

## Predictive Validity of the Scholastic Aptitude Test (SAT) for Hispanic Bilingual Students

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*This study examines the effect of bilingual background on standardized testing among middle-class Hispanic students in South Florida. Scholastic Aptitude Test (SAT) scores and college GPA after four semesters were compared for 220 Hispanic and 892 non-Hispanic White students at the University of Miami. SAT scores accounted for a similar percentage of the variance in college GPA for the two groups, but mean SATs were significantly lower for the Hispanic students (about 45 points on average, both verbal and math), despite equivalent college grades. A given SAT score predicted a slightly higher GPA for the Hispanic student. In view of this finding, affirmative action policies that recommend different interpretations of standardized scores with minority groups may represent not a lowering of academic standards but, rather, a fairer prediction for that group.*

In assessing the costs and benefits of bilingualism for academic and cognitive development, research in the United States is hampered by the close association between bilingualism and minority status. Consequences of minority status are often attributed to bilingualism, which is then regarded as a liability rather than an asset. This study examines the effect of bilingual background on standardized college admissions testing in a specific population where bilingualism is not associated with many of the common disadvantages of minority status. The findings have relevance, not only to admissions testing, but to bilingual assessment and development in general.

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The bilingual group chosen for study are Cuban-American college students in Miami. The students who are our subjects have done well academically, first in high school and then in college, where they major in the demanding technical fields more often than their non-Hispanic classmates. Unlike other Hispanic subgroups, Cuban-American students closely resemble the norming samples for national tests with respect to income levels, educational preparation, and other socioeconomic indicators (Anderson, 1990; Clewell & Joy, 1988). Indeed, in Miami, they represent a majority of the population (Metro-Dade County, 1990). Yet their scores on college entrance tests remain low (Pennock-Román, 1988, 1990). The current study confirms that even when social, economic, and academic factors are held constant, a small but significant disparity exists between test scores for Hispanic bilingual students and for mainstream monolinguals. In light of this disparity in test scores, but *not* in high school or college grades, the usefulness of the test scores is called into question.

Most previous research on Hispanics and college admissions testing has been done on Mexican-Americans and Puerto Ricans (Astin, 1982; Durán, 1983; Goldman & Hewitt, 1976; Goldman & Richards, 1974; Goldman & Widawski, 1976; Pennock-Román, 1990). In those groups, the deficit compared to non-Hispanic Whites in Scholastic Aptitude Test (SAT) scores is about 80 points or more on a 600-point scale. According to studies published by the College Entrance Examination Board, these lower SAT scores translate into lower levels of achievement in college. Durán (1983) has compared the predictive validity of the SAT for Hispanics and other groups in terms of the magnitude of  $r^2$  in a regression analysis. Despite some evidence to the contrary, he concludes that in most cases the accuracy of prediction is comparable for Hispanics and non-Hispanic Whites, for both high school record and SAT scores. The tests, therefore, are not considered biased against Hispanics but are taken to be accurate reflections of Hispanics' poorer academic status and somewhat limited verbal skills in an English environment.

Pennock-Román (1990) also investigates with regression analyses the relative accuracy of prediction of test scores, to which she adds detailed information on language use and actual tests of proficiency. Comparing different admissions models at six universities of varying size and competitiveness, she too concludes that there are no major consistent differences in the prediction from SAT scores for Hispanics and non-Hispanic Whites. Her study allows a further inference: that in some circumstances SAT scores may be more important to the prediction of college success for Hispanic minorities than for other groups. Based on the occurrence—in some of Durán's (1983) populations and for four of the six groups in her own study (Pennock-Román, 1990)—where minority college success is overestimated by the high school

record when the majority prediction equation is used, one might be justified in relying less on that measure. Penneck-Román finds no consistent evidence, either from her own work or Durán's, showing that SAT scores underestimate minority success in college.

However, Penneck-Román's study alerts us to differences between Florida Hispanics and other Hispanic subgroups. Because Florida students represent only one group of six in her sample, the Florida experience does not change her overall conclusion. Nonetheless, for the Hispanics at the Florida institution, the difference between the Hispanic and non-Hispanic White SAT scores is the smallest of all the groups, and the prediction of college grade point average from SAT scores and high school grades is the most similar. Further investigation of the Cuban experience may lead us to amplify these findings.

