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An empirical test of five prominent explanations for the black–white academic performance gap

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Abstract The viability of five prominent explanations for the black–white performance gap ("academic engagement," "cultural capital," "social capital," "school quality" and "biased treatment") is examined using NELS data and a LISREL model that adjusts for clustering of students within schools. Empirical models have typically assessed these factors *individually*—a practice that probably fosters overestimation of their explanatory power. School quality and biased treatment emerge as the primary explanations for black–white high school test performance differentials. Access to better-quality schools and receipt of more stimulating interpersonal "signals" from gatekeepers ensue from racial (and socioeconomic) privilege. Enhanced test performance in turn ensues from these resources. In essence, the explanations for the racial gap that place more emphasis on what black and white students "bring to" high school (i.e., specific levels of engagement, cultural and social capital), seem less consequential to performance differentials than "what happens to" them when they get there (i.e., quality of education provided, and race-contingent treatment received).

Keywords Black–white gap · School process · Teacher–student interaction · Race · Educational attainment process

The academic performance gap between black and white American students is a solidly documented social science pattern (Ferguson and Mehta 2004; Jencks and Phillips 1998). Few observers question either the significance of this gap, or the inadequacy as a comprehensive explanation of the still substantially inhibitive impact of blackness on socioeconomic well-being (Hacker 1992; Oliver and Shapiro 2006). Beyond this point, however, consensus fades—with explanations forging off in sometimes quite

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divergent directions. A shift from the dominant tendency of testing explanations for the gap *individually* (i.e., by examining only variables that evoke a specific hypothesis, while disregarding measures reflecting alternate theses), might facilitate resolution. Simultaneous assessment of multiple explanations diminishes the risk of over-stating the explanatory power of individual theses.

With this in mind, we assess in a single model the viability of five prominent explanations for the black–white performance gap. *Academic engagement* denotes exhibition of habits and values ostensibly congruent with good performance (Cook and Ludwig 1998; Downey and Ainsworth-Darnell 2002; Farkas et al. 2002; McWhorter 2000; Mickelson 1990; Ogbu 1991; Solorzano 1991; Winston et al. 1997).[1] *Cultural capital* denotes immersion in activities that facilitate disbursement of socially coveted "symbolic wealth" (Bourdieu 1973)—so-called "high-brow," "high-culture," or "high-status" activities (DiMaggio and Ostrower 1990; Kalmijn and Kraaykamp 1996; Roscigno and Ainsworth-Darnell 1999).

Social capital has been defined inconsistently, and at times, vaguely (Portes 2000). Clarifying the meaning of the concept, Portes delineates "individual" and "collective" versions. The former centers on individuals or small groups as the units of analysis, and stresses "benefits accruing to individuals or families" stemming from "their ties with others." These benefits accrue from powerful behavioral expectations and perceptions of mutual obligations that (purportedly) prevail. Collective social capital emphasizes attributes of and benefits accruing to *communities*, with a myriad of "civic spirit" indicators taking center-stage (Portes 2000, pp. 1–5). "Individual" social capital—which is more congruent with the foundational Pierre Bourdieu- (1980) and James Coleman (1988) formulations (Portes 2000)—is analyzed here. Differential access to individual social capital probably helps sustain the black–white gap (Smith-Maddox 1999; Thompson et al. 1988).

School quality-themed explanations emphasize blacks' and whites' dissimilar access to institutions that proficiently foster learning (Card and Krueger 1992; Ferguson 1998; Kozol 1992; Wenglingsky 1997). Finally, the *biased treatment* explanation accentuates the significance to the black–white performance gap of race-linked signals about ability and diligence that teachers and schools communicate to students—with varying degrees of subtlety (Alexander et al. 1987; Ehrenberg et al. 1995; Ferguson 2003; Jussim et al. 1996; Oakes 1982; Oates 2003).[2] As we expand upon later, the data analyzed here facilitate only a *partial* assessment of the "biased treatment" hypothesis—rendering possible a seemingly reasonable (albeit indirect) test for racial "bias," but restricting precise assessment of the *impact* of such bias.

[1] Various analogues for "academic engagement" appear in research addressing the concept's association to race: e.g., "oppositional culture" (Ogbu 1991), "anti-intellectualism" (McWhorter 2000), "cultural deficit" (Solorzano 1991), and "academic disidentification" (Winston et al. 1997).

[2] As with academic engagement, the race-"biased treatment" association has been examined under multiple labels: e.g., "teacher bias" (Farkas et al.), "bias in teachers' perceptions, expectations and behaviors" (Ferguson 2003), and "racial stereotype bias" (Jussim et al. 1996).

1 Academic engagement, cultural capital, social capital, school quality, and biased treatment as factors in the black–white achievement gap: surveying empirical evidence

The notion that blacks trail whites on these potential resources—whether indirectly because of the negative impact of blackness on socioeconomic status, or because of more "direct" effects of race—is contested quite vigorously in some instances. The strength of evidence affirming the link between these factors and academic performance also varies from factor to factor.

1.1 Academic engagement and the black–white gap

Whether blacks are fettered by problematic habits and attitudes is perhaps the most spiritedly contested of all issues surrounding the achievement gap. Qualitative observations of pre-college students by John Ogbu and colleagues (e.g., Ogbu 1991; Fordham and Ogbu 1986) are the most widely cited indications of blacks falling short in the engagement arena. Ogbu's "oppositional culture" hypothesis stresses the role of insufficient "effort in pursuit of schooling" among native-born blacks—a "by-product of. . . coping responses. . .developed. . .under subordination and exploitation" by whites (Ogbu 1991, p. 437). Within black peer groups, academic accomplishment is highly vulnerable to derision: equated with "acting white." McWhorter's (2000) lament of pestilential "anti-intellectualism" among black students, derived from his observations at a highly selective university, has also garnered significant attention.

As some well-placed recent work attests, however, qualitative investigations do not speak in unison on the question of black (dis)engagement. Horvat and Lewis (2003), reflecting on extended observations of students in two California high schools, characterize as "narrow" conceptualizations of the black peer group "as a homogenous collective. . . opposed to academic excellence." The black peer group is instead "multidimensional"—with the segments "applying negative peer pressure to those who excel academically" *coexisting* alongside those supporting "the academic excellence and college attendance of black adolescents" (p. 275). Tyson et al. (2005), who analyze open-ended questionnaire responses from a multi-racial North Carolina elementary/middle and high school sample, conclude that "the burden of acting white" is neither (as Ogbu and colleagues posit) a "major reason" for black under-performance nor "a key contributor" to the black–white achievement gap. Students of *all* racial and ethnic backgrounds "confront similar dilemmas of high achievement," and use similar strategies for addressing them (pp. 600–601).

"Quantitative" models utilizing structured surveys of representative samples generally belie the proposition of black student-disengagement (Ainsworth-Darnell and Downey 1998; Cook and Ludwig 1998; Downey and Ainsworth-Darnell 2002; Solorzano 1991; Winston et al. 1997). Typifying this research, Ainsworth-Darnell and Downey (1998, p. 551) conclude that "if anything, African-Americans maintain *more* pro-school values and are *more* likely to esteem their high-achieving peers than are whites." The "oppositional culture" thesis *does* however receive indirect support from

survey-based models taking into account observations of *teachers*. Ainsworth-Darnell and Downey themselves find that teachers of the same black students who report generally "pro-school" values characterize them as putting forth less effort and as more disruptive than white peers.

Furthermore, Farkas et al. (2002, p. 152), in a comment on Ainsworth-Darnell and Downey (1998) notable for its deviation from the typical oppositional culture-belying slant of quantitative investigations, contend emphatically that "it *is* a burden for African-American students"—undermined by an "oppositional peer group culture"—"to pursue academic excellence. . .particularly during the teenage years." In an equally spirited rejoinder, Downey and Ainsworth-Darnell (2002, p. 157) counter that the (NAEP) data analyzed in the Farkas–Lleras–Maczuga comment actually offer "*as much reason to argue for peer-group opposition for whites as for blacks*." Moreover, equations predicting academic performance indicate that racial differences in oppositional culture-related attitudes (such as they are), are "clearly" not germane to why whites outperform blacks.

