Comparison of Item and Unit Nonresponse in Household Surveys

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1. Introduction

Survey quality is thought to be impacted by nonresponse, both item nonresponse and survey or unit nonresponse. The relationship between item nonresponse and unit nonresponse has been studied by Dixon (2002). Dahlhamer et al. (2003) also studied item nonresponse across several federal surveys.

The current study examines the nature of item nonresponse and the relationship with subsequent unit nonresponse for two surveys: the Current Population Survey (CPS) and the Consumer Expenditure Quarterly Survey (CEQ).

2. Item nonresponse

Item nonresponse is often considered a source of nonsampling error. Mason, Lesser and Traugott (2002) point to several surveys which have found bias due to item nonresponse. Item nonresponse may increase with reductions in unit nonresponse if respondents who are reluctant to participate decline to answer sensitive questions.

Item nonresponse can be a predictor of unit nonresponse. Loosveldt, G., Rickery, J., and Billet, J. (1999) found that increases in item nonresponse were related to higher refusal probability (unit nonresponse) in subsequent panels of a survey. Item characteristics were hypothesized to relate to bias. If the refusal is related to the survey topic, then bias is highly likely. Threatening or sensitive items also are likely to produce bias. Income items are a common example where response may be related to the survey sponsor and the survey topic. Other item characteristics which may produce refusal are: difficulty, memory demand, access to information (such as financial records), response complexity, and question format.

Item and respondent characteristics can interact to produce item nonresponse. Murata and Gwartney (1999) used a theoretical grouping of items and an expert rating of items to explore their characteristics. For respondent characteristics they found more education to be related to higher item nonresponse, especially for women and Hispanics, although the effect was confounded with age. For question characteristics more "important" questions had less nonresponse, and more salient questions usually produced lower item nonresponse. Question vagueness, difficulty, multiple tasks, multiple concepts, and question length were all related to higher item nonresponse. Question characteristics seemed to have a stronger effect than person characteristics, but their survey had an unusual variety of questions. In contrast, Borgers and Hox (2001) found person characteristics more predictive of item nonresponse than question characteristics.

The impact of item nonresponse on error may vary considerably by survey. Mason, Lesser and Traugott (2002) found more callbacks and refusal conversions didn't improve estimates in the surveys they reviewed. Benchmarking to external sources revealed some potential bias in some surveys. They suggested that item nonresponse may be more of a problem than unit nonresponse. Where unit nonresponse is a problem, item nonresponse is often also a problem. Efforts to convert refusals often produced higher item nonresponse in the surveys they studied, making the efforts less effective in terms of the estimates.

Dixon (2002) found two patterns of item nonresponse (personal and work related items), which indicated that respondents' sensitivity to items are different. For some respondents, economic items may seem like an intrusion, while for other respondents personal items may seem irrelevant in an economic survey. This is different from the theory that the propensity to respond is on a single continuum. The reasons for not responding are probably different for different items, and may be different for each survey. Serfling (2003) found a "reverse cooperation continuum" in a German socio-economic survey, in contrast to the Loosveldt et al. (1999) and Dixon (2002) studies. The current study attempts to examine these relationships.

3. Design

The CPS is a monthly household labor force survey conducted by the U.S. Census Bureau for the Bureau of Labor Statistics. Approximately 48,000 eligible households are sampled each month in a two-stage clustered design. Sampled

households are interviewed a total of eight times over a 16 month period. National level data on the labor force, employed, and unemployed are produced monthly, quarterly, and annually. As a household survey the CPS provides rich demographic detail, including age, sex, race, Hispanic origin, educational attainment, marital status and family attributes, foreign-born status, veteran status, and other demographic characteristics. For the current analysis households were matched for the years 2002 through 2003. Persons in the household who were not eligible for the labor force (e.g., under 16 years old) were excluded. Waves 4 and 8 were used because more questions were asked during those interviews, and 197,077 persons were included in the analysis.

