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Defining Group Membership: The Impact of Multiple Versus Single Ethnic/Racial Categories on Testing Practices

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ABSTRACT

The SAT® Program undertook two studies aimed at evaluating the impact of allowing students to indicate more than one ethnic/racial category. Information was collected during two large fall administrations of the SAT I: Reasoning Test. Students were asked, immediately following the testing, to indicate their ethnic/racial background on their answer sheets; multiple selections were allowed. During the first fall administration, students were asked to indicate all categories that described them, using essentially the same list found on the Student Descriptive Questionnaire (SDQ). During the second administration, students were asked to use a two-part question to describe themselves, first indicating their ethnicity (Hispanic or non-Hispanic) and then their race (using the remaining SDQ categories). Approximately 93 percent of test-takers responded to the questions on both the answer sheet and the SDQ, and about 4.5 percent moved from a single ethnic/racial category to multiple ones. The effect of the shift from single to multiple categories was further examined by comparing differential item functioning (DIF) results using the test-takers from the first administration. Results indicated that the mean DIF changed very little when the groups were redefined using their responses on the answer sheets. These analyses provide preliminary information on the impact of allowing students to choose multiple ethnic/racial categories.

KEYWORDS:

SAT I
SDQ
Ethnicity
Race

The SAT tests (SAT I: Reasoning Test and the SAT II: Subject Tests) are designed for juniors and seniors in high school, and the scores are used to assist in the college admission process. The SDQ is the primary mechanism for gathering demographic and background information on students who take these tests. This questionnaire, which is voluntarily completed at the time students register to take the SAT I or SAT II, asks a variety of questions, including course-taking patterns, college preferences, self-reported grades, and various family and self indicators. One of the questions on the SDQ asks students to choose the ethnic/racial category that describes them (see Table 1). However, only one ethnic/racial category may be chosen. Even though responses to the SDQ are voluntary, most questions have a high response rate; for example, the ethnic/racial question has a response rate of more than 90 percent.

As student demographics have changed, increasing requests have been made to allow students to choose multiple ethnic/racial categories. In addition, in November 1997, the Office of Management and Budgeting issued changes to the racial and ethnic categories that allow for multiple selections. And, for the first time the Census 2000 allowed individuals to choose multiple racial and ethnic categories. As a result of these changes, the SAT Program decided to undertake a series of studies to examine the impact of allowing students to indicate more than one ethnic/racial category.

SAMPLE

Data were collected during two large fall administrations of the SAT I in 1998. Students were asked, following the testing, to indicate their ethnic/racial background on their answer sheets. Multiple selections were allowed. Only those students who completed the ethnic/racial question on both the SDQ and the answer sheet were included in the analyses.

During the first fall administration, students were asked to indicate *all* categories that they felt described them using essentially the same list of ethnic/racial categories listed on the SDQ. (Note: Although "Native Hawaiian or other Pacific Islander" was listed as a separate category, it was combined with "Asian or Asian American" for analysis purposes.) During the second administration, students were asked to describe themselves using two separate questions. First, they were to indicate their ethnicity as being "Hispanic or Latino" or "Not Hispanic or Latino." Then they were to indicate their race, using all of the remaining SDQ categories that applied. Table 1 presents both sets of questions.

TABLE 1
ETHNIC/RACIAL QUESTIONS

Student Descriptive Questionnaire question:

1. How do you describe yourself? (Mark only one.)
   - American Indian or Alaskan Native
   - Asian, Asian American, or Pacific Islander
   - African American or Black
   - *Hispanic or Latino background:*
     - Mexican or Mexican American
     - Puerto Rican
     - Latin American, South American, Central American, or other Hispanic or Latino
   - White
   - Other

First Administration question:

1. How do you describe yourself? Mark *all choices that apply:*
   - American Indian or Alaskan Native
   - Asian or Asian American
   - African American or Black
   - *Hispanic or Latino background:*
     - Mexican or Mexican American
     - Puerto Rican
     - Latin American, South American, Central American, or other Hispanic or Latino
   - Native Hawaiian or other Pacific Islander
   - White
   - Other

Second Administration questions:

1. How do you describe yourself? Choose *only one*:
   - Hispanic or Latino
   - Not Hispanic or Latino
2. How do you describe yourself? Mark *all choices that apply*:
   - American Indian or Alaskan Native
   - Asian or Asian American
   - African American or Black
   - Native Hawaiian or other Pacific Islander
   - White
   - Other