Gripping as this Farkas–Lleras–Maczuga—Downey and Ainsworth-Darnell (2002) exchange on oppositional culture is, it bears emphasizing that neither contribution pursues the central objective of the present analyses—simultaneous examination of *multiple* prominent explanations for the black–white gap. Implicitly acknowledging the necessity for investigations in this mold, Downey and Ainsworth-Darnell contend that students' "…attitudes are not the sole or even the primary predictor of" black–white performance differences, and that "blacks are more often disadvantaged than whites in terms of other factors in the environment that influence behavioral outcomes" (p. 161).

There is immense support for the proposition that academic engagement elevates school performance (Ainsworth-Darnell and Downey 1998; Carbonaro 2005; Farkas et al. 2002; Downey and Ainsworth-Darnell 2002; Muller 1998). Whether this propitious effect holds up when other potential predictors of performance are factored in is an important question that is addressed here. On this score, Muller observes a salutary effect of students' expectations on high school completion and Math proficiency *net* of teachers' expectations and ability group level. Similarly, Carbonaro finds that students' "effort" elevates Math test performance net of track level.

1.2 Cultural capital and the black–white gap

Black students' lower access to cultural capital—whether operationalized as museum- or arts-exposure (e.g., DiMaggio and Ostrower 1990; Kalmijn and Kraaykamp 1996; Roscigno and Ainsworth-Darnell 1999; Orr 2003), or household educational resources (Teachman 1987; Roscigno and Ainsworth-Darnell 1999)—apparently stems indirectly from lower socioeconomic status rather than race-induced indifference. Epitomizing this research, DiMaggio and Ostrower (1990) conclude that black arts-participation is "remarkably similar" to whites' when socioeconomic differences are adjusted for. Similarly, Roscigno and Ainsworth-Darnell (1999) declare racial disparities in access to "high-brow" culture and household educational resources to be largely functions of the impact of race on socioeconomic privilege.

The positive effect of cultural capital on school performance that many observe (e.g., Kalmijn and Kraaykamp 1996; Orr 2003; Roscigno and Ainsworth-Darnell 1999; Roscigno et al. 2006) leaves open the possibility that it may be a factor in the black–white gap. The question of whether this significantly positive effect remains net of *several* other possible predictors of performance is, of course, a central focus here. On this score, findings from Roscigno and Ainsworth-Darnell (1999) may be telling. These models, decidedly rare for their inclusion of variables tapping multiple hypotheses, portray the impact of cultural capital as secondary to that of "teachers' evaluation and track placement." The primacy of the evaluative measures, combined with apparently race- and class-linked variation in the impact of cultural capital on performance, lead Roscigno and Ainsworth-Darnell to conclude that cultural capital exerts "only a small mediating role" in the black–white achievement gap.

1.3 Social capital and the black–white gap

Studies of scholastic performance that explicitly reference "social capital" typically assess some combination of the following: family structure (usually conformity to the nuclear ideal and/or number of siblings); parental involvement (in organizations at children's schools, monitoring of children's activities, and/or parent-child interaction regarding school); and closure of parental networks (defined typically as familiarity with children's friends' *parents*). This rubric signifies "individual" social capital (Israel et al. 2001; Morgan and Sorensen 1999; Portes 2000; Smith-Maddox 1999). The disproportionate presence of black children in single-parent households, a pattern explained substantially but not exhaustively by the race-socioeconomic status connection, is well known (Bumpass and McLanahan 1989). Race- and class-effects on other dimensions of individual social capital typically go unreported (presumably because a positive effect of racial and socioeconomic privilege on these factors is presupposed). Cook and Ludwig (1998) do gauge the impact of race on parental monitoring of children and participation in school-related activities, and find black parents to be "at least as involved" as similar-status whites. Roscigno et al. (2006) find that socioeconomic privilege boosts parental involvement.

A significant amount of research (overwhelmingly from models that do not integrate other potential predictors) suggests that social capital elevates academic achievement (Israel et al. 2001; Roscigno et al. 2006; Smith-Maddox 1999; White and Glick 2000).[3] That said, Portes (2000) and Morgan and Sorensen (1999) strike a cautionary tone regarding the "true" magnitude of this effect. Portes concludes that many of the "alleged benefits" of social capital may prove "spurious" when other factors are accounted for. Morgan and Sorensen, who examine why Catholic schools seemingly enhance learning, reject the "density of parental networks" thesis in favor of the proposition that these institutions provide more challenging curricula. They thus embrace implicitly the notion that "school quality" is more consequential to performance than social capital.

[3] In an intriguing exception to this pattern, Orr (2003) observes an *inhibitive* social capital-effect on test performance.

1.4 School quality and the black–white gap

White children's access to better schools is a firmly established pattern. Whites typically enjoy a substantial advantage over blacks with respect to factors such as per-pupil spending, teacher-salaries and credentials, and class size (Card and Krueger 1992; Ferguson 1998; Kozol 1992; Wenglingsky 1997). This advantage apparently extends to schools that *prioritize* learning—as signaled by the Lee–Bryk–Smith (1993, p. 226) characterization of the modern public high school as a "highly differentiated intellectual environment" where "both educational opportunities and outcomes" are "stratified by race and social class."

Schools that prioritize learning boast "strong leadership focused on academic outcomes; close monitoring of students' work; positive expectations by teachers for all students; a purposeful social environment or 'ethos'; and an orderly climate" (Lee and Bryk 1989, p. 73). Such schools instill in students "a sense of purpose" (Gamoran 1996). School quality-indicators generally enhance performance (Ferguson 1998; Downey et al. 2004; Gamoran 1996; Lee et al. 1993; Roscigno et al. 2006; Wenglingsky 1997), and critically, have apparently figured prominently in the historical reduction of the black–white achievement gap (Card and Krueger 1992; Ferguson 1998; Neisser 1998). Whether this mediating role persists when multiple "competing" explanatory factors are considered is a hitherto unaddressed question.

1.5 Biased treatment and the black–white gap

Assessments of the contentious question of whether blacks are harmed unduly by social psychological processes unfolding in schools typically center on teachers' perceptions and/or the practice of tracking (Alexander et al. 1987; Ehrenberg et al. 1995; Farkas et al. 1990; Hallinan 1996; Jussim et al. 1996; Oakes 1982; Roscigno and Ainsworth-Darnell 1999). Ronald Ferguson's (2003) review of research on teacher-perceptions yields substantial support for the notion of anti-black bias *when the* "*unconditional race neutrality*" standard is applied (i.e., when the impact of student's race on teacher's perceptions is considered *without* regard to other pertinent factors). Ferguson, however, portrays research applying the more appropriate "*race neutrality conditioned on observables*" standard (where pertinent factors such as prior grades and test scores are adjusted for) as less than dispositive.

Notably however, Ferguson's (2003) adjudication of the "bias in teachers' perceptions and expectations" question does not factor in the findings of either Alexander et al. (1987); Ehrenberg et al. (1995), or Muller (1998)—who do observe the conditioned race neutrality standard. Alexander, Entwisle, and Thompson find that negative expectations (and ultimately, depressed performance) ensue especially where "high social distance" separates teacher from student. The pairing of lower class black students with middle/upper class white teachers epitomizes this phenomenon. Ehrenberg, Goldhaber and Brewer report a salutary effect of the match of teacher's and student's race on "subjective evaluations" of black students. Muller reports a similar effect of socioeconomic status on teacher's expectations, implying an indirect inhibitive effect of blackness on this disposition.

These signs of anti-black teacher-perception bias in the Alexander-Entwisle-Thompson, Ehrenberg-Goldhaber-Brewer and Muller models are replicated in more recent investigations by Downey and Pribesh (2004) and Oates (2003). Net of a range of theoretically relevant predictors, teachers' perceptions of black students appear especially unfavorable in the racially "mismatched" (Downey and Pribesh) or "dissonant" (Oates) white teacher–black student contexts—precisely where black students are most likely to be located.[4]

Research on predictors of track placement, which Ferguson (1998) surveys, belies the proposition that the tracking process discriminates against blacks, per-se. There is some evidence of bias, however, favoring the *socioeconomically* privileged.

