Third National Survey on Children's Exposure to Violence (NatSCEV III)

METHODOLOGY REPORT

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Submitted to:

Crimes against Children Research Center
Family Research Lab
University of New Hampshire
10 West Edge Drive, Ste. 106
Durham, NH 03824

Submitted by:

Abt SRBI Inc.
Health Research Division
8405 Colesville Road, Suite 300
Silver Spring, MD 20910

Table of Contents

List of Figures

List of Tables

Overview of the Survey Methodology

The National Survey on Children's Exposure to Violence (NatSCEV) is the most comprehensive nationwide survey of the incidence and prevalence of children's exposure to violence. This important study, designed and conducted by the University of New Hampshire Crimes Against Children Research Center and sponsored by the Office of Juvenile Justice and Delinquency (OJJDP) with support from the Centers for Disease Control and Prevention (CDC), recently completed its third round of data collection, NatSCEV III. Abt SRBI has had the privilege of implementing the computer-assisted telephone interviewing (CATI) survey for all three rounds, and this report describes the sampling methodology; data collection process, challenges, and outcomes; nonresponse analysis, and weighting adjustments for NatSCEV III.

The NatSCEV III sample was constructed using four sources: (1) an address-based sample (ABS) of 80,000 addresses from which 37,101 cell and residential numbers were dialed; (2) a pre-screened sample of 5,726 telephone numbers of households with children from recent national random-digit dialed (RDD) surveys; (3) a listed landline sample with 113,461 telephone numbers (targeted on child in the household based on commercial lists); and (4) 2,184 cell-phone numbers drawn from a targeted RDD sample frame.

ABS respondents received an advance letter for the study with a household information form to determine eligibility and willingness to participate in the study. While participants in the other sampling frames did not receive an advance letter, we mailed a letter about the project to any parent, guardian, or child who wanted more information about the study before they participated. This letter explained the purpose of the study, assured confidentiality, emphasized the voluntary nature of participation, and otherwise conformed to standards for the protection of human subjects.

The survey was administered in English and Spanish using computer-assisted telephone interviewing (CATI) and took an average of 60.3 minutes to complete. It included questions about things that may have happened in a child's school, neighborhood, or home, and questions about the child's health. Some questions were sensitive in nature, such as those that asked about the child's experience with violence and unwanted sexual advances.

In households with more than one child aged 0-17, the eligible child was randomly selected by the CATI program. If the selected child was age 9 years or younger, the adult parent or guardian completed the entire interview on behalf of the child. If the selected child was 10 years old or older, a short interview was conducted with the parent or guardian and then permission was requested to conduct the remainder of the interview with the 10-17 year old upon receipt of the youth's assent. A total of 4,000 interviews were conducted: 2,041 or 51% with adult parents or guardians of children age 0-9 and 1,959 or 49% with adult parents or guardians of adolescents age 10-17. If permission was granted to interview the 10-17 year old but the child was not available at the time of the adult interview, a callback was scheduled. When permission was refused, the child was not re-contacted.

ABS respondents with children who returned a household information form received a $5 check as a thank-you. All parent/guardian respondents received a $20 check for completing the CATI survey (whether the child was 0-9 or 10-17), and all youth respondents who completed the youth portion also received a $20 check as a thank-you.

The compiled frame yielded at total of 4,000 completed interviews, with 1,011 interviews from the ABS frame (651 from those who replied to the study mailing [AAPOR Response Rate 3 (RR3) of 52.7%] and 360 from those with matched telephone numbers on file [RR3 of 15.1%]),

520 from the pre-screened sample (RR3 of 22.1%), 2,443 from the listed landline sample (RR3 of 14.7%), and 26 from the cell phone RDD sample (RR3 of 9.7%).

We developed weights to account for differential probability of selection within and across the sampling frames and to adjust for non-response. Within each frame, weights were constructed to reflect the probability of selection from the frame and, where information was available, to adjust for eligibility and non-response. Weights were then adjusted to account for the overlap between the frames. One example of such overlap would be respondents who were dual landline and cell phone users who may have been reachable through the listed landline sample and the cell phone RDD sample, increasing their selection probability. Finally, the weights were calibrated to the national distribution of household parent and child demographic characteristics found in the American Community Survey and National Health Interview Survey in 2012. Moderate weight trimming was applied at several stages to reduce design effects as much as possible. The final weighted sample reflects the U.S. population on a range of household, parent and child demographic characteristics.

We conducted three types of nonresponse analysis: (1) a comparison of early vs. late responders, (2) a study of response probabilities (propensities), and (3) among parents or guardians of children aged 10-17 who completed the adult survey, a comparison of those who did vs. did not provide permission to interview the selected youth. Early respondents were more likely to receive TANF, be cell phone only users, have younger children, and have higher final weights than later respondents, but no significant differences were observed on the other substantive and victimization variables. Response propensity modeling found a range of differences in frame variables and demographic characteristics that were by and large mitigated by the combination of nonresponse adjustment and weight calibration. Parents who did not provide permission to speak with youth were more likely to come either from the relatively better-off households (more educated parents, healthier children, higher income, school/neighborhood violence less of a problem) and/or from families with younger children (10-12 age group).

Sampling Procedures

Current Survey Challenges

In addition to the multitude of challenges the survey research industry is currently facing, including growing noncontact and nonresponse coupled with diminishing landline telephone coverage, the unique aspects of the NatSCEV study present additional difficulties. The primary challenges of conducting sensitive topic telephone surveys of children are:

(1) Identifying and contacting a representative sample of households with children (32.4% of all U.S. households as estimated by the 2012 American Community Survey);

(2) Convincing adult caretakers to complete the interview;

(3) Convincing adult respondents with an eligible child as young as ten years old to consent to the youth interview;

(4) Getting the child to complete the youth interview; and

(5) Survey topic (sensitive questions).

To this list, NatSCEV adds:

(1) Survey length (average of over an hour); and

(2) A limited budget for the scope of the study.

Original Sample Design and Adaptations

During the planning phase of NatSCEV III, we relied heavily on the growing body of recently published and ongoing research suggesting that address based sampling (ABS) would be a cost effective and efficient approach for dealing with both general survey challenges as well as our own study specific issues. Address-based sampling uses large, computerized address databases that contain all delivery point addresses serviced by the USPS to draw probability-based, representative household samples from any geography within the U.S. The ABS frame provides a high level of coverage, the ability to reach cell phone only households, geographic precision, matched telephone numbers, and the ability to append auxiliary data to the frame. These benefits made ABS an attractive alternative to RDD for obtaining the majority of the NatSCEV III completes. If it proved necessary, we had also planned to supplement with 500 or more CATI interviews from a listed frame of known households with children (the pre-screened sample).

Our budget allowed for only a one-time advance mailing to all households plus telephone contact attempts to screen and complete interviews with every household with a matched telephone number, regardless of whether the household returned the screening form. Those who returned the form and reported having children under the age of 18 in the household were mailed a check for $5. The budget did not allow for an unconditional token cash incentive to be included with the initial mailing or any additional mailings or follow-up other than refusal conversion letters.

Whereas our budget assumed a 4.2% return rate for the household information forms that were designed to screen for households with children, the first two batches of ABS sample produced less than half that at a rate of 2%. Given the lower than expected response rate in the ABS sample, we needed to adjust the sample design to accomplish several goals: (1) obtain the desired number of completes, which were adjusted from 4,500 to 4,000; (2) maintain the representativeness of the national sample; and (3) meet the first two goals within budget. We determined that the best strategy was to implement the pre-screened sample, add a listed landline sample to balance out the older youth respondents, and add a cell RDD sample to test the viability of this frame as a counterbalance to the landline frame. Our rationale was to use a mix of sample frames to reach different segments of household with children, maintain a high level of coverage, increase our efficiency, and keep study costs as close to the budget as possible while reaching the desired number of completes.

NatSCEV III Sample Construction

A national sample (excluding the state of New Hampshire) was constructed using four sources: (1) an address-based sample (ABS) of 80,000 addresses for which 37,101 cell and residential numbers were dialed; (2) a pre-screened sample of 5,726 telephone numbers of households with children from recent national RDD surveys; (3) a listed landline sample of 113,461 telephone numbers (targeted on child in the household based on commercial lists); and (4) a cell phone RDD frame consisting of 2,184 telephone numbers.

Address Based Sampling Procedures

The ABS frame was constructed with a national sample of addresses from the Postal Delivery Sequence File (DSF) pulled in two batches, purchased from Marketing Systems Group (MSG). Census data at the block level was used to create a stratified sampling design that targeted areas of high incidence of children in the household. Five strata were created based on the likely density of children in the household, and we over sampled in the higher density areas.

Using an adaptive design approach, based on the first batch of return results and vendor data, we modified the design of the second batch with the intent of boosting response rates. Sample

vendor-provided ancillary demographic data for the matched addresses and demographic data collected from the first batch of mail returns were used to assess the accuracy of the vendor-appended ancillary demographic data. These results were then used to develop an optimal stratified allocation for the second batch.

Both batches of 40,000 addresses were mailed a one page household information form along with an advance letter. Both documents were printed in English on one side and Spanish on the other (with the Spanish side on top if the sample vendor flagged the household as likely to be Hispanic.)

The letter said that the household had been selected for the National Survey of Child and Youth Safety and briefly described the study. It asked any household that had children under the age of 18 to fill out the enclosed household information form and mail it back in the pre-paid envelope. In return, the household would receive a check for $5 and would soon be called to conduct the telephone interview for an additional $20. The household information form asked about household member age groups and for the parent/guardian's name and telephone number.