The CEQ is a household expenditure survey conducted by the U.S. Census Bureau for the U.S. Bureau of Labor Statistics. Approximately 8,910 eligible addresses are sampled each quarter, with 6,160 completed interviews typical. Households (or more correctly: consumer units) were matched for the years 2002 through 2003. The response rate is usually in the range of 80-83 percent. In this study 122,214 persons were matched across the five quarters, although only Interviews 2 and 3 are used here.

4. Method
Since questions often differ between surveys, the comparisons were done with item "concepts" (Dahlhamer et al., 2003). Item concepts from "demographics" (e.g., Race, Hispanic origin, Educational attainment), "labor force" (e.g., class of worker), and "income" (e.g., interest, rent, dividends) were used. These sets of items had been found to be related to unit nonresponse in other panels and labor force estimates. Logistic models were used to relate the item sets to unit nonresponse and whether respondents were employed or other (not in the labor force or unemployed). The survey weights (probability of selection weights) were adjusted to make the sample proportions the same for the two surveys for ease of interpretation. Item nonresponse includes both refusal and "don't know" because the coding system for the CEQ didn't differentiate the two for the months studied. The "don't know" rate is small, so for all practical purposes the nonresponse is from refusal. All of the models where overdispersion was detected use adjusted covariances. The power of the tests should be considered in examining the tables. The large sample size is offset by the small proportions and the multiple tests. Dividing the

estimate by its standard error should give a better index of the size of the effect than the simple significance test indicated by italics.

5. Results
Table 1 shows the noncontact and refusal rates for the two surveys in the first two rows. Nonresponse is lower for the CPS. Noncontact is higher in the CPS than the CEQ relative to refusal (probably due to a shorter interview period). The rest of Table 1 shows the item nonresponse rates. The highest nonresponse for both surveys was from total income questions. Except for education and whether they were ever in the armed forces, the items on the CEQ had higher nonresponse.

Table 2 shows the coefficients and standard errors for a number of logistic regressions on noncontact. The first set of coefficients (labeled "Single") is from nine separate regressions. The strongest relationship was with "income" (.81 with standard error of .01), although nonresponse on all the items was associated with noncontact. Significance at the .05 level is indicated by the italics. Non-italicized coefficients weren't significant. The next two columns are for nine models with an indicator for which survey was taken added to the models. The positive numbers under the "Survey" column indicate the CEQ had more noncontact than the CPS. The "Item" column can be compared to the first column under the "Single" column. While all the coefficients are similar to the single variable models, many become non-significant when the variability of noncontact attributable to differences in the surveys is accounted for. The last three columns show the models with the interaction between the survey and item nonresponse. The last column is of most interest, since it is the one testing for an interaction. Most of the significant coefficients indicate a negative relationship; nonresponse on the item is associated with less likelihood of noncontact in the CEQ relative to the CPS. The exception is for "income", where nonresponse is associated with a higher likelihood of noncontact on the CEQ relative to the CPS.

Refusal was studied in a similar series of regressions as was done with noncontact. Table 3 shows the coefficients for the three sets of models. The first set shows item nonresponse is related to a higher probability of survey refusal except for "education." The second two columns show that adjusting for differences between surveys finds the same higher probability of refusal, but with "education" and "armed forces

participation" becoming nonsignificant. While "income" is still significant, the strength of the relationship is diminished similarly to the noncontact model. The last three columns show the interaction between item nonresponse and survey. The nonsignificant interaction term and high standard error for "sex" is probably due to small cell counts, and should be disregarded. The interaction terms which are negative indicate item nonresponse is associated with lower probability of refusal for the CEQ relative to the CPS. All of the probabilities were related to higher probability of refusal (the column labeled "Item").

The relationship of unit noncontact, unit refusal, and item nonresponse with labor force status was examined with a series of multinomial logistic regression models (using "employed" as the reference category).