RESULTS

Shifts in Categories. For all analyses, the subcategories for "Hispanic" were collapsed into one category. A total of 349,608 students (93.1 percent of the SAT I test-takers) responded to both the SDQ and the answer sheet questions in the first administration (see Table 2). Of these students, over 83 percent selected the same category both times. These numbers are shaded in Table 2. White (97.0 percent), African American (90.7 percent), and Asian American (93.2 percent) students tended to select a single category, while Hispanic and American Indian students selected a number of ethnic/racial categories. This is especially apparent in the American Indian category: Only 35.4 percent of students choosing this category on the SDQ selected the category again on the answer, while 28.1 percent moved from "American Indian" to "White."

Some 15,829 (4.5 percent) of the students shifted from a single category on the SDQ to more than one ethnic/racial category on the answer sheet. (Although 4.5 percent may not seem like a large number, when taken in context of the three million students who take SAT Program tests each year, this percentage represents about 135,000 test-takers.) These numbers are presented in the bottom row of Table 2 ("Multiple"). Students who indicated they were "American Indian" or "Other" on the SDQ chose multiple categories more frequently than other groups: About 28.4 percent of students indicating "American Indian" and 28.3 percent indicating "Other" chose multiple categories on the answer sheet.

A further analysis examined the percentage of students who moved from single to multiple ethnic/racial categories by region. This information is presented in Table 3. For this analysis, states were grouped into regions based on the College Board–defined regions. In most regions, the shift from a single category response on the SDQ to a multiple category response on the answer sheet was less than 3 percent. For the Southwest, just

TABLE 2
STUDENT RESPONSES TO ETHNIC/RACIAL CATEGORIES ON SDQ AND SAT I ANSWER SHEET (FIRST ADMINISTRATION)

	SDQ Response					
Answer Sheet Response	**American Indian**	**Asian American**	**African American**	**Hispanic/ Latino**	**White**	**Other**
American Indian	736 (35.4)					
Asian American	70 (3.4)	31,696 (93.2)				506 (5.7)
African American	54 (2.6)		23,956 (90.7)			238 (2.7)
Hispanic/Latino				21,266 (87.2)		
White	585 (28.1)			291 (1.2)	211,778 (97.0)	1,306 (14.8)
Other	32 (1.5)	480 (1.4)	265 (1.0)			4,086 (46.3)
Multiple	591 (28.4)	1,572 (4.6)	1,785 (6.8)	2,584 (10.6)	4,185 (1.9)	2,496 (28.3)

Note:. Numbers in parentheses are percentages. Empty cells mean less than 1 percent of students indicated membership in that ethnic/racial group. This table is based on 349,608 test-takers. These students represented about 93.1 percent of students taking a fall 1998 SAT I who completed the Student Descriptive Questionnaire (SDQ) and the answer sheet (A/S) question about ethnicity/race.

over 4 percent of the students chose multiple ethnic/racial categories on the answer sheet. In the West, the percentage of students moving from a single category to multiple categories was the highest of all regions, 7.5 percent. The volume for this fall administration was very high for the western region (mostly due to California test-takers) and thus represents a high percentage of the total number of test-takers. This undoubtedly influences the total shift seen in Table 2. It is possible that in other test administrations, where the percentage of test-takers from the West is lower, the shift from single to multiple categories will be lower than 4.5 percent.

Test-takers marked a wide variety of multiple categories and a total of 186 combinations were found. However, combinations of two ethnic/racial categories represented 74 percent of students marking multiple categories. Table 4 displays the most frequently occurring combinations for this testing administration. Note that "White" and another racial category encompass a substantial number of test-takers.

For the second administration, 243,820 students (92.9 percent of the SAT I test-takers) responded to both the SDQ and the answer sheet questions (see Table 5). This set of questions

TABLE 3
PERCENTAGE OF STUDENTS CHOOSING MULTIPLE CATEGORIES, BY REGION

Region	Percentage of Students
New England	2.67
Middle States	2.84
South	2.90
Midwest	2.51
Southwest	4.06
West	7.51

