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The Role of Socioeconomic Status in SAT–Freshman Grade Relationships Across Gender and Racial Subgroups

Jana L. Higdem, *CEB SHL Talent Measurement Solutions,*
Jack W. Kostal, Nathan R. Kuncel, and Paul R. Sackett, *University of Minnesota,*
Winny Shen, *University of Waterloo,*
Adam S. Beatty and Thomas B. Kiger, *Human Resources Research Organization*

Recent research has shown that admissions tests retain the vast majority of their predictive power after controlling for socioeconomic status (SES), and that SES provides only a slight increment over SAT and high school grades (high school grade point average [HSGPA]) in predicting academic performance. To address the possibility that these overall analyses obscure differences by race/ethnicity or gender, we examine the role of SES in the test–grade relationship for men and women as well as for various racial/ethnic subgroups within the United States. For each subgroup, the test–grade relationship is only slightly diminished when controlling for SES. Further, SES is a substantially less powerful predictor of academic performance than both SAT and HSGPA. Among the indicators of SES (i.e., father's education, mother's education, and parental income), father's education appears to be strongest predictor of freshman grades across subgroups, with the exception of the Asian subgroup. In general, SES appears to behave similarly across subgroups in the prediction of freshman grades with SAT scores and HSGPA.

Keywords: academic performance, admissions testing, ethnicity, gender, race, socioeconomic status

Standardized tests such as the SAT and ACT frequently serve as a gatekeeping mechanism for entry into higher education. Over the past 5 years, a minimum of 1,500,000 graduating high school seniors in the United States have taken some form of standardized test (i.e., SAT or ACT) each year (ACT, 2014a; College Board, 2014). For many test takers, the scores achieved on these tests will partially determine postsecondary admissions and scholarship funding. Failure to achieve a desired score can preclude attendance at preferred colleges or create a financial burden due to lack of scholarship opportunities. As such, it is important that admissions tests perform as intended when used as selection devices.

A large body of research suggests that admissions tests provide meaningful levels of predictive validity for a number of student outcomes. For example, admissions tests typically exhibit moderate-to-large correlations with first-year and cumulative college grade point average (GPA). Although precise estimates of effect sizes may vary somewhat due to differences in the institutions sampled within a data set and decisions made regarding statistical corrections, observed correlations between SAT scores and first-year GPA tend to fall near .35 (Kobrin, Patterson, Shaw, Mattern, & Barbuti, 2008). Corrections for range restriction and other sources of error (e.g., differences in course-taking patterns) can increase this correlation to the mid-.40s to mid-.50s (cf. Berry & Sackett, 2009; Sackett et al., 2012). Similar effect sizes are observed when predicting cumulative GPA through the fourth year of college (Mattern & Patterson, 2011). Analogous results have been observed for ACT–grade relations (ACT, 2014b; Westrick, Le, Robbins, Radunzel, & Schmidt 2015). Taken in tandem with evidence of incremental validity beyond other commonly used predictors such as high school GPA (HSGPA; Mattern & Patterson, 2011), this body of evidence suggests that admissions tests have value as predictors of performance during college.

Despite these promising findings, concerns have emerged over whether student socioeconomic status (SES) accounts for observed predictive relationships. In this article, we contribute to this literature by investigating the impact of SES on SAT–grade relationships across gender, and within separate racial/ethnic subgroups. Previous research investigating the impact of SES on SAT–grade relationships has relied on samples that aggregate across racial and ethnic subgroups. It is well known in statistics (cf. Simpson, 1951) that relationships and inferences derived from aggregation across meaningful subgroups can resemble none of the encompassed subgroups. In other words, we do not know whether previous findings

Jack W. Kostal, Department of Psychology, University of Minnesota, 75 East River Road, Minneapolis, MN 55455; kosta021@umn.edu. Jana L. Higdem, CEB-SHL Talent Measurement Solutions, 650 Third Avenue South, Suite 1700, Minneapolis, MN 55402; janahigdem@gmail.com. Nathan R. Kuncel and Paul R. Kuncel, Department of Psychology, University of Minnesota, 75 East River Road, Minneapolis, MN 55455; kunce001@umn.edu; psackett@umn.edu. Winny Shen, Department of Psychology, University of Waterloo, 200 University Avenue West, Waterloo, ON Canada N2L 3G1; winny.shen@uwaterloo.ca. Adam S. Beatty and Thomas B. Kiger, Human Resources Research Organization (HumRRO) 66 Canal Center Plaza, Suite 700, Alexandria, Virginia 22314; abeatty@humrro.org; tkiger@humrro.org.

in this literature apply to any single race or sex. This is especially concerning when considering that previous samples consist predominantly of White students (cf. Aud, Fox, & KewalRamani, 2010). Below, we elaborate this point.

Subgroup Differences in Academic Opportunity and SES

It is commonly acknowledged that understanding subgroup differences in SES is critical to understanding race-related issues in academic performance (cf. Reyes & Stanic, 1988). Greater numbers of White individuals fall into the higher range of SES in the United States, and links between SES and academic opportunities are likely to affect the distribution of academic opportunities across racial/ethnic subgroups. In addition, SES may affect students' academic accomplishment via several pathways, including early childhood speech exposure (Hoff, 2006; Hoff, Laursen, & Tardif, 2002; Hoff-Ginsberg, 1998), educational aspirations (Hearn, 1984; Kao & Tienda, 1998; Karen, 1991; Lareau, 1987; Walpole, 2003), and afforded opportunities in the curricula (Garibaldi, 1997; Matthews, 1984; Orfield, Eaton, & Jones, 1996). Although many studies have shown that mean SES varies considerably by subgroup, little research has explored whether the role of SES in admissions tests–performance relationships differs across subgroups.

