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**The Effects of Questionnaire Design
on Reporting of Detailed Hispanic Groups
in Census 2000 Mail Questionnaires**

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**The Effects of Questionnaire Design on
Reporting of Detailed Hispanic Groups in Census 2000 Mail Questionnaires¹**

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Several recent newspaper articles have suggested that the design of the Census 2000 questionnaire affected Hispanics' reports of membership in specific Hispanic groups. Scott (2001) and the Los Angeles Times (2001) suggest that dropping the examples that appeared in the 1990 Hispanic origin question resulted in less complete identification of Salvadorans and Guatemalans in Los Angeles County, and of Dominicans, Colombians, and Ecuadorians in New York City, in Census 2000. (The 1990 and 2000 questions are shown in figures 1 and 2.)

Obviously, one cannot investigate the effect of examples by comparing 1990 and 2000 census data, because questionnaire effects are confounded by real population differences. Comparison of responses to 1990-style and Census 2000 mail questionnaires administered in an experiment conducted during Census 2000 makes it possible to test hypotheses about the effect of examples and other questionnaire features on Hispanic reporting.

Examples might affect reporting because they illustrate for respondents the intended specificity of response. That is, they affect comprehension of the intent of the question. Examples also may stimulate recall, because they can serve as reminders of specific groups of origin that might not otherwise come to mind. For instance, adding "German" and dropping

¹This article reports the results of research undertaken by Census Bureau staff. The views expressed are attributable to the author and do not necessarily reflect those of the Census Bureau. More complete findings of the study are reported in Martin (2002).

“English” as examples in the ancestry question in the 1990 census apparently resulted in a large increase in the number of people reporting German ancestry and a large decline in the number claiming English ancestry, compared to the 1980 census (Scarr, 1993). As was the case of ancestry in 1990, examples may introduce bias, because they can enhance recall for example items but inhibit it for non-example items.²

Hypotheses about the effects of examples on comprehension and recall yield contrasting predictions about their effects upon reporting of detailed Hispanic groups. If the examples affected respondents’ comprehension of the intent of the Hispanic origin question, then the effect should be an overall increase in the specificity of reporting. If, on the other hand, examples stimulated recall, then the predicted effect would be increased reporting of example groups and reduced reporting of groups not given as examples, due to the inhibitory effect of cues on recall of noncued items.

Background. The mail questionnaire, including the race and Hispanic origin questions, was extensively revised and tested prior to Census 2000 (see e.g., Dillman, Sinclair, and Clark, 1995; Gerber, de la Puente, and Levin, 1998; U. S. Census Bureau 1996, 1997). A number of changes made in the Census 2000 questionnaire were intended to improve reporting for the Hispanic origin item, including:

1.) Format changes: the 1990 short form used a matrix format (with questions in rows and

²In psychology, this effect is termed the part-set or part-list cuing effect. If subjects learn a list of words, then providing as cues part of the list increases recall of the cued items and suppresses recall of noncued items, compared to unaided or free recall. The effect is found generally for both episodic and semantic memory, that is, memory for events and general knowledge. (See e.g., Roediger and Neely, 1982.)

persons in columns) for 100% items, while the 2000 short form used individual person spaces intended to make the form easier to understand and follow.

2.) Resequencing of race and Hispanic questions: In 1990, race preceded Hispanic origin by two questions; in 2000, Hispanic origin preceded race. The intent, supported by research results, was to reduce item nonresponse for the Hispanic origin item (Bates et al., 1995; U. S. Census Bureau, 1996).

3.) Rewording of question and instruction: In 1990, the origin question was, “Is this person of Spanish/Hispanic origin? Fill ONE circle for each person.”

In 2000, the question was, “Is this person Spanish/Hispanic/Latino? Mark the ‘No’ box if not Spanish/Hispanic/Latino.”

4.) Use of examples: In 1990, examples were printed above the box for “other” write-ins: “Yes, other Spanish/Hispanic (Print one group, for example: Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.)” In 2000, the examples were dropped and the other category was reworded: “Yes, other Spanish/Hispanic/Latino— *Print group.*”

Figs. 1 and 2 show the Hispanic origin item in the Census 2000 (item 5) and 1990-style questionnaires (item 6), respectively.