Between the first and second mailing, minor text edits were made to the letter and the household information form to clarify that we only wanted to speak with households with children. In addition, we asked respondents to please fill in all of the items on the household information form, including phone number.

Returned household information forms were scanned and logged in the Cambridge, MA office. Once a week, the returned forms were processed, and anyone who returned the form reporting that there were children residing in the household was mailed a thank-you check for $5. Each household that provided a telephone number was loaded into the CATI system. If a form was received without a phone number, but the household had a matched telephone in the sample file, the case was loaded into CATI with the matched phone number. A total of 651 completed interviews came from cases who returned the reply form.

If a household did not return a reply form but had a matched telephone number on file, the case was loaded into CATI with that phone number. A total of 360 completed interviews came from those who did not respond to the ABS mailing but were dialed on the listed matched phone number for that address.

Pre-screened Sampling Procedures

This sample consisted of 5,725 households previously screened for the presence of children in three recent national studies. All three surveys used an overlapping dual frame (cell and landline) RDD design and oversampled younger adults (ages 16-34 or 16-39). A total of 520 completed interviews came from this source.

Listed Landline Sampling Procedures

A national sample of listed landline telephone numbers was obtained from Survey Sampling International (SSI). Using SSI's targeted age sample, only cases flagged as likely to have children in the household were dialed. This sample largely consists of white-page telephone directories from across the U.S. The sample vendor uses both Census data and secondary sources to predict age of household residents. A total of 2,443 completed interviews came from this source.

Cell RDD Sampling Procedures

A small, targeted sample of cell RDD phone numbers was pulled by overlaying the same census data used for creating the ABS strata (presence of children in the household) with cell phone rate centers. The sample was purchased from MSG, and utilized the sample vendor's

Cell WINS product, which flags cell phones as active or not. Only active (and unknown activity) phone numbers were dialed. A total of 26 completed interviews came from this source.

Screening for Eligibility

The ABS return sample was treated slightly different than all other sources in that these numbers were loaded into CATI as "qualified," giving them an initial higher minimum number of call attempts. The CATI introduction script for these cases was also slightly different, referencing the advance letter and the respondent's name provided on the reply form.

No matter what sample source a case came from, all cases were screened once we reached someone on the phone. Only households with children 17 years of age or younger currently living in the household were eligible for inclusion in the study. If there were no children residing in the household or there were no adult residents (18 years of age or older), the interview was terminated and the contact was counted as a screen-out. Anyone living in the state of New Hampshire was also screened out as ineligible.

Once an eligible household was identified, the interviewer asked to speak with the parent or guardian who was most familiar with the everyday activities of the child or children living in the household. The interviewer then enumerated all children in the household and collected their ages. A focal child was selected at random by the CATI program from all children living in the household. If the designated child was aged 0-9, the entire interview was conducted with the parent or guardian. If the designated child was age 10-17, a short interview was first conducted with the parent or guardian and the child portion of the interview was conducted with the child only after receiving consent from both the parent or guardian and assent from the selected youth respondent.

Telephone Contact and Data Collection

Data collection was conducted over the course of eight months, beginning on August 28, 2013 after an interviewer training and ending April 30, 2014.

Questionnaire

The NatSCEV III questionnaire was very similar to the previous wave minus the extended family exposure to violence follow-up section that was included in NatSCEV II. The questionnaire asked for household demographics and questions about the focal child's health. A series of 52 juvenile victimization screening questions (JVQ) were asked, and for every screener the respondent endorsed, a series of follow-up questions about that victimization was asked. In addition, the survey included sections on lifetime and past year adversity, internet victimization, community disorder, bullying, delinquency, and the child/parent relationship.

Questionnaire Changes During Fielding

Some of the changes between the NatSCEV II and III questionnaires involved the victimization follow-up questions. New questions were added that asked about witnesses and police involvement. While monitoring interviews it became apparent that some of these new questions were confusing to the respondents. As a result, questions SS and TT were revised and question UU was added. These changes were implemented on September 25, 2013.

Training

A training led by Project Director Rachel Martonik was conducted September 28, 2013 via Go-to-Meeting with interviewers and supervisors from the Abt SRBI call center in Hadley, MA. Interviewers and supervisors were introduced to the study, and all survey questions were reviewed. Interviewers and supervisors were trained on frequently asked study questions as

well as the adverse event protocol. Subsequent trainings were held when additional interviewers were added to the study. Only female interviewers worked on NatSCEV III.

Telephone Contact

The maximum number of call attempts ranged from 5 - 8 for non-qualified callbacks, depending on the sample type. Non-qualified callbacks include busy, ring no answer, fax tone, and other similar dispositions under the condition that we do not know if an eligible respondent could be reached at that number. Once a case was qualified, meaning that the household was eligible, the maximum number of call attempts ranged from 12-16 depending on the sample type. Additionally, if the focal child was age 10-17, the count of call attempts was reset at the interview handoff from the adult to the youth, allowing more opportunities to reach the youth on the phone if a callback was set.

Daytime calls were made on every third attempt and answering machine messages were left on the 3rd consecutive answering machine disposition.

Adverse Events

Interviewers were trained on the sensitive nature of the survey questions as well as how to deal with upset respondents. Interviewers were trained to offer the Boys and Girls Town Hotline number (1-800-448-3000) to respondents if warranted.

Child in Danger Protocol

This study employed a Child in Danger (CID) protocol. The CID protocol was intended to alert study clinicians of a possible child in danger (i.e., child has been attacked/assaulted with a weapon by parent, sexual assault, neglect, etc.). The CATI program included algorithms that flagged cases for predetermined incidents. If the case was flagged, at the end of the survey, the interviewer was prompted to ask the respondent the following: “Someone may need to contact you again. When is the best time to call you back?” The interviewer was also asked if, in her opinion, the child was in any danger (even if CATI did not flag the case). These data were checked twice a week and transferred securely to the UNH study clinician, Wendy Walsh, Ph.D. for review. A total of 396 (9.9% of the 4,000 completed interviews) cases were flagged over the course of data collection.

Survey Outcomes

A total of 4,000 interviews were completed with 2,041 parents or guardians of 0-9 year old children and with 1,959 parents or guardians and 10-17 year olds. The average interview length was 60.3 minutes. The distribution of the number of call attempts per telephone number ranged from a single call (27,938 cases, or 17.6% of the sample) to 69 calls. Whereas the average number of call attempts per telephone number was 4.8, it took an average of 5.7 call attempts for each completed interview. The interview was offered in English or Spanish, with 96% of the parent/caretaker surveys conducted in English (4% in Spanish), and 98.9% of the youth survey conducted in English (1.1% in Spanish).

Response Rates

Response rates in social science surveys have been steadily decreasing over the better part of three decades (Peychev et al., 2009), but the reasons for the increase in nonresponse have yet to be fully determined. We know that respondents are more or less likely to respond based on societal factors, personal traits, experiences, and interests. In addition to these predispositions, survey topic and saliency, along with interviewer interaction can also impact the respondent’s willingness to participate (Groves, 2006).

While there is evidence supporting the lack of strong association between response rates and nonresponse bias across studies (Groves 2006), best practice recommendations continue to support attempts to achieve the highest possible response rate considering the tradeoffs between the survey objectives, the survey budget, the level and type of effort, and the duration of data collection. In this context, there are a number of factors under the control of the data collector that can affect the response rate. Contact procedures and introductions influence the ability to reach the designated respondent and persuade him or her to complete a questionnaire. Questionnaire order and wording can improve the flow of the survey and reduce terminations. Interviewer quality and training improves the interpersonal interaction needed to achieve and maintain cooperation throughout the interview.

Procedures Used to Maximize Response Rates

In order to attain the highest possible response rate, the interviewing strategy used the following major components:

- Careful development and training of the initial contact script. Most refusals occur within the first minute of contact. Because of this, special attention was paid to:
  - (a) Explaining the social utility of the survey;
  - (b) Explaining why we need the information and how it will be used;
  - (c) Assuring potential respondents that they would not have to answer any questions that they do not want to answer.
- Assignment of all cases to a group of thoroughly trained and experienced interviewers who were highly motivated and closely supervised.
- Ranking of interviewers based on screening rate, cooperation rate, and completion rate. Only top tiered interviewers were used when the sample allowed.
- A sufficiently long field period to facilitate the eventual interview of respondents who were difficult to reach and to provide sufficient time to convert active refusals and terminations.
- A more efficient system for managing partial completes (where parent portion was finished, but youth portion was not) was employed halfway though data collection to prioritize calling them to increase completed surveys among this group.