There is considerable indication that favorable teacher-perceptions and track placements elevate scholastic performance (Alexander et al. 1987; Carbonaro 2005; Ferguson 2003; Ferguson 1998; Jussim et al. 1996; Muller 1998; Oakes 1982; Oates 2003; Roscigno and Ainsworth-Darnell 1999). Furthermore, if (as findings by Jussim, Eccles, and Madon suggest) teacher-perceptions are more consequential to black than to white scholastic performance, anti-*black* (vis-à-vis white) teacher-perception bias may be particularly critical to race-based performance differentials. Regarding the important question of whether salutary teacher-perception- and track level-effects remain when variables tapping *other* hypotheses are adjusted for, the Roscigno and Ainsworth-Darnell analysis—which considers three of the five themes addressed here—suggests a "yes" response.

It bears emphasizing, however, that effects of teachers' perceptions and track assignments on performance are *not* completely equivalent to effects of "bias" in these arenas. For a significant number of students, specific teacher-perception and track levels are *not* "biased," but "*fair*": well-justified in light of "credentialing" factors (e.g., performance- and academic engagement-levels) they have exhibited to teachers and school officials (Ferguson 2003; Jussim et al. 1996; Oates 2003). This non-trivial "fairness" component in favorable teacher-perceptions and track assignments is likely an important force underlying their tendency to elevate student-performance. Observed teacher-perception- and track placement-effects on performance thus seemingly involve two not precisely quantifiable components: the aforementioned "fairness" element (essentially reflecting "validation" of justifiable perceptions and placements), and a "bias" element likely tied to *self-fulfilling prophesies*.

Oates' (2003) elaboration on how self-fulfilling prophesies mold effects of teacher-perceptions on performance seems readily applicable to track level-effects as well: "self-fulfilling prophecies occur when students perform in a manner that validates erroneous teacher-perceptions." Such perceptions "are 'erroneous' to the extent that they are not thoroughly justified by past performance and other relevant information" (and "'accurate' to the degree that they *are* justified by observable evidence"). "Self-fulfilling prophesies may occur, for example, if teachers are more pleasant to students whom they view favorably and provide them with more effective instruction, or if students (as a consequence of favorable/unfavorable teacher-perceptions) develop good/poor problem solving skills and work habits" (p. 510). The more

[4] Goldsmith's (2004) findings indicate that dissonant teacher–student combinations also augur unfavorably for the *academic engagement* and ultimately, performance of black and Latino(a) students.

challenging nature of higher track classwork also seems likely to enhance students' problem solving skills and work habits.

Given the potential for teacher-perception- and track level-effects on performance to comprise *both* "bias" and "fairness" components, their observed effects are better construed as "ceilings" of possible "bias"-effects—"*upper limits*" (versus precise indications) of the possible impact of "bias." The earlier caveat that these analyses do not permit precise estimation of the *impact* of bias on performance (though they facilitate a reasonable test for the *presence* of bias) reflects this constraint. That said, to the extent that equations predicting performance adjust adequately for factors that "justify" specific teacher-perceptions and track placements (e.g., students' prior performance and engagement) teacher-perception- and track level-effects on performance arguably capture the "bias" component moreso than the "fairness"/"validation" component. Such adjustments distinguish the present model.

2 Modelling the explanatory role of competing explanations for the black–white gap

A structural equation model addresses the central question at issue: the relative consequence to the black–white performance gap of academic engagement, cultural capital, social capital, school quality, and biased treatment. The assessment of (the viability of) these themes in a *single* model represents the primary distinguishing feature of the present research.

2.1 Data

Data are extracted from the National Educational Longitudinal Study (NELS) of 1988 (U.S. Department of Education, National Center for Education Statistics 1994), a nationally representative survey with student, parent, teacher, and principal/counselor components. The initial student component is a multi-stage cluster sample of 24,599 eighth graders. This analysis centers largely on the educational process unfolding between grades ten and twelve—i.e., the second (1990) and third (1992) waves of NELS. Estimates address the 8,047 black and white tenth and twelfth grade wave participants (766 black and 7,281 white) with standardized test information from all three waves, from schools where at least 3 students meet the test information criteria. Utilization of the "Multilevel Structural Equation Modeling" (MSEM) feature of LISREL8.5 (Jöreskog and Sörbom 2003)—which facilitates adjustment for the clustering of "lower" level sample elements within "higher" level elements (students within schools, in this instance)—necessitates the latter sample-restriction. Raw data are weighted to correct for differential probabilities of selection into the second wave.

2.2 Variables

The model includes both single-indicator and multi-indicator "latent" variables. Indicators of specific latent variables are chosen based on evidence obtained from prior

empirical analyses of the given concepts, and are combined via a process amounting to "confirmatory" factory analysis (see Jöreskog and Sörbom 1993, p. 22).

Race (blacks coded 1) reflects designations on the NELS' "composite" variable. *Socioeconomic status* is a latent variable tapped by baseyear parent-reported "yearly family income" ("none" = 1 … "$15,000–$19,999" = 8 . . . "$200,000 or more" = 15), and parent- or student- reported "highest level of education attained" by either of the student's parents (less than high school = 1, HS graduate/GED = 2, <4-year degree = 3, 4-year college graduate = 4, M.A/equivalent = 5, Ph.D., MD, or other = 6). NCES derives parental education primarily from parent-reports at wave one, but substitutes student-reports in their absence.

Academic engagement indexes six indicators, based on student-reports at grade ten, that signal belief in the value of education, and dedication to scholastic success (see Ainsworth-Darnell and Downey 1998; Cook and Ludwig 1998; Mickelson 1990). The first four are Likert-scaled items gauging perceptions of (1) the importance of "good grades" (not important = 1, somewhat important = 2, important = 3, very important = 4); (2) whether "education is important to getting a good job later on" (strongly disagree = 1, disagree = 2, agree = 3, strongly agree = 4); and whether (3) it is (*not*) o.k. to "skip school" all day, or (4) "cut a couple" classes" (1 = often, 2 = sometimes, 3 = rarely, 4 = never). Educational expectations (5) is an NCES-constructed variable denoting "how far in school" the student expects to get (1 = less than high school graduation, 2 = high school graduation only, 3 = <2 years of trade school, 4 = 2 or + years of trade school, 5 = <2 years of college, 6 = 2 or > years of college, 7 = 4-year college, 8 = Masters degree or equivalent, 9 = Ph.D. or M.D).[5] Homework (6) denotes the actual number of hours weekly (range = 0 to 14) spent doing homework "in" and "out of" school. There is substantial convergence between these six indicators of academic engagement and those examined by Ainsworth-Darnell and Downey (1998); Cook and Ludwig (1998) and Mickelson (1990) in their detailed discussions of approaches to operationalizing the concept.

Cultural capital combines three baseyear parent-report-derived indicators reflecting the dimensions of the concept emphasized in prior work (DiMaggio and Ostrower 1990; Kalmijn and Kraaykamp 1996; Roscigno and Ainsworth-Darnell 1999; Teachman 1987): museum exposure, extracurricular cultural classes, and household educational resources. The museum and cultural classes indicators represent the sum across dichotomously coded ("yes" = 1, "no" = 0) art, science, and history museum; and art, dance, and music class items respectively. Household educational resources reflects the sum across the following items either present in (coded 1) or absent from (coded 0) students' homes: a specific place for study, daily newspaper, magazine subscription, encyclopedia, atlas, dictionary, typewriter, computer, pocket calculator, and more than 50 books.

The latent *social capital* measure groups three indicators that collectively, evoke the pre-eminent parental "network closure," parental school involvement, and parental nurturing dimensions of individual social capital (Israel et al. 2001; Orr 2003; Portes 2000): Number of the student's closest friends' *parents* the interviewed parent knows

[5] Cook and Ludwig (1998, p. 382) argue compellingly that anticipation of substantial education is incongruous with disengagement.

