Determining Nativity Through Household-level and Person-level Question Designs

Randy Capps, Kevin Wang, Scott McNiven, Jeffrey S. Passel, Urban Institute, David Cantor, Westat
Kevin Wang, Urban Institute, 2100 M Street, NW, Washington DC, 20037

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When faced with the task of obtaining responses to the same item for all persons within a household, survey designers may take one of two approaches. In a person-level approach, the item is explicitly asked of each eligible household member. For example, health insurance coverage would be asked for each person in the household separately. In contrast, a household level approach for the same information might begin by asking if anyone in the household is insured. Answers of "yes" to the initial household level question are then followed by questions on the insurance status of each household member. Conventional wisdom suggests that a person-level approach produces data with less measurement error than a household-level approach since the respondent is able to focus on each person in the household. However, the person-level approach may be more tedious and burdensome to interviewers and respondents than a household-level approach.

We use data from the National Survey of America's Families (NSAF) to shed light on the merits of household and person level approaches to question design. The NSAF has been completed in two rounds. Round 1 was completed in 1997, while round 2 was completed in 1999. A third round is planned for 2002. Round 1 of the NSAF used a household level approach for determining country of origin while a person level approach was used in round 2. The person level approach used in round 2 identified significantly more persons born outside the United States than the household level approach used in round 1. In the analysis, we compare data on the foreign born in the NSAF with corresponding data from the March U.S. Current Population Survey (CPS) for both rounds. In addition, the round 2 NSAF sample consists of a partial overlap with sample units from round 1. We use information on persons matched between rounds to analyze the characteristics of those who responded differently to nativity items between rounds.

Previous Research

Hess, Moore, Pascale, Rothgeb and Keeley (2000) examine the merits of household versus person level questioning by using data from a split ballot test in which household and person level questions were asked for several topics, including demographics, functional limitations, health insurance, program income sources and asset ownership. Hess, et al., (2000) consider not only differences in estimates obtained through different methods of questioning but also examined differences between the two forms in item nonresponse rates, response reliability, interviewer behavior and interview length.

Of particular relevance to the question of whether to use a household or person-level approach to asking about nativity, Hess, et al. (2000) analyze differences in estimates for four demographic items: household members' "usual residence", Hispanic origin, service in the U.S. armed forces and current school enrollment. The first two items pertained to all household members, the last two were only asked of persons age 15 or older.

Hess, et al. (2000) report a statistically significant difference in estimates only for current school enrollment, with the person-level approach yielding more reports of current school enrollment than the household-level approach. The person-level approach also yields more reports of having served in the armed forces than the household-level approach, but the difference is not statistically significant. The estimates for Hispanic origin and "usual residence" are in the opposite direction of the expectation that a person-level approach should yield more reports of the characteristic of interest than a household-level approach.

The NSAF Design and Estimation

The NSAF, a survey of the well-being of children, adults under age 65, and their families, is a component of Assessing the New Federalism (ANF), an Urban Institute project designed to examine the impact of recent shifts (devolution) of much of the responsibility from the federal level to state and local governments for programs designed to assist low-income families. Low-income families (defined as a family income below 200 percent of the federal poverty level) are of particular interest because policy changes are expected to affect these families the most. Westat conducted the survey for both rounds.

Table 1
Population Estimates in NSAF and CPS, by Nativity of Adults (18-64) and Children

	NSAF Population (thousands)			CPS Population (thousands)			Foreign-born Population Difference CPS - NSAF	
Population and Year of Survey	Total	Foreign-Born	F.B. Share	Total	Foreign-Born	F.B. Share	Total	Percent
Foreign-Born Adults								
1997	162,810	14,987	9.2%	163,690	20,372	12.4%	-5,385	-26.4%
1999	166,630	20,250	12.2%	167,330	21,070	12.6%	-820	-3.9%
Foreign-Born Children								
1997	71,201	2,415	3.4%	71,224	2,618	3.7%	-203	-7.7%
1999	71,964	2,810	3.9%	72,022	2,372	3.3%	439	18.5%
Native-Born Children of Foreign-Born Parents								
1997	71,201	5,220	7.3%	71,224	11,068	15.5%	-5,848	-52.8%
1999	71,964	8,832	12.3%	72,022	11,702	16.2%	-2,871	-24.5%