Reasons for Refusals

When a refusal occurred, interviewers asked the respondent to provide the reason for the refusal and, if a response was given, it was recorded in the CATI system. There are four points in the survey where this information was recorded:

(1) PI1B – After consent was read to a parent of child 0-9 (parent at start of survey)

(2) PI2B – After consent was read to a parent of child 10-17 (parent at start of survey)

(3) PI76B1 – After parent survey complete and request for consent to speak with child 10-17 was read (parent at hand-off)

(4) PI77B – After youth consent was read to child 10-17 (youth at hand-off)

Table 1 displays the reasons for refusal given during the survey, with the top three reasons highlighted for each point in the survey. The number one reason for refusal given by a parent of a young child at the start of the survey was that the survey was too long, given by a majority of

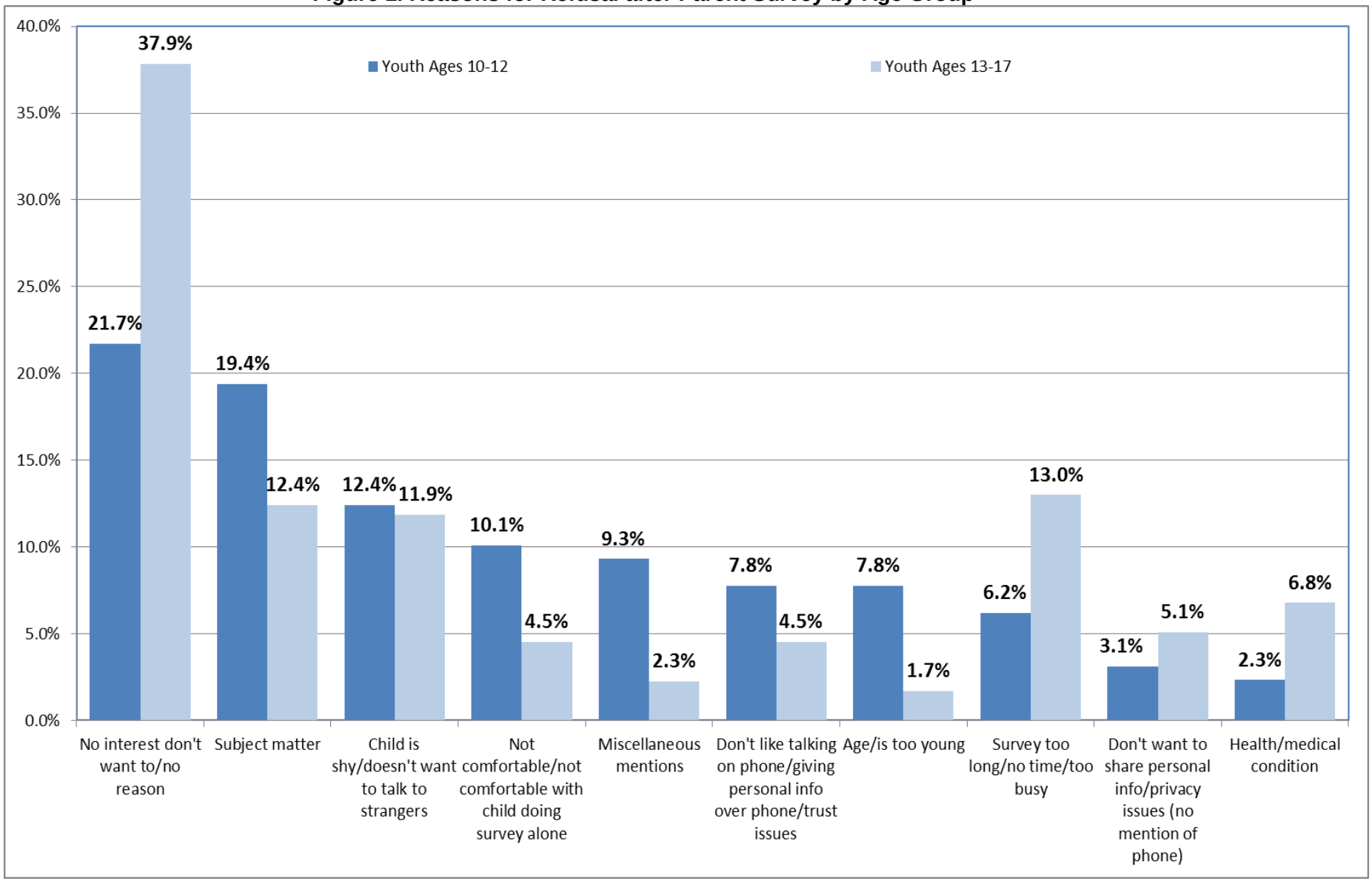
the refusing respondents. General disinterest in the survey was the number one reason for refusal given at the other three points in the survey.

Table 1. Reasons for Refusal

Reason for Refusal	PI1B Parent of Child 0-9 at Start (n=169)	PI2B Parent of Child 10-17 at Start (n=124)	PI76B1 Parent of Child 10-17 at Hand-off (n=306)	PI77B Youth 10-17 at Hand-off (n=86)
No interest/doesn't want to/no reason (unspecified)	16.4%	42.6%	32.6%	56.6%
Survey too long/no time/too busy	60.9%	13.9%	10.6%	13.2%
Subject matter	2.4%	4.0%	16.1%	7.2%
Don't want to share personal info/privacy issues (no mention of phone methodology)	4.2%	14.7%	4.4%	2.4%
Don't like talking on phone/giving personal info over phone/trust issues	5.4%	7.3%	6.1%	3.6%
Not comfortable/not comfortable with child doing survey alone	1.8%	4.0%	7.2%	6.0%
Age/is too young	0.0%	0.8%	4.4%	1.2%
Health/medical condition	0.6%	0.8%	5.1%	1.2%
Child is shy/doesn't want to talk to strangers	0.0%	0.0%	12.7%	10.8%
Miscellaneous mentions	10.9%	13.1%	5.4%	1.2%

Figure 1 displays the reasons for refusal given by the parent/guardian after the parent portion of the interview was complete and consent to speak with the youth was requested. The figure is broken down by age group, showing the reasons for refusal by parents/guardians of children 10-12 years old compared to those ages 13-17. Parents/guardians of younger children were more likely to refuse consent due to the survey subject matter, because they did not want their child to do the interview alone, and because they thought the child was too young to do the survey.

Figure 1. Reasons for Refusal after Parent Survey by Age Group



Standardized Rates by Type of Sampling Frame

The dispositions, standardized AAPOR contact, cooperation, refusal, and response rates for each of the five sample types are presented in Table 2, summarized in this section, and discussed in further detail in the nonresponse analysis. The key elements and definitions used for the computation of the outcome rates are:

- **Completed interviews.** These are 100% completed surveys defined as any interview completed by a parent or guardian representing a 0-9 year old child and any interview completed by both a parent and an adolescent age 10-17 years old.
- **Partial interviews.** These are surveys where the adult portion of the interview was completed for a selected adolescent age 10-17 years, but the child portion is less than 100% complete. We used question PI45, the last question administered to all parents or guardians in the adult portion of the interview as the indicator. In households where the designated child was 10-17 years old, any adult interview with a response to PI45 where the youth interview was less than complete was counted as a parent complete, or partial interview. Partial interviews include incomplete surveys conducted with a screened respondent where a successful callback to complete the youth survey could not be made, adult refusals to grant permission for a youth interview, adolescent refusals to complete the youth portion of the interview where parent or guardian permission was granted, and incomplete youth interviews.
- **Screen outs.** These include completed household screeners indicating that there were no children under 18 years of age in the household, the respondent resided in New Hampshire, or there was no adult aged 18 years or older residing in the household. These households were considered to be not eligible.
- **Eligible non-interviews.** These include cases that were determined to be eligible but who terminated at some point during the interview prior to qualifying as a partial interview. Screened non-interviews include refusal or callback terminations occurring after the screening questions determined that the household was eligible and the designated child was selected, but before PI45.
- **Unknown eligibility, non-interviews**. These include any contacts with a household or cell phone respondent that terminated before the screener questions could be asked to determine eligibility. These non-interviews with unknown eligibility include hang-ups, refusals and callbacks, voicemail contacts, and contacts with individuals who could not communicate effectively with an interviewer. Contacts with households of unknown eligibility also include numbers that were always busy or that had no answer on all attempts.
- **Not eligible.** Ineligible numbers include fax or data lines, non-working or disconnected numbers, business or other non-household numbers, and non-Spanish language. This category also includes calls made to screened households that resulted in a screen-out.

As a reminder, while the ABS return sample was loaded into CATI as “qualified,” eligibility was determined in the same way for these returns as for the other samples.

