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Predicting College Performance of Homeschooled Versus Traditional Students

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The prevalence of homeschooling in the United States is increasing. Yet little is known about how commonly used predictors of postsecondary academic performance (SAT, high school grade point average (HSGPA)) perform for homeschooled students. Postsecondary performance at 140 colleges and universities was analyzed comparing a sample of traditional students matched to a sample of 732 homeschooled students on four demographic variables, HSGPA, and SAT scores. The matched sample was drawn from 824,940 traditional students attending the same institutions as the homeschooled students, which permitted a very precise level of matching. This comparison did not show a difference in first-year college GPA (FGPA) or retention between homeschooled and traditional students. SAT scores predicted FGPA and retention equally well for both groups, but HSGPA was a weaker predictor for the homeschooled group. These results suggest that, among college students, those who were homeschooled perform similarly to traditionally educated students matched on demographics and academic preparedness, but there are practical implications for college admissions in the use of HSGPA versus standardized test scores for homeschooled students.

Keywords: admissions, college, homeschool, predictive bias

T he prevalence of homeschooled students in the United States has been steadily increasing, and as of the 2011–2012 school year, this amounts to 3.4% of the K-12 student population in the United States (Noel, Stark, & Redford, 2013). Prominent reasons for why parents choose to homeschool their children include a concern about the environment of other schools, a dissatisfaction with academic instruction at other schools, a desire to provide moral or religious instruction, or a desire to provide a nontraditional approach to their child's education (Noel et al., 2013). Taken together, these reasons suggest that many parents who choose to homeschool their children intend for it to replace and to potentially provide a better education than traditional schooling systems in the United States.

At the same time, because homeschooling in the United States is regulated differently from traditional education, and because homeschooling regulations vary among states (Ruger & Sorens, 2013), we are concerned with whether homeschooling would yield particularly meaningful grades and whether it would produce students who would be as effective in college as traditional students. To address this, we examine whether high school grades and standardized test scores for homeschooled students are predictive of college grades and retention, and we do so by comparing these relationships with those observed for a large matched sample of traditional students to determine: (1) if traditional college admissions information is equally predictive for the two groups and (2) if homeschooling is associated with better college grades or retention when controlling for standardized test scores, high school grades, and socioeconomic status (SES).

Descriptively, homeschooled students appear to differ from the national average in high school performance and other characteristics. Survey studies conducted by Rudner (1999) and Ray (2000, 2010) found that on standardized achievement tests for various K-12 subjects (e.g., reading, math, sciences) the mean national percentile for homeschooled students ranged approximately from the 70th to 90th percentile. compared to the 50th percentile for the overall national average. They also tend to come from families with higher levels of education and income (Ray, 2000, 2010; Rudner, 1999). This suggests that, on average, homeschooled students may be showing better academic performance due to factors other than homeschooling. Therefore, homeschooled students may be a unique group with characteristics not proportionately represented in the general student population, so it is possible that the higher performance of homeschooled students may be explained by other factors, meaning that direct comparisons between homeschooled students and traditional students in general may not be appropriate.

For postsecondary academic outcomes, the existing research is limited by small sample sizes of homeschooled students from a small number of postsecondary institutions, but the research does provide some support that homeschooled students perform similarly to other students. Jones and

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Gloeckner (2004a) compared 55 homeschooled first-year students from public colleges or universities in Colorado with a sample of 53 traditional students who attended the same institutions. They found no significant differences in ACT scores, first-vear grade point average (GPA), first-vear retention (fall to spring semester), and first-year credit hours earned. Cogan (2010) examined academic data from 7.776 students from a private university in the upper Midwest, of which 76 students reported that they were homeschooled. In this study, homeschooled students were found to have significantly higher ACT composite scores and higher first-year and fourth-year GPA, but there was no effect of homeschooling on retention or graduation rates. Interpretation of these findings is difficult, as students do not apply to college at random and are not admitted at random, meaning that the characteristics of college students who were homeschooled may be different from those who were traditionally educated. The impact of homeschooling on students can only be inferred from these studies if assumptions are made about self-selection effects during application and the admissions decision. What can be learned from enrolled students is the extent to which characteristics of homeschooled students are related to academic achievement in college and whether these relationships are similar in magnitude to those observed for students who attended traditional public and private schools.

