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**Changes in Public Opinion During the Census**

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## Changes in Public Opinion During the Census<sup>1</sup>

by

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### Introduction

In its scale, the U. S. decennial census is a survey like few others in the world: it seeks to gain the cooperation of approximately 120 million households (and thousands of group quarters and institutions) in order to enumerate an estimated 267 million people within a few months. Most of the population is enumerated using a self-administered questionnaire, which in Census 2000 was mailed or delivered to each household in mid-March. Households not returning a form within five weeks were enumerated in person by an army of nearly half a million enumerators. Aiding the Census 2000 enumeration effort was a \$167 million advertising campaign intended to increase public awareness of the census and improve public cooperation with it. Thus, the census takes place in a relatively brief time in an environment that includes massive amounts of

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<sup>1</sup>This article reports the results of research and analysis undertaken by Census Bureau staff. It has undergone a more limited review than official Census Bureau publications. This report is released to inform interested parties of research and to encourage discussion. My thanks to Jennifer Marks, Ken Prewitt, Paul Siegel, and Eleanor Singer for helpful comments, and to Bob Fay for advice on computations of standard errors. An earlier version of this paper was presented at the annual meeting of the American Association for Public Opinion Research.

advertising and promotional activities as well as direct communications (including the form itself) from the Census Bureau to every household in the country.

The extraordinary effort expended to promote and publicize Census 2000 was intended to reverse a long-term decline in cooperation that has affected the census as well as surveys generally (Groves and Couper, 1998; Miskura, 1992). Of course, only part of what the public hears about the census is deliberately planned by the Census Bureau, since the census attracts fairly intensive news coverage of its politics and process, including talk shows, speeches and other commentary by pundits and politicians, as well as independent promotional campaigns sponsored by states and local communities. In the fishbowl atmosphere of the census, communications by and about it can reverberate and ripple through the populace in ways that may have unintended consequences.

This paper examines the dynamics of and immediate influences on changes in public perceptions of privacy and confidentiality during the course of Census 2000. The paper focuses on 3 related perceptions of the census—that it is mandatory, that it is confidential, and that it is an invasion of privacy. Changes in opinions about these issues result from the public's reaction to the census itself, to the advertising and promotion conducted for it, and to the surrounding climate of public discussion, news and commentary. The paper analyzes how public perceptions change in the short-run, over the course of a census, and in the long run, from one census to the next, using the 1990 Census as a benchmark for comparison. The goal of the paper is to discern regularities in the public's response to the census, as well as aspects of public reaction to Census 2000 which

depart from past trends and which may signal important changes in the role of privacy and confidentiality concerns as factors influencing census cooperation.

### **Prior Research**

Declining public cooperation with the census and surveys has been attributed in part to increasing public concerns about privacy and confidentiality issues (cf. Singer, Hippler, and Schwarz, 1992). In their examination of the determinants of mail response to the census, Fay, Bates, and Moore (1991) found no clear trends from the 1980 to the 1990 census in levels of public concern about confidentiality and privacy of the census. However, they did find that concerns about privacy and confidentiality became increasingly important barriers to public cooperation in 1990. Controlling for other demographic correlates, concern about privacy and mistrust of confidentiality predicted lower mail response by households in the 1990 Census, but not in the 1980 Census (Fay Bates, and Moore, 1991; Kulka, et al., 1991). The conclusion that privacy and confidentiality concerns influenced 1990 census participation holds whether analysis is based on self-reported or actual return of a census form (Singer, Mathiowetz, and Couper, 1993; Fay, Bates, and Moore, 1991).

It is uncertain whether concerns about privacy and confidentiality reflect different aspects of the same general concern, or are distinct issues. Previous researchers have carefully distinguished between concerns about confidentiality (that is, concern that information, once reported, will not be kept confidential) versus privacy (the legitimacy of a request for or release of information to

any agent) (Singer, Mathiowetz, and Couper, 1993). One analysis strategy has been to use multiple items to create separate scales measuring privacy (commonly reflecting privacy concerns about a broad set of institutions and activities, including the census) and confidentiality (see, for example, Singer, Mathiowetz, and Couper, 1993; Kulka et al., 1991). However, Fay, Carter, and Dowd's (1991) analysis of the dimensionality of a broad set of measures suggests that census-related knowledge and attitudes are complex and inconsistent with the assumption of simple scales or indices representing (for example) "concerns about confidentiality." Their analysis indicates that "respondents answer questions concerning confidentiality in a complex way, indicating that there is not a single dimension corresponding to respondents who are more or less knowledgeable about confidentiality" and that "'violation of privacy' is not closely linked to confidentiality..." (1991: ). Another issue addressed in this paper, then, is the extent to which privacy and confidentiality represent distinct dimensions of public concern, or reflect a general set of concerns aroused by requests for information, such as the census.

The paper addresses five questions:

1. How do the public's concerns about privacy and confidentiality shift during the course of a census? (Public opinion changes during the course of a census are referred to as intracensal changes.)
2. Are intracensal changes in privacy concerns constant from one census to the next? If so, this would imply that these reactions to a census arise from events common to all censuses, rather than arising from unique events surrounding a particular census. (Surveys conducted during the 1990 and 2000 censuses are compared to address this question.)

3. Are there long-term trends (1990 to 2000) in public concern about privacy and confidentiality?
4. Are there long-term changes in the structure of public opinion on these issues?
5. What were the proximal influences on shifts in privacy and confidentiality concern during the 2000 census?

### **Data and Methods**

Two sources of data provide the basis for comparisons between the 1990 and 2000 censuses. I briefly describe the two data sources below, then summarize differences between them that affect their comparability and limit the inferences that can be drawn from them.

#### **CENSUS 2000: INTERSURVEY TRACKING SURVEYS.**

A series of 5 cross-sectional surveys was conducted by InterSurvey, Inc. under the sponsorship of several private foundations<sup>2</sup> between March 3 and April 13, 2000. Respondents were recruited into the panel by NORC using an RDD sample. Households who agreed to participate were provided free hardware and Internet access, allowing surveys to be administered using a Web browser and to include multimedia content. The response rate for recruitment is about 57 percent (InterSurvey, n.d.). Baseline data on non-census related topics were collected in late February, then each household was assigned to one of five monitoring surveys conducted at different stages

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<sup>2</sup> The Andrew W. Mellon Foundation, The Willam and Flora Hewlett Foundation, Annie E. Casey Foundation, The John D. and Catherine T. MacArthur Foundation, Ford Foundation, The Russell Sage Foundation, and Carnegie Corporation of New York.

of the census process. The response rate for the baseline survey was 81 percent, and ranged between 58 and 83 percent for the five monitoring surveys (InterSurvey, n.d.). The sample characteristics show fairly close correspondence to population data from the Census Bureau's Current Population Survey, with one important exception: individuals with less than a high school education are under represented. The surveys were self-administered using web TV. Results are weighted to reflect sampling probabilities and to adjust for nonresponse.

