A COMPARISON OF TWO SURVEY QUESTIONS ON RACE AND ETHNICITY AMONG HIGH SCHOOL STUDENTS

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In 1997, the Office of Management and Budget (OMB) announced a revision to Statistical Policy Directive No. 15, Race and Ethnic Standards for Federal Statistics and Administrative Reporting (U.S. OMB 1997a). According to the new standards, respondents must be offered the option of selecting one or more of at least the following five racial categories: American Indian or Alaska Native, Asian, black or African American, Native Hawaiian or other Pacific Islander, or white. In addition, the standards require the collection of data on whether a person is of Hispanic or Latino culture or origin. Federal programs are required to "adopt these new standards as soon as possible, but not later than January 1, 2003, for use in household surveys, administrative forms and records, and other data collections" (p. 58782).

The Youth Risk Behavior Surveillance System (YRBSS), conducted by the Centers for Disease Control and Prevention (CDC), is one of many federal surveys affected by these new standards. For the past decade, the YRBSS has served as a primary source of data about behaviors that most influence the health of young people in the United States and is used to measure progress toward achieving national health and education objectives. The YRBSS assesses biennially priority health-risk behaviors among large city, state, and national samples of high school students (Kolbe, Kann, and Collins 1993). The core survey instrument is the Youth Risk Behavior Survey (YRBS) questionnaire, a self-administered questionnaire containing 87 multiple-choice questions. Students complete the questionnaire in classrooms and record their responses directly on a computer-scannable booklet.

In response to the 1997 standards, CDC introduced a revised question to assess race and ethnicity on its 1999 YRBS questionnaire. To develop the new race/ethnicity question, CDC followed the Provisional Guidance on the Implementation of the 1997 Standards for Federal Data on Race and Ethnicity

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issued by OMB (U.S. OMB 2000). The new question gives respondents the option of selecting one or more of six response options: American Indian or Alaska Native, Asian, black or African American, Hispanic or Latino, Native Hawaiian or other Pacific Islander, or white. Previous versions of the YRBS required students to select only one of six response options: white, black, Hispanic or Latino, Asian or Pacific Islander, American Indian or Alaskan Native, or other. Although OMB prefers the use of separate questions to assess race and Hispanic origin, field testing during the development of the YRBS questionnaire indicated that some adolescents did not distinguish between the two concepts, resulting in missing data. Both the old and new YRBS questions on race/ethnicity therefore ask about these concepts in a single question, an acceptable method under the new standards (U.S. OMB 1997a).

As part of the process for revising the standards, the Bureau of Labor Statistics, the Census Bureau, and other federal agencies conducted several research studies to compare the various approaches to collecting data on race and ethnicity (U.S. OMB 1997b). While these studies were useful in the development of the new standards, OMB also noted that agencies affected by the standards should conduct their own research to "evaluate the effects of the proposed changes and to consider methods for accommodating them" (U.S. OMB 1997b, p. 36943). In addition, most of the studies were conducted among adults. One exception is the May 1995 Supplement on Race and Ethnicity to the Current Population Survey, which included respondents aged 15 and older. Published reports of that study do not, however, provide age-specific results (Tucker et al. 1996; U.S. Bureau of Labor Statistics 1995), so research on how adolescents respond to various questions on race and ethnicity is scarce.

Consistent with OMB's recommendation for affected agencies to conduct their own studies and to provide data on adolescent responses to race and ethnicity questions CDC conducted a methodological study of the YRBS questionnaire that included a comparison of the old and new race/ethnicity questions. This study was conducted in 2000 and was separate from the national YRBS, which is conducted in odd-numbered years. The purpose of this study was to understand how the new YRBS question might affect the racial and ethnic distribution of survey respondents and to inform the development of bridging techniques for trend analyses. Students were administered different versions of the questionnaire on two occasions approximately 2 weeks apart (time 1 and time 2). This design allowed us to compare the distributions produced by the different question versions, as well as to examine the test-retest reliability of each question, the missing data associated with each question, and the correspondence between respondents' answers to each version of the question.

Method

A convenience sample of respondents was drawn from 61 schools in 20 states plus the District of Columbia. Because the goal of sampling was to obtain a diverse group of respondents, the 20 states were geographically dispersed. Selection of ninth- through twelfth-grade classes within each volunteer school varied according to the school's schedule. In about half of the schools, students in health education or physical education classes were eligible to participate. In about one-fourth of schools, students in required academic subjects (e.g., English) were eligible to participate. In other schools, all students were eligible to participate. In each school, local parental consent procedures were followed. This study was approved by CDC's Institutional Review Board.