Method. An experiment was conducted during Census 2000 to evaluate the combined effect of all of the Census 2000 questionnaire and content changes on race and Hispanic origin responses. 1990-style mail short forms (which replicated 1990 question wording, categories, matrix format, and sequencing³) were mailed to a random sample of 10,500 households, and a control panel of

³The 1990-style form differed from the 1990 census form in that it dropped questions that were eliminated in Census 2000, including marital status, which followed age in the 1990

about 15,000 households received Census 2000 mail short form questionnaires. Both panels were selected and administered as part of the Alternative Questionnaire Experiment (AQE).

The AQE sample was stratified and oversampled housing units in tracts with large numbers of minority (Black, Hispanic) and renter households in 1990. The sample is limited to the national mail out-mail back universe. Thus, results exclude mail nonrespondents who were enumerated in nonresponse followup and segments of the population (e.g. American Indians on reservations, Alaska Natives) enumerated in other operations.

Between 72 and 73 percent of sample households mailed their forms back in both panels (rates are weighted and exclude undeliverable addresses and blank and duplicate forms). The experimental data were keyed rather than imaged as production Census 2000 data were. For AQE sample respondents, the experimental questionnaires were the only census questionnaires they received and the responses they provided were their census data. After the data were keyed, the experimental cases were merged with the full census file and processed through the full census edit and imputation process.

This paper analyzes the unedited data. For present purposes, a simplified version of the standard Census 2000 pre-edits and coding procedures was applied to data from both forms: missing data were not imputed or allocated, as they were in the census data. In 1990, a content edit followup operation was conducted to obtain more complete responses from households providing insufficient data; this was not conducted in Census 2000 or the experiment.

Differences in editing and processing may result in differences between results reported here and

questionnaire. In addition, the Census 2000 letter and envelope were used, and certain recognizable graphical features, such as the logo and color scheme, were similar to the Census 2000 questionnaire.

1990 or 2000 census data. Thus, results reported here can support conclusions about questionnaire differences in the *quality and content of response data* they produce, but not about differences in *final data quality*.

Results are weighted to reflect stratum sampling probabilities, and are nationally representative of areas in the mail back universe. Standard errors (given in parentheses in the tables) and t-statistics were computed using stratified jackknife replication methods (Fay, 1998) that account for the stratified sample design and clustering of people within households.

Despite the large sample, statistical inferences about small population groups (such as detailed Hispanic groups) may not be reliable. The design of the experiment does not permit estimation of the separate effects of specific design features.

Results. Table 1 shows that nearly identical fractions of people were reported as Hispanic in Census 2000 and 1990-style mail short forms—11.17% and 11.14% respectively. In Census 2000 questionnaires, the fraction reported as not Hispanic is larger, and the fraction with missing data is smaller. Great effort went into crafting the Census 2000 form to obtain more complete reporting of Hispanic origin than in 1990. Research in preparation for Census 2000 showed that reversing the sequence of race and origin and adding an instruction to fill out both items would substantially reduce missing data for the Hispanic item (Bates et al., 1995). In past censuses, most people for whom Hispanic origin was missing were non-Hispanics, who often skipped the question because they believed it did not apply to them. The modified instruction to “mark the ‘no’ box if not Spanish/Hispanic/Latino” was intended to reduce nonresponse by this group. The results in Table 1 suggest that the efforts to redesign the Census 2000 questionnaire succeeded in

achieving very substantial reductions in item nonresponse. In particular, it appears that many non-Hispanics who would have left the origin item blank in 1990-style questionnaires completed it in Census 2000 questionnaires. Assuming that the nonrespondents are non-Hispanics, then the results in Table 1 suggest that the Census 2000 questionnaire did not affect the fraction reporting as Hispanic, except to reduce item nonresponse. However, the effect on the final Hispanic distribution would depend on how missing data were edited and imputed.