#### 1990 CENSUS: OUTREACH EVALUATION SURVEY

Two stratified, cross-sectional national surveys<sup>3</sup> were conducted by the Census Bureau before and after the 1990 Census, in Jan.-Feb. and April-May 1990, to evaluate the impact of its outreach and promotion campaign on census attitudes and awareness. Interviews were conducted by telephone or in person with about 2,000 households in each of the two surveys, with response rates of about 95 percent. Results are weighted to account for oversampling of target populations.

#### SURVEY DIFFERENCES

Timing. The InterSurvey surveys were more tightly clustered around the time of the mailout than the 1990 surveys were. The census mailout occurred March 13-15, during the last few days

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<sup>3</sup>The sample design was stratified to ensure sufficient representation of Blacks and Hispanics. Fifty District Offices were sampled from three strata, and 10 block clusters were selected from each DO. Within each block cluster, 10 housing units from the Census Bureau's master address file in January 1990 were systematically selected, with half (or 2,500 housing units) designated for interview at the first wave and the remaining half designated for the second wave.

of the second monitor survey on March 10-17, 2000. For most analyses, the first two monitor surveys were collapsed to represent the pre-census period, and the last three were combined to form post-census measures (see header of Table 1b for the dates of the InterSurvey monitors).

Question wording and order. Several comparable or similar measures were collected in both the 1990 and 2000 surveys. Item 1 measures awareness of the legal requirement to participate in the census. Items 2 and 4 measure trust in confidentiality and concern about the consequences of a lack of confidentiality, and item 3 measures perceptions of the census as an invasion of privacy.

The items as they appear in the 2000 surveys are:

1. "So far as you know, does the law require you to answer the census questions?"
  - Have to answer the questions
  - Can choose not to answer the questions
  - Don't know
  
2. Do you happen to agree or disagree... "The Census Bureau's promise of confidentiality can be trusted."
  - Strongly agree
  - Agree
  - Neither agree nor disagree
  - Disagree
  - Strongly disagree
  
3. "The census is an invasion of privacy."
  - Strongly agree
  - Agree
  - Neither agree nor disagree
  - Disagree
  - Strongly disagree

Items 1-3 had nearly identical wordings in the 1990 and 2000 surveys. A fourth agree-disagree item is reversed and the wording altered in the 2000 survey:

4. "People's answers to the census can not be used against them." (1990)  
 "My answers to the census could be used against me." (2000)



The order of the four items varied in the two surveys: in 1990, it was 1, 2, 3, 4, with two items separating 3 and 4. In 2000, the order was 1, 4, 2, 3, with other items interspersed between 1 and 4, and 2 and 3.

Response categories. In 2000, an explicit “don’t know” (DK) was offered in item 1 and “neither agree nor disagree” category offered in items 2-4. In 1990 interviewers recorded DK or “no opinion” only if the response was volunteered by respondents. As a result, between 20 to 35 percent of respondents chose the neutral, no opinion, or DK options in the 2000 survey, when they were explicitly offered, compared to 5 to 20 percent in 1990, when they were not. (See Tables 1a and b for the detailed marginals for the four items in the 1990 and 2000 surveys.) In order to achieve comparability between these forms of the questions, “no opinion” and “neither agree nor disagree” and DK responses are excluded from both sets of data. This strategy is supported by Schuman and Presser’s research showing that the relative proportions in substantive categories is unaffected by the presence or absence of an explicit no opinion or middle category (cf. Schuman and Presser, 1979; Presser and Schuman, 1980). (To test the robustness of this assumption, however, I also examine whether the exclusion of neutral and DK responses affects the fit or results of the model.) In addition, “strongly agree” and “agree” are combined, as are “strongly disagree” and “disagree.”

Auspices, mode, response rate, and sample differences. It is important to keep additional differences between the two data sources in mind when comparing them: the 1990 data were collected by the Census Bureau, respondents were interviewed in person, and the response rate

was over 90 percent. The 2000 data were collected by an independent, outside company, the sample was restricted to telephone households, respondents self-responded over Web TV, and the response rate was much lower (between 25 and 40 percent, depending on the survey). All of these factors—auspices, self-response, mode, and response rate differences—could affect comparisons.

Some evidence is available to assess two possible sources of bias: the survey auspices, and sample differences. The four items to be analyzed here were also included in an independent survey conducted by NORC about the same time as the second wave of the 1990 Census Bureau study. The results (shown in Table 2) suggest that respondents expressed slightly more favorable opinions about the census to Census Bureau interviewers than to NORC interviewers—especially the item asking respondents to agree or disagree that the “Census Bureau’s promise of confidentiality can be trusted,” which shows a 13 percentage point difference between surveys.

On the other hand, the InterSurvey’s lower response rate, and under representation of less educated people, may understate privacy concerns, which are negatively correlated with education, based on evidence from this and other surveys. InterSurvey excluded nontelephone households, and their recruitment success was less in households with unlisted telephones. In 1990, people without telephones were significantly more likely to agree that the census is an invasion of privacy, and were more concerned that census answers could be used against a person; differences for the other two items are not significant (Table 3a). In 2000, people with unlisted phones were more likely to agree the census invades privacy, while the other three items

show no differences. Thus, the effect of excluding nontelephone households and underrepresenting households with unlisted telephones is likely to be an understatement of privacy concerns.

Evidence about the sources of bias, suggests that both surveys are likely to understate concerns about privacy and confidentiality, but for different reasons. Therefore, it is probably unwise to place much faith in estimates of overall trends based on these surveys. More confidence can be placed in measurements of changes over the course of a single census, and comparisons of these intracensal changes between 1990 and 2000, because the before-after measurements for each census are based on comparable methods. Thus, the ability to address question 3 is very limited, but questions 1,2, and 4 may be addressed using these data.

## **Results**

Below, item-by-item trends are summarized, then changes in patterns of association among all four items are examined.

### **CHANGES FROM 1990 TO 2000**

I begin by briefly summarizing trends for each item individually, then examine patterns of change involving all four items.

Figures 1a-d show changes in opinion for each item from before to after the census, in 1990 and

2000<sup>4</sup>. In figure 1a, we see that the public's awareness of the legal requirement was low but increased sharply and substantially immediately after the start of each census. This is in large part the effect of receiving the census mailing package; the legal requirement was not part of the advertising and promotion campaign in either census. Although the mandatory message was communicated more forcefully in 2000,<sup>5</sup> the intracensal change is similar in both censuses, as indicated by the fact that the before-after increase (measured by the cross product ratio) does not significantly differ between 1990 and 2000. The pattern of change in fig. 1a suggests that very little of the increase in awareness of the legal requirement resulted in permanent learning. It appears that every decade, people must learn anew that the law requires their participation. If permanent learning took place, one would expect the precensus baseline in 2000 to be higher than it was in 1990, and perhaps even comparable to the 1990 postcensus level of knowledge. (Of course, many people who resided in the U.S. in 2000 were not born, were too young, or did not reside in the country in 1990, so had neither opportunity nor reason to learn about the census prior to 2000.)