Of the 6,802 students enrolled in the selected classes, 5,216 (77 percent) completed questionnaires during the first survey administration. The remaining 23 percent were absent on the day of the survey, failed to return a parental consent form, refused to participate, or had parents who refused to have their child participate. Of those who completed questionnaires in the first administration, 4,628 (89 percent) completed questionnaires during the second administration. Nine students did not have matching identification numbers on time 1 and time 2 questionnaires. The final sample, therefore, consisted of 4,619 students. The distributions of gender, grade, and age in the sample were similar to the characteristics of ninth- through twelfth-grade students in the United States (U.S. Bureau of the Census 1998). In terms of race/ethnicity, white students and Hispanic students were underrepresented in the sample, but black students were overrepresented (Brener et al. 2002).[1]

As part of a larger study designed to test the reliability of all the items and the effect of alternative question wording for some items, eight very similar forms of the questionnaire were developed (Brener et al. 2002). All questionnaires were self-administered and contained between 97 and 100 multiple-choice questions. The first five questions measured demographic information, including race/ethnicity, the next two asked students to report their height and weight, and the remaining items assessed health-risk behaviors.

Data collection began in February 2000 and was completed in April 2000. The questionnaire was administered in a regular classroom setting and took students about 40 minutes to complete. A standard computer-scannable questionnaire booklet contained the questions and was used to record responses.

Trained data collectors from Macro International Inc. (ORC Macro) conducted the survey. The data collectors read aloud scripts that explained the survey procedures. Students were informed during the first survey administration that they would be asked to complete a "very similar" questionnaire

1. The race/ethnic distribution of the sample was calculated using bridging techniques described later in this article. These techniques allowed the combination of data from different questions on race/ethnicity.

a few weeks later. Other than that variation, the administration procedures used in this study were the same as those used for the standard YRBS.

Several versions of the questionnaire were distributed randomly within each classroom, so that approximately one-fourth of the sample received each combination of the old and new race/ethnicity questions. Specifically, 23.8 percent of the sample answered the old question at both time 1 and time 2 (panel A), 25.6 percent answered the new question at both time 1 and time 2 (panel B), 25.3 percent answered the old question at time 1 and the new question at time 2 (panel C), and the remaining 25.2 percent answered the new question at time 1 and the old question at time 2 (panel D).

The old question required students to select only one response option; it read:

How do you describe yourself?

A) White—not Hispanic
B) Black—not Hispanic
C) Hispanic or Latino
D) Asian or Pacific Islander
E) American Indian or Alaskan Native
F) Other

Responses to this question were processed by using a standard algorithm that produced six possible race/ethnicity categories corresponding to response options A–F. In this sample, no student selected option F, resulting in five categories.

The new race/ethnicity question allowed students to select more than one response option. This question read:

How do you describe yourself? (Select one or more responses.)

A) American Indian or Alaska Native
B) Asian
C) Black or African American
D) Hispanic or Latino
E) Native Hawaiian or Other Pacific Islander
F) White

Responses to this question were processed by using a standard algorithm that produced eight possible race/ethnicity categories: American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or other Pacific Islander, white, multiple Hispanic, and multiple non-Hispanic. Specifically, respondents who selected only one response option were assigned to the race/ethnicity category that corresponded to that response option (A–F). Respondents who selected more than one response option and included Hispanic as one of their responses were assigned to the race/ethnicity category "multiple Hispanic." Respondents who selected more than one re-

Table 1. Percent Distribution of Race/Ethnic Categories at Time 1, by Question Version

	Panel			
Race/Ethnicity	A Old-Old (N = 1,100)	B New-New (N = 1,184)	C Old-New (N = 1,170)	D New-Old (N = 1,165)
White—not Hispanic	52.7	49.2	48.7	51.8
Black—not Hispanic	31.8	29.6	31.5	29.0
Hispanic*	6.1	8.1[a]	5.4	6.4[b]
Asian or Pacific Islander**	3.9	7.9[c]	6.8	8.5[d]
American Indian or Alaska Native	.7	1.3	1.2	.4
Multiple non-Hispanic	N.A.	2.5	N.A.	3.0
Missing**	4.7	1.4	6.4	.9

NOTE.—N.A. = not applicable.
[a] Includes 7.3 percent Hispanic + .8 percent multiple Hispanic.
[b] Includes 5.0 percent Hispanic + 1.4 percent multiple Hispanic.
[c] Includes 6.3 percent Asian + 1.6 percent Native Hawaiian or Other Pacific Islander.
[d] Includes 7.2 percent Asian + 1.3 percent Native Hawaiian or Other Pacific Islander.
* Effect of panel significant at $p = .05$.
** Effect of panel significant at $p < .0001$.

sponse option and did not include Hispanic were assigned to the race/ethnicity category "multiple non-Hispanic."