(1); a "parental PTA involvement" index; and a "parental nurturing" index (3). All three social capital indicators reflect baseyear parent-reports. Items comprising the parental PTA involvement and nurturing indexes are first multiplied by their standardized LISREL loadings (obtained from separate measurement models including items tapping the respective indexes), and then summed. PTA involvement combines dichotomously coded ("yes" = 1, "no" = 0) attendance at PTA meetings (loading = .620), and participation in other PTA-related activities (loading = .756). Parental nurturing combines regularity of parent-child conversations (1 = "not at all," 2 = "rarely," 3 = "occasionally," 4 = "regularly") regarding school experiences (loading = .493), high school plans (loading = .778), *post*-high school plans (loading = .754), and parent's expectations regarding child's ultimate educational accomplishment (1 = "less than high school diploma," 2 = GED, 3 = high school graduation, 4 = <1 year of vocational/trade/commercial school, 5 = 1–2 years of vocational/trade/commercial school, 6 = 2 or > years of vocational/trade/commercial school, 7 = <2 years college, 8 = 2 or > years college, 9 = 2 year college diploma, 10 = 4 year college diploma, 11 = Masters or equivalent, 12 = PhD/MD, etc./ loading = .285).[6]

School quality combines five indicators derived from grade ten principal-/councilor-reports: (1) number of "advanced placement" course offerings; (2) percentage of tenth grade students in "college prep., academic, or specialized" programs; (3) percentage of preceding academic year-graduates enrolled at four year colleges; characterization of the school as one where (4) "students are expected to do homework," and where (5) "students place a high priority on learning." A five-category Likert scale (1 = "not accurate at all"… 3 = "somewhat accurate"… 5 = "very accurate") accompanies the latter two indicators. Collectively, these items tap features portrayed by previous investigations (e.g., Ferguson 1998; Lee and Bryk 1989; Gamoran 1996; Roscigno et al. 2006; Wenglingsky 1997) as essential to "quality": i.e., adequacy of critical resources, suitability of social climate, and (perhaps most critically) emphasis on learning and academic rigor.[7]

[6] An earlier iteration the social capital measuring model included two additional indicators—i.e. number of siblings (0 = none … 6 = "6 or more") and nuclear family background (1 = "student lives with both parents")—that tap the "family composition" aspect of social capital that some models have incorporated (e.g., Israel et al. 2001; Portes 2000; Smith-Maddox 1999; Thompson et al. 1988; White and Glick 2000). Strikingly low LISREL factor loadings (−.222 for the siblings item and .246 for the nuclear family item) explain their exclusion from the present index. Omission of these two family composition items does not significantly alter the model's findings.

[7] Two additional grade ten-gauged items that evoke the "resource adequacy" and "suitability of social climate themes" in particular, i.e., class size and proximity to turmoil, were excluded from the school quality measure presented here because of exceptionally low factor loadings (−.271 for class size, and −.175 for the turmoil item). Class size is the quotient of (principal- /councilor-reported) "total student enrollment" and "number of full time regular teachers." Proximity to turmoil denotes the sum across teacher-assessments of how much each of the following problems confronts the school (1 = "not a problem," 2 = "minor problem," 3 = "moderate problem," 4 = "serious problem"): "absenteeism," "class-cutting," physical conflicts," "gang activities," "robbery/theft," "vandalism," "alcohol" usage, "illegal drugs" usage, and "possession of weapons." Safe, orderly environments, where discipline problems are minimal, constitute a "necessary condition" for the routine pursuit of academic work (Lee and Bryk 1989). Incorporation of these two items does not significantly alter observed effects of school quality on performance. There is a noteworthy (if ultimately modest) consequence, revealed later in the "results" section, for the observed effect of race on school quality (see footnote 11).

Biased treatment, apropos teachers' perceptions and track assignments, is gauged by applying the "race neutrality conditioned on observables" standard articulated by Ferguson (2003). Specifically, anti-black/white "bias" is presumed to the extent that being black/white depresses teachers-perceptions and track assignments *net* of students' prior test performance, prior grades, and contemporaneous academic engagement. This specification taps the previously-discussed issue of "error" (vs. "accuracy") in teacher-perceptions and track assignments. *Favorable teacher-perception* indexes teachers' appraisals of reference-students on frequency of homework completion, absenteeism, tardiness, attentiveness, disruptiveness, and working "hard for good grades" ("never" = 1, "rarely" = 2, "some of the time" = 3, "most of the time" = 4, "all of the time" = 5); along with whether reference-students will "probably go to college" ("no" = 1, "don't know" = 2, "yes" = 3). These appraisals come from tenth grade English, History/Social Studies, Mathematics, or Science teachers.[8] Assessments of students' diligence and scholastic potential typically take center stage in "teacher perception" research (e.g., Downey and Pribesh 2004; Ehrenberg et al. 1995; Jussim et al. 1996; Oakes 1982; Oates 2003).

High track level distinguishes between (transcript-indicated) enrollment in academic, advanced or honors programs (coded 1), and other high school programs (0). The non-trivial potential for students to change tracks during school years, and for *student*-preferences to influence track placements (notwithstanding the dominant role of school personnel), do bear mentioning (Hallinan 1996). These factors likely attenuate both the probability of racial bias in track assignments, and the impact of track level on subsequent achievement.

Standardized test performance at the twelfth grade—the average of Item Response Theory (IRT) test scores in Reading, Mathematics, History/Citizenship/Geography, and Science—is the outcome of ultimate interest. Test score differentials are the most consequential aspect of the black–white scholastic performance gap (Jencks and Phillips 1998; Neisser 1998). Moreover, test performance has become an increasingly prominent concern of education policy-initiatives in recent decades. Earlier (eighth/tenth grade) standardized test performance and *grades (GPA)* figure among the predictors of twelfth grade test performance (and of mediating variables). Eighth grade GPA is a NELS-coded composite. Tenth grade GPA is the mean of student-reported Mathematics, English, History, and Science grades (1 = "mostly below D"… 8 = "mostly As").[9]

Private school (private/religious institutions coded 1) and *gender* (females coded 1) are the other variables assessed. Private schools (particularly Catholic-run ones) appear significantly more effective at fostering learning (Lee et al. 1993; Morgan and Sorensen 1999). Female students typically seem more engaged, and receive better teacher-appraisals and grades (Buchmann and DiPrete 2006; Muller 1998).

[8] The first sequentially occurring teacher-assessment is used where two are available. Use of second sequentially occurring assessments does not alter findings significantly.

[9] History/Citizenship/Geography IRT scores are not included at the eighth grade wave; and there is no NCES-constructed tenth grade GPA measure.

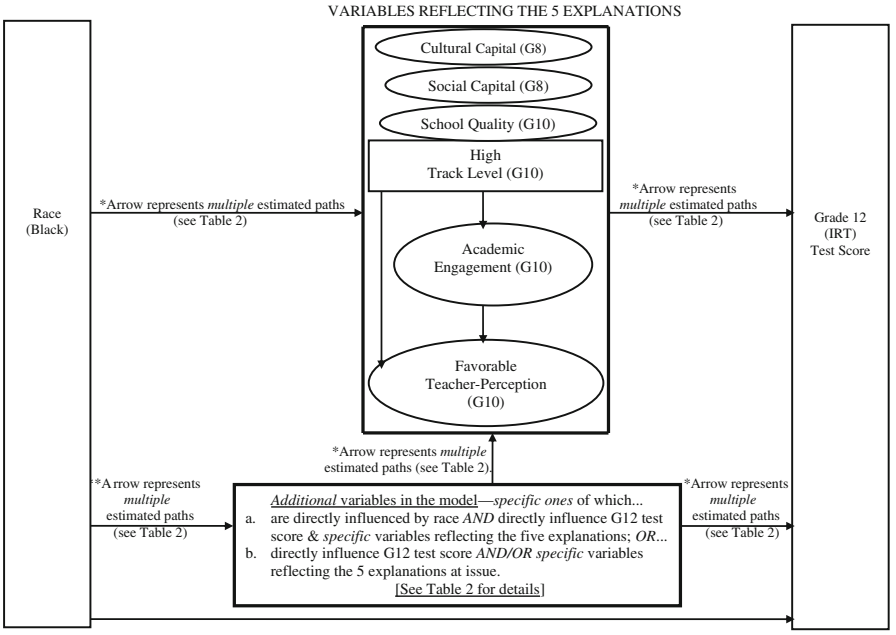

Fig. 1 Baseline conceptual model assessing the relative impact of prominent explanations for the black–white performance gap