Table 1. Hispanic origin, by form type (standard errors in parentheses)

	2000	1990-style	$t_{2000-1990}$
Total persons	100.00%	100.00%	
All persons identified as Hispanic	11.17% (.29)	11.14% (.45)	.05
Not Hispanic	85.50% (.32)	74.39% (.62)	15.8*
Hispanic item blank or uncodable	3.33% (.14)	14.46% (.49)	-21.9*
Unweighted N of people	40,723	16,616	

*difference between forms significant at $p < .05$

Table 2 examines form differences in Hispanics' reports of membership in detailed Hispanic groups. Such reports may be given by checking off one of the three boxes associated with a group, or by printing a group in the space next to "other Spanish/Hispanic/Latino."

Detailed Hispanic groups are classified into three categories:

(1) those with check boxes (Mexican, Puerto Rican, Cuban), for which specific cues appear in both forms;

(2) those listed as examples in the 1990-style form (Argentinian, Colombian, Dominican,

Nicaraguan, Salvadoran, Spaniard), for which specific cues appear in the 1990-style but not the Census 2000 form; and

(3) all other specific groups with no check boxes and not listed as examples, for which specific cues appear in neither form.

(4) write-ins of general descriptors, such as “Hispanic,” “Spanish,” or “Latino.”

(5) no write-ins, or uncodable entries.

If the examples affected respondents’ comprehension of the question, their inclusion in the 1990-style form should result in more reports in the first three categories, and fewer reports in categories 4 and 5. If, on the other hand, mentioning a specific group stimulates recall for that group, then we should observe differential form effects for categories 1-3: There should be no form differences in reporting of category 1 groups, because specific cues for them appear in both forms. There should be more reports of category 2 groups in the 1990-style form, where they were listed as examples, than in the Census 2000 form, where they were not. Finally, there should be fewer reports of category 3 groups in the 1990-style form than in the Census 2000 form, because the examples in the 1990-style form would inhibit recall of non-cued items.

Table 2. Percentage of Hispanics reporting in specific groups, by form type (Standard errors in parentheses)

	2000	1990-style	$t_{2000-1990}$
Total persons self-identified as Hispanic	100.00%	100.00%	
1. "Check box groups": Hispanic groups with separate check boxes in both forms (sum of a-c)	70.25% (1.25)	73.23% (1.77)	-1.37
a Mexican, Chicano, Mexican Am.	54.26% (1.38)	58.68% (2.02)	-1.81*
b Puerto Rican	11.42% (.83)	11.01% (1.28)	.27
c Cuban	4.58% (.54)	3.54% (.67)	1.21
2. "Example groups": listed as examples in 1990-style form but not Census 2000 (sum of d-i)	6.41% (.63)	11.16% (1.17)	-3.58*
d Argentinean	0.24% (.10)	0.32% (.15)	-.45
e Colombian	1.34% (.28)	1.89% (.42)	-1.08
f Dominican	2.59% (.43)	2.76% (.63)	-.22
g Nicaraguan	0.52% (.17)	0.57% (.19)	-.21
h Salvadoran	1.39% (.31)	2.28% (.49)	-1.52
i Spaniard	0.32% (.12)	3.33% (.73)	-4.06*
3. All other detailed Hispanic groups	4.20 (.50)	8.68% (1.23)	-3.38*
4. Write-in is general descriptor ("Hispanic" / "Latino" / "Spanish")	11.90% (.88)	1.90% (.42)	10.32*
5. Hispanic, no write-in (or write-in uncodable)	7.25% (.66)	5.03% (.79)	2.15*
Unweighted N	5,163	3,091	

*difference between forms significant at $p < .05$

The overall fraction of self-identified Hispanics who checked the Mexican, Puerto Rican, or Cuban box (or who wrote in one of these groups) does not differ significantly between forms (70% in the Census 2000 form compared to 73% in the 1990-style form). However, significantly fewer Hispanics checked the Mexican box (or wrote in Mexican) in the Census 2000 form than in the 1990-style form. The reason for this difference is probably not the examples or the wording of the response category, which is identical in both forms (“Yes, Mexican, Mexican-Am., Chicano”). It may be a question wording effect resulting from dropping the word “origin” in the Census 2000 questionnaire; this possibility is discussed below.