Table 4 shows the coefficients and standard errors. The first two columns of coefficients show the intercepts for "Unemployed" (U) and "Not in labor force" (N) relative to "Employed." The unemployed are a lower percentage than not-in-labor-force. The column labeled "Item" shows the coefficient relating the pooled Unemployed and Not-in-the-labor-force categories to Employed. Noncontact (-0.18) and refusal (-0.12) are related to a lower probability of being employed, as is nonresponse to "sex" (-1.48). The remaining coefficients related item nonresponse to a higher probability of being employed, although only four were significant.

The next four columns show the effect of adjusting for survey differences, with only nonresponse to "origin" and "income" remaining significant.

The interaction between nonresponse and labor force status shows the CEQ had noncontact, refusal and most item nonresponse associated with higher probability of employment relative to the CPS. The only significant item nonresponse with a negative relationship was "income".

Additional models examining the relationship between item nonresponse and labor force status adjusting for unit noncontact and unit refusal didn't find any substantive differences from the models described here and so will not be presented. Additional models separating out the labor force status into pairs (to avoid nonproportional odds) are shown in Tables 5 through 7. The only strong departures from proportional odds were with lower nonresponse items.

6. Discussion

Many studies of nonresponse are motivated by the idea that nonresponse is a propensity which, when a threshold is crossed, produces refusal. Many factors may affect the threshold: survey topic, interviewer characteristics and behavior, and previous contact among others.

Noncontact is thought to be more complex; with the effort of the interviewer, timing of attempted contacts, and availability of the respondent all interacting to produce the outcome. This study found similar relationships for most items with both noncontact and refusal. Noncontact may be a form of refusal in some cases.

Item nonresponse is thought to behave in a similar manner to unit nonresponse. For those who participate in the survey, some items would trigger nonresponse (usually refusal) due to concerns about privacy and/or confidentiality. The current study supported other studies that found item nonresponse was related to refusal (as well as noncontact). The only items which didn't relate positively had very low nonresponse rates, suggesting that they were at the end of the propensity curve.

The propensity theory would suggest that surveys with higher unit nonresponse should have lower item nonresponse since those who are most likely to not respond to some items would be eliminated by unit nonresponse. This wasn't the case with the two surveys studied here, where there was a mix of effects. The most sensitive items (income related) had higher nonresponse on the CEQ even though the unit nonresponse was higher.

Some of the items on the CPS which had lower nonresponse were items which are used in reports (sex, race), so they would be more easily justified by the interviewer. Since some of the other items not used in reports show the same pattern, this explanation isn't sufficient to explain the lower item nonresponse. The Mason, Lesser and Traugott (2002) study showed more effort by interviewers didn't improve estimates in their surveys. This may be a confounding factor in the surveys studied here, where more effort may be required for the CEQ producing some higher item nonresponse as the cost of lowering unit nonresponse. A future study including call history data may clarify the effect.

The relationship between unit nonresponse (both refusal and noncontact) and labor force status was consistent between surveys for the employed and not-in-labor-force categories. The unemployment category was small and the

effects very small. The surveys were consistent in the overall relationship between income nonresponse (and most of the other nonresponse items), and labor force status, but not for nonresponse on "armed forces participation," birth date, or race. The relation of the item nonresponse to labor force status was usually opposite the unit nonresponse. This was also seen in Dixon (2003).

7. Limitations and Future Research

This study used 85 logistic models to examine the relationships between item nonresponse, unit nonresponse, and labor force status. While most of the models were variations of nested models, there is a problem with choosing an appropriate confidence region.

The CPS is a complex sample (stratified and clustered) and the CEQ is a stratified sample. While the design effect is small for both surveys, correct standard errors should be considered in future research (at least for comparison). The standard errors would increase by less than 10 percent in the variables studied here.

The difference between item refusal and "don't know" should be explored.