Table 2. AAPOR Disposition Table by Sample Type

	AAPOR CODES	ABS RETURNS	ABS MATCHED	PRE-SCREENED	LISTED LANDLINE	CELL RDD
Interview (Category 1)						
Complete	1.000	651	360	520	2443	26
Partial	1.200	176	185	199	1158	12
Eligible, non-interview (Category 2)						
Refusal and breakoff	2.100	272	575	502	3302	52
Respondent never available	2.210	5	25	11	88	1
Unknown eligibility, non-interview (Category 3)						
Always busy	3.120	0	147	43	559	56
No answer	3.130	18	2413	200	7575	102
Answering machine-don't know if household	3.140	126	5931	524	26029	696
Call blocking	3.150	1	40	6	65	0
Technical phone problems	3.160	0	1	0	0	0
Housing unit, unknown if eligible resp.	3.200	2	219	9	269	4
No screener completed	3.210	15	9694	1940	31059	585
Other	3.900	0	0	0	0	0
Not eligible (Category 4)						
Fax/data line	4.200	0	415	24	1779	0
Non-working/disconnect	4.300	64	6736	843	11239	152
Non-working number	4.310	4	315	39	4708	3
Temporarily out of service	4.330	6	174	60	294	5
Number changed	4.410	38	20	4	31	2
Business, government office, other org.	4.510	8	527	96	1197	59
No eligible respondent/Screen-out	4.700	138	7645	687	21250	404
Other	4.900	3	145	19	391	25
Total phone numbers used		**1527**	**35567**	**5726**	**113436**	**2184**
Completes and Screen-Outs (1.0/1.1)	I	651	360	520	2443	26
Partial Interviews (1.2)	P	176	185	199	1158	12
Refusal and break off (2.1)	R	272	575	502	3302	52
Non Contact (2.2)	NC	5	25	11	88	1
Other (2.3)	O	0	0	0	0	0
Unknown household (3.1)	UH	145	8532	773	34228	854
Unknown other (3.2, 3.9)	UO	17	9913	1949	31328	589
Not Eligible (4.0)	NE	261	15977	1772	40889	650
e = Estimated proportion of cases of unknown eligibility that are eligible.	(I+P+R+NC+O)/((I+P+R+NC+O)+NE)	0.809	0.067	0.410	0.146	0.123
Response Rate 1	I/(I+P) + (R+NC+O) + (UH+UO)	0.514	0.018	0.132	0.034	0.017
Response Rate 2	(I+P)/(I+P) + (R+NC+O) + (UH+UO)	0.653	0.028	0.182	0.050	0.025
Response Rate 3	I/((I+P) + (R+NC+O) + e(UH+UO))	0.527	0.151	0.221	0.147	0.097
Response Rate 4	(I+P)/((I+P) + (R+NC+O) + e(UH+UO))	0.670	0.229	0.306	0.217	0.142
Cooperation Rate 1	I/(I+P)+R+O)	0.592	0.321	0.426	0.354	0.289
Cooperation Rate 2	(I+P)/((I+P)+R+O))	0.753	0.487	0.589	0.522	0.422
Cooperation Rate 3	I/((I+P)+R))	0.592	0.321	0.426	0.354	0.289
Cooperation Rate 4	(I+P)/((I+P)+R))	0.753	0.487	0.589	0.522	0.422
Refusal Rate 1	R/((I+P)+(R+NC+O) + UH + UO))	0.215	0.029	0.127	0.046	0.034
Refusal Rate 2	R/((I+P)+(R+NC+O) + e(UH + UO))	0.220	0.242	0.214	0.199	0.194
Refusal Rate 3	R/((I+P)+(R+NC+O))	0.246	0.502	0.407	0.472	0.571
Contact Rate 1	(I+P)+R+O / (I+P)+R+O+NC+ (UH + UO)	0.868	0.057	0.309	0.095	0.059
Contact Rate 2	(I+P)+R+O / (I+P)+R+O+NC + e(UH+UO)	0.890	0.471	0.520	0.417	0.336
Contact Rate 3	(I+P)+R+O / (I+P)+R+O+NC	0.995	0.978	0.991	0.987	0.989

Response Rate 3 (RR3) is adjusted for the estimated proportion of cases of unknown eligibility that are expected to be eligible based on the eligibility rate in the known cases. It includes only completed surveys in the numerator (in contrast to the less conservative Response Rate 4 (RR4), which includes both completed surveys and partials in the numerator). RR3 ranges from a low of 9.7% in the cell RDD sample to a high of 52.7% in the ABS return sample.

Table 3 displays the ratio of "working" and "non-working" numbers by sample type. This ratio varied from a low of 77% for working numbers in the ABS matched sample to a high of 92% working in the ABS returns sample. Similarly, the non-working number ratio varied from a high of 23% for the ABS matched sample to a low of 8% for the ABS returns sample. A phone number is deemed as working or good if it rings to what we believe is a household. A non-working or bad phone number is one where no household can be reached.

Table 4 displays the disposition breakdown of the working telephone numbers by sample type. While over three quarters of all telephone numbers were coded as working, we had a difficult time screening for eligibility. This is indicated by the range of 11%-74% for all working numbers that still had unknown eligibility at the end of the field period. Even in the ABS return sample, where we expected a high eligibility rate, 10% screened out and we were unable to screen an additional 12% on the telephone in spite of making numerous contact attempts.

Table 5 shows the percentage of cases that were eligible compared to those that screened out among those screened. Here again, there is substantial variation by sample type. Only the ABS returns and prescreened samples were screened in at a higher rate than 32.6%, which is the current ACS national estimate of houses with children under the age of 18.

Table 3. Working and Non-Working Numbers by Sample Type

	ABS Returns		ABS Matched		Prescreened		Listed Landline		Cell RDD	
	N	%	N	%	N	%	N	%	N	%
Bad (Non-working) Numbers	123	8%	8,332	23%	1,085	19%	19,639	17%	246	11%
Good (Working) Numbers	1,404	92%	27,235	77%	4,641	81%	93,797	83%	1,938	89%
Total Numbers Dialed	1,527	100%	35,567	100%	5,726	100%	113,436	100%	2,184	100%

Table 4. Disposition Summary of Working Numbers by Sample Type

	ABS Returns		ABS Matched		Prescreened		Listed Landline		Cell RDD	
	N	%	N	%	N	%	N	%	N	%
Interviews (Completes and Partials)	827	59%	545	2%	719	15%	3,601	4%	38	2%
Ineligible (Screen-outs)	138	10%	7,645	28%	687	15%	21,250	23%	404	21%
Non-Interviews (Eligible)	277	20%	600	2%	513	11%	3,390	4%	53	3%
Non-Interviews (Unknown Eligibility)	162	12%	18,445	68%	2,722	59%	65,556	70%	1,443	74%
Total Good (Working) Numbers	1,404	100%	27,235	100%	4,641	100%	93,797	100%	1,938	100%

Table 5. Summary of Screened Cases

	ABS Returns		ABS Matched		Prescreened		Listed Landline		Cell RDD	
	N	%	N	%	N	%	N	%	N	%
Eligible	1104	89%	1145	13%	1232	64%	6991	25%	91	18%
Ineligible (Screen-outs)	138	11%	7645	87%	687	36%	21250	75%	404	82%
Total Screened	1242	100%	8790	100%	1919	100%	28241	100%	495	100%

Weighting Procedures

We developed weights to account for differential probability of selection within and across the sampling frames and to adjust for nonresponse. The sampling design of the NatSCEV III survey is based on 5 frames representing different ways to reach a given adult respondent. Some of the frames have limited coverage (listed landline; selected cell phone rate centers) and/or differential probabilities of selection (different sampling rates for mail surveys; varying final weights in the prescreened frame). Response rates were low on all frames, requiring extensive nonresponse adjustments. Weight calibration for child and parent/guardian demographic characteristics was successfully applied, meaning that the sample reflects the household, child and parent/guardian demographic characteristics of the general population when the weights are applied.

Sequence of weighting steps

Weights were developed using the following steps:

(1) Within each frame, where appropriate, the baseline probability of selection of the unit from the frame (address from MSG; landline from SSI; targeted cell phone RDD) was computed.
(2) Within each frame, where information was available, eligibility and nonresponse adjustments were made.
(3) The frames were combined to account for the multiple ways some respondents could be reached, adjusting the weights based on this increase in the probability of selection due to overlap in the frames.
(4) The weights were calibrated using a combination of household, parent/guardian, and child-level targets from the American Community Survey and National Health Interview Survey in 2012.

Moderate trimming was applied at a number of steps to keep design effects as low as possible.

Frame and weighting steps matrix

Table 6 summarizes the information that we used in weighting for each of the frames.

Table 6. Summary of Sample Frames

	ABS returns	ABS matched	Prescreened	Listed Landline	Targeted cell
Base weight (probability weight)	For each stratum: Total number housing units/number sampled There were 5 sampling strata for mailout 1, and 15 sampling strata for mailout 2	Same as ABS returns (excludes those without a listed telephone number	Final weights from the respective studies from which the sample was drawn, divided by the number of adults in the household (converting from an individual weight to a household weight)	Number on frame / number sampled (frame size provided by sample vendor)	For each of 29 strata: Number on frame / number sampled
Eligibility (household has child)	Weighted to number of household with children in each stratum (adjusted for proportion of households with children)	Same as ABS returns	No adjustment: Survey data indicated all households had children	No adjustment: Sample vendor selected only households with children	No adjustment: Sample size too small to determine with any degree of accuracy
Nonresponse (information available for assessment/ adjustment)	MSG (vendor) variables	MSG (vendor) variables	Original survey self-reported demographic variables	No frame data	No frame data
Frame integration (coverage and overlap)	Full coverage – assume full overlap with all other frames	Listed landline numbers only	Full coverage – assume full overlap with all other frames	Listed landline numbers with vendor flags for presence of children	Partial geographic coverage

Base weights

In probability sampling, the base weight for each case is the inverse probability of its selection. Thus, cases sampled at a higher probability of selection receive lower weights than cases sampled at a lower probability of selection.

For the ABS frame, Table 7 shows the selection probability for each stratum. This selection probability is defined as the number sampled divided by the total number of housing units. We sampled at a higher probability of selection in those strata where Census data indicated there was a higher incidence of households with children. The sampling rates for the second mailout

were developed based on information from the mail returned from the first mailout, as described in the sampling discussion above.