2.3 The model

Figure 1 depicts core elements of the baseline model formulated to assess the viability of the five hypotheses at issue. Arrows in the diagram signify direct causal effects, or *groups* of such "paths," that are estimated (or "freed"). Essentially, race is presumed to exert both direct and *in*direct effects on twelfth-grade test score, the ultimate dependent variable. Variables reflecting the five explanations "mediate" the causal relationship between race and twelfth grade-test score: All are modeled as direct functions of race, and as direct predictors of grade twelve performance. Causal relationships are also specified *among* variables reflecting the five themes in the instances where such effects are manifestly warranted. Thus there are "paths" from track level to academic engagement and to favorable teacher-perception, and from academic engagement to favorable teacher-perception. Track level and academic engagement therefore potentially exert indirect effects on grade twelve test score (atop their possible direct effects).

As Fig. 1 reveals, the model also incorporates a number of "additional variables" which, while not indicators of the five central hypotheses, facilitate a more comprehensive and exacting assessment of their relevance to the black–white performance gap. Included among these additional variables—which exert either "mediating" ("endogenous") or "control variable" ("exogenous") roles in the analyses—are socioeconomic background, gender, standardized test and GPA performance at pre-twelfth-grade waves, and private school status. All are described in the preceding "variables" section.

The need to minimize clutter precludes the diagramming in Fig. 1 of individual causal effects involving these additional variables; but direct and total causal effects in which they (and the model's other variables) factor are *all* presented in Table 2. Correlations are permitted among all variables in the model (instead of a possible configuration where some are fixed a priori at zero). Possible direct effects in the model that are *not* estimated are discussed at some length later. The model's structural equation and latent variable components are estimated by LISREL8.5, with estimates based on raw data generated by PRELIS8.5 (Jöreskog and Sörbom 2003). Factor loadings for indicators of latent variables, along with descriptive statistics for all indicators utilized, are presented in Table 1.

Table 1 Completely standardized LISREL factor loadings [a] and descriptive statistics for observed variables used in analyses

Variable	LISREL loading	Mean	Standard deviation
Race (Black = 1)	1.000	.095	.293
Gender (Female = 1)	1.000	.505	.500
Socioeconomic background			
Family income	.587	10.220	2.300
Educational level of parent (with higher educ. level)	.641	3.300	1.210
Academic engagement…			
Importance of good grades	.625	3.596	.578
Importance of education for getting good job	.412	3.629	.562
NOT o.k. to…			
Skip school…	.468	3.465	.725
Cut a couple of classes	.487	3.500	.721
#Hours per-week spent doing homework	.329	4.703	2.579
Educational expectations	.527	6.558	1.941
Cultural capital…			
Student visits (Art/Science/History) museums	.562	1.482	1.240
Student takes (Art /Music/Dance) classes	.406	.563	.781
Total# of educational resources in student's home	.305	7.605	1.845
Social capital			
# of student's closest friends' *parents* known to parent	.416	3.269	1.360
Parental PTA involvement	.404	.452	.563
Parental nurturing	.432	9.500	1.411
School quality			
# of advanced placement courses offered	.317	4.924	5.642
% of 10th grade students in college prep., academic, or specialized programs	.816	54.460	26.713
% of graduates in 4-year college	.911	47.852	23.221
Students expected to do homework	.480	4.231	.730

Table 1 Continued

Variable	LISREL loading	Mean	Standard deviation
Students place high priority on learning	.584	3.896	.766
Favorable teacher-perception			
(Teacher believes student…) works hard for good grades	.728	2.351	.919
…regularly completes homework	.819	4.074	.914
…is regularly absent	−.399	2.165	.624
…tardy	−.457	1.538	.709
…attentive	.787	3.949	.820
…disruptive	−.519	1.606	.827
Teacher's expectations (re: student's education)	.536	2.380	.843
High track level (academic, advanced or honors = 1)	1.000	.591	.492
12th grade (IRT Standardized) test score (Avg. of Reading, Math, Science, Hist./Ctznshp/Geog)	1.000	36.298	8.041
10th grade (IRT Standardized) test score (Avg. of Reading, Math, Science, Hist./Ctznshp/Geog)	1.000	33.484	7.716
8th grade GPA (IRT Standardized) test score (Avg. of Reading, Math, Science,)	1.000	29.448	6.548
10th grade GPA (Avg. of student-reported Math, English, History, & Science grades)	1.000	29.448	6.548
8th grade GPA (NELS-calculated composite)	1.000	3.126	.686
Private School	1.000	.136	.343
White teacher (used in supplementary analyses)	1.000	.922	.268
Black teacher (used in supplementary analyses)	1.000	.035	.183

[a] Loadings of all indicators of latent variables are statistically significant ($p < .001$)

As indicated previously, LISREL's Multilevel Structural Equation Modeling feature adjusts for the clustering of students within schools. The combination of the MSEM feature's sensitivity and the model's complexity necessitated estimation of the measurement and structural components in *separate* stages—with loadings of latent variable indicators "fixed" during the structural equation stage at levels obtained during the measurement/confirmatory factor analysis stage. To forestall scenarios of cases (students) within clusters (schools) being insufficient to permit estimation of specific model-components, missing values on observed indicators are imputed using the "multiple imputation" facility of PRELIS8.5. This facility substitutes simulated values that reflect (within-case) patterns occurring across other variables with non-missing data. It bears emphasizing that given the criteria for selecting the sample, *none* of the values on the main independent or dependent variables (i.e., race and twelfth grade test score), or specific important control variables (eighth and tenth grade test score) is simulated. Furthermore, to minimize inflation of correlations between mediating variables and the main independent and dependent variables (which would boost "artificially" the probability of obtaining significant paths), the main independent and dependent variables are *excluded* from the pool of indicators factored in during the simulation

Table 2 Completely standardized direct (upper cells) and total (lower cells) causal effects from model assessing prominent explanations for the black–white gap:NELS data

		Dependent variables								
		SES background	Grade 8 test score	Cultur. capital	Social capital	School quality	(High) track	Acad. engagement	Teachr perception	Grade 12 test score
Race (Black)	Direct	−.238**	−.083**	−.014	.147**	−.018	.017	.133**	−.051**	−.032**
	Total	−.238**	−.183**	−.182**	−.039^{+}	−.069**	−.053**	.073**	−.048**	−.055**
SES Background	Direct	–	.418**	.823**	.784**	.214**	.115**	.182**	.009	.083*
	Total	–	.418**	.823**	.784**	.214**	.213**	.225**	.151**	.067**
Gender (Female)	Direct	–	–	–	–	–	–	.138**	.110**	–
	Total	–	–	–	–	–	–	.138**	.163**	.007**
Grade 8 test score	Direct	–	–	–	–	–	.233**	.075**	.117**	–
	Total	–	–	–	–	–	.233**	.087**	–	.012**
Grade 10 test score	Direct	–	–	–	–	–	–	–	–	.784**
	Total	–	–	–	–	–	–	–	–	.784**
Grade 8 GPA	Direct	–	–	–	–	–	.145**	.403**	.193**	–
	Total	–	–	–	–	–	.232**	.087**	.158**	.021**
Grade 10 GPA	Direct	–	–	–	–	–	–	–	–	.061**
	Total	–	–	–	–	–	–	–	–	.061**
Private school	Direct	–	–	–	–	.088**	–	–	–	.106**
	Total	–	–	–	–	.088**	–	–	–	.109**
Cultural capital	Direct	–	–	–	–	–	–	–	–	.009
	Total	–	–	–	–	–	–	–	–	.009
Social capital	Direct	–	–	–	–	–	–	–	–	−.057**
	Total	–	–	–	–	–	–	–	–	−.057**