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Appendix:

Table 1: Noncontact and Refusal, and Item Nonresponse

	survey	
	CEQ	CPS
noncontact	.07572	.05894
refuse	.16901	.02975
armforce	.00059	.00441
birthdate	.02332	.02091
education	.00281	.01638
sex	.00640	.00007
marital	.02010	.00561
origin	.01507	.01639
race	.00933	.00299
income	.19850	.14241
phone	.02368	.00500

Table 2: Logistic regressions for Noncontact (standard errors are show in parentheses)

Item nonresponse	Single	With Survey		Interaction		
		Survey	Item	Survey	Item	Survey*Item
Armed force	0.65(.10)	.136(.04)	.758(.63)	.138(.01)	-4.1(16.3)	-5.1(16.3)
Birth date	0.44(.04)	.134(.06)	.436(.33)	.144(.01)	.448(.04)	-0.34(.04)
Education	0.26(.06)	.137(.07)	.360(.64)	.142(.01)	-1.4(.39)	-1.93(.39)
Sex	0.77(.08)	.132(.002)	.653(.03)	.132(.01)	.471(.52)	0.18(.52)
Marital Status	0.38(.05)	.132(.06)	.305(.42)	.138(.01)	.542(.05)	-0.48(.05)
Origin	0.41(.04)	.135(.003)	.414(.02)	.134(.01)	.413(.04)	0.19(.04)
Race	0.78(.06)	.131(.005)	.715(.04)	.132(.01)	.744(.07)	-0.05(.07)
Income	0.81(.01)	.108(.20)	.792(.43)	-0.01(.01)	.666(.02)	0.46(.02)
Telephone	0.60(.04)	.129(.03)	.515(.19)	.132(.01)	.672(.05)	-0.24(.05)

Table 3: Logistic regressions for Refusal (standard errors are show in parentheses)

Item nonresponse	Single	With Survey		Interaction		
		Survey	Item	Survey	Item	Survey*Item
Armed force	0.29(.10)	.950(.06)	1.20(.80)	.954(.01)	.56(.15)	-1.0(.15)
Birth date	0.84(.03)	.950(.06)	.857(.25)	.961(.01)	1.01(.03)	-0.29(.03)
Education	-0.20(.06)	.951(.10)	.583(.83)	.963(.01)	0.14(.08)	-0.98(.08)
Sex	1.95(.06)	.940(.012)	1.36(.10)	.940(.01)	-2.30(15.0)	3.62(15.0)
Marital Status	1.08(.03)	.940(.04)	.725(.18)	.944(.01)	.970(.05)	-0.30(.05)
Origin	1.05(.03)	.950(.03)	1.19(.11)	.946(.01)	1.12(.04)	0.132(.04)
Race	2.00(.04)	.940(.03)	1.77(.15)	.937(.01)	1.59(.07)	0.240(.07)
Income	1.55(.01)	.928(.22)	1.50(.35)	.773(.01)	1.18(.02)	0.48(.02)
Telephone	1.20(.03)	.937(.04)	.798(.19)	.942(.01)	1.09(.05)	-0.34(.05)