Role of SES in the SAT–Performance Relationship

At the turn of the millennium, a number of scholars suggested that the correlation between admissions tests and college performance was an artifact of SES (Biernat, 2003; Crosby, Iyer, Clayton, & Downing, 2003). In response to these concerns, Sackett, Kuncel, Arneson, Cooper, and Waters (2009) conducted a multifaceted investigation into the effects of controlling for SES on the test–performance relationship. Their study included a meta-analysis of the existing literature, an examination of a large data set on SAT–grade relationships across over 150,000 students at 41 colleges and universities, and a reanalysis of six archival data sets (e.g., National Longitudinal Study of the Class of 1988, National Longitudinal Study of the Class of 1972). A consistent pattern across all data sets was that the test–performance relationship was only minimally reduced when controlling for SES. For example, in the large SAT data set based on 41 institutions, the range-restriction corrected validity estimate of .47 was reduced to .44 when controlling for SES.

Although this research finds that the predictive power of the SAT is not substantially diminished after controlling for SES across all college students, it leaves open the question of whether the predictive power of the SAT is differentially affected when controlling for SES in different racial/ethnic subgroups, and for males and females.

Research Question 1: To what degree does the finding that the SAT retains its predictive power in predicting grades after partialling out the effect of SES hold across gender and racial/ethnic subgroups?

Role of SES in the SAT and HSGPA–Performance Relationship

A second concern regarding the use of admissions tests is whether they provide incremental validity beyond high school grades. Atkinson and Geiser (2009) dismissed the Sackett et al. (2009) findings due to the sole focus on test scores (i.e., SAT) as a predictor of academic performance. They noted that test scores are typically used in conjunction with high school grades in the admissions process. The question of interest is whether these tests have incremental validity over high school grades once SES is controlled for. They asserted that University of California data show that this does not occur. Their data appeared to show that controlling for SES eliminates the incremental validity of admissions tests.

In response to these concerns, Sackett et al. (2012) reexamined public reports of the University of California data. They found that controlling for SES did *not* have a substantial impact on the incremental validity of SAT over high school grades. Atkinson and Geiser's research controlled not only for SES, but also for a second test, the SAT II. Sackett et al. (2012) showed that it is the inclusion of the SAT II, a test highly correlated with the SAT, rather than SES that is responsible for the diminution of the predictive power of the SAT. These findings build upon earlier research by Zwick (2004), who analyzed SAT–grade relationships separately at each of seven University of California campuses and found that adding SES to regression equations already containing HSGPA and SAT scores resulted in only small changes to the weight assigned to either predictor.

Thus, at this point there is strong evidence that neither the test–academic performance relationship nor the incremental test–performance relationship above and beyond high school grades is artifactually driven by SES. However, the research summarized above focuses on students as a whole, and does not examine the role of SES in test validity and incremental validity separately by racial/ethnic and gender subgroups.

Research Question 2: Does the finding that the SAT retains the vast majority of its incremental predictive power in predicting grades above and beyond high school grades, after controlling the effects of SES, hold across gender and racial/ethnic subgroups?

Method

Sample

The College Board collected SAT scores, school-reported HSGPA, SES, and freshman grade information from entering cohorts at a number of colleges and universities from 2006 to 2010. Information on SAT scores, school-reported HSGPA, race, gender, and SES were available for a subset of 415,599 students at 148 colleges, which together constitute the sample for our study. Schools were selected to be geographically diverse, to include large and small schools, to include public and private institutions, and to cover a broad range in terms of school selectivity. The sampled schools included 91 private and 57 public institutions. Mean freshman class size was 1,606 ($SD = 1{,}890$), with a range from 166 to 12,365. The mean HSGPA of entering students across the 148 schools was 3.42 ($SD = .29$), with a range from 2.59 to 4.07 (grades above 4.0 reflect extra credit for Advanced Placement [AP] and honors courses). The mean of the mean SAT total score across schools was 1,634 ($SD = 171$), with a range from 1,291 to 2,116. See Kobrin et al. (2008) for prior research using an earlier version of this data set to examine SAT validity.

Measures

Demographics. Two demographic variables, sex and race/ethnicity, were obtained from questionnaires completed by students when taking the SAT. Students indicated if they were male or female and what racial/ethnicity group they belonged to within eight classification options: (1) American

Indian or Alaskan Native; (2) Asian, Asian American, or Pacific Islander; (3) Black or African American; (4) Mexican or Mexican American; (5) Puerto Rican; (6) Other Hispanic, Latino, or Latin American; (7) White; and (8) Other Ethnicity. The three Hispanic categories (i.e., Mexican or Mexican American, Puerto Rican, and Other Hispanic, Latino, or Latin American) were combined to create an overall Hispanic subgroup to ensure adequate sample sizes for analyses. In addition, the Other Ethnicity category was considered to be sufficiently uninterpretable for our purposes of examining specific ethnicities and was dropped from the analysis. In addition, we included only those racial/ethnic subgroups with at least 1,000 individuals available for each analysis. This resulted in dropping the American Indian or Alaskan Native subgroup from our analyses. Our final analyses thus included a total of four racial/ethnicity categories (i.e., Asian, Black, Hispanic, and White). The final four categories are generally aligned with racial/ethnicity group classifications used by the United States Census.