Overall, significantly more Hispanics reported in one of the “example groups” (category 2) in the 1990-style form (about 11%, compared to 6% in the Census 2000 form). Most of the difference, however, is due to a large difference in reporting of “Spaniard” (.32% reported “Spaniard” in Census 2000 forms compared to 3.33% in 1990-style forms). Excluding reports of “Spaniard,” 6.08% reported an “example group” in Census 2000 forms, compared to 7.82% in 1990 forms ($t=1.56$, $p<.10$). Except for the difference in reports of “Spaniard,” none of the form differences for specific example groups is statistically significant. More Hispanics report as Salvadoran in the 1990-style form (2.28% compared to 1.39% in the 2000 form); the difference is marginally significant ($t = 1.52$, $p<.10$ in a one-tailed t-test). As noted above, the sample size is insufficient to detect form differences for small groups with much precision.

Significantly larger numbers of Hispanics wrote in a detailed non-checkbox, non-example group (category 3) in the 1990-style form (almost 9% compared to about 4% in the Census 2000 form). Thus, the examples did not inhibit recall and reporting of groups that were not specifically mentioned, but instead appeared to increase reporting of them, consistent with a

hypothesized effect of examples upon comprehension of the intent of the question.

Finally, write-ins of nonspecific descriptors (category 4) are far more common in Census 2000 questionnaires, in which about 12% of Hispanics wrote in Hispanic, Latino, or Spanish as their “group,” compared with 2% in 1990- style questionnaires. There were also significantly more missing and uncodable write-in entries (category 5) in the Census 2000 questionnaires.

For all three categories (groups with separate check boxes, those listed as examples, and the remaining groups), the 1990-style form elicited more detailed reporting of Hispanic origin groups than the Census 2000 questionnaire. Overall, about 92% of Hispanics reported a specific group in 1990-style forms, compared with 80% who filled out Census 2000 forms. In the latter, Hispanics tended to describe their ethnicity in general rather than specific terms (category 4). About 12% wrote in Hispanic, Latino, or Spanish as their “group,” compared with about 2% in 1990-style questionnaires.

These results support the hypothesis that the examples (perhaps along with other design features in the 1990-style form) communicated a better understanding of the type of response being requested. However, this hypothesis does not account for the higher rate of Mexican reporting in that form. This difference requires a different explanation because the specific examples (Mexican, Mexican Am., Chicano) are identical in both forms. As noted above, a number of design features differ between 1990-style and Census 2000 forms, and it is not possible to say with certainty which of the following caused the reporting difference:

Question wording: the 1990-style question asks respondents to report their origin (which may be interpreted as geographic origin of oneself or ones ancestors), while Census 2000 asks them to report what they are. It is possible that some people with origins in a specific Hispanic group do not identify with it in the sense implied by the Census 2000 question wording. For example,

people whose parents or grandparents came from Mexico (and who would report Mexican origin in a 1990-style questionnaire) may not consider themselves to be Mexican, Mexican-American, or Chicano in response to the Census 2000 question. This hypothesis is that the Census 2000 question obtains less detailed data because it is directed to a more global, overarching identification and that the absence of specific Hispanic examples would reinforce this question wording effect.

Vague instruction: Without examples, the instruction to “print group” that follows the “Yes, other Spanish/Hispanic/Latino” response category in the Census 2000 form is vague. It may have been interpreted by some respondents as a request to indicate which of the three terms they preferred. The effect would be more write-ins indicating a general identification, and fewer providing a specific group, as was observed.

Question order and context: Hispanic race reporting is highly sensitive to the order of race and Hispanic origin questions (see Bates et al., 1995). More Hispanics checked “Some other race” and wrote in “Hispanic” as their race in the 1990-style than in Census 2000 questionnaires (Martin, 2002). If respondents have already written in “Hispanic” in the preceding race question, then they may be more likely to provide a specific Hispanic group in the Hispanic question. By this reasoning, one might expect to see more people reporting specific Hispanic groups if they had just reported “Some other race”; this could only occur in the 1990-style form because the question order is reversed in the other form. However, as shown in Table 3, Hispanics were more likely to report a specific Hispanic group in the 1990-style form, regardless of whether they had reported themselves as “Some other race” (and written in Hispanic) or in another major race category (Black, White, etc.) This result suggests that the context established by the prior race item in the 1990-style form does not account for the greater specificity of Hispanic reporting.