The NSAF has large probability samples in each of 13 focal states, as well as a sample for the balance of the country, and it produces reliable state and national estimates of child and adult characteristics. The NSAF uses a dual-frame sample design. A random digit dialing (RDD) frame of telephone households is supplemented with an area probability sample of non-telephone households.

The NSAF interview ranges from 25 to 45 minutes, depending on whether the questions are intended to ask about a single adult or about children in the household. Interviews about adults are conducted with a randomly selected adult over 18 years old. Interviews about children and families are conducted with the person who knows the most about the health and well being of the children (Most Knowledgeable Respondent or MKA). Among the topics included in the interview are demographics, health status, health care utilization, employment, income, welfare, program participation, child care arrangements, social service needs, and measures of child and family well-being.

There are three features of NSAF design and weighting that have relevance for comparing estimates of the foreign born between the NSAF and CPS for 1997 and 1999. First, a partial overlap of sampling units (telephone numbers) from the round 1 NSAF was used in round 2. Round 1 used a list-assisted RDD sample to represent telephone households in the nation as a whole as well as for the 13 focal states. For round 2, two-thirds of the telephone sample consisted of telephone numbers that were used in round 1. The remaining one-third of the round 2 sample was a list-assisted RDD drawn to represent the study population for the NSAF in 1999. Telephone numbers from round 1 were used again in round 2 in order to increase the precision of estimates of change between the two rounds.

Persons in the NSAF sample were matched between rounds using their telephone number, first name, age, and gender. In this paper, we further restrict our analyses of matched persons to those who had the same household respondent on nativity questions in both rounds. Using these matched persons, we are able to compare answers to nativity questions between the two rounds of the survey.

Second, the NSAF was conducted only in English and Spanish. While interviewing procedures did allow for the use of proxy respondents, for the most part interviews were not conducted with households in which no household member spoke English or Spanish.

Third, we should comment on the NSAF weights that were used to produce estimates in this paper. Broadly speaking, NSAF weights for estimation reflect 1) differential probabilities of selection, 2) adjustments for unit nonresponse, and 3) post-stratification to known population control totals. In the post-stratification phase for child and adult weights, control totals were based on Census Bureau estimates at the state level by

Table 2
Underestimates of Foreign-Born Adults (18-64) in NSAF 1 and 2, by Household Size and Number of Foreign-Born

NSAF Round 1 vs. 1997 CPS

HH Size	Total Foreign-Born in HH: 1	2	3	4	5+
Difference in population estimate, foreign-born adults, 1997 CPS vs. NSAF Round 1					
1	-250				
2	**-357**	-551			
3	**-99**	-271	-465		
4	**-245**	**-609**	-173	-191	
5+	**-157**	**-602**	-323	-342	**-749**
Percent Difference, NSAF 1 vs. 1997 CPS					
1	-19%				
2	**-25%**	-22%			
3	**-12%**	-19%	-28%		
4	**-31%**	**-37%**	-19%	-14%	
5+	**-30%**	**-48%**	-31%	-31%	**-30%**

NSAF Round 2 vs. 1999 CPS

HH Size	Total Foreign-Born in HH: 1	2	3	4	5+
Difference in population estimate, foreign-born adults, 1999 CPS vs. NSAF Round 2					
1	-119				
2	**257**	-293			
3	**127**	-148	-255		
4	**74**	**-62**	-65	-106	
5+	**36**	**-71**	-194	-134	**126**
Percent Difference, NSAF 2 vs. 1999 CPS					
1	-8%				
2	**19%**	-11%			
3	**14%**	-8%	-16%		
4	**8%**	**-4%**	-7%	-8%	
5+	**6%**	**-6%**	-17%	-11%	**6%**