SAT. SAT-Math, SAT-Critical Reasoning, and SAT-Writing scores were obtained from College Board records. These three scores were combined into a single unit-weighted composite for each student in the database. The decision to aggregate SAT subtests into an overall composite variable reflects the typical use of this instrument in academic admissions. Supplementary analyses wherein SAT subtests were disaggregated found patterns of results identical to those reported below. Results from these analyses are available from the corresponding author upon request.

High school grades (HSGPA). HSGPA was obtained from college records (i.e., from information obtained via applicant high school transcripts). Grades are reported on a 4-point scale, with scores beyond 4.0 reflecting AP and honors credits.

Socioeconomic status (SES). Three SES variables were obtained from questionnaires completed by students at the time they took the SAT: father's education, mother's education, and family income. Response options for father's education and mother's education were recoded into a numerical format quantifying the corresponding number of years of education. Grade school was coded as 8; some high school as 10; high school diploma as 12; business school or some college as 13; associate's degree as 14; bachelor's degree as 16; some graduate school as 17; and graduate degree as 18. Response options for family income varied by year. For the entering classes of 2006 and 2007, students were provided with 13 response options, ranging from *less than $10,000* to *more than $100,000*. Beginning in 2008 the upper limit of these income brackets was increased, so that students now were provided with 15 response options ranging from *less than $10,000* to *more than $200,000*. In order to place student responses from different years onto the same scale, family income was converted to dollar values using the midpoint of each income bracket by year. Then, we took the natural log of the converted family income variable to normalize the distribution.

In the overall applicant pool of SAT takers, the correlation between the two education variables averaged .60 across years; father's and mother's education correlated .46 and .43, respectively, with family income. To create an SES composite, each of these variables was standardized, then combined using the procedures described by Sackett et al. (2009). In some cases, individuals did not provide data on all three SES variables. Where this occurred, only the variables without missing data were used to create the SES composite.

Freshman GPA (FGPA). FGPA scores were provided by each school from official records.

Analyses

Our first set of analyses, addressing Research Question 1, examined the partial correlation between SAT and FGPA when holding the effect of the SES composite constant. The partial correlation was calculated at the individual school level, sample-size weighted, and aggregated to the entire sample for each subgroup. This was done in order to avoid conflating between- and within-school effects, as previous research has shown that there are reliable school-level effects for the variables being examined (Mattern, Shaw, & Williams, 2008; Shen et al., 2012; Zwick & Green, 2007). A partial correlation of zero would indicate that the relationship between SAT and FGPA disappears after taking SES into account, and is therefore spurious.

For our second set of analyses, corresponding to Research Question 2, we examined multiple regression models to determine the role of SES, relative to the traditional predictors SAT and HSGPA, in predicting FGPA for each gender and racial/ethnic subgroup. We fit two separate models within each subgroup. Model 1 examines both SAT and HSGPA, while Model 2 examines SAT, HSGPA, and the SES composite.

All regression models were computed within each school and particular subgroup, and standardized regression coefficients were aggregated across schools, using sample-size weighting. Some schools did not have adequate representation of certain subgroups. To ensure stable results, only schools with at least 15 individuals for any particular subgroup were included in the overall aggregated analyses for that particular subgroup. Sample-size weighted correlation matrices from these analyses are available upon request.

Finally, since admissions measures are used to select students, range restriction can obscure the true size of relationships between variables for the full applicant group (Schmidt & Hunter, 2014). Range restriction refers to the fact that variance in test scores is reduced when the sample available for study has been selected in part on the basis of scores on the test in question (e.g., computing SAT–grade correlations in samples where SAT scores were part of the selection process). Restricted variance on the test results in a lower test–grade correlations than would be the case if the relationship were examined in applicant samples (Sackett & Yang, 2000). In light of this concern, we sought to obtain applicant population data in order to correct correlations and regression coefficients among SAT scores, HSGPA, SES, and FGPA for range restriction.

The data needed to correct for range restriction are the unrestricted means, *SD*s, and correlations among the variables. As such, we obtained estimates of appropriate means, *SD*s, and correlations separately for each gender and racial/ethnic group in the applicant pools of each of the 148 colleges and universities. Although actual applicant pool data for each school was not available, we were able to obtain data which we believe provide a reasonable proxy to the school-specific applicant pool. When students take the SAT, they indicate the schools to which they wish their scores be sent; we used the set of students who asked that their scores be sent to a

Table 1. Multiple Regression of Freshman GPA on SAT, HSGPA, and SES Indicators

	HSGPA β	SAT β	SES Composite β	Father's Education β	Mother's Education β	Ln Income β	Adj. R^2
SAT & HSGPA	.410 (.057)	.194 (.072)					.268
SAT, HSGPA, & SES Composite	.417 (.055)	.173 (.070)	.075 (.005)				.273
SAT, HSGPA, & Father Ed.	.415 (.056)	.178 (.070)		.066 (.000)			.272
SAT, HSGPA, & Mother Ed.	.413 (.056)	.183 (.069)			.050 (.000)		.270
SAT, HSGPA, & Ln Income	.415 (.055)	.183 (.072)				.056 (.013)	.271
SAT, HSGPA, Father Ed., Mother Ed., & Ln Income	.418 (.055)	.172 (.070)		.045 (.000)	.018 (.000)	.032 (.000)	.274

Note. $N = 284{,}734$, $K = 148$. All coefficients are sample-size weighted means across schools. Standard deviations of beta weights across schools, corrected for sampling error, are in parentheses. Standard errors of mean beta weights ranged from .002 to .006.