Figure 1b shows a contrasting pattern of change in public trust in the Census Bureau's promise of

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<sup>4</sup>For each item, a log linear model was fit to the 3-way cross-classification of response by time (pre- and post-census) by decade (1990 and 2000), in order to test whether intracensal changes differed by decade. (For 2000, pre-census = monitors 1- 2 and post-census = monitors 3- 5.) Fit statistics for these models are the basis of assessments of significance.

<sup>5</sup>In 1990 the questionnaire cover said, "By law (Title 13, U.S. Code), you're required to answer the census questions to the best of your knowledge." In 2000, the envelope said: "U.S. Census Form Enclosed YOUR RESPONSE IS REQUIRED BY LAW." The letter said: "Your privacy is protected by law (Title 13 of the United States Code), which also requires that you answer these questions."

confidentiality. Excluding the “no opinion” and neutral responses (which accounted for a third of responses in 2000), trust in confidentiality is high in both years, and rather slight changes after the census mailout in either 1990 and 2000. While there was no change in trust in confidentiality after the 1990 mailout, there was a slight decline in 2000; the interaction effect is statistically significant ( $p < .012$ ). Thus, the 2000 census had a more negative short-term effect on trust in confidentiality than the 1990 census.

The fact that there was no positive change in trust in confidentiality during either census is noteworthy, because the census mailing package both years included confidentiality assurances that explained and emphasized the legal protections for an individual’s census information. There is no evidence that these communications had any positive effect on trust in the confidentiality of census data in either 1990 or 2000, nor do results presented in Tables 1a and 1b suggest that receipt of the mailing package reduced uncertainty about whether the confidentiality pledge could be trusted. The absence of positive change may occur because people who were skeptical or uncertain to start with either did not read or were not persuaded by confidentiality assurances given in the mailing package.

Figure 1c shows that a relatively small fraction perceived the census as “an invasion of privacy” beforehand, but the fraction who did so rose after the census got underway in both 1990 and 2000. The increase is not uniform, with a significantly greater increase in privacy concern in 2000 than in 1990 ( $p < .015$ ).

Figure 1d shows that concern that individuals' answers could be used against them dropped after the 1990 mailout, but rose after the 2000 mailout; the interaction effect again is significant ( $p < .0001$ ).

To summarize: Intracensal changes—that is, the short-run changes in opinion during the period of the census—differed significantly in 1990 and 2000 for all three items related to privacy and confidentiality. There is evidence of more substantial short-run increases in concerns about privacy and confidentiality in 2000 than in 1990. Moreover, these differences between 1990 and 2000 are unlikely to be affected by methodological differences between surveys, because each pre- and post- set of measures are based upon the same survey method. In contrast to the pattern for the privacy and confidentiality items, awareness of the legal requirement increased sharply in both censuses.

The different patterns of intracensal change raise the questions of which opinion shift led the change, and whether there has been change in the underlying beliefs about privacy and confidentiality of census data. In order to better understand changes in opinion on all four items, I fit alternative log-linear models to the 6 way cross-classification of the 4 attitude measures, and two measures of time: before and after the census, and 1990 versus 2000. Analyzing patterns of change for all four items simultaneously makes it possible to control for intercorrelations among items and to determine whether, when responses to the other items are controlled, opinions to each underwent significant change. In addition, changes over time in patterns of intercorrelation are examined. The purpose of the exercise is to describe the dynamics of shifts in opinions over

time rather than their causes, so controls are not introduced. All four opinion items are treated as dependent variables, and the object is to understand how levels and associations among them change in the short run (over the course of a single census) and in the long run (between 1990 and 2000). The variables fitted are:

- YEAR (2000, 1990)
- TIME (After census, Before<sup>6</sup>)
- PRIVACY: (1=agree “the census is an invasion of privacy,” 2=Disagree)
- CONFIDENTIALITY: (1=disagree “the Census Bureau’s promise of confidentiality can be trusted,” 2=agree)
- AGAINST: (1=people’s answers can be used against them, 2=cannot be used)
- LAW: (1=must answer the census questions, 2=can choose not to)

(Note that the opinion items are scored so that the first category represents greater privacy concern or mistrust of confidentiality. Positive coefficients in Table 4 thus imply that a variable led to an increase in concern about privacy and confidentiality.)

Alternative hierarchical models are compared using model selection techniques described by Goodman (1971). Pearson chi-square test statistics ( $X^2$ ) are used to evaluate model goodness of fit, and Likelihood-ratio chi-square test statistics ( $L^2$ ) to compare the goodness of fit of alternative models and evaluate the contribution of particular terms to the fit of the models (see

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<sup>6</sup>For 2000, the first two surveys are combined for the precensus measurement, and the last three comprise the postcensus measurement; see Table 1b.

Goodman, 1971; Fay, 1985; 1988). Chi-square test statistics and standard errors are computed using stratified jackknifed replication methods, with computations performed using CPLX statistical software (Fay, 1988).

Table 4 presents the model that best fits the six-way table, in the sense that it cannot be significantly improved by adding additional effect parameters, nor can effects be dropped without a significant loss of fit. (The model fits the data very well; with jackknifed Pearson  $X^2 = .99$  on 40 degrees of freedom,  $p > .50$ .)

The  $\lambda$  parameters are analogous to coefficients of linear regression, where the object is to predict the distribution of frequencies among the 64 cells formed by the cross-classification of the 6 dichotomous variables. The single parameter shown for each effect is the effect of the first level of a variable ( $\lambda_1$ ), with the effect of the second level  $\lambda_2 = -\lambda_1$ . (This parametric form is found in Goodman (1978) and elsewhere.) Statistically significant effects have values at least twice their standard errors, as indicated by standardized values greater than 2.

To facilitate interpretation, the effect parameters in Table 4 are grouped into categories corresponding to different types of change. The results imply the following conclusions about short-term and long-term patterns of change in opinions related to privacy and confidentiality.

Intracensal changes. Perceptions of the census as an invasion of privacy, and awareness of the legal requirement to participate, both increased significantly during the course of each census.



There were no significant intracensal declines in the public's trust in confidentiality, except for the declines that indirectly resulted from the increase in privacy concern. Over the course of each census, mistrust in confidentiality became significantly more closely associated with the belief that people's census answers could be used against them. It makes sense that as people experience the census, their beliefs about the confidentiality of census data become more consistent.

These short-term shifts in public opinion held true in both 1990 and 2000 censuses, with no evidence that the short-term increases in privacy concern and awareness of the legal requirement were greater or less in Census 2000 than in 1990. These results, then, suggest that privacy concern and awareness of the legal requirement led the shift in opinion during both censuses.

Changes in patterns of intracensal change. For one item, the results indicate a difference between censuses in the pattern of intracensal change. In 1990, there was no increase during the census in the perception that answers could be used against a person, but in 2000 there was. The interaction with year is significant ( $p < .015$ ).

Long term opinion shifts in public concern about privacy and confidentiality. As noted above, it is unwise to draw firm conclusions about changes between 1990 and 2000 in overall levels of public concern about privacy and confidentiality because the 1990 and 2000 surveys are affected by different sources of biases which very likely affect levels of agreement. That said, the results tentatively suggest that only two of the four items show significant trends from 1990 to 2000. Controlling for inter-item associations, there were significant increases in the perception that people's census answers could be used against them, and in awareness of the legal requirement to

participate, between 1990 and 2000. Note that the small but significant increase in awareness of the legal requirement is only detected controlling for all four measures; the marginal trend (as shown in Fig. 1a) is insignificant.