Table 2 Continued

		Dependent variables								
		SES background	Grade 8 test score	Cultur. capital	Social capital	School quality	(High) track	Acad. engagement	Teachr perception	Grade 12 test score
(High) track	Direct	–	–	–	–	–	–	.053**	.031**	.027**
	Total	–	–	–	–	–	–	.053**	.051**	.029**
Academ. engagement	Direct	–	–	–	–	–	–	–	.386**	.015^{+}
	Total	–	–	–	–	–	–	–	.386**	.026**
Teacher-perceptn.	Direct	–	–	–	–	–	–	–	–	.029**
	Total	–	–	–	–	–	–	–	–	.029**
School quality	Direct	–	–	–	–	–	–	–	–	.031**
	Total	–	–	–	–	–	–	–	–	.031**

Dashes ("–") signify direct effects that are not estimated, or total effects that are inapplicable (given the causal sequencing of variables in the model)
* $p < .01$, ** $p < .001$, $^{+}$ $p < .05$

process. The model is an all-"level one" setup (in multilevel modeling parlance) that specifically addresses variations among *students*.

As outlined in Fig. 1 (and elucidated in Table 2), good use is made of NELS' longitudinal feature. For example, academic engagement, school quality, teacher-perceptions, and advanced track level, all gauged at grade ten, are specified as direct functions of prior performance (eighth grade GPA and test score). Similarly, twelfth grade test performance is deemed a direct function of test performance, grades, academic engagement, school quality, social and cultural capital, and teacher-perceptions—all measured at immediately preceding waves with available data for the given variable. Where theoretically justifiable, direct causal relationships are specified between some variables measured contemporaneously. Within this category lie (a) the aforementioned effects of tenth grade track level and academic engagement on same-year teacher-perception, and track level on academic engagement, and (b) the effects of socioeconomic background, measured at grade eight, on same-wave-assessed cultural and social capital.

To keep the model manageable, a number of additional causal paths that could plausibly be specified are not. Neither race nor socioeconomic status, for example, is allowed to influence eighth grade GPA or private school enrollment; and tenth grade test performance is (like eighth grade GPA and private school enrollment) modeled as an *ex*ogenous variable—not influenced, for example, by likely direct predictors such as race, socioeconomic background, or eighth grade performance. The model also does not adjust for possible period-specific variation in the mediating role of each concept. Thus if the impact of a given factor on performance (or the effect of race on the same factor) reaches its apex or nadir prior to the period that is assessed, such variation is missed.

Characterized precisely, the model gauges how academic engagement, cultural and social capital, school quality, teacher-perceptions and track level mediate *changes* in blacks' and whites' test performance between grades ten and twelve. The presence of a control for the "stability" in standardized test performance during that period (i.e. a path from tenth to twelfth grade test performance) renders this test of the explanatory power of these mediating resources appropriately rigorous.[10]

3 Results

Determining whether academic engagement, cultural and social capital, school quality, teacher-perceptions and track assignments explain black under-performance necessitates a two-step process: assessing whether (a) blacks *actually* fall short of whites on each purported resource, and (b) whether each resource on which blacks trail whites *facilitates* performance, net of controls for other relevant factors. Table 2 reveals indicators of school quality, teachers' perceptions, and track placement to be the only ones that satisfy *both* of these conditions. Coefficients in Table 2 are completely

[10] The stability in test performance is gauged between the *tenth* and twelfth grade waves, rather than between the *eighth* and twelfth grade waves, because of the closer proximity of the tenth grade measure to the performance outcome. This specification enhances the rigor of the "test."

standardized direct and total causal effects of independent variables (which occupy rows) on dependent variables (which occupy columns). Total causal effects represent the sum of direct and *in*direct effects—which are not presented in the table. In instances where direct and total causal effects in Table 2 are identical, indirect effects amount to zero. Given that the coefficients are fully standardized, they denote the level of increase/decline in each dependent variable resulting from increases in specific independent variables (standard deviation proportions being the metric for both sets of changes).

3.1 Effects of race on mediating variables

Obtained effects of race on mediating variables comport with all but one of the five assessed explanations for the black–white performance gap—academic engagement being the exception. Being black significantly inhibits access to cultural capital (the total causal effect of −.182 being significant at the .001 probability level). As observed by others (e.g., DiMaggio and Ostrower 1990; Roscigno and Ainsworth-Darnell 1999), this pattern seems almost entirely attributable to black–white differences in socioeconomic standing. Blackness reduces significantly a student's likelihood of being from a privileged background (coefficient = −.238**); and this asset elevates cultural capital quite substantially (.823**). This pronounced *in*direct effect of blackness on cultural capital via socioeconomic background (a statistically significant −.195** coefficient that is not presented Table 2), easily eclipses the trivial direct effect (−.014).

In the case of the similarly thesis-affirming disadvantages that are evident among blacks with respect to social capital and quality schooling, the mediating role of socioeconomic background again proves decisive. The substantially negative *in*direct effect of race (black) on social capital—the product of the inhibitive impact of blackness on socioeconomic background (−.238**) and the latter's considerably favorable impact on social capital (.823**)—far outstrips the positive direct effect (.147**). The total causal effect of blackness on social capital is thus significantly negative (−.039^{+} in Table 2). Regarding school quality, the significantly negative total effect of blackness (−.069**) exceeds the direct effect (a non-significant −.018) quite noticeably.[11] The difference between these two coefficients (i.e., the indirect effect) is the product of the direct effect of blackness on socioeconomic background (−.238**) and the appreciable direct impact of socioeconomic background on school quality (.214**). Essentially then, disadvantages among blacks (vis-à-vis whites) with respect to cultural capital, social capital, and quality schooling appear primarily attributable to their lower socioeconomic status. Phrased in structural equation modeling parlance, socioeconomic status significantly "mediates" the relationship between race and these three potential resources. This pattern squares very closely with findings obtained previously (e.g., Card and Krueger 1992; Cook and Ludwig 1998; Ferguson 1998; Wenglingsky 1997).

[11] The *direct* impact of race (black) on school quality rises to a statistically significant level (−.40**) when the class size and "turmoil" items referenced in footnote 7 are incorporated into the school quality index.

Findings in Table 2 also indicate that blacks—atop lesser access than whites to cultural capital, social capital, and quality schooling (given the *total* effects of race)—confront relatively unfavorable teacher-perceptions and track placements. However, application of the "conditioned race neutrality" standard (Ferguson 2003) dictates that anti-black "bias" be inferred for teacher-perceptions only (and not track placements). *Net* of the predictably significant positive direct effects of prior test performance (.117**) and grades (.193**), contemporaneous track level (.030**) and academic engagement (.385**), black (vs. white) student-status *directly* suppresses teacher-perceptions (−.051** in Table 2). The significance of this direct race effect belies the notion of complete "race neutrality" in teachers' perceptions, since a range of factors that "justify" specific teacher-perceptions are controlled for. By contrast, the direct effect of blackness on track placement is neither negative nor statistically significant (.017)—contradicting the idea that blackness per se induces track level-disadvantages.

Notably, "bias" in track assignments does seem dictated by *socioeconomic* privilege. Socioeconomic background directly elevates track level (.115**), notwithstanding the presence of statistical controls for direct effects of prior test performance (.233**) and grades (.145**). The (significantly positive) total causal effect of socioeconomic background on track level is even more pronounced than the direct effect (i.e., .213**). Notably—and mirroring the case of cultural and social capital—socioeconomic background proves a significant mechanism through which race (indirectly) influences track placement. The significance of the negative *total* causal effect of blackness on track level (−.053**) is largely attributable the combination of the negative impact of blackness on socioeconomic background (−.238**), and the positive impact of background on track level. The (not-displayed) indirect effect of blackness on track level is significantly negative (−.070**). Overall, the pattern of race- and class-effects on teacher-perceptions and track assignments are highly congruent with findings reported previously (Alexander et al. 1987; Downey and Pribesh 2004; Ehrenberg et al. 1995; Ferguson 1998; Oates 2003).