TABLE 4
MOST FREQUENTLY OCCURRING ETHNIC/RACIAL COMBINATIONS

Frequency	Categories
2,073	White – American Indian
1,921	White – Asian American
1,706	White – Other
1,346	White – Other Latino
1,160	White – Mexican
813	White – African American
526	White – Puerto Rican
484	American Indian – African American
412	Asian American – Other
406	Mexican – Other Latino
284	African American – Other
269	African American – Other Latino
263	Asian American – African American

appears to have caused confusion among test-takers. For those students indicating they were Hispanic/Latino on *both* the answer sheet and the SDQ, over one-half selected "Other" as their race and about one-third selected no race category on their answer sheets. For those students indicating they were Hispanic/Latino on the answer sheet but *not* the SDQ, most selected the same race category on the answer sheet as they did on the SDQ. These cells are shaded in Table 5 (top half). Those students who indicated they *were* Hispanic on the SDQ but *were not* Hispanic on the answer sheet selected "Other," "White," or multiple race categories on the answer sheet. And the majority of the students who indicated they were not Hispanic on *both* the answer sheet and the SDQ selected the same race category on the answer sheet as they had on the SDQ. As seen in the first administration, White, African American, and Asian American students tended to select one category on the answer sheet, while American Indian students again selected a number of categories. These cells are shaded in Table 5 (bottom half).

DIF analysis. Students from the first administration were used to compare DIF for groups formed using different ethnic/racial indicators. Two focal groups were formed: "Only" includes students who chose only a single ethnic/racial category on the answer sheet (for example, only African American); "Plus" includes any student who chose a particular ethnic/racial category on the answer sheet and at least one other category (that is, they belonged to the "Multiple" category).

Mean Mantel-Haenszel DIF differences were computed using the "Original" group (that is, the particular ethnic/racial category in which students were placed based on their SDQ responses) as the reference group and the "Only" and "Plus" groups as focal groups. For each ethnic/racial group the difference between each item (the "Original" minus "Only" or "Original" minus "Plus") was calculated and the mean using the absolute differences was computed.

Table 6 displays the differences for the items from the operational form given during the administration. As shown, the differences are very small, indicating that the DIF estimates are highly similar, irrespective of the particular group used. Additional analyses performed on pretest items (Table 7) produced similar results. Differences range from .01 to .14 for the operational items and from .06 to .16 for the pretest items.

These differences are quite reasonable, especially if compared to the differences when the same items are given to two different groups of "Original" students. For example, differences of .07 to .20 were seen in pretests that appeared in two different forms of the test at the same administration. These results are not surprising, however, in that the majority of students did not change ethnic/racial categories from the SDQ to the answer sheet. And of those students who indicated multiple categories, the majority still selected the ethnic/racial category they originally selected on the SDQ in addition to another category or categories. The ethnic/racial group showing the largest mean

TABLE 5
STUDENT RESPONSES TO ETHNIC/RACIAL CATEGORIES ON SDQ AND SAT I ANSWER SHEET (SECOND ADMINISTRATION)

Hispanic = Yes

Answer Sheet Response	SDQ Response: American Indian	Asian American	African American	Hispanic/ Latino	White	Other
American Indian	37 (42.5)					
Asian American		174 (72.2)				
African American		3 (1.2)	284 (43.4)			73 (11.2)
White	2 (2.3)	4 (1.7)	15 (2.3)	1,159 (6.9)	532 (60.2)	77 (11.8)
Other	10 (11.5)	11 (4.6)	160 (24.4)	8,968 (53.5)	79 (8.9)	176 (27.0)
Multiple	33 (37.9)	45 (18.7)	105 (16.0)	1,239 (7.4)	200 (22.6)	249 (38.2)
None	5 (5.7)	4 (1.7)	84 (12.8)	2,137 (30.8)	45 (5.1)	42 (6.4)

Note: Numbers in parentheses are percentages. Empty cells mean less than 1 percent of students indicated membership in that ethnic/racial group.

Hispanic = No

Answer Sheet Response	SDQ Response: American Indian	Asian American	African American	Hispanic/ Latino	White	Other
American Indian	414 (33.5)					
Asian American	35 (2.8)	14,423 (90.2)		19 (3.8)		257 (5.0)
African American	48 (3.9)		17,492 (90.6)	53 (10.7)		244 (4.8)
White	344 (27.8)			171 (34.4)	120,318 (96.4)	819 (16.0)
Other	21 (1.7)	339 (2.1)	236 (1.2)	188 (37.8)		2,353 (46.1)
Multiple	374 (30.2)	1,005 (6.3)	1,407 (7.3)	54 (10.9)	2,936 (2.4)	1,381 (27.1)
None				9 (1.8)		

Note: Numbers in parentheses are percentages. Empty cells mean less than 1 percent of students indicated membership in that ethnic/racial group.

differences was "American Indian," and that group also displayed the greatest change in responses from the SDQ to the answer sheet. It should also be noted that the analysis with "American Indian" as the focal group also contained the smallest sample; the larger DIF differences may be an artifact of the small sample size.