Inter-item associations. Model results indicate that the three items focused on privacy and confidentiality—PRIVACY, CONFIDENTIALITY, and AGAINST—are all highly positively correlated, as would be expected. One of them, PRIVACY, is also positively associated with LAW. That is, people who knew the census is required by law were also more likely to believe that it is an invasion of privacy. This makes sense; if one may choose whether to answer census questions or not, then the census poses little or no threat to privacy. Thus, part of what may be driving the intracensal increase in privacy concern is the public's rather sudden realization of its legal requirement to respond to the census. Knowledge of the legal requirement is unrelated to either measure of mistrust in confidentiality.

Inter-item associations were constant in 1990 and 2000, with the exception of associations involving the PRIVACY item. Between 1990 and 2000, there was a substantial increase in the associations between PRIVACY and CONFIDENTIALITY, and between PRIVACY and AGAINST. Both interaction terms involving year are highly significant (for each,  $p < .0001$ ). Table 5 shows that for each pair, the cross-product ratio measuring association between items increased from 3.8 (in 1990) to 20 (in 2000) for PRIVACY and AGAINST, and from 4.8 to 22.5 for PRIVACY and CONFIDENTIALITY. (Note the consistency of the increase in the associations between PRIVACY and the two confidentiality measures, despite the fact that the wording one of them--AGAINST--was reversed in the 1990 and 2000 surveys.) These changes

in association raise the possibility that change in the underlying structure of beliefs about privacy and confidentiality has occurred. The three items appear to form a more coherent set in 2000 than they did in 1990, suggesting that distinctions between privacy and confidentiality may have become more blurred over time. That is, in 2000 a threat to privacy is also perceived as a threat to confidentiality, and vice-versa; this was less true in 1990. In 1990, even among those who believed people's census answers could be used against them, only 38 percent also thought the census was an invasion of privacy (see Table 5). In 2000, this fraction rose to 63 percent. That is, in 2000 those who felt their confidentiality was threatened were much more likely to also feel their privacy was threatened, than was the case in 1990.

(As noted earlier, the data upon which Table 4 is based exclude neutral and DK responses to the four opinion items. As a check on the robustness of the results, the model was applied to the data including the neutral and DK responses, which were recoded into the second category for each item (see p. 13). The model still fits these data quite well ( $X^2 = -1.3$ ,  $df = 40$ ,  $p > .5$ ), and there are only two changes in the substantive results of the model: the coefficient for the PREPOST x CONFIDENTIALITY x AGAINST interaction drops to nonsignificance (standardized value = 1.917 compared to 2.412 in Table 4), as does the YEAR x LAW effect (standardized value = -.868 compared to 2.325 in Table 4. Otherwise, the size, direction, and level of significance of the model coefficients are quite similar using either version of the data.)

In order to further examine the structure of attitudes about privacy and confidentiality, Rasch models (1960/1980) were fit to the cross-classification of various subsets of the 4 opinion items,

to test the hypothesis that a single underlying latent dimension accounts for responses in 1990 and/or 2000 (RASCHPLX was used; see Fay and Turner, 1989). Table 6 presents the results of separately fitting three alternative log linear models to 1990 and 2000 data:

1. The model of independence, which posits that responses to each item are independent of responses to the other two.
2. The two-factor model, which posits that responses to each pair of variables are associated, and that there are no higher order interactions among them.
3. The Rasch model, which posits an underlying, single dimension which accounts for associations among the items. That is, the Rasch model specifies that, conditional on the unobserved value of the underlying dimension, responses to items are independent. The goodness of fit of this model provides a test of the hypothesis that there is an underlying latent dimension reflecting concern about privacy and confidentiality which explains responses to all three items.

The first set of models in Table 6 are fitted to the three privacy and confidentiality measures. As expected, the model of independence is rejected in both 1990 and 2000. In both years, the two factor model fits acceptably well. The Rasch model does not fit the 1990 data ( $p < .0001$ ), indicating that the hypothesis that a single underlying dimension accounts for responses to all 3 items is rejected. This result is consistent with Fay, Carter, and Dowd's (1991) analysis of similar 1990 data, in which they concluded that "violation of privacy" was not closely related to confidentiality concerns. However, the Rasch model provides an excellent fit to the 2000 data ( $p > .5$ ). Thus, in 2000 (but not 1990) responses to these items can be accounted for by a single

latent dimension that is tapped by all three measures.

When the model is expanded to include the fourth item (LAW), the Rasch model no longer fits the 2000 data ( $p < .0001$ ). Thus, this item does not tap the same underlying dimension as the other three. This result seems reasonable, since its content is different from the other three items, and Table 4 showed it is correlated only with the PRIVACY item.

These results suggest that by the time of Census 2000, the public was no longer distinguishing between “privacy” and “confidentiality” in the same way they appear to have done in the past. Thus, attitude change of a fundamental sort may be occurring. The fit of the Rasch model means that these items now measure a single underlying dimension, implying that confidentiality and privacy are no longer distinct issues.

To summarize: The data provide evidence of both stability and change in the public’s reaction to the 1990 and 2000 censuses. In each decade, the public’s perception of the census as an invasion of privacy rose at the same time as, and probably in part as a consequence of, its growing awareness that the law requires census participation. The two measures of confidentiality became more strongly associated with each other during each census.

There is also evidence of change between the 1990 and 2000 censuses. First, during Census 2000 people increasingly came to believe that their answers could be used against them, which did not occur during the 1990 census. Second, from 1990 to 2000 there is evidence that concerns

about privacy became more highly correlated with confidentiality concerns, and that privacy and confidentiality may no longer represent distinct issues. Finally (and less certainly, because of limitations on the comparability of the surveys) there may have been an increase from 1990 to 2000 in the belief that a person's answers could be used against him or her, and a small but significant increase in knowledge that the census is mandatory.

These results suggest that every census (at least the past two) poses something of a threat to the public's sense of privacy, but there are some indications that Census 2000 engendered more sensitivity on this issue than the previous census did. In the next section we examine contextual factors that may have influenced this increased sense of threat.

#### CONTEXTUAL INFLUENCES ON PRIVACY CONCERNS DURING CENSUS 2000

During the course of Census 2000, the public was exposed to a great deal of information and public discussion of the census, resulting in very high levels of public awareness. By March 3, the date of the first survey, 83 percent of survey respondents already had seen or heard something about the census, and this rose to 99 percent by the first week in April. Much of the exposure resulted from the Census Bureau's intensive advertising and promotion campaign: by April 7, 68 percent said they had seen and heard "a lot" about the census from TV commercials. In addition, there was a great deal of news coverage and public commentary about the census, with 44 percent of respondents reporting having heard or seen a lot about the census on television news stories or interviews. Some news stories and commentary were concerned with privacy issues, and several prominent political figures' comments on the perceived intrusiveness of long

form questions were widely quoted in the press in late March. The public became increasingly aware that the long form was controversial: when asked in an open-ended question to report what they had seen or heard about the census, the fraction who mentioned controversy about the long form rose from 1 percent in early March to 16 percent<sup>7</sup> by the first week in April (see fig. 2a). Did this controversy affect public reaction to the census, especially public concerns about privacy and confidentiality, and did awareness of the controversy condition peoples' reactions to the census forms they received in the mail?