The University of Miami (UM) provides an ideal setting in which to investigate this question. The school is a medium-sized private university with high tuition compared to the public colleges in the city. Although proportionately more financial aid is available, the student profile in general, including Hispanics, is middle and upper middle class. Hispanics, 90% of whom are from South Florida, comprise approximately 20% of the student body. They perform well academically at the University of Miami. Their high school records are comparable to those of non-Hispanic Whites, their retention at the university is better than the overall school population, and their average grade point average (UM-GPA) is the same as the average for non-Hispanic Whites (see below).

Unlike Hispanic bilingual populations in other parts of the United States, the Miami Latin community is, to a large extent, middle and upper middle class. It is particularly strong financially and politically (Boswell & Curtis, 1983; Pérez, 1986). The Cuban-Americans who make up over 60% of Miami Hispanics control large sectors of the banking industry, media, and government. Median income for Cubans is higher than for other Hispanic groups around the nation, although it remains slightly lower than for non-Hispanic Whites. Nonetheless, the upper strata of Hispanic society in Miami compare favorably in educational background and income with groups used for norming standardized tests (Clewell & Joy, 1988; De La Rosa & Maw, 1990; Fernández, Pearson, Umbel, Oller, & Molinet-Molina, 1992).

The present study reevaluates the predictive validity of SAT scores and their relative importance in predicting college success for academically well-qualified Hispanic bilingual students. If these students perform better in college than their SAT scores would predict, then test scores may be less important for Hispanic bilinguals than for other groups, or the scores may

need to be interpreted differently. Low levels of predictive validity, or a substantively different prediction, will challenge the suitability of monolingual norms for bilinguals. That is, bilingual students may be more able academically than current tests allow them to demonstrate.

## Method

### Subjects

The study population was 1,900 students entering the University of Miami in fall 1988. Of these, 294 described their background in school records as Hispanic or Cuban, 1,300 as non-Hispanic White, 104 as Black, 68 as Asian, and 134 gave no ethnic background information. Analyses were done for the 220 Hispanics (including Cubans) and 892 non-Hispanic Whites who, after four semesters, were making satisfactory progress toward a degree. There were 56% females in the Hispanic group and 41% females in the non-Hispanic White group. As gender has been identified as a factor associated with lower SAT scores (Lane, 1988), all analyses include gender as a factor.

Because the conclusions of this study rest on the assumption that the Hispanic students at the University of Miami are bilingual, but essentially middle class and U.S.-educated, the language and family background of this group was confirmed by means of a questionnaire administered to about one third of the students in the Hispanic group still in attendance after four semesters (83 of 220).

Our assumption about the economic background of the students is upheld by the range of professions reported for these parents: 70% professionals, managers, and business owners and only 1% from service or unskilled labor categories (see rankings of professions according to census figures in Nam & Powers, 1983). The average number of years of education for their parents is 14 years for their fathers and 13 years for their mothers, compared to 14.3 years and 13.6 years, respectively, for the general population of non-Hispanic White SAT takers (Clewell & Joy, 1988). Only 5% were from single-parent households.

All but 1 of the 83 students went to high school in the United States. In fact, 77% were born here, and all but 9 students attended school in the United States from the second grade on. All but 1 reported instruction exclusively through the medium of English. Although 96% had studied Spanish as a subject in elementary, junior high, senior high, or college, only 25% studied it throughout their school careers. Only 13 students took the Spanish Advanced Placement Test.

Spanish was reported as a first language by 97% of the students, but 89% of them reported English as their best language. (Twelve students learned the two languages simultaneously, of whom 3 say they are equally comfortable in English or Spanish.) Almost all of the students report being comfortable speaking and reading in Spanish, but about 20% say they are ill at ease writing in Spanish, and a handful of them mention problems reading about, or discussing, technical subjects in Spanish. Although only 25% use mostly Spanish with their siblings, 98% report using Spanish with their parents at least half of the time. In contrast, 90% report having mostly bilingual friends with whom they speak mostly in English. These figures confirm findings by Nielsen & Fernández (1982) who show Cuban-Americans being bilingual to a greater degree than other Hispanic subgroups. Thus our assumptions about the language background of these students appear to be valid.