Table 7. ABS Frame Stratification

Geographic stratum	Appended demographic variables	Total housing units	Housing units with persons age 0-17	Incidence of HHs with children	Number sampled	Probability of selection
Mailout 1						
Stratum 1		45,239,902	7,767,659	17.2%	6,037	0.013%
Stratum 2		27,524,630	7,767,234	28.2%	7,037	0.026%
Stratum 3		23,311,503	7,766,507	33.3%	8,140	0.035%
Stratum 4		19,702,675	7,767,574	39.4%	8,940	0.045%
Stratum 5		15,201,890	7,766,553	51.1%	9,846	0.065%
Mailout 2						
Stratum 1						
	No children	32,807,734	3,967,764	12.09%	8,943	0.027%
	1+ children	4,773,533	3,301,178	69.16%	2,009	0.042%
	No information	7,658,635	498,717	6.51%	1,580	0.021%
Stratum 2						
	No children	19,341,949	4,196,878	21.70%	6,062	0.031%
	1+ children	4,298,645	2,972,765	69.16%	1,752	0.041%
	No information	3,884,035	597,590	15.39%	969	0.025%
Stratum 3						
	No children	16,561,477	4,527,760	27.34%	5,047	0.030%
	1+ children	3,871,886	2,677,636	69.16%	1,502	0.039%
	No information	2,878,140	561,110	19.50%	823	0.029%
Stratum 4						
	No children	14,087,192	4,812,876	34.16%	4,609	0.033%
	1+ children	3,561,468	2,462,964	69.16%	1,295	0.036%
	No information	2,054,015	491,734	23.94%	515	0.025%
Stratum 5						
	No children	10,519,041	5,044,561	47.96%	3,448	0.033%
	1+ children	3,145,059	2,174,993	69.16%	1,003	0.032%
	No information	1,537,790	546,999	35.57%	444	0.029%

For the prescreened frame, we used the final weights produced for surveys we sampled from as the base weight for NatSCEV III.

For listed landlines, the base weights were calculated as the ratio of the frame size, as provided by the sample vendor, to the number of phone numbers purchased and dialed.

For the targeted cell frame, within each of 29 strata, the base weights are defined as the ratio of the number of cell numbers in the frame (marked as active or unknown activity by the vendor) to the number of phone numbers purchased and dialed. For the cell frame, we stratified by cell phone rate center and sampled at a higher rate from rate centers in the most productive geographic stratum from the ABS design.

Nonresponse and eligibility adjustments

Nonresponse adjusted weights account for differential response based on known characteristics included in the sample frame for each case. In frames where case-level demographic information was available (ABS returns and matched, prescreened), we used logistic regression to model response propensity. These response propensities were then collapsed into cells to reduce the variance of the nonresponse weights.

Eligibility adjustments for the proportion of households with children were included for the two ABS frames to ensure that cases were weighted to the number of households with children in each stratum. Because the prescreened and listed landline frames were drawn from frames of households flagged as having children, no eligibility adjustments were required. The cell RDD sample was too small to make accurate eligibility adjustments.

The nonresponse adjusted weight produced at the end of this step was the inverse of the product of the selection probability and the response probability, adjusted for eligibility in the ABS frames.

In the ABS frames, the following vendor demographic flags were used to predict response propensity in a logistic regression model:

- Sampling strata
- Presence of a matched phone
- Household income (transformed using both its logarithm and its square)
- Number of adults in the household
- Number of children in the household
- Presence of adults 25 to 34 years of age
- Presence of adults 35 to 64 years of age
- Marital status
- Presence/absence of any other demographic flags in vendor data

The models for both the mail returns and matched frames were a good fit as indicated by the area under the ROC curve and the Archer-Lemeshow goodness of fit test. The mail return model had and ROC of 0.671 and a non-significant Archer-Lemeshow goodness of fit p-value of 0.312 (i.e., the null hypothesis of good fit was not rejected). The area under the ROC curve in the model for matched phone completes was 0.696, with an Archer-Lemeshow goodness of fit p-value of 0.563 (i.e., the null hypothesis of good fit was not rejected).

Seven nonresponse adjustment cells were created in each of the ABS mail returns frame and the ABS matched frame, with approximately equal ranges. The inverse of the mean response probability in each cell was used as a nonresponse adjustment factor for cases in that cell. The nonresponse adjusted weights were then multiplied by the eligibility rate – the proportion of households with children -- obtained from the Census Summary File data.

In the prescreened frame, the following data collected in the original survey were used to predict response propensity in a logistic regression model:

- Phone use in the original study (the dual users suffered the most attrition, likely due to dropping their landline service in the 1–3 years since the original study was conducted)
- Number of adults in the household
- Education
- Employment status
- Race/ethnicity
- Age
- Gender
- Whether the household rents or owns their dwelling

This model was also an adequate fit as indicated by the area under the ROC curve, which was 0.657, and the non-significant Archer-Lemeshow goodness of fit test p-value of 0.639 (i.e., the null hypothesis of good fit was not rejected).

Seven nonresponse adjustment cells were created with approximately equal ranges. The inverse of the mean response probability in each cell was used as a nonresponse adjustment factor for cases in that cell.

Table 8 describes the resulting nonresponse adjustment cells.

Table 8. Nonresponse Adjustment Results

Frame/Cell	# of cases	Min Response Propensity	Max Response Propensity	Combined Nonresponse and Eligibility Adjustment Factor
Mail returns				
Cell 1	867	0.001726	0.002743	33.71
Cell 2	14626	0.002744	0.004360	23.61
Cell 3	29585	0.004360	0.006931	23.80
Cell 4	20476	0.006931	0.011016	15.37
Cell 5	9153	0.011016	0.017507	10.11
Cell 6	3691	0.017511	0.027826	11.16
Cell 7	1603	0.027832	0.177619	3.59
Matched numbers				
Cell 0: no matched phone	43709	0	0	
Cell 1	4652	0.002111	0.004724	32.29
Cell 2	13568	0.004724	0.007066	23.32
Cell 3	8149	0.007067	0.010570	15.71
Cell 4	4624	0.010571	0.015812	10.39
Cell 5	2798	0.015813	0.023647	4.48
Cell 6	1555	0.023652	0.035359	14.02
Cell 7	946	0.035386	0.118407	8.42
Prescreened				
Cell 1	281	0	0.027649	17.08
Cell 2	1129	0.027720	0.055316	7.73
Cell 3	1429	0.055336	0.082995	4.84
Cell 4	1168	0.083016	0.110666	3.46
Cell 5	810	0.110687	0.138305	2.69
Cell 6	517	0.138337	0.165915	2.20
Cell 7	391	0.166267	0.276668	1.71

Because no auxiliary case-level information was available for the remaining frames (listed landline and targeted cell), the nonresponse adjustment was a simple ratio of the number of cases sampled over the number of completed interviews. In other words, the final nonresponse adjusted weight (the base weight with nonresponse adjustment) is the ratio of the frame size to the number of completes.

Frame integration

Frame integration accounts for the fact that some cases have a probability of selection from more than one frame because the frames overlap. These cases will have a higher selection probability than their frame weight (the nonresponse adjusted weight) indicates. To compensate for this increased selection probability, cases found in multiple frames generally need to be downweighted.

We used the frame multiplicity approach where for each unit i,

$$w_i^{\Sigma} = \text{integrated weight}_i = \frac{\text{frame weight}_i}{\#\text{ of frames unit } i \text{ can be found in}}$$

where the frame weight is the weight from the previous stage of weighting (i.e., the nonresponse adjusted frame weight).

We do not have all of the information needed to reliably establish membership in all frames. For example, we did not ask, and the respondent may actually not know, if their landline number was listed (and thus they would appear on frames 2 and 4). If some of the frame membership is uncertain, the more applicable expression is

$$w_i^{\Sigma} = \text{integrated weight}_i = \frac{\text{frame weight}_i}{\sum_k \text{Prob}[\text{ unit } i \text{ can be found in frame } k]}$$

Some of the probabilities are trivially 0 (a cell phone only case cannot be found in the landline frame) or 1 (ABS matched cases are a subset of the ABS mail frame). In the most common case of overlapping frames – dual frame cell and landline RDD – this frame integration method boils down to a ½-compositing approach. While this approach may be somewhat inefficient, it is the simplest method of frame integration and the only one we could use under the circumstances. All other known methods of frame integration rely on data that were not available for NatSCEV III (perfect knowledge of membership in each frame, known probabilities of selection from every frame, etc.).

We made the following assumptions when we assigned unit membership in frames other than their own frame:

(1) Frame 1 is assumed to have universal coverage: any unit can be reached through ABS sampling. Thus, all units are assumed to be found on Frame 1.
(2) Frame 2 is assumed to consist of matched landline numbers (while the vendor flags some phone numbers as cellular, the fraction is very low)
    a. Frame 1 (ABS returns) units are assumed to be found on Frame 2 only if they have a matched number flag (regardless of whether they were reached via the number the household supplied in the household information form or though the matched number).
    b. Frame 3 (Prescreened) units are assumed to be found in Frame 2 with probability p_{LISTED} = number of listed numbers with children / number of landline numbers if they are landline only or dual users, and assumed to be out of Frame 2 if they are cell-phone only users.
    c. Frame 4 (Listed Landline) are assumed to be in Frame 2.
    d. Frame 5 (Targeted Cell Phone RDD) are assumed to be out of Frame 2.
(3) Frame 3 (Prescreened) is assumed to be universal: any unit can be reached through a (previous) nationwide dual frame RDD survey.