The finding that the three privacy and confidentiality items tap the same underlying dimension in 2000 implies that the items can be combined in a single scale. To form the scale, the number of responses indicating concern about privacy or confidentiality are counted<sup>8</sup>, so the scale takes on values from 0 (no concern) to 3 (all three responses indicate concern). (In a Rasch scale, all items are given equal weight; cf. Duncan, 1984.) Neutral responses are excluded from the scale, and cases with missing or neutral values for any item are dropped from the analysis. Fig. 2b plots the mean values of the Privacy Index (along with 95% confidence intervals) over the course of Census 2000.

This scale may be analyzed as an interval-level variable using techniques of linear regression to

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<sup>7</sup>This is the fraction who volunteered having heard about the long form controversy; a much larger fraction (44 percent) report hearing about it in response to a direct question (Nie and Junn, 2000).

<sup>8</sup>Responses expressing concern are strongly disagree or disagree to item 2, strongly agree or agree to item 3, and "can be used against me" to item 4.

identify factors which influenced privacy concerns during Census 2000. Table 7 presents linear regression coefficients for five regression models predicting scores on the Privacy Index.

(Models were fitted using Westat's WESVAR, version 2.12,, with standard errors calculated using simple jackknife replication methods.) Model 1 regresses the index on age, education and race, with each independent variable treated as categorical. Age has non-monotonic effects: young persons (16-24 years old) score significantly lower in privacy concern relative to those 55 and older (the excluded category), while people 45-54 years old score highest. Education is significantly negatively correlated with privacy concern, with respondents who have a high school education or less scoring highest. Finally, Black respondents are more concerned about privacy, and Hispanics less, than whites (the excluded category). Only the coefficient for Hispanics is statistically significant, however. The negative effect of education is consistent with prior research (see e.g., Singer, Mathiowetz, and Couper, 1993) but the positive, nonmonotonic effect of age is not. Previous research found higher levels of concern about privacy and confidentiality among Blacks; the same general relationship is found here, but the differences by race are smaller and mostly nonsignificant. The three demographic variables account for about 4% of the variance.

Model 2 adds measures of trust in government and in other people which were collected in the baseline survey prior to the census.<sup>9</sup> These two items are highly predictive of the level of privacy

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<sup>9</sup>The items are:

“How much of the time do you think you can trust the government in Washington to do what is right? Just about always; Most of the time; Some of the time; None of the time; Don't know” and

“Generally speaking, would you say that most people can be trusted to do the right thing, or that



concern, net of the effects of demographic variables. People who trusted the government in Washington “none of the time” subsequently scored much higher in privacy concern than those who thought it could be trusted at least some of the time. Similarly, people who responded that “you can’t be too careful in dealing with people,” scored higher than those who thought “most people can be trusted” or it “depends.” The two measures of trust improve the explanatory power of model 2 ( $R^2 = .09$ ).

Model 3 incorporates measures of census form receipt. The excluded category is precensus responses. The coefficients in the table represent the before-after change in levels of privacy concern for short form recipients, long form recipients, and those who reported receiving no form or multiple forms, compared to levels of privacy concern before the census began. All of the coefficients are significant and positive, indicating that for all three groups privacy concerns increased significantly after the census began, compared to precensus levels. The change in privacy concern is significantly greater among long form recipients and those who received no form or multiple forms than it is among short form recipients ( $p < .02$ ). Thus, part of the increase in concern about privacy during Census 2000 is a reaction to the census questions, especially the long form, which requested detailed and in some cases sensitive information about the household and its members.

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you can’t be too careful in dealing with people? Most people can be trusted; Can’t be too careful; Depends; Don’t know”

For the first item, the first three categories and DK were collapsed. For the second, “Depends”, “Most people can be trusted”, and DK were combined.

Finally, model 4 incorporates a measure of awareness of the controversy about the long form. At the very beginning of each of the surveys, respondents were asked in an open-ended question what they had seen or heard (if anything) about the census. Responses were coded into one of 11 categories to reflect what respondents had seen or heard, including: the long form controversy and concern about census questions<sup>10</sup>; the importance or benefits of the census; news about census hiring; the census was coming; people should fill out their forms and send them in; and so on. The effect of hearing about the long form controversy is contrasted with hearing other news or information about the census. (Respondents who had heard nothing or couldn't report anything they heard about the census are dropped from the analysis.)

Hearing about the long form controversy is strongly associated with level of privacy concern, net of the effects of other variables in the model, and adding this variable improves the explanatory power of the model from an  $R^2$  of .121 (model 3) to .148 (model 4). This result suggests that the long form controversy may have sensitized the public to privacy issues. However, the inference that hearing about the controversy caused an increased concern about privacy is uncertain, since these two measurements were collected simultaneously (in the same surveys). It is possible that concern about privacy led people to pay attention to and report privacy-related census news,

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<sup>10</sup>Examples of responses coded as having heard about the long form controversy or concerns about census questions: "About how much invasion of privacy it is causing," "2 different census forms, one longer and more personal," "Far too many people seem to be objecting to the questions asked," "Lots of things, don't tell people your answers on the long form," "Some forms long and complex," "The type of questions asked; fact that most would receive short questionnaire, and those receiving a lengthy one would have questions not deemed applicable by many, even including a congressman," "Too much detail--too much personal info asked for," "the long form is a beast" "The TV has shown some who object to personal questions such as 'how many bathrooms'", "too long."

rather than the other way around. If this were the case, then we would expect the predictors of privacy concern to also predict hearing about the long form controversy. However, this is not the case. As shown in Table 7 (Model 2) respondents who score high in privacy concern tend to have a high school education or less, be middle-aged (45-54), and mistrust the government in Washington. In contrast, respondents who heard about the long form controversy (rather than something else about the census) tend to be college educated, 55 or older, white, with no differences in their level of trust in government or other people, and no differences in their receipt of a long versus short form (these results not shown). Thus, hearing about the long form controversy was not concentrated among those who were already sensitized about privacy and mistrustful of the government or people in general, suggesting that these attitudes did not predispose people to hearing about the long form controversy. This result lends support to a causal interpretation of the large coefficient for this variable in Model 4, and strongly suggests that the controversy about the long form did indeed increase the public's privacy concerns about Census 2000.

Finally, a series of interaction terms was tested to examine three questions:

- Did hearing about the long form controversy have a greater impact on privacy concerns among respondents who themselves received the long form?
- Did people who already mistrusted the government respond differently to news of the long form controversy? and
- Did people who mistrusted the government respond differently to receipt of a long form?