Table 3. Percent of Hispanics who report a detailed Hispanic group in the Hispanic origin question, by race and form type

Race	2000	1990-style	$t_{2000-1990}$
“Some other race”	80% (1.96)	90% (2.22)	-3.3*
“White”, “Black”, “American Indian and Alaska Native”, “Asian, “Native Hawaiian and Other Pacific Islander”	79% (1.54)	94% (1.24)	-7.7*
$t_{\text{SOR-other}}$.64	-1.57	

* $p < .05$

Interpretation. The results support the conclusion that the design of the Census 2000 questionnaire resulted in fewer reports of detailed Hispanic groups compared to the 1990-style questionnaire. Hispanics who filled out Census 2000 mail questionnaires were more likely to report a general descriptor (such as Hispanic, Latino, or Spanish) than those who filled out 1990-style questionnaires. It is important to keep these questionnaire effects in mind when analyzing reporting differences between 1990 and 2000 censuses. It might be tempting to conclude that a decline in reporting of detailed groups was due to Hispanics’ changing self-identifications over the past decade, when the change can be attributed (at least in part) to a change in the design of the mail questionnaire.

In part, the AQE results are consistent with the speculations offered by the press and other analysts that there was an “example effect.” It seems likely that the examples in the 1990-style questionnaire helped respondents understand the type of response they were being asked to provide, i.e., specific group, rather than Hispanic identification. This inference is supported by the fact that reporting of specific Hispanic groups was greater both for example and non-example groups in the 1990-style form. If instead the reporting difference had been due to the effects on

recall, then we would expect fewer rather than more reports of non-example groups in the form that included examples. This would occur because the reminders would be expected to stimulate recall for example groups, but inhibit it for non-example groups.

It makes sense that examples appear to have little effect on recall of membership in specific Hispanic groups, since most Hispanics have only one group to report and it is likely to be recalled with or without reminders, if respondents understand they are being asked to report a specific group. In contrast, recall probably plays a more important role in explaining the effects of examples on the reporting of ancestry. Because most Americans could potentially report a large number of different ancestry groups, the retrieval process is likely to be more influenced by the presence of examples and cues, which may explain the effects of adding “German” and dropping “English” in the 1990 census.

More research is needed to examine the effects of examples upon processes of comprehension and recall in surveys. Example effects upon reporting are potentially large, and a better understanding is needed of the factors that determine whether their use in survey questions proves beneficial or distorting. The effects may vary according to subject matter, as suggested by the apparent contrast in their effects on reporting of specific Hispanic groups and ancestry reporting.

Factorial experiments are needed to disentangle the effects of examples, other questionnaire design features, and subject matter upon reporting. The experiment reported here was designed to evaluate the combined effects on the data of all the wording and design differences between the 1990 and 2000 mail questionnaires, and is not well suited to isolating the causes for reporting differences. The differences do not appear to be due solely to the effects of the examples (as suggested by the difference in “Mexican” reporting), and probably are due to

the combined effects of the modified question wording, the vague “print group” instruction, and the elimination of examples in the Census 2000 questionnaire. Question order does not appear to have contributed to the differences.

The results provide another caution, if another was needed, that questionnaire changes that might seem minor can have important effects on survey data. They also remind us of the need to pretest and evaluate all questionnaire changes. In this case, tests conducted prior to the census did not seem to show effects of dropping examples from the Hispanic origin question, perhaps because the test design and sample size were not adequate to detect them. In preparation for the next census and for its demographic surveys, the Census Bureau plans additional, intensive research on the effects of question wording and questionnaire design, including the use of examples, on race and Hispanic origin reporting.