Table 4: `Labor force status (Using Employed as the reference)`

Item nonresponse	Single			With Survey			
	U	N	Item	U	N	Survey	Item
Noncontact	*-3.65(.05)*	*-0.64(.02)*	*-0.18(.07)*	*-3.66(.06)*	*-0.64(.02)*	*-0.04(.02)*	-0.17(.08)
Refusal	*-3.65(.03)*	*-0.64(.01)*	*-0.12(.03)*	*-3.66(.06)*	*-0.65(.02)*	-0.10(.07)	-0.03(.02)
Armed force	*-3.66(.03)*	*-0.64(.01)*	0.24(.21)	*-3.67(.03)*	*-0.66(.01)*	-0.04(.01)	0.21(.16)
Birth date	*-3.66(.06)*	*-0.65(.02)*	0.23(.17)	*-3.67(.03)*	*-0.66(.01)*	-0.04(.01)	0.20(.09)
Education	*-3.67(.12)*	*-0.65(.04)*	0.59(.38)	*-3.67(.06)*	*-0.66(.02)*	-0.03(.02)	*0.56(.19)*
Sex	*-3.66(.01)*	*-0.65(.002)*	*-1.48(.36)*	*-3.67(.02)*	*-0.65(.01)*	-0.04(.01)	-1.46(1.06)
Marital Status	*-3.66(.01)*	*-0.65(.003)*	*0.22(.05)*	*-3.67(.03)*	*-0.65(.01)*	-0.04(.01)	0.19(.15)
Origin	*-3.66(.03)*	*-0.65(.01)*	*0.24(.11)*	*-3.67(.03)*	*-0.66(.01)*	-0.04(.01)	*0.21(.09)*
Race	*-3.66(.01)*	*-0.65(.002)*	0.09(.04)	*-3.67(.03)*	*-0.65(.01)*	-0.04(.01)	0.06(.22)
Income	*-3.72(.18)*	*-0.70(.06)*	*0.31(.15)*	*-3.73(.14)*	*-0.71(.05)*	-0.05(.04)	*0.32(.11)*
Telephone	*-3.66(.02)*	*-0.65(.01)*	0.07(.06)	*-3.67(.02)*	*-0.66(.01)*	-0.04(.01)	0.10(.05)

Item nonresponse	Interaction				
	U	N	Survey	Item	S*I
Noncontact	*-3.65(.05)*	*-0.65(.004)*	*-0.04(.004)*	*-0.18(.02)*	*0.13(.02)*
Refusal	*-3.65(.05)*	*-0.65(.012)*	*-0.04(.012)*	*-0.20(.06)*	*0.17(.06)*
Armed force	*-3.67(.01)*	*-0.65(.004)*	*-0.04(.004)*	-3.70(12.48)	-3.93(12.48)
Birth date	*-3.67(.01)*	*-0.66(.004)*	*-0.04(.004)*	0.08(.09)	-0.13(.09)
Education	*-3.67(.01)*	*-0.66(.004)*	*-0.03(.004)*	0.40(.22)	-0.16(.22)
Sex	*-3.67(.01)*	*-0.56(.004)*	*-0.04(.004)*	-4.56(16.27)	-4.06(16.27)
Marital Status	*-3.67(.01)*	*-0.66(.004)*	*-0.04(.004)*	*0.70(.18)*	*0.55(.18)*
Origin	*-3.67(.01)*	*-0.66(.004)*	*-0.04(.004)*	*0.61(.17)*	*0.41(.17)*
Race	*-3.67(.01)*	*-0.66(.004)*	*-0.04(.004)*	*0.76(.22)*	*0.78(.22)*
Income	*-3.73(.01)*	*-0.71(.004)*	*-0.03(.004)*	*0.31(.01)*	*-0.14(.01)*
Telephone	*-3.67(.01)*	*-0.66(.004)*	*-0.04(.004)*	*0.14(.04)*	-0.07(.04)

Table 5: Unemployed `Labor force status (Using Employed as the reference)`

Item nonresponse	Single		With Survey		
	U	Item	U	Survey	Item
Noncontact	*-3.26(.01)*	-0.04(.05)	*-3.27(.01)*	*-0.03(.01)*	-0.03(.04)
Refusal	*-3.26(.01)*	-0.07(.04)	*-3.26(.01)*	*-0.03(.01)*	*-0.05(.01)*
Armed force	*-3.26(.01)*	-0.34(.29)	*-3.27(.03)*	*-0.03(.01)*	*- 0.36(.17)*
Birth date	*-3.26(.01)*	-0.20(.12)	*-3.27(.03)*	*-0.03(.01)*	*-0.23(.09)*
Education	*-3.26(.01)*	-0.40(.17)	*-3.27(.01)*	*-0.03(.01)*	-0.43(.13)
Sex	*-3.26(.01)*	-8.06(70.)	*-3.27(.01)*	*-0.03(.01)*	-8.04(1.41)
Marital Status	*-3.26(.01)*	0.17(.20)	*-3.27(.01)*	*-0.03(.01)*	0.15(.18)
Origin	*-3.26(.01)*	0.02(.12)	*-3.27(.01)*	*-0.03(.01)*	-0.01(.12)
Race	*-3.26(.01)*	0.02(.28)	*-3.27(.01)*	*-0.03(.01)*	0.01(.17)
Income	*-3.26(.01)*	0.003(.03)	*-3.27(.04)*	-0.03(.04)	0.01(.11)
Telephone	*-3.27(.01)*	*0.24(.10)*	*-3.27(.01)*	*-0.03(.01)*	*0.27(.01)*