A question of practical and scientific interest is whether the academic performance of homeschooled students during high school can effectively predict college performance. The predictive validity of high school GPA and standardized tests (e.g., ACT, SAT) for academic performance in college has been well established in previous research (e.g., Sackett, Kuncel, Arneson, Cooper, & Waters, 2009). To our knowledge, however, it is currently unknown whether the predictive validity of high school GPA and standardized tests for college performance generalizes to homeschooled students, and if homeschooling is a moderator of the relationship between high school performance and college performance. For purposes such as college admissions, knowing if there is any predictive bias that depends on whether a student is homeschooled or not will help to better inform admissions decisions. For example, is a B high school grade point average for home schooled students associated with the same level of performance in college as a B average for traditionally educated students?

In this study, we aim to expand and to improve on the existing research on the academic outcomes of homeschooled students as compared to traditional students, and to address the lack of knowledge as to what predicts performance during college or university for homeschooled students. Using a nationwide sample of 732 homeschooled students. Using a nationwide sample of 732 homeschooled students enrolled in college paired with a closely matched sample drawn from 825,672 first-year students at 195 postsecondary institutions across the United States, we first conduct a descriptive analysis to provide normative comparisons between homeschooled and traditional students. Then, we examine any moderating effects of homeschooling on the predictive validity of high school GPA, SAT scores, and socioeconomic status for firstyear college GPA and retention after first-year.

Previous studies on this topic have compared samples of homeschooled students to some overall sample of traditional students, but we are concerned about whether doing so would actually provide meaningful results. Because the characteristics of homeschooled students enrolled in college may not be proportionally represented among traditional students enrolled in college, we believe that, in order to effectively isolate the effects of homeschooling from other student characteristics on college performance, the most appropriate comparison would be between homeschooled students and a sample of traditional students matched to as many characteristics of the homeschooled students as possible. For example, Jones and Gloeckner (2004a) matched each homeschooled student in their study with a traditional student from the same postsecondary institution. However, matching only on postsecondary institution may be insufficient, as there are many other potential variables, such as gender, ethnicity, and SES, that may potentially be disproportionately represented in samples of college-attending homeschooled versus traditional students, especially when the sample of homeschooled students obtained for a study may be limited in size and not necessarily representative of the population of homeschooled students. Additionally, since homeschooled students have been found to perform better in high school than traditional students (Ray, 2000, 2010; Rudner, 1999), further matching based on measures of high school achievement such as high school GPA and scores on standardized college admissions tests will be necessary to account for prior differences in college preparedness when examining differences in academic outcomes during college. The main challenge with generating a matched sample is that it requires drawing from a large pool of traditional students to be feasible, and the size of our sample provides such an opportunity. Ultimately, analyses using matched samples will provide a more meaningful analysis of the effects of homeschooling on academic performance.

Method

Sample

Data for this study were provided by the College Board on 825,672 first-year students from 2009 to 2011 at 195 postsecondary institutions across the United States, of which 732 students at 140 of these postsecondary institutions were homeschooled prior to admission (specifically, at the time they took the SAT).

Measures

SAT scores. SAT scores consisted of scores on the three sections of the SAT: Math, Critical Reading, and Writing. These scores were averaged into a composite SAT score for each student.

High school GPA. Two forms of high school GPA (HSGPA) were provided in the data set. One was self-reported by the student at the time of taking the SAT, and the other was school-reported by a subset of the postsecondary institutions based on their own calculations of each of their student's high school GPA. Self-reported GPA has been found to be less accurate than GPA that is not self-reported, particularly for students with low GPA (Kuncel, Credé, & Thomas, 2005). Because of that, we conducted analyses using both forms of HSGPA so that any results idiosyncratic to either self-or school-reported high school GPA could be identified. Our conclusions turned out the same no matter which form of GPA was used in the analysis, so only the results from the analyses

using the school-reported HSGPA will be presented for the sake of simplicity.

Socioeconomic status. At the time they took the SAT, students reported their father's education, mother's education, and parental income. The natural logarithm of parental income was used in this study. A composite SES score was calculated by equally weighting these three SES variables using a method described by Sackett et al. (2009).