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→ **NOTE: Please answer BOTH Questions 5 and 6.**

5. Is this person Spanish/Hispanic/Latino? Mark the **"No"** box if **not** Spanish/Hispanic/Latino.

No, not Spanish/Hispanic/Latino Yes, Puerto Rican
 Yes, Mexican, Mexican Am., Chicano Yes, Cuban
 Yes, other Spanish/Hispanic/Latino — *Print group.* ↘

6. What is this person's race? Mark **one or more races** to indicate what this person considers himself/herself to be.

White
 Black, African Am., or Negro
 American Indian or Alaska Native — *Print name of enrolled or principal tribe.* ↘

Asian Indian Japanese Native Hawaiian
 Chinese Korean Guamanian or Chamorro
 Filipino Vietnamese Samoan
 Other Asian — *Print race.* ↘ Other Pacific Islander — *Print race.* ↘

Some other race — *Print race.* ↘

Fig. 1. Race and Hispanic origin questions in Census 2000 mail short form questionnaire

<p>4. Race Fill ONE circle for the race that the person considers himself/herself to be.</p> <p>If Indian (Amer.), print the name of the enrolled or principal tribe. →</p> <p>If Other Asian or Pacific Islander (API), print one group, for example: Hmong, Fijian, Laotian, Thai, Tongan, Pakistani, Cambodian, and so on. →</p> <p>If Other race, print race. →</p>	<p><input type="radio"/> White</p> <p><input type="radio"/> Black or Negro</p> <p><input type="radio"/> Indian (Amer.) (Print the name of the enrolled or principal tribe.) →</p> <p><input type="radio"/> Eskimo</p> <p><input type="radio"/> Aleut</p> <p>Asian or Pacific Islander (API)</p> <p><input type="radio"/> Chinese <input type="radio"/> Japanese</p> <p><input type="radio"/> Filipino <input type="radio"/> Asian Indian</p> <p><input type="radio"/> Hawaiian <input type="radio"/> Samoan</p> <p><input type="radio"/> Korean <input type="radio"/> Guamanian</p> <p><input type="radio"/> Vietnamese <input type="radio"/> Other API →</p> <p><input type="radio"/> Other race (Print race) →</p>	<p><input type="radio"/> White</p> <p><input type="radio"/> Black or Negro</p> <p><input type="radio"/> Indian (Amer.) (Print the name of the enrolled or principal tribe.) →</p> <p><input type="radio"/> Eskimo</p> <p><input type="radio"/> Aleut</p> <p>Asian or Pacific Islander (API)</p> <p><input type="radio"/> Chinese <input type="radio"/> Japanese</p> <p><input type="radio"/> Filipino <input type="radio"/> Asian Indian</p> <p><input type="radio"/> Hawaiian <input type="radio"/> Samoan</p> <p><input type="radio"/> Korean <input type="radio"/> Guamanian</p> <p><input type="radio"/> Vietnamese <input type="radio"/> Other API →</p> <p><input type="radio"/> Other race (Print race) →</p>																																																
<p>5. Age and year of birth</p> <p>a. Print each person's age at last birthday. Fill in the matching circle below each box.</p> <p>b. Print each person's year of birth and fill the matching circle below each box.</p>	<table border="1"> <thead> <tr> <th>a. Age</th> <th>b. 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<p>6. Is this person of Spanish/Hispanic origin?</p> <p>Fill ONE circle for each person.</p> <p>If Yes, other Spanish/Hispanic, print one group. →</p>	<p><input type="radio"/> No (not Spanish/Hispanic)</p> <p><input type="radio"/> Yes, Mexican, Mexican-Am., Chicano</p> <p><input type="radio"/> Yes, Puerto Rican</p> <p><input type="radio"/> Yes, Cuban</p> <p><input type="radio"/> Yes, other Spanish/Hispanic (Print one group, for example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.) →</p>	<p><input type="radio"/> No (not Spanish/Hispanic)</p> <p><input type="radio"/> Yes, Mexican, Mexican-Am., Chicano</p> <p><input type="radio"/> Yes, Puerto Rican</p> <p><input type="radio"/> Yes, Cuban</p> <p><input type="radio"/> Yes, other Spanish/Hispanic (Print one group, for example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.) →</p>																																																

Fig. 2. Race and Hispanic questions in 1990-style mail questionnaire.