Any opinions expressed in this paper are those of the author and do not constitute policy of the Bureau of Labor Statistics.

(table 5 continued)

Item nonresponse	Interaction			
	U	Survey	Item	S*I
Noncontact	*-3.27(.01)*	*-0.03(.012)*	-0.03(.05)	-0.04(.05)
Refusal	*-3.26(.01)*	*-0.03(.013)*	-0.04(.05)	-0.01(.05)
Armed force	*-3.27(.01)*	*-0.03(.012)*	-3.70(33.87)	-3.34(33.87)
Birth date	*-3.27(.01)*	*-0.03(.012)*	-0.47(.39)	-0.26(.39)
Education	*-3.27(.01)*	*-0.03(.012)*	-4.22(40.83)	-3.80(40.83)
Sex	*-3.27(.01)*	*-0.03(.012)*	-8.05(73.45)	0.03(73.45)
Marital Status	*-3.27(.01)*	*-0.03(.012)*	-3.43(28.09)	-3.59(28.09)
Origin	*-3.27(.01)*	*-0.03(.012)*	-4.01(40.14)	-4.01(40.14)
Race	*-3.27(.01)*	*-0.03(.012)*	-3.51(40.19)	-3.52(40.19)
Income	*-3.28(.01)*	*-0.05(.013)*	0.01(.03)	*0.11(.03)*
Telephone	*-3.27(.01)*	*-0.03(.012)*	*0.24(.11)*	-0.01(.11)

Table 6: Not in `Labor force status (Using Employed as the reference)`

Item nonresponse	Single		With Survey		
	N	Item	N	Survey	Item
Noncontact	*-0.71(.01)*	*-0.20(.02)*	*-0.72(.04)*	-0.04(.04)	-0.19(.15)
Refusal	*-0.71(.01)*	*-0.12(.01)*	*-0.72(.01)*	-0.00(.04)	-0.10(.15)
Armed force	*-0.72(.01)*	*0.31(.08)*	*-0.73(.01)*	*-0.04(.01)*	- 0.28(.19)
Birth date	*-0.73(.01)*	*0.27(.03)*	*-0.73(.01)*	*-0.04(.01)*	*-0.25(.05)*
Education	*-0.73(.01)*	*0.70(.04)*	*-0.74(.01)*	*-0.04(.01)*	*0.68(.03)*
Sex	*-0.72(.01)*	-1.39(.75)	*-0.73(.01)*	*-0.04(.01)*	-1.38(1.4)
Marital Status	*-0.72(.01)*	*0.23(.07)*	*-0.73(.01)*	*-0.04(.01)*	0.20(.25)
Origin	*-0.73(.01)*	*0.27(.03)*	*-0.73(.01)*	*-0.04(.01)*	*0.24(.12)*
Race	*-0.72(.01)*	0.11(.09)	*-0.73(.02)*	*-0.04(.02)*	0.07(.40)
Income	*-0.79(.01)*	*0.35(.01)*	*-0.80(.07)*	-0.05(.07)	*0.37(.17)*
Telephone	*-0.72(.01)*	0.05(.04)	*-0.73(.01)*	*-0.04(.01)*	0.08(.07)