First-year college GPA. First-year college GPA (FGPA) was provided by each postsecondary institution. To account for differences in difficulty, grading policies, or grading scales that may result in similar students obtaining different grades at different colleges or universities, the first-year college GPA of each student was adjusted based on the procedure used by Cullen, Hardison, and Sackett (2004). This procedure adjusted the FGPA for each student based on the expected difference in FGPA for students with similar SAT scores who attend different postsecondary institutions.

Retention after first year. Each institution reported whether each of their students was retained from first year to second year.

Matching Procedure

From the overall sample of 824,940 traditional students, a subset was matched to the homeschooled students on postsecondary institution, gender, ethnicity, HSGPA, SAT, and SES. For the purposes of the matching procedure only, HS-GPA, SAT, and SES were standardized within institution so that they would all be on the same scale with a mean of 0 and SD = 1. The matching procedure was carried out sequentially for each homeschooled student. First, the whole sample of traditional students was subset into a smaller sample matched to the postsecondary institution, gender, and ethnicity of the homeschooled student. Next, the absolute differences in standardized HSGPA, SAT, and SES between the homeschooled student and each traditional student in this subset were then averaged to create a matching index. For matching on HSGPA, the school-reported HSGPA was used if available, and the self-reported HSGPA was used only if the school-reported HSGPA was missing. Any variable with data missing for the homeschooled student was excluded from consideration in the matching process. The traditional student with the closest match to the homeschooled student (i.e., smallest matching index score) was selected into the matched sample of traditional students. To prevent the same student from being selected more than once, the selected student was then removed from consideration in matching with subsequent homeschooled students. This process was then repeated for each homeschooled student.

This matching process was able to closely match each homeschooled student with a traditional student, producing nearly identical matches on the six matching variables. The distribution of matching index scores in the sample of matched students clustered towards zero (Figure 1) had a median of .03, a mean of .07, and SD = .13.

The homeschooled sample consisted of 732 students from 140 postsecondary institutions, was 48.2% male, and had an ethnic composition of 79.0% White, 4.2% Hispanic, 2.9% Black,

2.7% Asian, 0.3% American Indian, and 2.9% other ethnicity (percentages for ethnicity do not sum to 100% due to nonresponse). The full sample of traditional students consisted of 824,940 students from 195 postsecondary institutions, was 46.1% male, and had an ethnic composition of 52.0% White, 7.7% Hispanic, 6.7% Black, 8.4% Asian, 0.4% American Indian, and 2.0% other ethnicity. The matched sample of traditional students consisted of 732 students from the same 140 postsecondary institutions as the homeschooled students, was 48.2% male, and had an ethnic composition of 83.7% White, 4.5% Hispanic, 3.1% Black, 3.1% Asian, 0.3% American Indian, and 3.0% other ethnicity.

Analyses

Missing data for the sample of homeschooled students and the matched sample of traditional students were imputed by multiple imputation using predictive mean matching (Schenker & Taylor, 1996). This was done separately for the sample of homeschooled students and the matched sample of traditional students. Missing data were not imputed for the full sample of traditional students due to the size of this sample and because our focal analyses involved the homeschooled and matched sample.

Means, standard deviations, and intercorrelations for all study variables were computed separately for homeschooled students and the full and matched samples of traditional students.

Using the matched samples, moderated multiple regression analysis was carried out to determine whether the predictive validities of HSGPA and SAT for postsecondary outcomes of FGPA and retention after first-year (RET) were moderated by whether a student was homeschooled or not. Linear regression was used to fit models where FGPA was the criterion, whereas logistic regression was used to fit models where RET was the criterion (RET was dummy coded as 1 = retained to second year, and 0 =not retained to second year). Models were fit using hierarchical regression analyses, with separate analyses conducted for each criterion variable (FGPA and RET) and each predictor variable (HSGPA and SAT). To do so, FGPA was first regressed onto HSGPA as the focal predictor in the initial step. Homeschooling and its interaction with HSGPA were then entered in the second step, followed by SAT entered as a control variable in the third step, and finally SES was entered as a control variable in the fourth step. A similar analysis was carried out using SAT as the focal predictor and HSGPA as a control variable. This was then repeated using RET as the criterion instead of FGPA.