Dummy variables corresponding to hearing about the long form controversy (1=heard about it,

0=heard about something else) and trust in government (1=none of the time, 0=all/most/some of the time/DK) were created and each appropriate interaction term was tested one at a time in model 4. None of the interaction terms is significant at the .05 level (although the interaction involving trust in government and hearing about the long form controversy is close; see model 5). In other words, the answer to each question above is, “no.”

Thus, receiving a long form, and hearing about the long form controversy both raised concerns about privacy, but the two variables do not interact in their effects. Rather, the long form controversy appears to have had general effects upon those who heard about it, and is associated with heightened privacy concerns to the same degree among short form and long form recipients. Similarly, receipt of the long form raised privacy concerns among those who were not particularly mistrustful of the government as well as those who were.

However, there is some weak evidence of an interaction between mistrust and hearing about the long form controversy. Both variables predict higher levels of privacy concern, but respondents who both mistrusted the government and heard about the controversy scored higher on the privacy index than would be predicted from the effect of either variable alone, as indicated by the positive interaction term in model 5. However, the effect is not statistically significant at the .05 level ( $p < .09$ ).

To summarize: Demographic characteristics (especially age, which is positively correlated with privacy scores, and education, which is negatively correlated) predict levels of concern about

privacy, but their effects are rather small compared to the effects of trust in government and experience with the census itself. People who trusted the government in Washington none of the time tended to see the census as an invasion of privacy and to mistrust its confidentiality, and this result holds up in all the models. This result suggests that general alienation and mistrust of government lead to mistrust of the census, and create a barrier to its acceptance by the public. In contrast, general trust in people appears to have a smaller effect on privacy concerns about the census. Although this variable is a significant predictor in Models 2 and 3, it is not significant in Model 4.

The experience of the census itself strongly influenced public concerns about privacy and confidentiality. First, the level of concern rose after the census mailout, and the increase was greater among long form recipients than among short form recipients. Thus, the public reaction was at least in part a reaction to the census questions themselves, especially the long form questions. In addition, however, there is evidence that people who heard about the long form controversy became sensitized to the privacy issue. People who heard about the controversy had heightened concerns about privacy regardless of whether they personally received the short or the long form, with some evidence of a more extreme reaction among people who already mistrusted the government.

## Conclusions

It is useful to return to the questions posed at the outset of the analysis, namely:

1. *How does the public's concern about privacy and confidentiality shift during the course of a census?* and
2. *Are intracensal changes in privacy concerns constant from one census to the next?*

In many ways, public reaction to the census was remarkably similar in 1990 and 2000. In both censuses, the public's perception of the census as an invasion of privacy rose at the same time as, and partly as a consequence of, its growing awareness that the law required census participation. The two measures of confidentiality became more strongly associated with each other. These changes suggest a sort of collective tension that occurred when the census actually began. The perceived threat posed by the census became real and salient, as the populace received their census forms and saw the questions. The predictability of the increase in concerns about privacy (assuming it is a general reaction to any census, not just the past two) suggests that steps may need to be taken to anticipate and allay public concerns at the start of a census. However, this is a tricky undertaking, since research shows that raising the issues of privacy and confidentiality may backfire, and have the effect of increasing threat rather than providing reassurance (see Singer, Hippler, and Schwarz, 1992). It is partly for this reason that census advertising and promotion has largely avoided the topics of privacy and confidentiality.

The data also suggest that public reaction to Census 2000 differed in some ways from the 1990

census, with several indications that Census 2000 engendered more sensitivity and a more diffuse privacy reaction than the previous census. For example, during Census 2000 people increasingly came to believe that their answers could be used against them, which did not occur during the 1990 census.

*3. Are there long-term trends in public concern about privacy and confidentiality?*

As discussed above, lack of comparability imply that conclusions about long-term trends in levels of concern should not be drawn from these data. The data suggest there may have been an long-term increase in the belief that people's census answers can be used against them, and a slight increase in awareness of the legal mandate, but confirmation of these trends must await additional surveys.

*4. Are there changes in the structure of public opinion on these issues?*

There is evidence that in 2000 concerns about privacy were more highly correlated with confidentiality concerns than in 1990, and that privacy and confidentiality may no longer represent distinct issues. In 2000, measures of privacy and confidentiality tap the same latent dimension; this was not the case in 1990. The implications of this finding seem unclear, but it suggests change of a fundamental sort. If the public no longer discriminates between concerns about privacy and confidentiality, it implies that a threat to privacy is also perceived as a threat to confidentiality and vice versa. A more diffuse, general, and perhaps extreme reaction to the census (and, perhaps, to other perceived privacy threats) would seem to be a possible consequence of this apparent change in attitude structure. It will also be useful to test the generalizability of this finding in other surveys.

*5. What are the proximal influences on shifts in privacy and confidentiality concern during a*

*census?*

Examination of the predictors of concern about privacy and confidentiality during Census 2000 suggests that the increase in concern is in large part a reaction to the census itself, as well as to public discussions and commentary about it. Privacy concerns increased after receipt of the census form, especially among long form recipients. In addition, people who had heard about the controversy over the long form expressed much greater concern about privacy. These two factors influenced privacy concerns independently: that is, hearing about the controversy raised concern among long form and short form recipients alike. In addition, people who mistrust “the government in Washington” appear predisposed to be concerned about census privacy and confidentiality, and there is some indication that they may have reacted more extremely to news of the long form controversy than those who trusted the government at least some of the time. This result is consistent with Couper, Singer, and Kulka’s conclusion that “participation in the U.S. census, like participation in politics, reflects a more fundamental relationship between the individual and the polity” (1998:74). This analysis suggests that some minimal degree of general trust in government is required in order to establish the conditions of legitimacy and trust needed to carry out an activity which depends on public cooperation, such as the census.



Fig. 1a. Percent who believe the law requires them to answer census questions in 1990 and 2000 (“don’t knows” excluded)

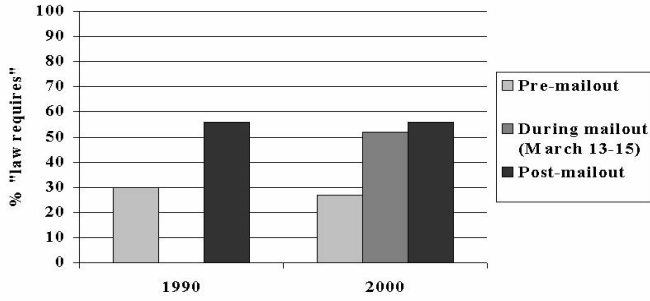


Fig 1b. Percent who agree or strongly agree that the Census Bureau promise of confidentiality can be trusted (excluding “no opinion”/ “neither agree nor disagree” responses)

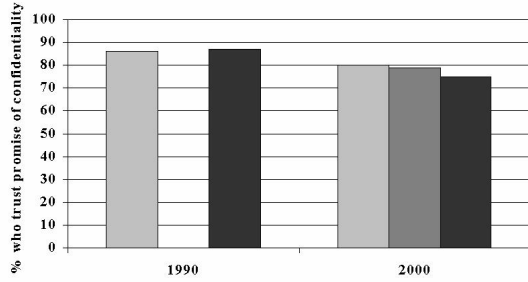


Fig. 1c. Percent who agree or strongly agree that “The census is an invasion of privacy” (excluding “no opinion”/ “neither agree nor disagree” responses)