Table 2. SAT–Freshman GPA Partial Correlations, Holding SES Composite Constant

	N	*K*	Mean *r*	Mean Partial *r*	$SD_{r-partial\ r}$
All Students	415,599	148	.347 (.067)	.326 (.061)	.006
Male	185,134	143	.324 (.068)	.306 (.062)	.007
Female	230,464	148	.396 (.062)	.369 (.054)	.008
Asian	38,060	98	.300 (.048)	.296 (.027)	.021
Black	31,013	103	.251 (.000)	.233 (.000)	.000
Hispanic	26,065	113	.273 (.027)	.249 (.000)	.027
White	295,084	147	.332 (.069)	.319 (.064)	.006

Note. All *r*s are sample-size weighted means across schools. Standard deviations of *r*s across schools, corrected for sampling error, are in parentheses. For mean *r*s, standard errors range from .005 to .009 (zero-order *r* range = .006 to .009; partial *r* range = .005 to .008). $SD_{r-partial\ r}$ indicates the size of variability in reduction of predictive power across schools, corrected for sampling error.

given school as our estimate of the applicant pool for that school, a strategy also used by Sackett et al. (2009). This provided school-specific applicant pool data for each gender and racial/ethnic subgroup, permitting subgroup-specific corrections for range restriction.

Thus, we made multivariate range restriction corrections using the school-specific and subgroup-specific estimates of the applicant pool as the referent population (Sackett & Yang, 2000). Students choose to which colleges they will apply based in part on how their SAT scores and HSGPAs match colleges' standards. Accordingly, SAT and HSGPA variability will be smaller within any given college's applicant pool than in the total population of college applicants. Correcting for range restriction using each college's applicant pool *SD*s and correlations as unrestricted values estimates how well SAT and HSGPA could be expected to predict grades within the average college's applicant pool.

Results

Overall Analyses

The results of regression analyses using SAT, HSGPA, and SES to predict freshman GPA in the overall sample are presented in Table 1. In order to determine whether the use of an overall SES composite masks the predictive power of any specific indicator (e.g., family income), separate regression models were also fit using each SES indicator in lieu of the composite score. These data indicate that overall, HSGPA is the best predictor of FGPA, and that father's education is the best predictor among the SES indicator variables. Here, it is also evident that, across the entire sample, each SES indicator contributes much less to the prediction of FGPA (βs ranging from .018 to .045) than HSGPA ($\beta = .418$) and the SAT composite ($\beta = .172$). Furthermore, when comparing the predictive power of the SES composite with that of the three SES variables considered separately, ΔR^2 is only .001. This indicates that when the composite variable of the three SES indicators is used to represent students' overall SES, it is not concealing the ability of one of its components to explain greater variability in FGPA. Similar patterns of findings were observed within each subgroup. Furthermore, regardless of whether individual SES indicators or the SES composite were used, substantive conclusions regarding the role of SES in explaining SAT–grade relationships remained the same. As such, we only report results for the SES composite below. Results from analyses using SES indicator variables are available upon request.

Research Question 1: SAT–FGPA Relationship Partialling Out the SES Composite

Table 2 shows that within each racial/ethnic and gender subgroup, the partial correlations are similar in magnitude to the zero-order relationships between SAT and FGPA. Among the racial/ethnic groups, the smallest drop from the zero-order SAT–FGPA relationship to the partial relationship holding SES constant is in the Asian subgroup (.004). The largest difference is in the Hispanic subgroup (.025). The drop after controlling for SES in the SAT–FGPA relationship is similarly small by gender. For men, the observed correlation for SAT–FGPA drops .018 when partialling out the effects of SES, and for women it drops by .027. Overall, after controlling for SES, the relationship between SAT and FGPA remains sizeable and only slightly diminished in magnitude across racial/ethnic and gender subgroups.

Finally, reporting only the mean value of coefficients could mask variability in results across schools. As such, Table 2 also reports the extent of variability across schools in the drop-off of predictive power when comparing zero-order correlations to partial correlations. Across all subgroups, little variability was observed (*SD*s ranging from an *SD* of .015 for Whites and Males to .033 for Hispanics). In addition, we emphasize that these coefficients are likely to overestimate the amount of variability at the *true-score* level across schools (Schmidt & Hunter, 2014). Observed variability in the extent to which

Table 3. Multiple Regression of Freshman GPA on SAT, HSGPA, and SES Composite Corrected for Multivariate Range Restriction

Model	HSGPA β	SAT β	SES Composite β	Adjusted R^2
	Total Sample (K = 148; N = 415,599)			
1. SAT+ HSGPA	.438 (.057)	.242 (.086)		.360
2. SAT + HSGPA + SES Composite	.444 (.056)	.211 (.084)	.075 (.013)	.365
	Men (K = 143; N = 185,134)			
1. SAT+ HSGPA	.428 (.043)	.225 (.079)		.335
2. SAT + HSGPA + SES Composite	.433 (.042)	.198 (.077)	.066 (.000)	.339
	Women (K = 148; N = 230,464)			
1. SAT+ HSGPA	.400 (.056)	.295 (.078)		.373
2. SAT + HSGPA + SES Composite	.406 (.054)	.258 (.076)	.090 (.008)	.380
	Asian (K = 98; N = 38,060)			
1. SAT+ HSGPA	.406 (.017)	.250 (.048)		.311
2. SAT + HSGPA + SES Composite	.406 (.015)	.248 (.024)	.004 (.000)	.313
	Black (K = 103; N = 31,013)			
1. SAT+ HSGPA	.405 (.029)	.193 (.023)		.279
2. SAT + HSGPA + SES Composite	.410 (.033)	.168 (.017)	.068 (.000)	.285
	Hispanic (K = 113; N = 26,065)			
1. SAT+ HSGPA	.388 (.000)	.215 (.000)		.280
2. SAT + HSGPA + SES Composite	.395 (.000)	.186 (.000)	.068 (.000)	.286
	White (K = 147; N = 295,084)			
1. SAT+ HSGPA	.447 (.054)	.209 (.083)		.336
2. SAT + HSGPA + SES Composite	.453 (.052)	.184 (.080)	.074 (.004)	.341