NSAF Round 1 vs. NSAF Round 2

HH Size	Total Foreign-Born in HH: 1	2	3	4	5+
Difference in Underestimate of Adults, NSAF 1 vs. NSAF 2					
1	131				
2	**614**	259			
3	**227**	123	210		
4	**318**	**546**	108	84	
5+	**194**	**531**	128	208	**875**
Percent Difference in Underestimate, NSAF 1 vs. NSAF 2					
1	11%				
2	**44%**	11%			
3	**26%**	10%	13%		
4	**39%**	**33%**	11%	6%	
5+	**37%**	**42%**	13%	20%	**36%**

age, sex and race/ethnicity, adjusted for the 1990 Census undercount, (that is, they were raked to national control totals from the CPS). Thus, for 1997 and 1999, the NSAF and CPS estimates in this paper are based on the same conceptual population totals. But critical to our discussion here, nativity was not used in the post-stratification phase that created the NSAF weights.

Questions on Nativity in NSAF

In both rounds of the NSAF, the nativity questions appear in Section O: Race, Ethnicity and Nativity. Round 1 of the NSAF asked the following sequence of questions to determine country of origin for all household members:

O4 Thinking about all of the people living or staying in this home, including all adults, children, and babies, were any of them born outside of the United States?

O5 Who was born outside the United States?

O6 In what country was (NAME) born?

Item O4 was asked once per household. Item O5 was only asked if item O4 was answered with a "yes". Item O6 was only asked of those identified as being born outside the United States in item O5. In contrast, the round 2 NSAF skipped items O4 and O5 and asked item O6 for each household member.

NSAF Underestimates of the Foreign-Born

Underestimates of the foreign-born population are much higher in round 1 than in round 2 of the NSAF, when compared to the CPS (table 1). Nationwide, the population of foreign-born adults ages 18 to 64 estimated by the NSAF was 26 percent lower than the number estimated by the CPS in 1997, but only 4 percent lower in 1999. [1] For foreign-born children, the round 1 underestimate was much lower (only 8 percent), and in round 2 the NSAF actually counted 19 percent *more* foreign-born children than the CPS. The greatest underestimates, however, occurred for *native-born* children with foreign-born parents: 53 percent in round 1 and 25 percent in round 2.

This pattern of higher underestimates among foreign-born adults and their native-born children suggests that many people for whom nativity was incorrectly determined lived in mixed nativity families at the time of the survey. In fact, according to data from round 2 of the NSAF, 80 percent of children in families with at least one foreign-born parent are themselves native born (Capps 2001). According to the 1998 CPS, 85 percent of families with at least one foreign-born parent

[1] For round 2 of the NSAF, the upper bound of the 95 percent confidence interval for the number of foreign born adults (ages 18-64) is just over 21 million. We have not calculated the standard error for the CPS total, but it would appear that estimated totals for round 2 of the NSAF and the CPS are within sampling error of each other.

Table 3
Characteristics of Adults in NSAF 1 and 2 Matching Sample, by Nativity in Each Round