Only 72% of the students in our subset were either born in Cuba or from Cuban parents. The other Hispanics were from the Caribbean basin and South America (only 3 from Puerto Rico). These Hispanics are usually included, along with Cubans, in Educational Testing Service (ETS) categories as "other Hispanic," that is, primarily not Mexican-American and not mainland Puerto Rican. There is some question whether generalizations about Cubans also extend to these other Hispanics. It is our experience in other studies (Fernández et al., 1992; Umbel, Pearson, Fernández, & Oller, 1992) that no significant differences were found on the dependent measures when the Miami group was divided according to Cuban and non-Cuban origin. Similarly, for this study, analyses were done separately for those who identified themselves as Cuban on school records, and only very tiny differences were observed between the groups (2 to 6 points on the mean SAT scores, and .1 in the mean grade point averages,  $t(218) = < 1$  for SAT-V and SAT-M, 1.74 for UM-GPA, all n.s.). It is possible that all Miami Hispanics benefit equally from the "additive" bilingualism (using Lambert's [1977] term) created by the institutions set in place by the early Cuban exiles (Pérez, 1986).

### Procedures

School records were examined for the 1,594 Hispanics and non-Hispanic Whites who entered the university in fall 1988. Each record listed the student's self-reported ethnic origin, gender, number of credits and UM-GPA after four semesters, major field, SAT-Verbal (SAT-V), SAT-Math (SAT-M), and high school decile (Hsdec), where available.

A preliminary analysis examined the difference by ethnic group of the 482 students who had not made satisfactory progress toward a degree, defined here as having earned fewer than 42 credits in 2 years on a semester system.

Of these, 373 had no credits. Because there is no way to distinguish which of these failed and which never registered, and because the percentages in each group making satisfactory progress were similar (74.8% of the Hispanics and 68.6% of the non-Hispanic Whites, chi-square = 1.79,  $p > .10$ ), the main analyses were done on the remaining 892 non-Hispanic Whites and 220 Hispanics. The two groups were compared on UM-GPA, SAT-V, and SAT-M. Ethnicity and gender served as the two independent variables. SAT-V scores were further broken down by high school decile and by major (humanities, social science including business, and science and engineering), and UM-GPA was broken down by major. Descriptive statistics are contained in Table 1.

Differences between the groups on these variables were tested with analyses of variance, shown in Table 2. The intercorrelations between the variables for the two groups were investigated using regression analyses, shown in Tables 3 and 4.

### Results

The clearest result was a significant lower mean SAT score (both Verbal and Math) for the Hispanic group, despite equivalent college grades. Mean UM-GPA after four semesters was 2.92 for the Hispanics and 2.90 for the non-Hispanic Whites. The Hispanic students do at least as well as the non-Hispanic Whites in terms of their university record, yet SAT means were 42 points and 49 points lower (Verbal and Math, respectively). As shown in Table 2, there were significant gender differences for the SAT measures but no interaction of ethnicity and gender. That is, both groups show gender differences to about the same degree. There were no significant differences for gender or ethnicity on academic achievement measures, UM-GPA and high school decile ( $F = \text{test not shown}$ ).

The pattern of difference in SAT scores between the ethnic groups was consistent in direction and magnitude across levels of high school achievement and across majors. In general, Hispanics in all majors had higher averages and lower SATs, except that the non-Hispanic Whites in science had both higher SATs and higher grades.

The consequences for prediction of grades of these differences were tested with regression analysis. One way of exploring the effect of ethnicity on the achievement measures is to compare the regression equation for both SAT scores together for all students, with and without ethnic background in the analysis. When SAT-V and SAT-M were allowed to enter in a stepwise analysis, only the SAT-M was entered at the .05 level of significance, yielding an  $r^2$  of .096 for the total population. (SAT-V, with a significance level of .33,