Note. All coefficients are sample-size weighted means across schools. Standard deviations of beta weights across schools, corrected for sampling error, are in parenthesis. For mean beta weights, standard errors range from .002 to .011 (HSGPA range = .005 to .010; SAT range = .007 to .011; SES range = .002 to .008).

controlling for SES leads to a drop-off in the SAT's predictive power may be attributed to *both* true differences across schools, and to the effects of sampling error. Only the former is of interest to our research question. When correcting for the upwardly biasing effects of sampling error (Schmidt & Hunter, 2014), estimates of variability across schools were reduced (*range* = .000 to .027; see Table 2). Thus, not only does controlling for SES lead to only a small decrease in the predictive power of the SAT *on average*, but this pattern of findings also generalizes across the schools in our data set.

Research Question 2: The Predictive Power of the SES Composite by Subgroup

Gender results. The patterns of results from analyses using corrected data mirrored those obtained using observed scores. Thus, for the sake of brevity, we only present results corrected for multivariate range restriction in Tables 3 and 4. Corresponding results obtained using observed data are reported in the text later, and in Figures 1 and 2. In addition, results from analyses using observed data are available upon request.

The models for the first set of analyses looking at the predictive power of the SES composite, SAT, and HSGPA within subgroups are presented in Table 3. By comparing Model 2 (SAT, HSGPA, and SES) to Model 1 (SAT and HSGPA), we see the incremental predictive power of SES over and above SAT and HSGPA in predicting FGPA. For both men and women, we see that SES is the weakest of the three predictors. In addition, SES shows only a small increment over SAT and HSGPA in the prediction of FGPA (ΔR^2 = .004 for men and ΔR^2 = .008 for women in the observed data; ΔR^2 = .004 for men and ΔR^2 = .007 for women in the range-restriction-corrected data). Finally, comparing Model 2 and Model 1 shows that within each gender, including SES in analyses has minimal impact on the predictive weight of the SAT.

Race/ethnicity results. Table 3 also presents comparisons across racial/ethnic subgroups. By comparing Model 2 (SAT, HSGPA, and SES) to Model 1 (SAT and HSGPA), we see the incremental predictive power of SES over and above SAT and HSGPA in predicting FGPA. Across all subgroups, this increment is consistently small (for the observed data, White ΔR^2 = .006, Asian ΔR^2 = .001, Black ΔR^2 = .006, and Hispanic ΔR^2 = .006; for the range restriction-corrected data, White ΔR^2 = .005, Asian ΔR^2 = .002, Black ΔR^2 = .006; and Hispanic ΔR^2 = .006). As with gender, the weight assigned to the SAT is not notably diminished in any racial/ethnic subgroup when including SES in regression models. For each gender and racial/ethnic subgroup, the SES composite's contribution was much smaller than both SAT and HSGPA, suggesting that its role in predicting academic achievement is less than that of the other two predictors.

Finally, we also examined whether the impact of controlling for SES on the SAT's regression weight varied across schools. Across all subgroups, observed variability in the size of reduction in the SAT beta weight tended to be small, ranging from an *SD* of .012 for the White subgroup to an *SD* of .036 for the Hispanic subgroup. As before, these estimates are likely to be inflated due to the effects of sampling error. Correcting for the effects of sampling error results in estimates of between-school variability that range from an *SD* of .000 for the Hispanic subgroup to an *SD* of .023 for the Asian subgroup. Tables reporting these results are available from the authors upon request.

Discussion

Our results indicate that the role of SES in the SAT–FGPA relationship is similar for men and women and by race/ethnicity. Across all groups, the SAT–FGPA correlation decreases only slightly in magnitude when the SES composite is partialled from both variables, and the incremental validity of SES over SAT and HSGPA is quite small. In addition, SES appears