Characteristics of Adults and Respondents*	Nativity of Adults in Matched Sample			
	Changers		Non-changers	
	Native to Foreign	Foreign to Native	Native	Foreign
Adults				
Percent of all Matching Adults	2.7%	0.2%	90.8%	6.3%
Percent Female	55.6%	48.0%	56.2%	56.2%
Percent below the Poverty Level	21.6%	20.0%	11.6%	23.8%
Average Household Size	4.5	4.0	3.9	4.3
Average Number of Foreign-Born in HH				
Round 1	**0.2**	2.1	0.0	2.5
Round 2	**2.1**	0.1	0.0	2.5
Percent of Households (Round 1) with:				
No Foreign-Born	**87.3%**	0.0%	97.6%	0.0%
One Foreign-Born and Natives	**7.4%**	28.0%	2.0%	23.1%
Two or More F.B. and Natives	**5.3%**	48.0%	0.5%	56.4%
All Foreign-Born	**0.0%**	24.0%	0.0%	20.5%
Percent of Households (Round 2) with:				
No Foreign-Born	**0.0%**	96.0%	96.5%	0.0%
One Foreign-Born and Natives	**32.8%**	0.0%	2.9%	22.9%
Two or More F.B. and Natives	**61.2%**	4.0%	0.6%	58.1%
All Foreign-Born	**5.9%**	0.0%	0.0%	19.0%
Relationship to respondent				
Self	49.7%	48.0%	55.5%	50.2%
Spouse	40.2%	40.0%	36.1%	37.1%
Parent	2.7%	8.0%	4.6%	5.6%
Child	3.6%	4.0%	2.3%	4.8%
Sibling	0.3%	0.0%	0.5%	0.3%
More Distant Relative	2.4%	0.0%	0.5%	1.3%
Nonrelative	1.2%	0.0%	0.4%	0.6%
Respondents				
Percent Foreign-Born				
Round 1	**1.2%**	80.0%	0.7%	85.7%
Round 2	**81.1%**	4.0%	1.1%	87.3%
Percent Interviewed in Spanish	29.6%	19.5%	0.4%	40.2%
Percent with no high school diploma	29.6%	14.6%	6.7%	28.9%
Sample Size	338	25	11,326	785

* Characteristics in NSAF Round 1 data, except where noted.
Note: Subsample of matched adults with same respondent in both rounds. Statistics are unweighted.

are mixed in terms of their nativity (Fix and Zimmermann 1999). Thus, in both surveys immigrant families included foreign-born adults and native-born children in a vast majority of cases.

It appears that round 1 underestimated foreign-born adults and native-born children living in the same families to a greater extent than round 2. It is in these families where confusion in the screener question ("...were any of *them* born outside the United States?") might have arisen. In fact, differences in

underestimates between rounds are greater for adults living in mixed nativity families than for those in families where all members are foreign-born (table 2).[2] Underestimates versus the CPS were high in both rounds for adults living in one, two or three person families with all foreign-born members. Underestimates were also high in round 1 for adults living in families with one foreign-born member, regardless of overall household size. In round 2, however, underestimates for these one foreign-born member families disappeared. Round 2 underestimates were also much lower for larger families (four or more members overall) with only two foreign-born members.

There are several reasons, aside from questionnaire issues, why the NSAF may have missed foreign-born adults in both rounds. As mentioned earlier, the survey was conducted in English and Spanish only, thereby missing foreign-born persons in households where English and Spanish are not spoken, for instance those with Vietnamese or Russian refugees. Also, response rate differences between the NSAF and the CPS as well as undercoverage of non-telephone households in the NSAF may have contributed to underestimation of the foreign-born in both rounds.

Nativity Responses in the NSAF Matched Sample

A total of 12,474 adults were sampled in both rounds, with the same respondent in each round. Of these, 785 adults (6.3 percent) were identified as foreign-born in both rounds, and 336 adults (2.7 percent) were counted as native-born in round 1, but foreign-born in round 2 (table 3). In only 25 cases were adults identified as foreign-born in the first but then native-born in the second round.

In this matched sample, most characteristics are the same when "changers" (adults who were counted as native-born in round 1 and foreign-born in round 2) are compared to "non-changers" (foreign-born in both rounds).[3] For instance, 56 percent of both changers and foreign-born non-changers were female, and poverty rates for their families were within 2 percentage points. The share of respondents with less than a high-school education was also similar, but a slightly lower share of changers than non-changers (30 versus 40 percent) lived in households where the survey was conducted in Spanish.[4] Thus, it does not appear that poverty, education or English language ability influenced the respondent's likelihood of missing foreign-born members when asked the household-level screener in round 1.