Supplementary analyses aimed at explaining the signs (in Table 2) of moderate anti-black bias in teacher-perceptions yield further consistency with previously reported findings. As detected in samples spanning the spectrum of pre-school- through high school-ages (Alexander et al. 1987; Downey and Pribesh 2004; Ehrenberg et al. 1995; Oates 2003) racially incongruous teacher–student pairings seem to bode particularly inauspiciously for appraisals of black students. Re-estimation of the teacher-perceptions equation—separately for each race, with dichotomous teacher-race items replacing the student-race dichotomous measure among predictor variables—yields a borderline-significant *negative* white teacher effect (coefficient = −.067, significance level = .10) on teacher-perceptions among black students. By contrast, the "consonant" black teacher effect on perceptions of black students is non-significantly positive (.051). Among *white* students, the implications of racial congruity for teacher-perceptions appear inconsequential: The "dissonant" black teacher effect (.006) and "consonant" white teacher effect (.007) on teacher-perceptions both approach zero.[12]

[12] Within both sub-samples, effects of the black and white teacher dichotomies are estimated in separate models. The magnitude and significance levels of these coefficients parallel closely those obtained by

Consistent with typical patterns in models utilizing structured surveys of probability samples (e.g., Ainsworth-Darnell and Downey 1998; Cook and Ludwig 1998; Solorzano 1991; Winston et al. 1997) coefficients in Table 2 suggest no academic engagement deficits among blacks. The direct and (less pertinently) total causal effects of blackness on engagement are actually *positive* (.133** and .073** respectively). The nature of these coefficients is sufficient to disqualify academic (dis)engagement as central to the explanation of black under-performance here (bearing in mind the "two-step" process articulated at the outset of this segment). The significantly negative *in*direct effect of blackness on engagement (which accounts for the total causal effect being noticeably smaller than the direct effect) is primarily attributable to the tendency for *socioeconomic* privilege (which being black inhibits) to elevate engagement. These positive direct and total effects of SES on engagement are .182** and .225** respectively.

Importantly, the absence of signs of black disengagement is apparently not an artifact of exclusive reliance on *student*-reports in the coding of academic engagement. Inclusion of the seven "teacher-perception" indicators alongside the six student-reported items in a re-constituted engagement index does not transform either the direct or (less critically) total effects of blackness to significantly negative coefficients that would constitute support for the engagement thesis. Direct and total causal effects of blackness remain to non-negative (the direct effect being .022 and significant at the .05 level, and the total effect, a non-significant .000).[13] The non-trivial validity-related challenges associated with use of teacher-appraisals as indicators of students' academic engagement explain their exclusion from the baseline model's engagement measure. As Carbonaro (2005) notes, teachers' appraisals of students' academic engagement may be confounded significantly by students' performance: "… Teachers may believe that high achieving students are diligent and attentive. . .while low- achieving students are. . .not; if teachers assess effort accordingly, then the relationship between effort and achievement may be biased because of measurement error" (p. 43).

3.2 Effects of mediating variables on test performance

Findings reviewed to this point sustain the viability of the cultural capital, social capital, school quality and biased treatment perspectives. Effects of race on pertinent mediating variables concur with presumptions of each of these perspectives (with signs of anti-*black* "bias" restricted to teacher-perceptions, rather than the tracking

Footnote 12 continued
Oates (2003), who analyzes the same NELS data and actually obtains a *fully* significant white teacher-effect on perceptions of black students (coefficient = −.062/significance level = .05). Discrepancies (such as they are) may reflect the adjustment here for clustering of students within schools.

[13] Item-loadings for this re-constituted index are as follows: (*student*-reported) educational expectations = .400, homework hours = .239, importance of education = .272, good grades = .419, inappropriateness of cutting classes = .293, skipping school = .246; (*teacher*-reported) homework dedication = .805, tardiness = −.464, attentiveness = .772, disruptiveness = −.518, absenteeism = .407, working hard for good grades = .725, educational expectations = .588. All loadings are statistically significant (at the .001 level).

process, in the case of the biased treatment thesis). The lack of signs of black disengagement—a pattern that proves insensitive to alternate operationalizations of the concept—undermines the viability of the academic engagement thesis. The focus now shifts to assessing which resources actually facilitate performance: the second step involved in adjudicating which factors are significant (or possible) mediators of the black–white achievement gap.[14] Relevant coefficients are the ones in Table 2 denoting effects of independent variables on twelfth grade test performance (i.e., the extreme right-hand column).

Of the perspectives that remain viable to this point—i.e., cultural capital, social capital, biased treatment, and school quality—only the latter two continue to be sustained. Quality schooling, to which blackness ultimately restricts access, significantly (if modestly) elevates test performance (.031** in Table 2). School quality-differentials thus emerge as a central part of the black–white performance gap puzzle. Favorable teacher-perceptions, less likely to typify the *black* student-reality, also enhance subsequent test performance (.029**). It bears reiterating that this impact of teacher-perceptions on test performance represents the *ceiling* of any "bias"-effect in this arena—since some (undeterminable) component of the coefficient reflects the impact of perceptions obtained race-"neutrally." High track placements, an arena where *class*-(vs. race-) related bias apparently operates, also boosts test performance (direct and total effects being .027** and .029** respectively).

Neither cultural (.005) nor social capital (−.057**) significantly *elevates* test performance in this setup that represents the most rigorous assessment to date of their pertinence to the black–white gap. The Roscigno and Ainsworth-Darnell (1999) speculation that other factors eclipse cultural capital in facilitating performance is thus supported, as is the similar Portes (2000) hypothesis regarding the impact of social capital. Both "paths," however, may be affected by multicollinearity associated with the role of socioeconomic background. Socioeconomic background is by far the strongest correlate of both cultural and social capital (correlations of .819 and .749 respectively). With its significant direct effect on twelfth-grade test performance (.083** in Table 2) removed, the impact of cultural capital becomes significantly positive (.062**), while the curiously *inhibitive* impact of social capital shrinks into non-significant territory (−.023 /"t"-value = 1.58).[15] This social capital-effect on test performance becomes significantly *positive* (.035**) when the impact of *cultural* capital (which has a hefty .601 correlation with social capital) is also excluded.

The thesis-affirming indication that academic engagement facilitates test accomplishment (the statistically significant direct and total causal effects in Table 2 being

[14] The "possible" reference evokes the biased treatment thesis specifically. As acknowledged earlier, the data do not facilitate precise estimation of the *impact* of "bias" on performance.

[15] This lone eyebrow-raising effect aside, the remaining coefficients in Table 2 *all* seem intuitively plausible—the model's elaborateness notwithstanding. Orr (2003) explanation for the negative impact of social capital on performance that she also observes—i.e., enhanced parental involvement linked to children's schoolwork difficulties—is less directly applicable here. The samples differ (Orr's comprising *pre*-high school students), as does the coding of social capital (Orr's reflecting parental assistance of children with schoolwork). A substantive explanation for the *present* negative effect might emphasize the possibility of students with relatively poor performance histories being focal points of extra parental nurturing, monitoring/network closure, and PTA involvement.

.015+ and .026** respectively), is also noteworthy. Had blacks been revealed to be relatively *dis*engaged, this positive impact of engagement on test performance suggests they would indeed pay a penalty—albeit of apparently modest magnitude.

4 Discussion

Of the five prominent explanations for the black–white performance gap that are examined here simultaneously, those more evocative of what students "bring to" high school (i.e., specific levels of academic engagement, cultural and social capital) appear less consequential to the racial gap than those more focused on what "happens to" them when they get there (i.e., the quality of education provided, and race-contingent treatment they receive).[16] The reliance on a nationally representative sample, substantial integration of the survey's longitudinal design, inclusion of controls for an array of theoretically important variables, and congruence between the findings and a wealth of prior research all enhance confidence in this indication of *at*-school occurrences being pre-eminent. The primacy of explanations emphasizing at-school processes affirms the presumption implicit in parents' decision to enroll their children, and in policymakers' decision to commit resources: What happens at school matters decisively *regardless of* what attributes signifying student-preparedness might be. Schools are, after all, our "major instrument of public policy affecting the functional competence of adults" (Hauser 1995, p. 151).