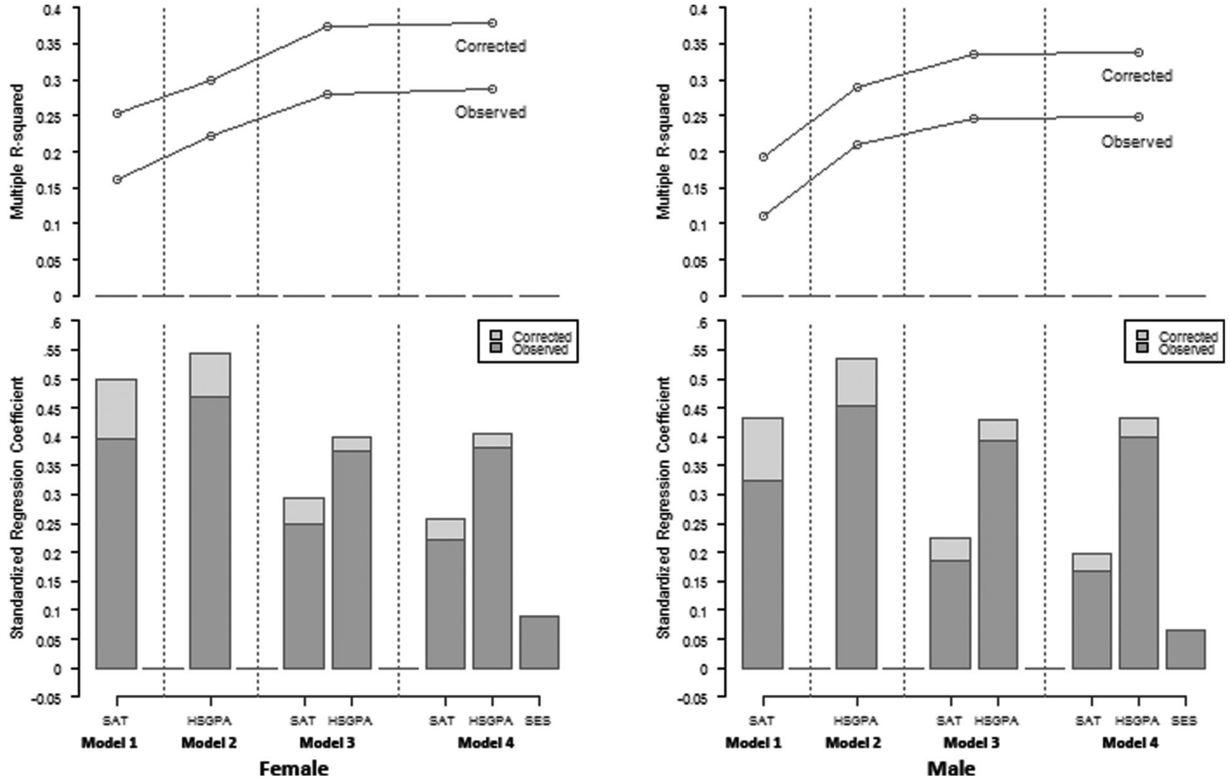

FIGURE 1. SAT, HSGPA, and SES contributions to predicting freshman GPA by gender. Values are corrected for multivariate school-specific range restriction.

to operate quite similarly across the racial/ethnic subgroups studied, in terms of both the size of effects and the rank order of predictive weights. In general, grades are best predicted by father's education, followed by parental income, and mother's education.

The notable exception in these racial/ethnic subgroups findings pertain to the Asian subgroup, where SES had a near-zero weight in the model that also included SAT and HSGPA. Consistent with other findings (e.g., Blair, Blair, & Madamba, 1999; Kao, Tienda, & Schneider, 1996), in this data set the Asian subgroup consistently scored the highest on the SAT and held the highest HSGPA (e.g., Asian White Cohen's d values were .15 and .14, respectively, for SAT scores and HSGPA). Similarly, Asian students obtained FGPAs similar to White students, and higher than other racial/ethnic minority groups (observed Cohen's ds = –.03, .24, and .59 when comparing Asian students with White, Hispanic, and Black students, respectively). Many scholars have suggested a cultural component to this superior performance (e.g., Caplan, Choy, & Whitmore, 1991; Schneider & Lee, 1990), such as a strong importance placed on education. In the present data, it may be that Asians with higher SES are of later generations of immigrants to the United States, as opposed to first- or second-generation Asian Americans. This is reasonable in that it likely takes time to establish affluence in a new economic system. Later generations would be more likely to have adopted a different set of values than their preceding immigrant generations. Should this be the case, one might expect the reduced relationship between SES and grades found among Asian students in this sample. Future research on this question is needed.

Our data also show that Atkinson and Geiser's (2009) argument that standardized tests do not have incremental value over high school grades and SES was untrue for both men and women and across the racial/ethnic subgroups examined. In fact, SAT and HSGPA both predicted academic performance for each of the subgroups examined in this article, regardless of the inclusion or exclusion of SES in the equation.

Figures 1 and 2 provide visual comparisons of the observed and multivariate range restriction corrected data for each subgroup. It is interesting to observe the continuity across models in the predictive strength of SAT and HSGPA—individually, together, and combined with SES. The figures also clearly indicate that the predictive value of SES, when added to SAT scores and high school grades, is minimal. When all variables were included together in the same model, predictive power for the SAT remained non-negligible and greatly exceeded that of SES. Including SES in the model had minimal impact on the predictive weight of the SAT.

Finally, we note that one limitation of our study is our reliance on self-reported indicators of SES. However, Looker (1989) reported correlations in excess of .80 between student-reported and parent-reported educational attainment and occupational status, suggesting that the source of SES information should be unlikely to alter substantive conclusions. Although students might be expected to have more difficulty accurately reporting their family income than parental education, the same substantive conclusions resulted whether the SES composite or individual SES indicators were used. Taken together, these patterns of findings suggest that the use of self-reports is not likely to be a major hindrance to the accuracy of our findings.