**Table 2. ANOVA Results for SAT and GPA Differences Between Hispanic and Non-Hispanic White Students**

Dependent Variable	df	ms	F	p
<b>SAT-Verbal</b>				
Gender	1	33,648	4.48	.034*
Ethnicity	1	269,357	35.89	.0001**
Gender x Ethnicity	1	18,089	2.41	.121
Error	1065	7,504		
<b>SAT-Math</b>				
Gender	1	622,635	74.04	.0001**
Ethnicity	1	296,817	35.29	.0001**
Gender x Ethnicity	1	7,648	< 1	.340
Error	1065	8,410		
<b>University of Miami GPA</b>				
Gender	1	.002	< 1	.92
Ethnicity	1	.106	< 1	.55
Gender x Ethnicity	1	.273	< 1	.33
Error	1108	.283		
<b>SAT-Verbal</b>				
High school decile	4	290,653	45.74	.0001**
Ethnicity	1	245,859	38.69	.0001**
High school decile x Ethnicity	4	6,450	1.01	.399
Error	911	6,355		
<b>SAT-Verbal</b>				
Major	2	157,790	21.78	.0001**
Ethnicity	1	318,206	43.91	.0001**
Major x Ethnicity	2	12,826	1.77	.17
Error	1063	7,246		
<b>GPA</b>				
Major	2	3.42	11.96	.0001**
Ethnicity	1	0.06	< 1	.66
Major x Ethnicity	2	0.84	2.94	.053
Error	1106	0.29		

\*p < .05; \*\*p < .01.

was never entered into the equation.) The addition of the ethnicity variable caused  $r^2$  to increase by .004 to .10 ( $p < .05$ ). SAT-M still accounted for most of the variance in UJM-GPA. SAT-V was not entered, but ethnic background was (see Table 3A).

A more usual analysis is to consider high school achievement, here high school decile, along with SAT scores. In the stepwise regression, high school decile alone accounted for more variance than the SAT score. The  $r^2$  for high school decile was .123. The addition of SAT-M increased  $r^2$  to .177 (see Table

**Table 1. Comparison of SAT Scores and University of Miami GPA for Hispanic and Non-Hispanic White Students**

Group	Hispanic		Non-Hispanic Whites		
	Score	SD	Score	SD	
SAT-Verbal	Female	482	90	359	89
	Male	476	90	499	84
SAT-Math	Female	519	86	359	90
	Male	557	112	499	90
University of Miami GPA/4 semesters					
SAT-Verbal by high school decile	Female	2.96	.58	2.89	.55
	Male	2.89	.56	2.91	.52
SAT-Verbal by major	All	2.92	.57	2.90	.53
	All	2.92	.57	2.90	.53
SAT-Verbal by high school decile	top 10%	523	84	559	81
	2nd 10%	468	80	523	81
SAT-Verbal by high school decile	2nd 20%	437	56	491	81
	3rd 20%	464	69	473	72
SAT-Verbal by high school decile	bottom 40%	417	117	458	79
	All	211	211	458	79
SAT-Verbal by major	All	484	85	507	90
	Humanities	467	84	511	83
SAT-Verbal by major	Science/engineering	494	97	551	79
	All	220	220	551	79
SAT-Verbal by major	Humanities	2.90	.6	2.84	.5
	Social science	2.94	.6	2.84	.5
SAT-Verbal by major	Science/engineering	2.93	.6	2.84	.5
	All	2.93	.6	2.84	.5

**Table 3. Regression Analyses—Hispanic and Non-Hispanic Whites Together**

	$r^2$	$p$
A. Stepwise regression of University of Miami GPA by SAT-Verbal and SAT-Math and ethnic background		
SAT-Math	.096	.0001
Ethnicity	.10	<.05
(SAT-Verbal not entered)		
B. Stepwise regression of University of Miami GPA by SAT-Verbal, SAT-Math, ethnicity, and high school decile		
High school decile	.123	.0001
SAT-Math	.177	.0001
(Ethnicity and SAT-Verbal not entered)		
C. Regression of University of Miami GPA by high school decile and ethnicity		
High school decile	.123	.0001
(Ethnicity not entered)		

**Table 4. Regression Analysis of University of Miami GPA by SAT-Verbal and SAT-Math—Hispanics and Non-Hispanic Whites Separately**

	SAT-Verbal		SAT-Math	
	Raw		Raw	
	$r^2$	Intercept	$r^2$	Intercept
Non-Hispanic Whites	.072	.001	.10	.0014
Hispanics	.065	.001	.089	.0013
		2.28		2.05
		2.38		2.22

NOTE: Significance of all  $r^2$  values  $p \leq .0001$ .