The viability of the distinction between "at-school" occurrences and attributes "brought to" school hinges admittedly on *thoroughness* of attention to possible causal relationships among "indicators" of each category. The baseline model does acknowledge this consideration insofar as it includes, for example, a direct effect of academic engagement (seemingly more of an attribute "brought to" school) on teacher-perceptions (more evocative of "at-school" experiences). However, if the specified direct effects of variables reflecting attributes "brought to" school on those unfolding primarily "at school" were fewer in number than "warranted," then the "true" explanatory role of variables reflecting the former category might be understated. Similarly, if the baseline model included fewer paths from indicators of "at school" occurrences to those reflecting attributes "brought to" school, then "true" explanatory role of "at school" occurrences might be downplayed.

To test this proposition, the baseline model featured in Fig. 1 and Table 2 was expanded to incorporate those additional direct causal relationships (among indicators of "at school" and "brought-to-school" phenomena) that seem theoretically viable. Symbolizing direct effects of "brought-to-school" phenomena on those unfolding primarily "at school" are paths from cultural and social capital to favorable teacher-perceptions. As might be recalled from Table 2, blackness ultimately suppresses access to cultural and social capital (the total effects being negative). A finding that either

[16] The specific reference to "the five prominent explanations" is an important qualifier, given the presence of socioeconomic background (an attribute that is unequivocally "brought to" school) among the model's mediating variables. Findings in Table 2 clearly portray socioeconomic background as exerting a significant mediating role in the race-test performance relationship. That said, the five explanations being "tested" evidently emphasize factors that are distinct from typical socioeconomic status indicators.

variable *elevates* teacher-perceptions would support the proposition that the baseline model understates the explanatory role of these "brought-to-school" phenomena—since the model would be essentially excluding their positive effects on a phenomenon shown to boost test performance. A path from school quality to academic engagement represents the (additional) direct effect of an "at school" experience on one (primarily) "brought to" school. Recall from Table 2 that being black suppresses access to quality schools (total effect = −.069**). If school quality were shown to enhance academic engagement (revealed in Table 2 as a stimulant of test performance), then the baseline model would be understating the explanatory power of a phenomenon occurring primarily "at school."[17] Findings of this revised model *do not* sustain the proposition that the baseline model understates the explanatory power of either factors reflecting what students "bring to" high school or what "happens to" them at school. Neither cultural capital nor social capital is found to elevate teacher-perceptions (the obtained coefficients being *non*-significant values of −.060 and −.039 respectively). The direct effect of school quality on academic engagement also proves to be non-significant (−.008). Critically, the variables shown in Table 2 to be statistically consequential to teacher-perceptions and academic engagement retain their *same* directions and significance-levels. Given the findings of this supplementary model, the theoretical distinction between explanations that stress factors unfolding (primarily) "at school" versus those largely "brought to" school seems reasonable.

The pre-eminence of the school quality and biased treatment explanations likely hinges on factors evoked earlier: the profound, multifaceted impact of race on privilege in America, and the demonstrable status of good schools and favorable interpersonal signals as resources that add *value* during the scholastic achievement process. Blackness apparently hinders access to better schools largely through the "indirect" (but consequential) mechanism of suppressing socioeconomic well-being.[18] Better schools likely enhance test performance because of the more widespread access they provide to stimulating climates, and their superior material resources.

The moderately less favorable perceptions of black students that teachers display (*net* of statistical controls for theoretically relevant factors such as socioeconomic background, prior grades and test scores, and current track level and academic engagement), may be linked to significant receptiveness in the dominant American culture to "motivational individualistic" (Hunt 2007), "modern racist" (Krysan 2000), or "symbolic racist" (Hughes 1998) sentiment—the inclination to view African Americans as insufficiently industrious, and to downplay the consequentialness of structural factors to their subordinate status. Recall (from Table 1) that the vast majority of the items constituting the "favorable teacher-perceptions" index tap appraisals of stu-

[17] While quality schooling could also conceivably be quite instrumental in fostering cultural capital (e.g., via school-arranged museum trips and extra-curricular "arts" classes), collection of the cultural capital data at a wave prior to the collection of the school quality indicators precludes estimation of a school quality-to-cultural capital path.

[18] With the discarded class-size and "turmoil" items added to the school quality index, the direct impact of race (black) expands from the non-significant −.018 in Table 2 to a statistically significant −.040**. Such a coefficient square with the Massey and Denton (1993) proposition that blackness restricts access to communities with better social resources *net* of personal wherewithal. The total effects of blackness on school quality also grows somewhat (to −.109** vs. −.069** in Table 2) when the expanded index is used.

dents' diligence. Notwithstanding the recent decade-upsurge in endorsement of motivational individualism among *non*-whites (Hunt 2007), *white* racial attitudes arguably merit particular mention when the moderate but significant race-effects on teacher-perceptions in Table 2 are considered.

Motivational individualistic sentiments remain (by an appreciable distance) both more common among whites than among other American racial groups, and the explanation for racial inequality that whites are most likely to be endorsed (Hughes 1998; Hunt 2007; Krysan 2000). Entwined with this empirical pattern is (a) the overwhelming tendency for the black students in American schools to be taught by whites, and (b) aforementioned signs (replicated here) that such "dissonant" pairings bode particularly inauspiciously for teacher-appraisals of black students.[19] Diminished visceral teacher-skepticism toward stereotypical notions of black intellectual inferiority (Steele and Aronson 1995)—and inferentially, relative pessimism regarding students' academic futures—are other probable concomitants of dissonant white teacher–black student environments. Perceptions of students' academic futures are invoked here given the inclusion of an "expectations" item in the favorable teacher-perceptions index (Table 1).

The propitious effect of teacher-perceptions on test performance likely combines the two (not-precisely-quantifiable) components elaborated on earlier: a "fairness" element signaling validation of *justifiable* perceptions, and a self-fulfilling prophesy-derived "bias" element that comports with presumptions of the biased treatment thesis. The positive track level-effect probably combines the same components. Again, however, *class*- rather than *race*-based bias apparently structures track placements. This pattern contrasts with the case of teacher-perceptions, where (applying the "conditioned race-neutrality" standard) modest signs of racial bias do emerge.

Different factors seem to underlie the non-affirmation of hypotheses stressing attributes that students "bring to" school. In the case of the cultural and social capital theses, assessment of an unprecedentedly broad range of probable test performance-predictors neutralizes (cultural- and social capital-) effects that might otherwise appear positive. The significant changes to the effects of cultural and social capital following removal of particularly strong correlates of each variable from the performance equation (detailed earlier) illustrate this point.

Unlike cultural and social capital, whose purported beneficial effects do not materialize here (absent adjustments to the baseline model), academic engagement does elevate test performance. Undermining the "engagement" thesis on black underperformance, however—and congruent with a significant body of quantitative *and* qualitative evidence—blacks show no signs of disengagement vis-à-vis whites. Their apparently *higher* engagement levels (also observed elsewhere) probably reflects a stronger perception of educational credentials as vital to socioeconomic attainment. Such a perception, of course, squares snugly with the actual tendency for blacks to be out-earned by similarly educated whites (Hacker 1992).

From racial (and socioeconomic) privilege ensues access to better-quality schools and receipt of more stimulating interpersonal "signals" from gatekeepers. From these

[19] Whites constitute an overwhelming 81% of the teachers furnishing perception data on the black students analyzed in the present models.

resources ensues enhanced performance. This much is deducible from the present findings. A "roadmap" for policy-initiatives seeking to narrow the black–white gap is also suggested: emphasis on programs fostering proliferation—*across* races—of access to demanding, invigorating curricula, and unambiguous messages to students regarding the plausibility and expectedness of success. Resources that students "bring" to school—should their "true" consequentialness to the back-white gap be somehow downplayed by these analyses—would likely *also* be elevated by such initiatives.

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