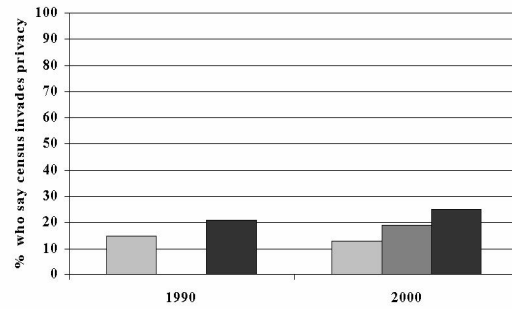


Fig. 1d. Percent who believe census answers could be used against a person (excluding “no opinion”/ “neither agree nor disagree” responses)

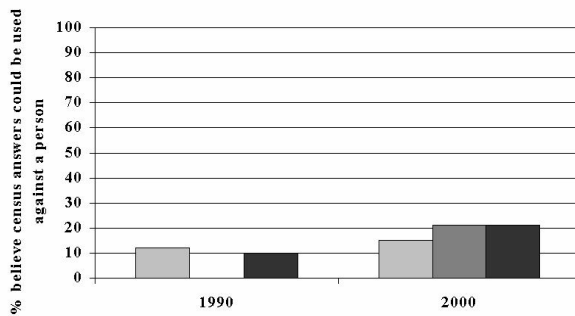


Fig 2a. Trends in fraction who report hearing about long form controversy

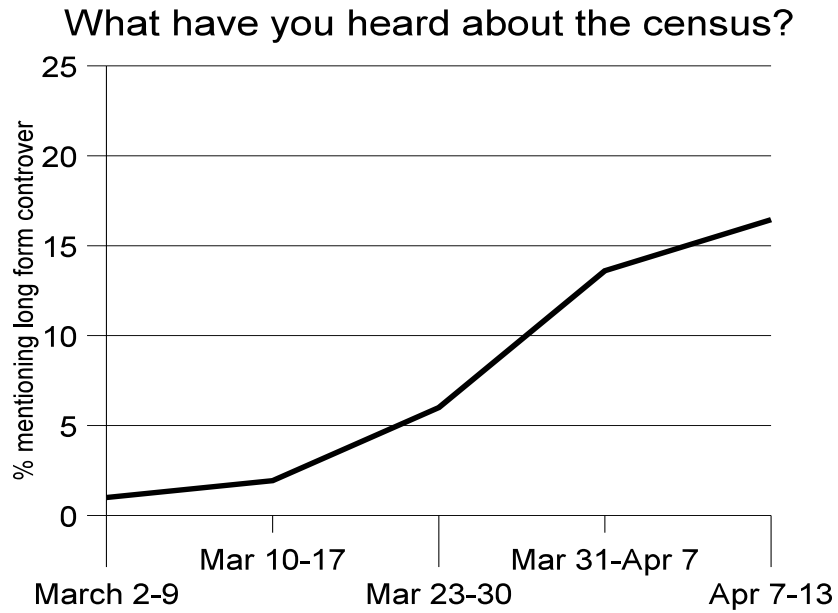


Fig 2b. Trends in privacy concern during Census 2000 (Mean Privacy Index scores, and 95% confidence intervals)

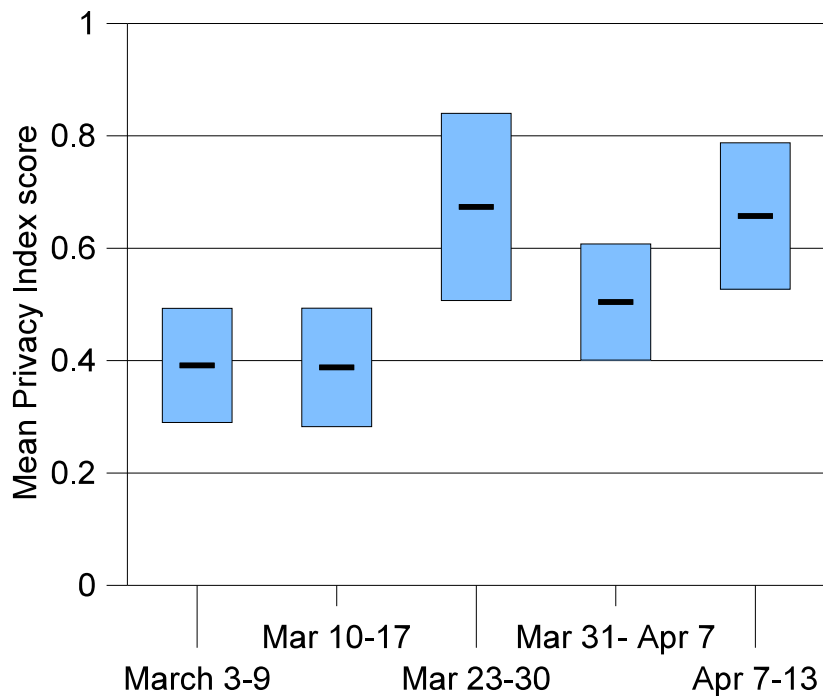


Table 1a. Trends in privacy-related opinions before and after the 1990 Census

	Jan.-Feb 1990	April-May 2000
<b>1. Does the law require you to answer the census questions?</b>		
Yes	25%	46%
No	57	37
Don't know	19	17
<b>2. The Census Bureau's promise of confidentiality can be trusted</b>		
Strongly agree	17%	19%
Agree	62	60
Disagree	11	10
Strongly disagree	2	2
No opinion	8	8
<b>3. The census is an invasion of privacy</b>		
Strongly agree	2%	3%
Agree	12	17
Disagree	69	59
Strongly disagree	12	15
No opinion	5	7
<b>4. People's answers to the census can not be used against them.</b>		
Strongly agree	17%	17%
Agree	61	64
Disagree	10	7
Strongly disagree	1	1
No opinion	11	10
Unweighted N	1,940	1,998

Table 1b. Trends in privacy-related opinions during Census 2000

	Mar 3-9, 2000	Mar 10- 17	Mar 23- 30	Mar 31- Apr 7	Apr 7- 13
So far as you know, does the law require you to answer the census questions?					
Have to answer the questions	19%	25%	47%	43%	46%
Can choose not to answer the questions	49	51	36	37	34
Don't know	32	24%	17	20	20
The Census Bureau promise of confidentiality can be trusted					
Strongly agree	14%	13%	15%	15%	15%
Agree	37	42	36	37	35
Neither agree nor disagree	36	33	32	34	33
Disagree	12	8	14	12	13
Strongly disagree	3	4	4	3	5
The census is an invasion of privacy					
Strongly agree	3%	2%	6%	6%	6%
Agree	7	8	12	10	14
Neither agree nor disagree	27	26	27	28	31
Disagree	47	46	36	43	35
Strongly disagree	16	18	19	13	14
My answers to the census could be used against me					
Strongly agree	2%	3%	5%	4%	4%
Agree	9	7	12	10	11
Neither agree nor disagree	31	30	29	28	31
Disagree	42	42	37	43	38
Strongly disagree	16	18	17	15	15
Unweighted N	993	973	719	1004	948