(4) Frame 4 (Listed Landline) is the most problematic frame in terms of determining whether a unit can be reached through that frame:
    a. Frame 1 units are assumed to be found on Frame 4 if they have a matched phone number flag and if they had an MSG flag indicating that the household has children
    b. Frame 2 units are assumed to be found on Frame 4 if they had an MSG flag indicating that the household has children
    c. Frame 3 units are assumed to be found on Frame 4 with probability p_{LISTED} (and all are assumed to have children) if they are landline only or dual users, and assumed to be out of Frame 4 if they are cell phone only users.
    d. Frame 5 units are assumed to be out of Frame 4.
(5) Frame 5 is assumed to be a very special frame. For purposes of frame integration, given the small number of cases it produced, it can be assumed that units from the other frames cannot be reached through Frame 5.

Once the frames were integrated according to the above procedure, extreme weights were compressed:

$$w_i^C = \begin{cases} w_i, & w_i < C \\ \sqrt{2Cw_i - C^2}, & w_i \geq C \end{cases}$$

This provides smooth soft trimming of high weights. The level of C was chosen to be double the 75th percentile of the integrated weights, which was equal to 19626.59. Compression affected 507 cases.

Table 9 summarizes the frame and integrated weights. The unequal weighting design effect, UWE DEFF, is (1 + (s.d. / mean)^2).

Table 9. Frame and Integrated Weights Summary

Weight Statistic	ABS Returns	ABS Matched	Prescreened	Listed Landline	Cell RDD	Overall
Sample	1186	11074	2632	34306	873	51811
Completes	651	360	520	2443	26	4000
Frame weight						
Min	8869.16	12197.7	823.70	3982.57	97932.69	
Mean	69792.0	62398.6	85062.83	3982.57	216512.1	
Max	185882	161390	1290987	3982.57	595363.9	
UWE DEFF	1.1409	1.1513	2.5723	1	1.2547	
Integrated weight						
Min	1707.49	1707.49	917.45	995.64	32644.23	917.45
Mean	18567.3	7979.67	29101.73	995.64	72170.69	8600.43
Max	65086.1	18227.7	290756.81	995.64	198454.65	290756.81
UWE DEFF						5.0954
Compressed integrated weight						
Min	1707.49	1707.49	917.45	995.64	29936.4	917.45
Mean	17435.9	7979.67	23026.2	995.64	47674.4	7467.23
Max	46579.3	18227.7	105014	995.64	86051.0	105014
N cases with compressed weights	240		241		26	
UWE DEFF						3.5294

Raking

Raking corrects for nonresponse by calibrating the weights so that the weighted demographic characteristics of the sample match the population, which for NatSCEV III is the population of households with children. Raking targets were defined using the American Community Survey (ACS, see http://www.census.gov/acs/www/) and National Health Interview Survey (NHIS, see http://www.cdc.gov/nchs/nhis.htm) from year 2012 for households that have children.

The following variables and categories were used:

(1) Types of phones used in household (cell phone only; landline one; dual cell phone and landline use)
(2) Household income (under $20K, $20K–under $50K, $50K–under $75K, $75K–under $100K, $100K and above)
(3) Number of adults in household (1, 2, 3 or more)
(4) Number of children in household (1, 2, 3, 4 or more)

(5) Parent/guardian education level (less than high school, high school or GED, some college, bachelor, graduate or professional degree)
(6) Parent/guardian employment status (none, one or two parents employed)
(7) Child's age group (0–3, 4–6, 7–9, 10–12, 13–15, 16–17)
(8) Child's gender
(9) Child's race/ethnicity (non-Hispanic White, non-Hispanic Black/African American, non-Hispanic Asian, non-Hispanic other or mixed race, Hispanic)
(10) Interaction of number of adults and number of children in household (1 adult x 1, 2, 3+ children; 2 adults x 1, 2, 3, 4+ children; 3+ adults x 1, 2, 3+ children)
(11) Interaction of number of adults and number of working parents/guardians in household
(12) Interaction of child's gender and age group
(13) Interaction of child's gender and race/ethnicity (Asian males and females were collapsed together because of low sample sizes)
(14) Interaction of child's race/ethnicity and age group. For the largest groups (non-Hispanic White and Hispanic), all 6 age categories were used. For the smaller groups (non-Hispanic Black, Non-Hispanic Asian, Non-Hispanic other), the age groups were defined as 0–9 and 10–17, aligned with the proxy vs. self reporting of the child portion of the survey.

The targets for phone use variable used NHIS 2012 data and the targets for all other demographic variables used ACS 2012 data. Child demographics and household size are included in the interactions and thus they were not used individually in raking.

Moderate trimming was applied according to the following rules:

- The maximum factor by which the weights could increase during raking was capped at 5 (41 cases)
- The highest absolute value of the weight was capped at 2.5 times the maximum of the pre-weight (2.5 x 105152.7 = 262881.75, 0 cases)
- The lowest absolute value of the weight was capped at 0.5 times the minimum of pre-weight (0.5 x 917.45 = 458.72, 254 cases)

Table 10 shows how many weights were trimmed by sample frame.

Table 10. Trimming by Frame

Counts	ABS Returns	ABS Matched	Prescreened	Listed Landline	Cell RDD	Overall
Trimmed from above, ratio	5	4	6	26	0	41
Trimmed from above, absolute	0	0	0	0	0	0
Trimmed from below, absolute	1	1	0	252	0	254
Untrimmed	645	355	514	2165	26	3705

Table 11 shows the population targets and results from the survey, unweighted, weighted with the pre-weights (before raking), and weighted using the final weights. The final weights match the population targets with relative discrepancy less than 10^{-6} (i.e., the margins reported below were reproduced to 6 decimal places).

Table 11. Unweighted and Weighted Raking Variables

Control Total Margin Variable	Target %	Unweighted %	Pre-weight %	Final weight %
Phone use, 3 cat				
Landline only	3.98%	3.15%	2.44%	3.98%
Cell phone only	43.71%	12.05%	40.28%	43.71%
Dual user	52.31%	84.80%	57.28%	52.31%
Child gender by age[a]				
Male, White	27.12%	38.35%	31.58%	27.12%
Male, Black/AA	6.91%	3.78%	4.68%	6.91%
Male, Other or mixed	2.67%	3.28%	4.23%	2.67%
Male, Hispanic	12.13%	5.28%	10.47%	12.13%
Female, White	25.74%	34.73%	26.48%	25.74%
Female, Black/AA	6.71%	4.08%	6.88%	6.71%
Female, Other or mixed	2.54%	3.05%	3.94%	2.54%
Female, Hispanic	11.59%	4.90%	8.48%	11.59%
Asian, both genders	4.58%	2.58%	3.25%	4.58%
Male, age 0 to 3	10.84%	7.80%	12.32%	10.84%
Male, age 4 to 6	8.76%	9.05%	10.07%	8.76%
Male, age 7 to 9	8.48%	9.65%	10.91%	8.48%
Male, age 10 to 12	8.65%	7.03%	4.35%	8.65%
Male, age 13 to 15	8.65%	10.20%	8.84%	8.65%
Male, age 16 to 17	5.75%	7.88%	5.16%	5.75%
Female, age 0 to 3	10.40%	7.45%	11.82%	10.40%
Female, age 4 to 6	8.27%	7.88%	10.00%	8.27%
Female, age 7 to 9	8.10%	9.20%	8.29%	8.10%
Female, age 10 to 12	8.30%	6.53%	6.13%	8.30%
Female, age 13 to 15	8.29%	9.50%	7.08%	8.29%
Female, age 16 to 17	5.51%	7.85%	5.04%	5.51%
Child race by age[a]				
White, age 0 to 3	10.73%	10.33%	13.91%	10.73%
White, age 4 to 6	8.67%	12.33%	11.82%	8.67%
White, age 7 to 9	8.67%	13.63%	11.16%	8.67%
White, age 10 to 12	9.13%	10.10%	5.48%	9.13%
White, age 13 to 15	9.34%	14.90%	9.55%	9.34%
White, age 16 to 17	6.32%	11.80%	6.14%	6.32%
Age 0-9, Black	7.40%	4.18%	7.32%	7.40%
Age 10-17, Black	6.22%	3.68%	4.25%	6.22%
Age 0-9, Asian	2.55%	1.48%	2.58%	2.55%
Age 10-17, Asian	2.03%	1.10%	0.67%	2.03%
Age 0-9, other/mixed race	3.09%	3.60%	5.99%	3.09%
Age 10-17, other/mixed race	2.12%	2.73%	2.18%	2.12%
Hispanic, age 0 to 3	5.42%	1.85%	4.64%	5.42%
Hispanic, age 4 to 6	4.31%	1.63%	2.52%	4.31%