Results

Means, standard deviations, and intercorrelations for all study variables are shown in Tables 1–3 for homeschooled students and the full and matched samples of traditional students, respectively. Compared to the full sample of traditional students, homeschooled students on average had higher HSGPA, SAT, FGPA, and SES, but there was not any difference in retention. On the other hand, when compared to the matched sample of traditional students, homeschooled students appeared to show no differences in FGPA and RET. There were also no differences in HSGPA, SAT, and SES in the matched samples comparison, reflecting the fact that close matches were obtained on these variables that were used for matching.





Comparing the homeschooled students to both the full and matched samples of traditional students, the correlations between HSGPA and the two postsecondary outcomes of FGPA and RET were substantially higher for traditional students, whereas there did not appear to be any substantial differences in the correlations between SAT and FGPA or RET. For homeschooled students, SAT had a stronger correlation with FGPA and RET than did HSGPA. SES was more strongly correlated with SAT for traditional students in the full sample, and this may be explained as being due to a restriction in the range of SES in the sample of homeschooled students and the matched sample of traditional students.

Table	e 1.	Means	and	Interc	orrelation	s for	the
Sam	ple	of Hom	esch	ooled	Students		

	Variable	М	SD	1	2	3	4	5
1.	HSGPA	3.80	.25					
2.	SAT	603.54	83.52	.47				
3.	FGPA	1.07	.93	.21	.39			
4.	RET	.88	.32	.04	.13	.24		
5.	SES	.32	.67	.09	.21	.20	.11	

Note. n = 732; HSGPA = high school GPA; SAT = SAT composite score; FGPA = first-year college GPA; RET = college retention after first year; SES = socioeconomic status. SAT is the average of scores on the three SAT sections. FGPA and SES are computed from rescaled variables, so their values are not directly interpretable. RET is coded as retained = 1, not retained = 0. Regression analyses predicting FGPA are shown in Table 4. The step 1 models for either HSGPA or SAT as focal predictors show that both HSGPA and SAT independently predicted FGPA. In the step 2 models, the interaction of homeschooling with HSGPA or SAT were both significant, but the results started to diverge on subsequent steps. After controlling for SAT, and then for SES, the interaction of homeschooling with HSGPA was still significant. On the other hand, after controlling for HSGPA, the interaction of homeschooling with SAT was no longer significant, and this held after SES was controlled for as well. Comparing the regression lines between homeschooled and traditional students, Figure 2 illustrates

Table 3.	Means and Intercorrelations for the	;
Matched	Sample of Traditional Students	

	Variable	М	SD	1	2	3	4	5
1.	HSGPA	3.77	.31					
2.	SAT	599.06	81.52	.51				
3.	FGPA	.99	.93	.51	.49			
4.	RET	.89	.31	.20	.19	.32		
5.	SES	.33	.69	.10	.30	.14	.13	

Note. n = 732; HSGPA = high school GPA; SAT = SAT composite score; FGPA = first-year college GPA; RET = college retention after first year; SES = socioeconomic status. SAT is the average of scores on the three SAT sections. FGPA and SES are computed from rescaled variables, so their values are not directly interpretable. RET is coded as retained = 1, not retained = 0.