Table 2. Percentage of respondents giving favorable responses in two surveys conducted by different survey organizations (neutral and DK responses excluded)

	<b>Census Bureau survey (April-May 1990)</b>	<b>NORC survey (June-July 1990)</b>
1. Census required by law	56%	52%
2. Can trust Census Bureau's promise of confidentiality	86%	73%
3. Census not an invasion of privacy	79%	78%
4. Not used against you	90%	84%

Table 3a. Percentage of respondents giving favorable responses in 1990 survey (both waves combined), in phone versus non-phone households (neutral and DK responses excluded)

	<b>Household has telephone</b>	<b>No telephone</b>
1. Census required by law	43%	40%
2. Can trust promise of confidentiality	86%	86%
3. Census not an invasion of privacy	82%	74%
4. Not used against you	89%	85%

Table 3b. Percentage of respondents giving favorable responses in all waves of 2000 survey, in households with listed versus unlisted phones (neutral and DK responses excluded)

	<b>All or some phones are listed</b>	<b>All phones are unlisted</b>
1. Census required by law	47%	44%
2. Can trust promise of confidentiality	78%	76%
3. Census not an invasion of privacy	81%	74%
4. Not used against you	82%	82%

Table 4. Parameter estimates for a log linear model fitting six variables (YEAR x PREPOST x PRIVACY x CONFIDENTIALITY x AGAINST x LAW)

Effect	Parameter Estimates		
	$\lambda$	S. e.	Standardized value
Intracensal changes			
PREPOST x PRIVACY	.113	.028	4.108
PREPOST x CONFIDENTIALITY	-.008	.031	-.253
PREPOST x AGAINST	.028	.034	.824
PREPOST x LAW	.266	.020	13.016
PREPOST x CONFIDENTIALITY x AGAINST	.089	.037	2.412
Intercensal trends from 1990 to 2000			
YEAR x PRIVACY	.011	.036	.305
YEAR x CONFIDENTIALITY	.061	.038	1.599
YEAR x AGAINST	.156	.032	4.807
YEAR x LAW	.054	.023	2.325
Changes in intracensal effects			
YEAR x PREPOST x AGAINST	.067	.028	2.427
Constant inter-item associations			
PRIVACY x CONFIDENTIALITY	.423	.033	12.889
PRIVACY x AGAINST	.383	.032	11.955
CONFIDENTIALITY x AGAINST	.527	.036	14.803
PRIVACY x LAW	.114	.027	4.160
Long-term changes in associations among items			
YEAR x PRIVACY x CONFIDENTIALITY	.125	.030	4.104
YEAR x PRIVACY x AGAINST	.144	.032	4.561
Jackknifed Pearson $\chi^2 = -.99$ , d.f. =40, $p > .5$			

Table 5. Associations between PRIVACY and two confidentiality items, 1990 and 2000

	1990	2000
	% who believe census is an invasion of privacy	
Census answers can be used against people	38%	63%
Cannot be	14%	8%
Cross-product ratio	3.8	20.0
Census Bureau promise of confidentiality cannot be trusted	41%	65%
Can be trusted	13%	8%
Cross-product ratio	4.8	22.5

Table 6. Goodness of fit of alternative models fitted to cross-classifications of items

Items included in Model	Model	Goodness of fit	
		1990	2000
PRIVACY, CONFIDENTIALITY, AGAINST	Independence	$\chi^2 = 12.8, df=4, p<.0001$	$\chi^2=24.5, df=4, p<.0001$
	Two-factor	$\chi^2 = -.25, df=1, p=.41$	$\chi^2 = .33, df=1, p=.22$
	Rasch	$\chi^2 = 3.86, df=2, p<.0001$	$\chi^2 = -.75, df=2, p>.5$
PRIVACY, CONFIDENTIALITY, AGAINST, LAW	Independence	$\chi^2 = 12.4, df=11, p<.0001$	$\chi^2=19.7, df=11, p<.0001$
	Two-factor	$\chi^2 = .30, df=5, p=.30$	$\chi^2 = .30, df=5, p=.31$
	Rasch	$\chi^2 = 7.2, df=8, p<.0001$	$\chi^2 = 13.2, df=8, p<.0001$

Table 7. Linear regression coefficients for Index of Privacy Concern regressed on demographic characteristics, trust, and census variables (Standard errors in parentheses)

Predictors	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Age</b> (excluded category: 55+)					
~16-24	-.24* (.091)	-.26** (.095)	-.27* (.107)	-.25* (.097)	-.26* (.096)
~25-34	.04 (.097)	.02 (.107)	.04 (.133)	.00 (.106)	-.01 (.105)
~35-44	.09 (.086)	.05 (.080)	.00 (.086)	-.04 (.086)	-.04 (.084)
~45-54	.22** (.076)	.20* (.075)	.21* (.088)	.18* (.087)	.18* (.086)
<b>Education</b> (excluded category: College grad+)					
<high school	.45** (.136)	.36* (.146)	.48* (.192)	.35* (.166)	.36* (.165)
High school	.25** (.070)	.23** (.066)	.19** (.063)	.20** (.071)	.20** (.070)
Some college	.09 (.066)	.09 (.065)	.11 (.073)	.10 (.074)	.10 (.073)
<b>Race</b> (excluded category: White, non-Hispanic)					
Black, non-Hispanic	.08 (.106)	.04 (.118)	.09 (.136)	.11 (.137)	.11 (.136)
Other, non-Hispanic	.04 (.086)	.11 (.092)	.05 (.099)	.06 (.110)	.06 (.111)
Hispanic	-.14* (.071)	-.13 (.075)	-.13 (.108)	-.14 (.097)	-.14 (.097)
<b>Trust government none of the time</b> (excluded category: All/most/some of the time/DK)		.70** (.122)	.65** (.146)	.64** (.152)	.58** (.162)



Predictors	Model 1	Model 2	Model 3	Model 4	Model 5
<b>Can't be too careful in dealing with people</b> (excluded: Most can be trusted/depends/DK)		.15* (.057)	.12* (.059)	.09 (.065)	.09 (.064)
<b>Form receipt</b> (excluded category: pre-census)					
Short form			.19* (.075)	.11 (.058)	.11 (.058)
Long form			.50** (.156)	.41** (.139)	.39** (.135)
No form, or both long and short			.57** (.138)	.55** (.155)	.55** (.155)
<b>Saw or heard about long form controversy</b> (excluded: saw or heard something else about the census)				.73** (.171)	.65** (.188)
<b>Heard about controversy</b> (1=heard about controversy, 0=other census news) <b>X trust in government</b> (1=none, 0=all/most/some/DK)					.61 (.339)
Unweighted N	1,993	1,911	1,515	1,373	1,373
R <sup>2</sup>	.036	.085	.121	.148	.151

\* p&lt;.05

\*\* p &lt; .01

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