Item nonresponse	Interaction			
	N	Survey	Item	S*I
Noncontact	*-0.72(.01)*	*-0.05(.004)*	*-0.20(.02)*	*0.15(.02)*
Refusal	*-0.72(.01)*	*-0.04(.004)*	*-0.22(.02)*	*0.19(.02)*
Armed force	*-0.73(.01)*	*-0.04(.004)*	-3.66(12.78)	-3.95(12.78)
Birth date	*-0.73(.01)*	*-0.04(.004)*	0.13(.09)	-0.12(.09)
Education	*-0.74(.01)*	*-0.04(.004)*	*0.52(.23)*	-0.16(.23)
Sex	*-0.73(.01)*	*-0.04(.004)*	-4.51(16.67)	-4.10(16.67)
Marital Status	*-0.73(.01)*	*-0.04(.004)*	-0.86(.20)	-0.70(.20)
Origin	*-0.73(.01)*	*-0.04(.004)*	0.75(.18)	*.53(.18)*
Race	*-0.73(.01)*	*-0.04(.004)*	*1.01(.27)*	*1.02(.27)*
Income	*-0.79(.01)*	*-0.02(.004)*	*0.36(.01)*	*-0.17(.01)*
Telephone	*-0.73(.01)*	*-0.04(.004)*	*0.13(.04)*	-0.08(.04)

Table 7: Unemployed Labor force status (Using NILF as the reference)

Item nonresponse	Single		With Survey		
	U	Item	U	Survey	Item
Noncontact	*-2.55(.01)*	*0.17(.05)*	*-2.55(.05)*	0.01(.05)	0.17(.19)
Refusal	*-2.54(.01)*	0.06(.04)	*-2.54(.01)*	0.01(.05)	0.05(.16)
Armed force	*-2.54(.01)*	*-0.65(.29)*	*-2.54(.01)*	0.01(.01)	*-0.64(.30)*
Birth date	*-2.54(.01)*	*-0.48(.12)*	*-2.53(.01)*	0.01(.01)	*-0.47(.04)*
Education	*-2.53(.01)*	*-1.11(.17)*	*-2.53(.01)*	0.01(.01)	*-1.10(.11)*
Sex	*-2.54(.01)*	-7.12(88.)	*-2.54(.01)*	0.01(.01)	-7.11(88.)
Marital Status	*-2.54(.01)*	-0.05(.20)	*-2.54(.02)*	0.01(.02)	-0.05(.36)
Origin	*-2.54(.01)*	-0.25(.12)	*-2.54(.02)*	0.01(.02)	-0.25(.20)
Race	*-2.54(.01)*	-0.08(.29)	*-2.54(.02)*	0.01(.02)	-0.07(.45)
Income	*-2.48(.01)*	-0.35(.03)	*-2.47(.11)*	0.02(.10)	-0.35(.28)
Telephone	*-2.54(.01)*	*0.19(.10)*	*-2.54(.01)*	0.01(.01)	*018(.06)*

Item nonresponse	Interaction			
	U	Survey	Item	S*I
Noncontact	*-2.55(.01)*	0.02(.013)	*0.17(.05)*	*-0.19(.05)*
Refusal	*-2.54(.01)*	0.02(.013)	*0.18(.06)*	*-0.21(.06)*
Armed force				
Birth date	*-2.53(.01)*	0.01(.012)	-0.60(.39)	-0.13(.39)
Education	*-2.53(.01)*	0.01(.012)	-4.62(35.94)	-3.52(35.94)
Sex				
Marital Status	*-2.54(.01)*	0.01(.012)	-4.56(36.95)	-4.57(36.95)
Origin	*-2.54(.01)*	0.01(.012)	-4.68(36.80)	-4.45(36.80)
Race	*-2.54(.01)*	0.01(.012)	-4.56(41.84)	-4.58(41.84)
Income	*-2.49(.01)*	*-0.03(.013)*	*-0.35(.03)*	*0.27(.03)*
Telephone	*-2.54(.01)*	0.01(.012)	0.14(.12)	0.07(.12)