3-B). That is, the combination of high school decile and SAT-M accounted for almost 18% of the variance in UM-GPA. Even though ethnicity information and SAT-V were included in the analysis, they did not contribute to a significant increase in  $r^2$  and thus were never added to the equation. In order to investigate the separate contribution of high school decile and ethnicity, a third regression analysis was run. As we can see in Table 3 C, the ethnicity variable added nothing to the prediction of grades by high school decile again.

To focus more clearly on the prediction differences by ethnic background, separate regressions were done for Hispanics and non-Hispanic Whites. Results are given in Table 4. All the differences, though significant, are small and therefore of little practical consequence. They do, however, bear out the pattern discovered in the analyses of variance. The percentage of variance in UM-GPA accounted for by SAT scores ( $r^2$ ) was similar for the two groups. The raw regression weights were also similar. However, the two groups differed in the intercept. When effect coding was used to test the difference of the two regression equations, there was no interaction between either of the SAT scores and ethnicity. However, the regression weights for the ethnicity variable,  $b = .070$  for SAT-V and  $.077$  for SAT-M, were significantly different,  $t(1066) = 3.704$ ,  $p = .0002$  for SAT-V and  $4.132$ ,  $p < .0001$  for SAT-M. This indicates that the actual prediction of UM-GPA from a given SAT score was higher for the Hispanics by  $.14$  for SAT-V and  $.15$  for SAT-M. Stating the difference from the perspective of the grade point average, if both an Hispanic and a non-Hispanic White student have the same UM-GPA, the Hispanic generally has a lower SAT score.

To recapitulate, a statistically significant, but very small amount of the variance in college grades measured after four semesters is accounted for by SAT-Verbal scores. A slightly larger amount of variance is accounted for by the SAT-Math score. With Hispanic students, no unique variance is explained by the SAT-Verbal, such that when both scores are available for analysis, the SAT-V does not get entered into the equation unless forced. With non-Hispanic White students, the verbal score is entered, but still increments the amount of variance accounted for only slightly.

If only SAT scores are available, it is useful to know the ethnicity of the student in predicting grades, although it adds only a small amount to the prediction already offered through the SAT-Math. When high school decile is known, a combination of decile and SAT-Math gives the better prediction. The information in ethnicity, however, adds nothing to the information about high school decile, indicating that the high school record is a fairly consistent predictor for both the Hispanics and the non-Hispanic Whites.

When the regression equation is used to calculate a predicted UM-GPA from a given SAT score, the same SAT score predicts a higher grade point average for the Hispanic than for a non-Hispanic White student. The difference in predicted average, although statistically significant, is less than one third of the standard deviation in UM-GPA for both groups. In conjunction with the results of the analysis of variance, though, even that small difference may affect how admissions criteria are set.

## Discussion

The level of prediction of sophomore grades by SAT scores, either alone or in combination with high school decile for University of Miami Hispanics and non-Hispanic Whites, is quite small. Yet the magnitude of the  $r^2$  found in this study is consistent with other studies in the literature. For example, Crouse (1985) examines releases from the College Board's Validity Study Service, and reports a "typical" increment in prediction for SAT and high school record, over high school record alone, of .06 to .08, compared to our finding of a .054 increment in prediction of sophomore grades. Crouse estimates that a difference of approximately that magnitude would lead to a different prediction of freshman grade point average 2.5 times in 100 cases; in forecasting the number that would graduate successfully, the two sets of predictors would differ in one case in 1000. If one accepts his method of analysis, the differential forecast of sophomore grades would, we presume, be somewhere in between. Whether the SAT scores add a practical amount of information, or whether they are outweighed by unmeasured variables, like recommendations, special talents, or personal statements, is a matter for admissions committees to think about seriously.

What is clearly shown here, though, is that the lower SAT score for this population is not associated with poor academics. By extension, at least a portion of the often-observed deficit in SAT scores for Hispanics is not necessarily associated with poor academic promise. This study indicates that about a 45-point deficit per test may be a harmless concomitant to bilingualism. Given that the prediction equation is different, even for these groups who are so similar on important variables like SES and parental education, it appears to us a mistake to use the same levels of SAT scores to assess Hispanic and non-Hispanic White applicants.