Table 2. Mean	ns and Intercorrelation	s for the Full Samp	le of Traditional Students
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Variable	М	SD	1	2	3	4	5
HSGPA	3.46	.48	439,163	354,727	431,887	439,160	338,726
SAT	557.81	87.87	.50	643,817	633,948	643,815	609,149
FGPA	.64	1.04	.49	.43	811,076	811,071	607,265
RET	.85	.35	.22	.18	.34	824,935	616,622
SES	.02	.96	.15	.41	.22	.11	616,624
	Variable HSGPA SAT FGPA RET SES	Variable M HSGPA 3.46 SAT 557.81 FGPA .64 RET .85 SES .02	Variable M SD HSGPA 3.46 .48 SAT 557.81 87.87 FGPA .64 1.04 RET .85 .35 SES .02 .96	VariableMSD1HSGPA3.46.48439,163SAT557.8187.87.50FGPA.641.04.49RET.85.35.22SES.02.96.15	VariableMSD12HSGPA3.46.48439,163354,727SAT557.8187.87.50643,817FGPA.641.04.49.43RET.85.35.22.18SES.02.96.15.41	VariableMSD123HSGPA3.46.48439,163354,727431,887SAT557.8187.87.50643,817633,948FGPA.641.04.49.43811,076RET.85.35.22.18.34SES.02.96.15.41.22	VariableMSD1234HSGPA3.46.48439,163354,727431,887439,160SAT557.8187.87.50643,817633,948643,815FGPA.641.04.49.43811,076811,071RET.85.35.22.18.34824,935SES.02.96.15.41.22.11

Note. Numbers on the diagonal indicate the sample size for each variable, and numbers above the diagonal indicate the sample size for each correlation. HSGPA = high school GPA; SAT = SAT composite score; FGPA = first-year college GPA; RET = college retention after first year; SES = socioeconomic status. SAT is the average of scores on the three SAT sections. FGPA and SES are computed from rescaled variables, so their values are not directly interpretable. RET is coded as retained = 1, not retained = 0.



FIGURE 2. Relationship between high school GPA and first-year college GPA by homeschooling status (homeschooled = 1, traditional = 0). The solid line represents traditional students and the dashed line represents homeschooled students.

the large slope difference when HSGPA was the predictor, and Figure 3 illustrates the negligible slope difference when SAT was the predictor.

GPA and SAT independently predicted RET. The step 2 models show that the interaction of homeschooling with HSGPA was Regression analyses predicting RET are shown in Table 5. significant, but its interaction with SAT was not. This result Similar to what was found for FGPA, the step 1 models for held for subsequent steps controlling for SAT or HSGPA, and



FIGURE 3. Relationship between SAT composite score and first-year college GPA by homeschooling status (homeschooled = 1, traditional = 0), controlling for high school GPA and SES. The solid line represents traditional students and the dashed line represents homeschooled students.

either HSGPA or SAT as focal predictors show that both HS-

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Focal Predictor	Model	Predictor	β	Std. Error	R ²	Focal
HSGPA	1	HSGPA	1.219**	.080	.137	Predictor
	2	HSGPA	1.531**	.103	.151	HSGPA
		Home	2.991^{**}	.616		noun
		Home × HSGPA	778**	.162		
	3	HSGPA	$.996^{**}$.105	.243	
		Home	3.292^{**}	.582		
		SAT	$.004^{**}$.000		
		Home × HSGPA	858**	.153		
	4	HSGPA	1.004^{**}	.105	.247	
		Home	3.283**	.581		
		SAT	.003**	.000		
		SES	$.087^{**}$.032		
		Home × HSGPA	855**	.153		
SAT	1	SAT	$.005^{**}$.000	.196	
	2	SAT	$.006^{**}$.000	.200	SAT
		Home	$.782^{*}$.321		
		Home × SAT	001*	.001		
	3	SAT	$.004^{**}$.000	.229	
		Home	.580	.316		
		HSGPA	.645**	.087		
		Home × SAT	001	.001		
	4	SAT	$.004^{**}$.000	.232	
		Home	.532	.316		
		HSGPA	$.654^{**}$.087		
		SES	$.085^{**}$.032		
		Home × SAT	001	.001		

Table 4. Hierarchical Regressions With HSGPA and SAT as Focal Predictors of First-Year College GPA. Moderated by Homeschooling

Table 5. Hierarchical Regressions With HSGP/	١
and SAT as Focal Predictors of College	
Retention After First Year, Moderated	
by Homeschooling	

Std.