Results

Table 1 provides the race/ethnic distributions of each of the four panels. To make the old and new response options comparable, students whose responses to the new question categorized them as "Hispanic" or "multiple Hispanic" were considered Hispanic, and those whose responses to the new question categorized them as "Asian" or "Native Hawaiian or other Pacific Islander" were considered "Asian or Pacific Islander."

Analysis of variance using PROC GLM in SAS indicated a statistically significant effect ($p \leq .05$) by panel for the Hispanic ($F = 2.6$, $p = .05$), Asian ($F = 7.3$, $p < .0001$), and missing ($F = 26.4$, $p < .0001$) categories (table 1). Post hoc tests using the LSMEANS procedure indicated that the percentage of students in panel B whose responses categorized them as "Hispanic" or "multiple Hispanic" was significantly greater than the percentage of students in panel C who answered "Hispanic." Compared to students in panels B, C, and D, a significantly lower percentage of students in panel A categorized themselves as "Asian or Pacific Islander." Panel C had the highest

Table 2. Categorization Based on Old versus New Race/Ethnicity Question for Respondents Answering Both Old and New Questions (Panels C and D Combined)

	Old Race/Ethnicity Category						
New Race/Ethnicity Category	White—Not Hispanic	Black—Not Hispanic	Hispanic or Latino	Asian or Pacific Islander	American Indian or Alaskan Native	Missing	Total (Overall percent)
American Indian or Alaska Native:							
Frequency	**9**	**0**	**0**	**1**	13	1	24 (1.0)
Row percent	**37.5**	**.0**	**.0**	**4.2**	54.3	4.2	
Column percent	**.8**	**.0**	**.0**	**.6**	50.0	.6	
Asian:							
Frequency	**0**	**0**	**2**	149	**0**	6	157 (6.7)
Row percent	**.0**	**.0**	**1.3**	94.9	**.0**	3.8	
Column percent	**.0**	**.0**	**1.7**	81.4	**.0**	3.7	
Black or African American:							
Frequency	**3**	665	**0**	**0**	**4**	32	704 (30.2)
Row percent	**.4**	94.5	**.0**	**.0**	**.6**	4.6	
Column percent	**.3**	96.4	**.0**	**.0**	**15.4**	19.5	
Hispanic or Latino:							
Frequency	**3**	**1**	110	**2**	**0**	9	125 (5.4)
Row percent	**2.4**	**.8**	88.0	**1.6**	**.0**	7.2	
Column percent	**.3**	**.1**	92.4	**1.1**	**.0**	5.5	

Native Hawaiian or other Pacific Islander:							
Frequency	**5**	**0**	**0**	16	**1**	12	34 (1.5)
Row percent	**14.7**	**.0**	**.0**	47.1	**2.9**	35.3	
Column percent	**.4**	**.0**	**.0**	8.7	**3.9**	7.3	
White:							
Frequency	1,103	**1**	**1**	**2**	**4**	51	1,162 (49.8)
Row percent	94.9	**.1**	**.1**	**.2**	**.3**	4.4	
Column percent	95.7	**.1**	**.8**	**1.1**	**15.4**	31.1	
Multiple Hispanic:							
Frequency	**1**	**1**	4	**4**	**0**	16	26 (1.1)
Row percent	**3.9**	**3.9**	15.4	**15.4**	**.0**	61.5	
Column percent	**.1**	**.1**	3.4	**2.2**	**.0**	9.8	
Multiple non-Hispanic:							
Frequency	**12**	**7**	**0**	**9**	**4**	26	58 (2.5)
Row percent	**20.7**	**12.1**	**.0**	**15.5**	**6.9**	44.8	
Column percent	**1.0**	**1.0**	**.0**	**4.9**	**15.4**	15.9	
Missing:							
Frequency	17	15	2	0	0	11	45 (1.9)
Row percent	37.8	33.4	4.4	.0	.0	24.4	
Column percent	1.5	2.2	1.7	.0	.0	6.7	
Total:							
Frequency	1,153	690	119	183	26	164	2,335
Percent	49.4	29.6	5.1	7.8	1.1	7.0	100.0

NOTE.—N = 2,335. Cells in boldface were added to calculate numerator of nonmatching responses (see discussion in text).

percentage of students who failed to complete the race/ethnicity question; this percentage was significantly higher than those in the other three panels. In addition, panel A had a significantly higher percentage of missing responses than did panels B and D.