It should also be noted that these results are for bilingual students whose best language is English and are not relevant for the evaluation of most international students. When English is the second and weaker language, applicants to American colleges need to demonstrate their skill in English, but not on the SAT-Verbal or SAT-Math. Alderman's (1982) study shows that the SAT score is not a suitable indication of aptitude for second language students at either the high or low end of the language proficiency scale. Although the aptitude tests in the first and second language were clearly related for students with superior English skills (with a raw regression weight of .47), the English test score was still very low compared to norms for English speakers, about 343 compared to approximately 500. For such students, success in an American college is probably best predicted by

measures of aptitude and achievement in the first language and a test of English language skill like the TOEFL. This is what is generally required of them.

For bilingual students whose best language is English, these results run counter to the prevailing view that SAT scores for minorities are merely the messenger of bad news. In this case, the poorer test performance does not portend poor academic performance. Working with a group of Hispanic test takers who by all socioeconomic and cultural indices are equivalent to their non-Hispanic White peers, we see that they are academically equivalent as well—except in terms of SAT scores. Even these high-achieving middle-class college students show a significant decrement in SAT score considered in conjunction with either their high school decile or their college grades. Because the students do not differ from the general population with respect to economic or academic status, one difference we can point to is language. The non-Hispanic Whites who make up the bulk of the norming group are largely monolingual; the Hispanics are overwhelmingly bilingual.

Why bilinguals would do worse on standardized tests like the SAT than on other measures of academic performance is not clear. The answer may reside in information processing factors associated with knowing two languages. Lexical storage for bilinguals may well be larger and may entail more complex coding; words that are represented in both languages may require more specification than a word known in only one language. Indeed, the lexical entry must include the word's extension in each language and must also note the differences between the languages. There is some evidence that words with multiple meanings pose greater problems for bilinguals than for monolinguals (Schmitt, 1988).

It has been observed (Durán, 1981, 1983) that Hispanics answer fewer questions (and get fewer answers wrong) than non-Hispanic Whites earning the same scores. This may be a difference in strategy, but it may also be a consequence of the limited time period of the test. Little research has been done on this (see Llabre, 1991, for a review), but minorities taking the tests under conditions that allow more time have sometimes shown proportionately greater improvement compared to non-Hispanic Whites who are also given more time (Evans, 1980). Working under a time pressure is no doubt a greater issue in the three hours one is given to demonstrate ability on the SAT than it is in the 15 weeks it takes to earn a college grade.

In terms of admissions decisions, our study shows that relatively little information is provided by the SAT score, compared to the high school record and the autobiographical material included in most applications. This message is already very strongly stated in the academic literature (Crouse, 1985;

Goldman & Widawski, 1976; White, 1981) but appears not to have captured the popular imagination. The inability to score well on SAT tests tells us about an applicant's testing ability in English but not very much about academic aptitude, except in very gross terms. To be sure, SAT scores of 1400 are more usually associated with excellent class rank than are scores of 850. However, when a SAT of 1400 is not backed up by a solid high school record, the candidate is generally a poorer admissions risk than, for example, the student with a SAT of 850 and very good grades.

Some of the current criticism of the SAT tests is being defused by announcements from ETS that major changes in the SAT will become effective in 1994 (Educational Testing Service, 1991). None of the announced changes addresses the question of making the standardization sensitive to differences in language background between test takers, and new studies of predictive validity will take several years to complete. For the sake of students in school now, educators must readjust their thinking on this issue now.

As more and more very capable bilingual students take the SAT, we still see a consistent deficit of about 40 points. Interestingly, this is about the same size deficit observed by Gannon (1981) in Asian-American law school applicants when they were compared with nonminority applicants matched for GPA at their own institutions. Asian-Americans, like Cuban-Americans, are often called the "nonminority minority". The results found with these two groups give us a different perspective on affirmative action. It does not represent a compromise with academic standards to say that different levels of standardized measures should be used for a different population. Rather, it is a realistic assessment that the norms from one group are not applicable for another. Bilingualism may not be an academic handicap, but it may appear so when standardized measures are improperly applied.

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