7	Predictor	Model	Predictor	β	Error
1	HSGPA	1	HSGPA	1.143**	.249
		2	HSGPA	1.161**	.323
			Home	3.991^{*}	1.977
			Home ×	-1.124^{**}	.528
3			HSGPA		
		3	HSGPA	1.053^{**}	.351
			Home	4.891^{*}	2.097
			SAT	$.005^{**}$.001
			Home ×	-1.366^{*}	.561
7			HSGPA		
		4	HSGPA	1.087^{**}	.354
			Home	4.859^{*}	2.096
			SAT	.045**	.001
			SES	$.370^{**}$.118
			Home \times	-1.358^{**}	.560
6			HSGPA		
0	SAT	1	SAT	.006**	.001
		2	SAT	$.008^{**}$.002
			Home	1.578	1.189
			Home \times	003	.002
9			SAT		
		3	SAT	.007**	.002
			Home	1.402	1.192
			HSGPA	.527	.297
2			Home \times	003	.002
2			SAL	006**	000
		4	SAI	.006	.002
			Home	1.250	1.200
			HSGPA	.55/	.299
			SES	.364	.118
			Home ×	003	.002
gh			SAI		

Note. *p < .05, **p < .001. Home = homeschooled; HSGPA = high school GPA; SAT = SAT composite score; SES = socioeconomic status. Home is coded as homeschooled = 1, traditional = 0.

then controlling for SES. Figure 4 illustrates the large slope difference when HSGPA was the predictor, and Figure 5 illustrates the negligible slope difference when SAT was the predictor.

Discussion

Previous large-scale studies have found that, on average, homeschooled students are superior to traditional students on academic outcomes, and also differ on other characteristics such as parental education and income (Ray, 2000, 2010; Rudner, 1999). In our comparison of students enrolled in college, we also found that when compared to the overall sample of traditional students, homeschooled students came from families with higher SES, had obtained better test scores, and earned better grades in high school and college. However, direct comparisons between homeschooled students and traditional students in general may not be appropriate given that the characteristics of homeschooled students may not be proportionately represented in the general student population. Indeed, when we compared our sample of homeschooled students who were enrolled in college to a more representative group of traditional students matched on postsecondary institution, gender, race, academic

Note. *p < .05, **p < .001. Home = homeschooled; HSGPA = high school GPA; SAT = SAT composite score; SES = socioeconomic status. HS is coded as homeschooled = 1, traditional = 0.

preparedness, and socioeconomic status, performance differences between homeschooled and traditional students effectively disappeared. Therefore, while homeschooled students can be as successful as traditional students in college or university, simply having been homeschooled does not appear to be an advantage or disadvantage among students enrolled in college.

The lack of a difference in first-year retention (RET) indicates that homeschooled and traditional students advance from the first to second years of college at the same rate, which is consistent with the findings of previous studies (Cogan, 2010; Jones & Gloeckner, 2004a). Also, regardless of homeschooling, both SAT and SES were correlated with RET, a result that has been observed in overall student samples (Mattern & Patterson, 2009). Advancement from year to year typically requires passing courses to obtain some minimum number of credits, and students with higher ability are more likely to do well in their coursework. If the cost of education is a factor, students higher in SES would be more likely to proceed through college.

Interestingly, the correlations between HSGPA and both FGPA and RET for homeschooled students are weaker than those for both the full and matched samples of traditional



FIGURE 4. Probability of being retained after first year of college depending on high school GPA by homeschooling status (homeschooled = 1, traditional = 0). The solid line represents traditional students and the dashed line represents homeschooled students.

students. The same issue was not present for SAT predicting FGPA or RET because the relationships are similar for all three groups. From Figure 2, it is clear that HSGPA performs much worse as a predictor of FGPA for homeschooled students than for traditional students, and from Figure 3 SAT can be seen to predict FGPA similarly for both homeschooled and traditional students. As depicted in Figures 4 and 5, a similar pattern of results can be observed when predicting RET as well. Therefore, in contrast to the high school grades of traditionally educated students, the high school grades of college students who were homeschooled do not appear to be as useful for predicting their college grades or their probability of being retained from first to second year of college.

As it stands, the only differences observed in this study between homeschooled and traditional students who were enrolled in college is the differential prediction of first-year college GPA and retention by high school GPA. In sum, while the SAT composite score predicts FGPA and RET equally well for both groups, HSGPA is a drastically worse predictor of FGPA and RET for the homeschooled group. Furthermore, when homeschooling is accounted for, if SAT is used to predict FGPA, adding HSGPA provides a smaller incremental prediction ($\Delta R^2 = .03$) when compared to adding SAT to HS-GPA ($\Delta R^2 = .09$). In other words, the SAT is a substantially more useful predictor of college success for homeschooled students than is HSGPA.