In summary, our findings provide further evidence that SES does not drive predictive relationships between the admissions tests and college performance. Using a large sample of students drawn from a diverse set of 4-year colleges,

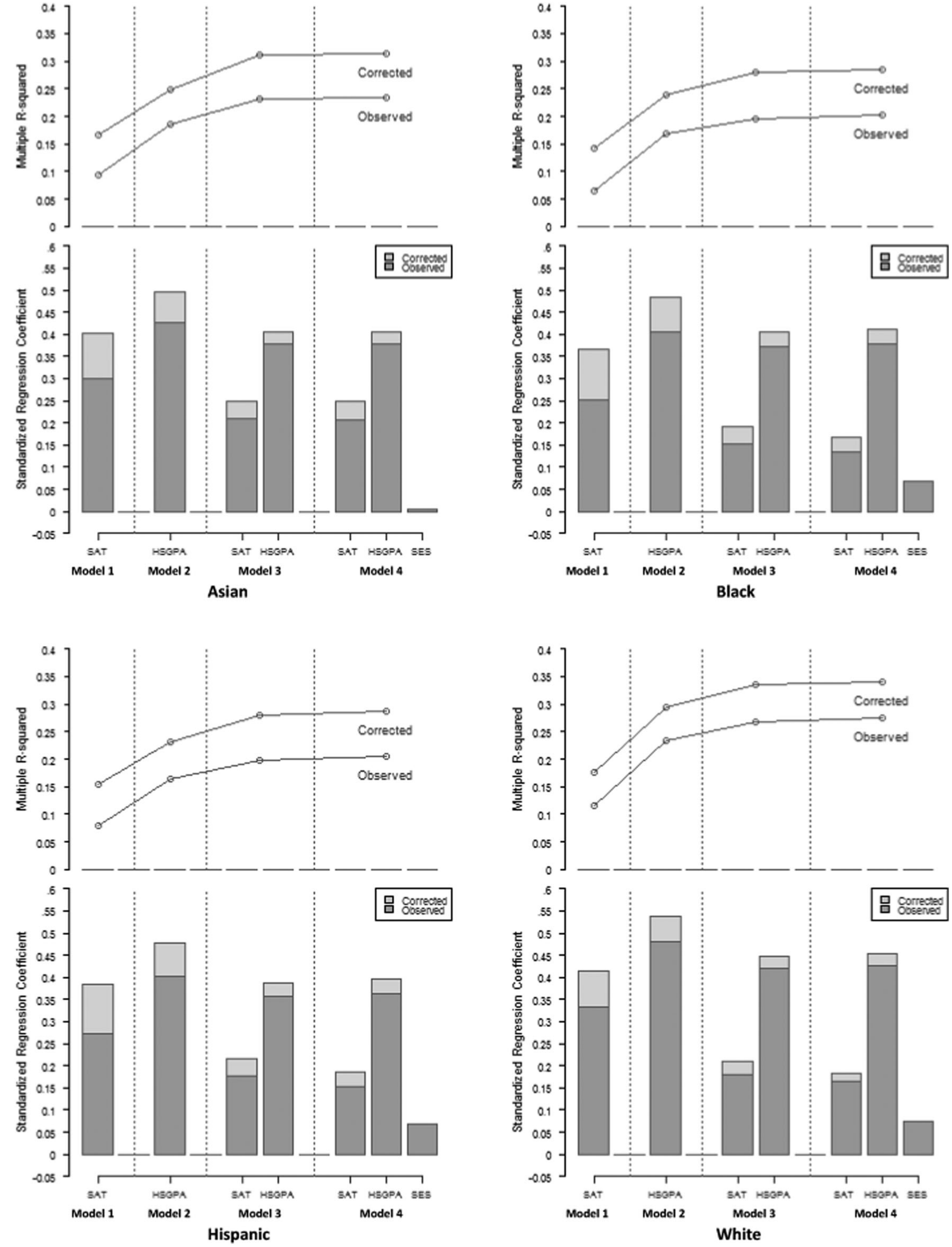

FIGURE 2. SAT, HSGPA, and SES contributions to predicting freshman GPA by race/ethnicity. Values are corrected for multivariate school-specific range restriction.

we used multiple regression and correlational analyses to examine the relative predictive power of the SAT relative to SES, as well as the relationship between the SAT and college performance after SES was controlled. Results revealed little decrement to SAT validity when controlling for SES, larger predictive weights for the SAT relative to SES, and only minor reductions in the predictive weight assigned to the SAT when SES was added to regression models. Findings were similar across all racial/ethnic groups investigated in this study. In each instance, our results refute the hypothesis that SAT–performance relationships are attributable to the effects of SES. As such, future theorizing should avoid invoking this variable as the sole explanation for the SAT's predictive power.

References

ACT. (2014a). The conditions of college and career readiness 2014: National. Retrieved September 20, 2015, from www.act.org/readiness/2014

ACT. (2014b). Technical manual: The ACT. Retrieved September 20, 2015, from http://www.act.org/aap/pdf/ACT_Technical_Manual.pdf

Atkinson, R. C., & Geiser, S. (2009). Reflections on a century of college admissions tests. *Educational Researcher*, *38*, 665–676.

Aud, S., Fox, M., & KewalRamani, A. (2010). *Status and trends in the education of racial and ethnic groups* (NCES 2010–015). Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Berry, C. M., & Sackett, P. R. (2009). Individual differences in course choice result in underestimation of the validity of college admissions systems. *Psychological Science*, *20*, 822–830.

Biernat, M. (2003). Toward a broader view of social stereotyping. *American Psychologist*, *58*, 1019–1027.

Blair, S., Blair, M. C. L., & Madamba, A. B. (1999). Racial/ethnic differences in high school students' academic performance: Understanding the interweave of social class and ethnicity in the family context. *Journal of Comparative Family Studies*, *30*, 539–555.

Caplan, N., Choy, M. H., & Whitmore, J. K. (1991). *Children of the boat people: A study of educational success*. Ann Arbor: University of Michigan Press.