Control Total Margin Variable	Target %	Unweighted %	Pre-weight %	Final weight %
Hispanic, age 7 to 9	4.00%	2.03%	3.46%	4.00%
Hispanic, age 10 to 12	3.89%	1.38%	2.53%	3.89%
Hispanic, age 13 to 15	3.72%	1.88%	3.69%	3.72%
Hispanic, age 16 to 17	2.38%	1.43%	2.10%	2.38%
Income, 5 cat				
<$20K	14.68%	10.05%	18.23%	14.68%
$20K to <$50K	26.60%	20.55%	29.25%	26.60%
$50K to <$75K	18.31%	15.80%	15.11%	18.31%
$75K to <$100K	13.62%	18.95%	14.00%	13.62%
$100K+	26.80%	34.65%	23.40%	26.80%
# of employed adults				
1 adult, not employed	4.75%	2.90%	5.05%	4.75%
1 adult, employed	12.51%	5.30%	8.43%	12.51%
2 adults, none employed	3.39%	4.28%	6.42%	3.39%
2 adults, 1 employed	23.75%	26.03%	27.79%	23.75%
2 adults, 2 employed	34.47%	40.48%	30.99%	34.47%
3+ adults, none employed	1.07%	2.55%	2.87%	1.07%
3+ adults, 1 employed	4.45%	8.68%	9.33%	4.45%
3+ adults, 2+ employed	15.61%	9.80%	9.12%	15.61%
Parent/guardian education				
Below HS	6.45%	3.58%	7.14%	6.45%
HS/GED	18.00%	10.78%	16.48%	18.00%
Some college	36.45%	23.15%	29.65%	36.45%
Bachelor	22.39%	30.33%	25.10%	22.39%
Graduate	16.71%	32.18%	21.63%	16.71%
Household size				
1 adult, 1 child	8.41%	3.75%	6.66%	8.41%
1 adult, 2 children	5.56%	2.83%	4.16%	5.56%
1 adult, 3+ children	3.29%	1.63%	2.66%	3.29%
2 adults, 1 child	23.42%	19.55%	23.13%	23.42%
2 adults, 2 children	24.31%	30.40%	24.43%	24.31%
2 adults, 3 children	9.82%	13.53%	11.78%	9.82%
2 adults, 4+ children	4.06%	7.30%	5.87%	4.06%
3+ adults, 1 child	10.91%	10.58%	9.71%	10.91%
3+ adults, 2 children	6.19%	6.55%	7.42%	6.19%
3+ adults, 3+ children	4.02%	3.90%	4.18%	4.02%

Notes: a. Control total multiplier = number of children

Nonresponse Analysis

Although the NatSCEV III design and budget limit the types of nonresponse analyses that are feasible to statistical analyses that that rely on the existing sample information, there are several methodologically sound approaches that do not require the collection of supplemental data from survey nonrespondents. These are: (1) a comparison of early vs. late responders, (2) a study of response probabilities (propensities), and (3) among parents or guardians of children aged 10-17 who completed the adult survey, a comparison of those who did vs. did not provide permission to interview the selected youth.

Early vs. late respondents

Studying the characteristics and behaviors of early and late responders is a widely used technique for nonresponse analysis. This approach dissects the sample into easy and hard-to-reach respondents and compares these two groups under the assumption that late responders who were difficult to contact are likely to be similar to the nonrespondents whom the survey failed to reach. Here, the noncontact nonresponse includes some unknown proportion of passive refusals that result from call avoidance, screening or blocking. However, we cannot assume that the hard refusals are demographically or behaviorally similar to the passive refusals and other noncontacts.

The distribution of the number of calls in the study ranges from a single call (479 completed cases) to 69 calls. We divided the respondents into two groups above and below the median number of call attempts for all contacts. Then, we computed the median separately for each frame including both respondents and nonrespondents. The use of frame-specific medians is dictated by the different frame-specific contact processes that yield different, frame-specific average propensities to respond.

For example, respondents from the ABS returns frame were at least marginally familiar with the study because they had read the advance letter and provided their consent to be contacted prior to being called. As a result, we would expect them to be more likely to answer the phone when we called and take fewer call attempts to complete the survey. In contrast, respondents from the ABS matched numbers frame may or may not have seen the earlier mail materials, and hence would be somewhat less likely (and/or take longer) to respond compared to willing respondents from who completed and returned the household information form. The other three frames can be considered as cold-calls with potentially lower propensities to respond, more call attempts, and longer field periods. Thus to classify respondents as early vs. late, separate analyses by frame had to be undertaken.

Table 12. Call Attempts by Sample Frame

	All Contacts	Completed Interviews					
	Median # of attempts	Strictly fewer attempts		At median		Strictly more attempts	
ABS Returns	5	349	54%	64	10%	238	37%
ABS Matched	3	99	28%	34	9%	227	63%
Pre-Screened	5	256	49%	46	9%	218	42%
Listed Landline	3	652	27%	300	12%	1491	61%
Cell RDD	5	12	46%	4	15%	10	38%

The following variables were analyzed for differences between early and late responders:

- parent/guardian and child gender
- violence in school and community as reported by the parent/guardian
- receipt of TANF aid
- child receives special services at school
- child's participation in sports and clubs
- violence against the child: whether anything was ever stolen from the child (C2), and whether the child was attacked (C5)
- count of all reported violence episodes (in log form)
- demographic variables used in raking
- final weights

Overall, 30 variables were analyzed. Of these, the following differences were observed: the early respondents were more likely to:

- receive TANF (30% vs. 23%)
- be cell phone only users (49% vs. 39%)
- have younger children (9.5 vs. 7.8 mean age)
- have higher final weights (12,320 vs. 7,853)

The latter observation is explained by the different proportions of respondents below the median for all contacts across the frames. TANF recipients may have wanted to receive the incentive earlier. Cell phone only respondents may have wanted to conclude the interviews faster so that they would not have to spend their minutes on the cell phone plan.

However, since no significant differences were observed on the other substantive and victimization variables, we can conclude that the number of attempts, as a proxy for late responders, did not reveal any nonresponse biases in important variables.

Response propensity modeling

Response propensity models allow for a rich set of covariates (available for all relevant cases) to be used to jointly model the probability of obtaining a response from a sampled unit. Explicit (logistic regression) models were built to predict response and provide nonresponse adjustments on the frames (ABS Returns and Matched, Prescreened) where additional

demographic information was available. For the ABS frames (Returns and Matched), selected demographic information was appended by the vendor. While not always accurate, it was nevertheless informative for modeling nonresponse. For the Prescreened frame, the reported information from the prior surveys was used as predictor variables.

For the frame of listed landline numbers, no information was available on the frame itself. Looking only at completed cases, the response propensity was modeled implicitly as the ratio of the base weight to the final weight, and we used demographic data from the survey as predictors in the regression.

The results can be summarized through the following lists of significant regressors:

(1) ABS return frame:
- Any demographic information other than income, household size, and marital status (OR 0.85, 95% CI 0.78–0.94; indicative of no children in the household)
- Flag for presence of adults 25 to 34 (OR 0.60, 95% CI 0.48–0.74)

(2) ABS Matched frame:
- Flag for presence of adults 25 to 34 (OR 0.66, 95% CI 0.49–0.89)
- Flag for rent vs. own (OR = 1.54, 95% CI 1.02–2.32)
- Marital status: single vs. married (OR 0.51, 95% CI 0.32–0.82); other vs. married (OR 0.63, 95% CI 0.48–0.83)

(3) Prescreened frame:
- Cell-mostly users (OR 0.59, 95% CI 0.40–0.87)
- Rent vs. own (OR = 0.69, 95% CI 0.49–0.96)
- Education: bachelor vs. below HS (OR 1.63, 95% CI 1.07–2.49); graduate/professional degree vs. below HS (OR 2.45, 95% CI 1.59–3.76)
- Unemployed vs. employed (OR 0.34, 95% CI 0.16–0.75).

(4) Listed Landline frame:
- Cell-only vs. dual frame (OR 0.56, 95% CI 0.53–0.59), landline only vs. dual frame (OR 0.73, 95% CI 0.61–0.88)
- Household income (monotonically declining; the lowest OR is for “$100K or more” vs. “less than $20K”, OR 0.40, 95% CI 0.38–0.43)
- Number of children: 1 child vs. 2 (OR 0.84, 95% CI 0.80–0.88)
- Household size (complex interactions of # of adults and # of children)
- Household employment status (e.g., 1 adult non-employed vs. 2 adults, both employed OR 1.36, 95% CI 1.25–1.48; 3 adults, none employed vs. 2 adults, both employed OR 3.26, 95% CI 3.02, 3.52)
- Parent/guardian education (below HS vs. graduate/professional OR 0.47, 95% CI 0.44–0.51)
- Child’s age (age 10–12 OR 0.51, 95% CI 0.49–0.53; age 13–15 OR 1.06, 95% CI 1.02–1.10; age 16–17 OR 0.88, 95% CI 0.85–0.92; vs. base category age 0–3)
- Child’s gender female vs. male (OR 0.95, 95% CI 0.93–0.97)
- Child’s race/ethnicity (Black/African American OR 0.74, 95% CI 0.71–0.77; Asian OR 0.44, 95% CI 0.41–0.47; Hispanic OR 0.76, 95% CI 0.73–0.79; vs. base category White)

For the first three frames, the nonresponse biases have been mitigated using the inverse response propensity as the adjustment. Additionally, phone usage, parent/guardian education and employment have been explicitly controlled for via raking. Marital status has been implicitly controlled via household size. Overall, the nonresponse biases due to different response rates in these demographic groups have been by and large mitigated by the combination of nonresponse adjustment and weight calibration.

Parent Consent vs. Refusal to Interview the Selected Youth

At the end of the adult interview where the focal child was 10–17, we asked the parent/guardian for permission to interview the child. If the adult refused consent, or said that the child refused, the case was coded as a refusal and not called again. If the parent/guardian consented, the interviewer asked to speak with the child. If the child was unavailable, a callback for the child was set. If the parent/guardian said they would like to think about it or asked us to send a letter about the study, we set a callback for two weeks later. There was an error in the CATI program that caused data for some cases at PEND01 (request for permission question) to be unset when a callback was set. While data for PEND01 is missing for some cases, the actual CATI program was working properly and no one who refused consent would have been called back.

For this analysis, we compared those who consented (or at least did not refuse; n=2,506) to those who refused (n=777). Table 13 displays the answers given at PEND01.