At this point, we can only speculate as to why high school GPA is a worse predictor for homeschooled students. The most apparent explanation is that the SAT is a standardized test whereas high school GPA is not, leading to the possibility that the reliability of high school GPA for homeschooled students may be lower than that for traditional students. Because states

widely vary in their regulation of homeschooling (Ruger & Sorens, 2013), whether HSGPA is a useful predictor or not may depend on how strictly homeschooling is regulated and how carefully grades are assigned. Unfortunately, we could not account for between-state differences in our analyses as there were no indications of where each homeschooled student was homeschooled in the data set used for this study. Other possible reasons include different norms for grading homeschooled students, a difference when teachers have to grade just one or a few students in a homeschool setting versus an entire class of students in a traditional setting, or the postsecondary institution having a different policy for obtaining or calculating the admission GPA of homeschooled students. Further research will be needed to pinpoint exactly how the properties of HSGPA differ between these two types of students.

Regardless of why HSGPA is an inferior predictor of FGPA for homeschooled students compared to traditional students, the predictive bias due to homeschooling was found in the analyses using the matched samples that attempted to isolate as much as possible the effects of homeschooling from other variables that may explain college performance, so it is likely to be a real effect with practical implications for college admissions. Whereas the SAT is an equally effective predictor for both homeschooled and traditional students, HSGPA appears to do a poorer job of differentiating between which homeschooled students are more likely to perform well in their first year of college than it does for traditional students. so it would follow that the use of HSGPA for college admissions should be considered differently depending on whether the applicant was homeschooled or not. For example, when evaluating homeschooled students, more emphasis could be



FIGURE 5. Probability of being retained after first year of college depending on SAT composite score by homeschooling status (homeschooled = 1, traditional = 0). The solid line represents traditional students and the dashed line represents homeschooled students.

placed on SAT scores over HSGPA. Obviously, the reality of actually doing so would be dependent on the admissions policies of each institution. Some institutions may be or may have been using such an admissions policy: in a survey of 55 admissions officers at U.S. colleges, Jones and Gloeckner (2004b) found that 74.5% of them had an official homeschool admissions policy and a high importance was placed on SAT or ACT scores for homeschooled students. That said, if policies are altered to account for differential prediction for homeschooled students, care should be taken so that they are not inadvertently put at a disadvantage in the admissions process.

The strength of this study lies in the analyses using a sample of traditional students matched to the characteristics of the homeschooled group, and the large pool of traditional students that allowed close matches to be found for each homeschooled student. This provided findings that were more meaningfully interpretable in contrast to the analyses with the overall group of traditional students. However, due to the fact that all of the students in our sample have attended a college or university, the generalizability of our findings may be limited to the population of students who at least meet the requirements that deem them acceptable to attend such institutions. Therefore, despite the conclusion that homeschooled students who attend college can be as successful as their traditionally educated counterparts, we currently cannot make any conclusions about the performance of homeschooled students relative to traditional students for those students who do not meet admissions requirements or who choose not to attend a college or university. Further research will be needed to address these other areas of comparison, and we suggest that future research comparing homeschooled students to traditional students should use a sample of traditional students matched to as many characteristics of the homeschooled

students as possible. As demonstrated in this study, differing conclusions can be obtained depending on whether the homeschooled students are compared to a matched sample of traditional students or some overall sample of traditional students. Given that the characteristics of homeschooled students are not proportional to those of traditional students, we believe that more realistic conclusions can be obtained from matched sample comparisons.

In summary, the results of this study provide positive support that college students who were homeschooled can perform as well as those who received a traditional education. However, while SAT scores predict college performance equally well for both homeschooled and traditional students, the high school GPA of homeschooled students should be carefully considered because it may not be as predictive of their performance in college compared to the high school GPA of traditional students. Ultimately, this suggests that the high school GPA of homeschooled students should always be considered in conjunction with standardized measures such as the SAT, and supports some implementation of different admissions policies for homeschooled and traditional students.

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