There were substantial differences, however, in the average number of foreign and native-born household members between changers and non-changers in round 1. Foreign-born adults in the NSAF matched sample tended to live in mixed nativity households, as in the full NSAF sample and the CPS. The average non-changer lived in a household with 4.3 members, 2.5 of whom were foreign-born (with no significant difference between rounds). Only 20 percent of non-changers lived in families made up entirely of foreign-born members; the other 80 percent lived in mixed nativity households. By contrast, in round 1 almost none of the changers lived in mixed households. Among changers, 87 percent lived in families with no foreign-born members, and the average number of foreign-born members was only 0.2 (out of 4.5). In round 2, however, an even greater share of changers (94 percent) than non-changers lived in mixed families. Thus, in the NSAF matched sample, virtually all of the cases in which nativity reporting changed between rounds were mixed nativity families.

Similar proportions of changers and non-changers (about half) were themselves respondents to the survey in both rounds. Another 40 percent were spouses of respondents. Only a few percent were distant relatives or non-relatives. In about 86-87 percent of cases, the non-changers lived in families with a foreign-born respondent. But among changers, the respondent was foreign-born in *only 1 percent* of cases during round 1. The share of foreign-born respondents jumped to 81 percent in round 2.

Thus, in almost every household where an adult's nativity changed from native to foreign-born between rounds, the respondent misreported nativity for herself or himself in round 1. Additionally, in many cases the spouse's nativity was also misreported in round 1. Since over 90 percent of their families were of mixed status, respondents likely did not misreport nativity of their native-born children.

[2] These comparisons use adults living in families, rather than families, as units of analysis, due to comparability issues in household and family-level weights between the NSAF and the CPS. The two surveys have comparable person-level weights.

[3] Estimates for these characteristics are unweighted. In the future, we will use probability of selection weights to carry out tests of statistical significance.

[4] Responses to questions about gender, income, and education, as well as the language of the interview, did not change substantially between rounds, so these means are for round 1 characteristics.

Discussion

The findings from our analysis of the matched sample suggest that a number of adults responding to the round 1 household-level screener question misreported nativity for themselves and their spouses, but not for their children. In most of these cases, the adults were foreign-born and the children native-born. Thus, it is possible that respondents misinterpreted the question as referring to their children but *not to themselves*. This may have occurred due to the first part of item O4, which asks the respondent to consider "…all of the people living or staying in this home, including all adults, children, and babies…"

Our findings suggest that survey researchers must consider heterogeneity within the household when designing questions about household demographics. When households are likely to be heterogeneous on a characteristic -- as is the case with nativity -- then a household-level screener may lead to inaccurate responses.

Additionally, respondents may have factored in the additional response burden in answering the question. When faced with the choice of differentiating their nativity from that of their children and other household members, some foreign-born respondents in round 1 may have decided to answer "no" to the household-level screener to avoid follow up questions. In round 2, however, they were given no such choice: person-level questions forced them to report each household member's nativity individually. In both rounds, the nativity items are asked fairly late in the NSAF interview. Preceding questions on health insurance coverage, unmet medical care, child care arrangements, employment, income sources, and adult education and training all utilize screening questions in which affirmative answers are followed by more specific questions. During the course of the interview, respondents may learn not to give answers of "yes" in order to avoid additional questions.

One reason for adopting a household-level approach over a person-level approach is to reduce the burden for both respondents and interviewers. We examined differences in time spent for rounds 1 and 2 for the race, ethnicity and nativity section of the NSAF. For interviews with low-income families with children, the average time spent on this section increased from 54 to 66 seconds between rounds. For interviews with high-income families with children, the time spent on this section increased from 41 to 49 seconds between rounds. For round 1, it is possible that difficulties in answering the household screener question (item O4) offset any reductions in time spent on these questions by not asking the country of origin question (item O6) for each person in the household.

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