Table 13. Request for Parental Consent

PEND01 Category	Completes	Non-completes	Total
1 - Yes, now	1,097	145	1,242
2 - Yes, but call on child's/another phone - CELL	10	6	16
3 - Yes, but call on child's/another phone - LANDLINE	2	1	3
4 - Not available now	358	308	666
5 - Send letter first	0	33	33
6 - Want to think about it	0	38	38
7 - Child refuses through parent	0	332	332
99 – Refused	0	445	445
PEND01 status unknown	0	336	336
PEND01 status missing, completed interview	492	0	492
PEND01 status missing, parent consented, qualified callback	0	94	94

The same variables as for the early vs. late responders were analyzed. Table 14 reports the statistically significant results at 5% without adjustment for multiple comparisons. (This analysis was conducted with unweighted data since no weights were developed for partial interviews.)

Table 14. Consent vs. Refused at PEND01

Variable	Among consented	Among refused	Unweighted p-value
Male parent (PI3)	27.8%	34.0%	0.0014
School violence is big/somewhat of a problem (PI6)	10.9%	7.8%	0.0210
Neighborhood violence is big/somewhat of a problem (PI7)	6.9%	4.7%	0.0376
Receive TANF (PI29)	13.8%	8.2%	0.0002
Child's general health = excellent (PI39)	60.0%	64.4%	0.0271
Household income:			
Under $20K	9.2%	4.4%	0.0000
Over $100K	39.0%	47.9%	
Single adult household (PI10)	9.9%	6.6%	0.0019
Highest education of the parents (PI21 + PI23)			
Below HS	3.9%	1.4%	0.0000
Graduate/professional degree	32.4%	35.4%	
Child's age (AGEMRK)			
10–12	27.7%	45.6%	0.0000
13–15	40.4%	33.4%	
16–17	31.9%	21.0%	

Overall, it appears that refusals were more likely to come either from the relatively better-off households (more educated parents, healthier children, higher income, school/neighborhood violence less of a problem) and/or from families with younger children (10-12 age group). These issues have been rectified through weight calibration.

Going Forward

As contact and response rates have declined, the cost of conducting surveys has increased. Survey researchers, including us, have spent the past 15 years exploring alternative sampling frames, including cell phone (vs. landline) RDD frames, address-based sampling (ABS), dual and other multiple frame designs, and hybrid models that combine probability and convenience frames. This is all with the aim of trying to balance research demands and rising costs. As suggested by the National Research Council (2013), "It is possible that a significant portion of the downward trend in response rates is attributable to (a) survey budgets not keeping pace with rising costs even with (b) the increasing use of new frames and modes of interview to combat declining coverage."

NatSCEV has many challenges compared to other surveys of youth. The survey is nationally-representative and the population is difficult to reach by telephone. Many other nationally-representative or probability-based surveys of youth use school-based samples with in-person data collection, greatly increasing response rates (albeit with a different set of challenges and costs); examples include the CDC's Youth Risk Behavior Surveys, the National Longitudinal Study of Adolescent Health (Add Health), and Monitoring the Future.

While these other data collections do include some sensitive topics, NatSCEV includes some of the most sensitive and difficult material of any survey of youth. This is likely to have increased the perceived burden and concern about confidentiality and reduced the willingness of

parents/guardians to allow their children to participate, particularly for those age 10-12. Other surveys on the topic of victimization use list samples from administrative data, such as child protective services, foster care, or program participant records. Many of these samples are also confined to a specific geographic area, such as a city, county or state. While NatSCEV has the methodological advantage of using a nationally-representative sample, the trade-off is not having a list of known eligible sample members, which increases the cost of finding and interviewing eligible households with children.

We believe that there may be ways to address some of these challenges in future waves of NatSCEV:

- **Reduce respondent burden:** As noted in Table 1 above, the length of the survey was a common reason for refusal. NatSCEV III averaged an hour to complete, well beyond the length of an average telephone survey. Reducing survey length must always be considered in plans to increase response rates. Many national surveys designate a "core" set of questions and break the rest into modules that are then allocated to a portion of the sample, reducing the overall average length per participant. These modules can provide adequate power for estimates requiring less sample size or for less central research questions.
- **Focus on effective sample size in designing the study:** While NatSCEV III includes 4,000 completed surveys; the design effect of 5.5 reduces the effective sample size to 727. For future surveys, we could determine the effective sample size needed to look at trends over time and design a study to meet that effective sample size, offsetting a reduced number of completes with reductions in design effects.
- **Experiments to improve response rates:**
    - The 10-12 year old age group is the least likely to complete the youth survey after the adult portion has been completed. Parents/guardians are more likely to refuse consent for this age group due to survey topic, child respondent age, and worries about the child taking the survey alone on the phone. In the future, we suggest at least testing a change to the handoff-protocol for this age group. We could randomize the sample, have the parent complete the entire survey for 10-12 year olds for one-half of the sample while the other half continues with the current handoff protocol to the child, and compare the estimates. We may also want to consider providing an option for a refusing parent/guardian to do the youth survey on behalf of their child.
    - In addition, it may be worth doing focus groups, or some other form of qualitative data collection to improve the consent language in the survey both in the beginning and at the parent/child hand-off.

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Appendix A Methods Text for Journal Article

Participants: NatSCEV III was designed to obtain up-to-date incidence and prevalence estimates of a wide range of childhood victimizations based on a CATI survey of a national sample of 4,000 children and youth age 0 to 17 years, conducted in 2013 and 2014.

Sampling: For NatSCEV III, a nationwide sample was constructed using four sources: (1) an address-based sample (ABS) of 80,000 addresses for which 37,101 cell and residential numbers from mail responses or that could be matched to the frame were dialed; (2) a pre-screened sample of 5,726 telephone numbers of households with children from recent national random-digit dialed (RDD) surveys; (3) a listed landline sample (targeted on indication of a child in the household based on commercial lists) with 113,461 telephone numbers; and (4) 2,184 cellphone numbers drawn from a targeted RDD sample frame. This combination of sample frames was designed to increase nationwide coverage of households while efficiently reaching households with children to obtain the desired number of completed interviews.

Recruitment: ABS respondents received an advance letter for the study with a household information form to determine eligibility and willingness to participate in the study. Both documents were printed in English on one side and Spanish on the other (with the Spanish side on top if the sample vendor flagged the household as likely to be Hispanic). The letter said that the household had been selected for the National Survey of Child and Youth Safety and briefly described the study. It asked any household that had children under the age of 18 to fill out the enclosed household information form and mail it back in the pre-paid envelope. In return, the household would receive a $5 check and soon be called to conduct the telephone interview for an additional $20. The household information form asked about household member age groups and for the parent/guardian's name and telephone number. If a household did not return a reply form but had a matched telephone number on file, the case was dialed with that phone number.

While participants in the other sampling frames did not receive an advance letter, we mailed a letter about the project to any parent, guardian, or child who wanted more information about the study before they participated. This letter explained the purpose of the study, assured confidentiality, emphasized the voluntary nature of participation, and otherwise conformed to standards for the protection of human subjects.

Procedure: The survey was administered using Computer Assisted Telephone Interviewing (CATI) in English or Spanish and took an average of 60.3 minutes to complete. In households with more than one child aged 0-17, an eligible child was randomly selected. If the selected child was age 9 years or younger, an adult parent or guardian completed the entire interview on behalf of the child. If the selected child was age 10 years or older, a short interview was conducted with the parent or guardian and then permission was requested to conduct the main interview with the 10-17 year old. If permission was granted to interview the 10-17 year old but the child was not available at the time of the adult interview, a callback was scheduled. When permission was refused, the child was not re-contacted. Upon obtaining the adult's consent, the child was interviewed only after providing assent.

ABS respondents with children who returned a study reply form received a $5 check as a thank-you. Parent/guardian telephone respondents received a $20 check for completing the survey (whether the child was 0-9 or 10-17), and youth respondents who took the child portion also received a $20 check.

Response Rates: A total of 4,000 interviews were completed: 2,041 or 51% with adult parents or guardians of children age 0-9 and 1,959 or 49% with adult parents or guardians and adolescents age 10-17. The additional 1,730 interviews conducted with adult parents or guardians of youths age 10-17 but not completed with the child were considered partial

interviews. Among the completed interviews, 1,011 came from the ABS frame (651 from those who replied to the study mailing [AAPOR RR3 = 52.7%; RR4 = 67%] and 360 from those with matched telephone numbers on file [RR3 = 15.1%; RR4 = 22.9%]), 520 from the pre-screened sample (RR3 = 22.1%; RR4 = 30.6%), 2,443 from the listed landline sample (RR3 = 14.7%; RR4 = 21.7%), and 26 from the cell phone RDD sample (RR3 = 9.7%; RR4 = 14.2%).

Weighting: Weights were developed to account for differential probability of selection within and across the sampling frames and to adjust for nonresponse. Within each frame, weights were constructed to reflect the probability of selection from the frame and, where information was available, adjust for eligibility and nonresponse. Weights were then adjusted to account for the overlap between the frames (i.e., that respondents may be reachable through multiple frames, increasing their selection probability). Finally, weights were calibrated to the national distribution of household parent and child demographic characteristics found in the American Community Survey and National Health Interview Survey in 2012. Moderate trimming of weights was applied at several stages to reduce design effects as much as possible. The final weighted sample reflects the U.S. population on a range of household, parent and child demographic characteristics.