College Board. (2014). *2014 College Board program results: SAT*. Retrieved September 20, 2015, from https://www.collegeboard.org/program-results/2014/sat

Crosby, F. J., Iyer, A., Clayton, S., & Downing, R. A. (2003). Affirmative action: Psychological data and the policy debates. *American Psychologist*, *58*, 93–115.

Garibaldi, A. M. (1997). Four decades of progress . . . and decline: An assessment of African American educational attainment. *Journal of Negro Education*, *66*(2), 105–20.

Hearn, J. C. (1984). The relative roles of academic, ascribed, and socioeconomic characteristics in college destinations. *Sociology of Education*, *57*, 22–30.

Hoff, E. (2006). How social contexts support and shape language development. *Developmental Review*, *26*, 55–88.

Hoff, E., Laursen, B., & Tardif, T. (2002). Socioeconomic status and parenting. In M. H. Bornstein (Ed.), *Handbook of parenting: Ecology and biology of parenting* (Vol. 2, pp. 161–188). Mahwah, NJ: Lawrence Erlbaum.

Hoff-Ginsberg, E. (1998). The relation of birth order and socioeconomic status to children's language experience and language development. *Applied Psycholinguistics*, *19*, 603–629.

Kao, G., & Tienda, M., (1998). Educational aspirations of minority youth. *American Journal of Education*, *106*, 349–384.

Kao, G., Tienda, M., & Schneider, B. (1996). Racial and ethnic variation in educational achievement. *Research in Sociology of Education and Socialization*, *11*, 263–297.

Karen, D. (1991). The politics of class, race, and gender: Access to higher education in the United States, 1960–1986. *American Journal of Education*, *99*, 208–237.

Kobrin, J. L., Patterson, B. F., Shaw, E. J., Mattern, K. D., & Barbuti, S. M. (2008). *Validity of the SAT for predicting first-year college grade point average* (College Board Research Report No. 2008-5). New York, NY: The College Board.

Lareau, A. (1987). Social class differences in family-school relationships: The importance of cultural capital. *Sociology of Education*, *60*, 73–85.

Looker, E. D. (1989). Accuracy of proxy reports of parental status characteristics. *Sociology of Education*, *62*, 257–276.

Mattern, K. D., & Patterson, B. F. (2011). *Validity of the SAT for predicting fourth-year grades: 2006 SAT validity sample* (College Board Research Report No. 2011–7). New York, NY: The College Board.

Mattern, K. D., Shaw, E. J., & Williams, F. E. (2008). *Examining the relationship between SAT, high school measures of academic performance, and socioeconomic status: Turning our attention to the unit of analysis* (College Board Research Note No. 36). New York, NY: The College Board.

Matthews, W. (1984). Influences on the learning and participation of minorities in mathematics. *Journal for Research in Mathematics Education*, *15*, 84–95.

Orfield, G., Eaton, S. E., & Jones, E.R. (1996). *Dismantling desegregation: The quiet reversal of Brown v. Board of Education*. New York, NY: New Press.

Reyes, L. H., & Stanic, G. M.A, (1988). Race, sex, and socioeconomic status, and mathematics. *Journal for Research in Mathematics Education*, *19*, 25–43.

Sackett, P. R., Kuncel, N. R., Arneson, J. J., Cooper, S. R., & Waters, S. D. (2009). Does socioeconomic status explain the relationship between admissions tests and post-secondary academic performance? *Psychological Bulletin*, *135*(1), 1–22.

Sackett, P. R., Kuncel, N. R., Rigdon, J. L., Beatty, A. S., Shen, W., & Kiger, T. B. (2012). The role of socio-economic status in college admissions: critical tests of claims that admission test validity is artifactual. *Psychological Science*, *23*(9), 1000–1007.

Sackett, P. R., & Yang, H. (2000). Correction for range restriction: An expanded typology. *Journal of Applied Psychology*, *85*, 112–118.

Schmidt, F. L., & Hunter, J. E. (2014). *Methods of meta-analysis: Correcting error and bias in research findings*. Washington, DC: SAGE Publications.

Schneider, B., & Lee, Y. (1990). A model for academic success: The school and home environment of East Asian students. *Anthropology & Education Quarterly*, *21*, 358–377.

Shen, W., Sackett, P. R., Kuncel, N. R., Beatty, A. S., Rigdon, J. L., & Kiger, T. B. (2012). All validities are not created equal: Determinants of variation in SAT validity across schools. *Applied Measurement in Education 25*(3), 197–219.

Simpson, E. H. (1951). The interpretation of interaction in contingency tables. *Journal of the Royal Statistical Society, Series B*, *13*, 238–241.

Walpole, M. (2003). Socioeconomic status and college: How SES affects college experiences and outcome. *Review of Higher Education*, *27*, 45–73.

Westrick, P. A., Le, H., Robbins, S. B., Radunzel, J. M., & Schmidt, F. L. (2015). College performance and retention: A meta-analysis of the predictive validities of ACT scores, high school grades, and SES. *Educational Assessment*, *20*(1), 23–45.

Zwick, R. (2004). Is the SAT a "wealth test?" The link between educational achievement and socioeconomic status. In R. Zwick (Ed.), *Rethinking the SAT: The future of standardized testing in university admissions* (pp. 203–216). New York, NY: Routledge Falmer.

Zwick, R., & Green, J. G. (2007). New perspectives on the correlation of Scholastic Assessment Test scores, high school grades, and socioeconomic factors. *Journal of Educational Measurement*, *44*, 1–23.