Panels C and D were unique in that those students answered both the old and new race/ethnicity questions, one at time 1 and the other at time 2. Combining the results of these two panels provides data on how the same students' answers to the old question correspond to their answers to the new question. Table 2 provides the number and percentage of students providing each combination of responses. For example, the first cell indicates that nine students categorized themselves as "white—not Hispanic" when answering the old question and as "American Indian or Alaska Native" when answering the new question. Among the students answering the old and new questions, these nine students represent 37.5 percent of those answering "American Indian or Alaska Native" to the new question, and 0.8 percent of those answering "white—not Hispanic" to the old question.

To calculate the percentage of students answering both the old and new questions who were categorized differently by their responses to the different questions, the cells in bold in table 2 were added to calculate the numerator. These cells represent nonmatching responses, using the same procedure described above for combining Hispanic and multiple Hispanic responses, and combining Asian and Native Hawaiian or other Pacific Islander responses. All cells besides the "missing" row and column were added to calculate the denominator. Using this technique, 77 of 2,137, or 3.6 percent, of students who answered both the old and new questions were categorized differently by their responses to the old versus new questions. Table 2 also shows that, among students who failed to answer the old race/ethnicity question, 25.7 percent were categorized as either "multiple Hispanic" or "multiple non-Hispanic" based on their response to the new question. In addition, those students categorized as "multiple non-Hispanic" based on their response to the new question were most likely to have selected "white—not Hispanic" when required to select only one response in the old question.

The design of this study also provided a test of the reliability of both the old and new questions. Among students answering the old race/ethnicity question at both time 1 and time 2, agreement between their time 1 and time 2 responses was almost perfect (kappa $= 0.99$, $N = 989$). In terms of missing data, 4.7 percent of students who were asked the old question at both time 1 and time 2 did not complete the question at time 1, and 8.4 percent did not complete it at time 2.

Among students answering the new race/ethnicity question at both time 1 and time 2, agreement between time 1 and time 2 responses was slightly lower, but still excellent (kappa $= 0.95$, $N = 1{,}141$). Missing values were less frequent. Only 1.4 percent of students who were asked the new question at both

time 1 and time 2 failed to complete the question at time 1 and 2.7 percent failed to complete it at time 2.

Discussion

This study demonstrates that allowing students to select more than one response to the race/ethnicity question on the YRBS had only a minimal effect on reported race/ethnicity among high school students. Among students who answered both the old and new race/ethnicity questions, more than 96 percent were categorized the same way regardless of the response options. While the percentage of Hispanic and Asian students sometimes varied depending on which question was asked, the percentages of the other race groups did not vary by question. This finding is consistent with past research, which has shown that adding a multiracial response option or allowing respondents to select more than one race does not affect significantly the percentage of respondents reporting that they are white or black but does affect the percentage of respondents in smaller racial groups (Sondik et al. 2000; U.S. OMB 1997b).

This study also demonstrates that the new race/ethnicity question used in the YRBSS beginning in 1999 is highly reliable and, that compared with the old race/ethnicity question, the new race/ethnicity question produced a lower item nonresponse.[2] About one-fourth of students who failed to complete the old race/ethnicity question selected more than one response when given the opportunity to do so under the new question. Therefore, for at least some students who consider themselves members of more than one racial/ethnic category, the option of selecting more than one race/ethnicity increases the likelihood that they will complete the race/ethnicity question.

Even when given the option of selecting multiple responses to the race/ethnicity question, however, only 2.5 percent of students in panel B and 3.6 percent of students in panels C and D did so. Overall, this percentage of respondents selecting multiple categories is only slightly greater than the 2.4 percent found in the 2000 U.S. Census (U.S. Bureau of the Census, 2002).

To create a YRBS trend data set covering surveys from 1991 through 2001, CDC developed bridging methods for the race/ethnicity questions. Students categorized as Asian, Native Hawaiian, American Indian or Alaska Native, and multiple non-Hispanic in any survey year are reassigned to an "other" category, because the numbers of students in each of these groups from any single year of the survey are too small for meaningful analysis. Students categorized as black or white in any survey year are left in those categories.

2. It also should be noted that, for both the old and the new race/ethnicity questions, the item nonresponse at time 2 was nearly twice as high as at time 1. This generally was true for all items in the questionnaire and probably reflects students' unwillingness to answer the same questions they had answered 2 weeks earlier.

Students categorized as multiple Hispanic in 1999 or 2001 are reassigned to the Hispanic category, which provides similar results to those obtained using separate questions for race and Hispanic origin (U.S. OMB 1997b). These bridging techniques for trend analysis appear appropriate, based on this study's finding that the revision to the race/ethnicity question has had only a minimal effect on reported race/ethnicity among high school students. It seems that YRBS data users interested in white, black, and Hispanic high school students are on solid ground when using the race/ethnicity variable in trend analyses.

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