SUMMARY

These analyses provide preliminary information about the effect of allowing students to choose multiple categories. Although a small percentage of students across the country are likely to respond to multiple categories, the percentage of students is much larger in some regions (for exam-

TABLE 6
MEAN MANTEL-HAENSZEL DIF DIFFERENCES FOR OPERATIONAL ITEMS

Comparison	Group	Verbal (# items = 78)	Math (# items = 60)
African American/White	Only	.01	.02
	Plus	.02	.02
Hispanic/White	Only	.03	.03
	Plus	.03	.03
Asian American/White	Only	.02	.03
	Plus	.03	.05
American Indian/White	Only	.14	.14
	Plus	.14	.12

ple, West and Southwest) than in others. And taken in context of the number of students testing through the SAT Program, this small percentage could represent a substantial number of students.

It appears that the two-level question used in the second administration is difficult for students to answer. That is, the distinction between "race" and "ethnicity" may not be clear for some students. Thus, the single question used in the first administration seems to be the preferable one.

Although some recommendations can be made based on these data, it is apparent that additional work is needed to determine the full impact that changing demographics may present in current testing practices. There are also several issues that need further exploration. For example,

TABLE 7
MEAN MANTEL-HAENSZEL DIF DIFFERENCES FOR PRETEST ITEMS

Pretest	African American/ White		Hispanic/ White		Asian American/ White	
	Only	Plus	Only	Plus	Only	Plus
Verbal						
1 (# of items = 35)	.06	.07	.11	.08	.08	.09
2 (# of items = 35)	.07	.07	.09	.12	.10	.10
3 (# of items = 35)	.11	.10	.13	.12	.10	.10
4 (# of items = 35)	.07	.07	.14	.11	.08	.09
5 (# of items = 35)	.08	.08	.11	.10	.07	.09
6 (# of items = 35)	.07	.08	.13	.12	.07	.10
7 (# of items = 30)	.09	.07	.16	.12	.14	.15
8 (# of items = 30)	.10	.09	.14	.13	.12	.12
9 (# of items = 35)	.06	.07	.10	.08	.08	.07
10 (# of items = 30)	.07	.07	.12	.12	.08	.09
11 (# of items = 30)	.08	.07	.10	.08	.06	.05
12 (# of items = 30)	.09	.07	.09	.08	.08	.08
Math						
1 (# of items = 25)	.09	.07	.12	.12	.13	.12
2 (# of items = 25)	.11	.06	.16	.11	.10	.11
3 (# of items = 25)	.06	.06	.08	.07	.12	.11
4 (# of items = 25)	.16	.09	.14	.14	.09	.12
5 (# of items = 25)	.06	.05	.14	.13	.12	.10
6 (# of items = 25)	.10	.10	.13	.15	.10	.11

Note. Sample sizes were too small to perform "American Indian" analyses.

the SDQ presents a more detailed list of categories for "Hispanic/Latino" (for example, Mexican or Mexican American, Puerto Rican, etc.) but not for other categories, such as for "Asian or Asian American." Whether other ethnic/racial categories (for example, "Asian or Asian American") also require a list of subcategories, and the impact of using subcategories versus a collapsed category in analyses such as DIF, should be studied further.

In addition, the characteristics of the students who use the "Other" category are still largely unknown. Over the last five years, the percentage of students indicating "Other" on the SDQ has risen slightly (from 2 percent to 3 percent). It was expected that a good number of these students would move from "Other" to multiple categories. Although the number of students selecting "Other" was reduced when they were able to choose more than one ethnic/racial category, there was still a substantial percentage of students who used "Other" to describe themselves. These students may feel that their ethnic/racial groups are not represented by the current list of categories.

Finally, results of this study indicated that there is little impact on DIF analyses when different definitions of ethnic/racial classifications are used compared to traditionally defined classifications. Until the percentage of students representing multiple ethnic/racial categories increases, it is unlikely that current testing practices need to be modified. However, the changing demographics of these test-takers should continue to be monitored and tracked to determine their possible impact in the future.

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