Methodological Challenges Facing the National Crime Victimization Survey

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Abstract

This paper presents an overview of current methodological research being conducted to improve the National Crime Victimization Survey (NCVS). The NCVS is sponsored by the United States Bureau of Justice Statistics and in its current form has been providing national estimates of the incidence and characteristics of criminal victimization since 1992. Although there are many benefits to the current NCVS design, there are also some practical limitations. This paper will provide an overview and key findings from the methodological work currently being conducted across three broad areas to address these limitations. These areas include: 1) the survey design and estimation process, 2) producing subnational estimates, and 3) instrumentation changes.

Keywords: crime surveys; survey methodology; subnational estimation; National Crime Victimization Survey.

1. Introduction

The U.S. Bureau of Justice Statistics' (BJS) National Crime Victimization Survey (NCVS) is a household-based, omnibus crime survey dating back to the 1970s. It is one of the two main sources of data on crime in the United States and the only source that provides detailed information on the level, nature and consequences of crime. By capturing crimes not reported to police, as well as those known to law enforcement, the NCVS serves as the primary, independent source of information on crime in the U.S.

In its current form, the NCVS has been providing national estimates of the incidence and characteristics of criminal victimization since 1992. The NCVS uses a rotating panel design based on a nationally-representative area probability sample of households. Sampled households stay in the panel for three and a half years, with interviews conducted every six months, for a total of seven interviews. Generally, the initial interview is conducted in-person and follow-up interviews are conducted either by telephone or in-person. Within selected households, all persons age 12 or older are interviewed about their experiences with personal and property victimizations. Each interview consists of a basic screening questionnaire and, if applicable, a crime incident report. The screener is asked of all respondents while the detailed crime incident report is only asked of those who report one or more victimizations during the screening process.

In the mid-2000s, growing survey costs and budget cuts forced BJS to reduce the size of the NCVS sample. Coupled with declining crime rates, smaller sample sizes resulted in less precision and reliability around the weighted national estimates. In order to enhance the utility of the NCVS, increase the precision of estimates, and contain survey costs, BJS initiated a substantial redesign effort to enable the NCVS to meet stakeholder needs for reliable statistics on criminal victimization and build the capacity of the NCVS to generate subnational estimates of criminal victimization. Among the major redesign efforts that have been initiated to date are a series of methodological research projects focused on

improving the efficiency of the survey design and estimation process; the development of the multipronged subnational estimation program; and a comprehensive assessment and overhaul of the NCVS survey instrument.

Because BJS is a relatively small statistical agency with less than 10 statisticians working on the NCVS, external resources are required to assist with carrying out these redesign efforts. First, all efforts related to sampling, data collection, and data processing are carried out by the data collection agent, the US Census Bureau. Additionally, in 2011, BJS established the National Victimization Statistical Support Center to serve as an extension of the in-house NCVS unit and provide scientific and technical support for statistical and methodological research, statistical analyses, and dissemination, as well as to assist with the development of the subnational program. BJS also relies on other external contractors to carry out specific tasks associated with redesign efforts. Finally, in order to increase the utility of the NCVS and obtain stakeholder buy-in, BJS developed an NCVS Technical Review Panel comprised of researchers, practitioners, and other experts in the field to meet on a routine basis and provide review and feedback on substantive and methodological issues related to the administration of the survey.

2. Survey Design and Estimation Process
While on a number of metrics the NCVS has been successfully conducted for over 20 years, BJS is constantly reviewing the survey methodology and estimation methods to ensure that the survey is operating as efficiently and effectively as possible to generate reliable and precise estimates of criminal victimization. This section describes several of the methodological areas that BJS has recently assessed.

2.1 Panel Design
The NCVS utilizes a seven wave rotating panel design, which provides several tangible benefits. Namely, a rotating panel design serves to bound interviews within the reference period (i.e., the reference period is constrained by the prior interview), reduce costs through higher response rates and the use of less expensive interview modes in the second through seventh interviews, and allow for longitudinal data analysis. However, panel surveys can suffer from respondent fatigue in later interview waves and the NCVS is no exception. On average respondents report 49% fewer victimizations in the seventh interview compared to the first interview.

BJS and RTI reviewed the current NCVS design to determine if seven interview waves is optimal for containing costs and maintaining the precision of victimization estimates or if the number of interviews could be reduced without negative impacts on cost or precision (Berzofsky & Carrillo-Garcia, 2014). For this analysis, RTI conducted a simulation study using response and victimization patterns from the current design to examine the impact of fewer interview waves on three factors: (1) estimated cost of the design, (2) accuracy of the estimates, and (3) precision of the estimates. The study revealed that four panel waves struck the right balance between reducing respondent fatigue while not dramatically increasing costs.

2.2 Bounding
While the NCVS rotating panel design offers the benefit of bounded interviews in waves two through seven, the first time-in-sample interview with a household or person is not bounded. This initial interview may be subject to telescoping, in which the respondent reports a victimization that occurred outside of the reference period as though it happened during the reference period. Prior to 2006 BJS excluded the first NCVS interview wave from victimization estimates in order to avoid the potential for falsely inflated estimates due to telescoping. However, because of reductions in the NCVS sample data from these interviews were incorporated into victimization estimates beginning in 2006 in order to maintain existing precision levels. To account for telescoping, the Census Bureau adjusts the incident weights from the first interviews so the number of reported victimizations reflects the average estimates from the six remaining bounded interviews. The adjustment is made separately for person and household victimizations.

RTI and BJS assessed the bounding adjustment from a total survey error perspective to determine if it properly accounts for all potential sources of error First, the assessment explored the implications of the lack of adjustment applied to households or persons interviewed for the first time in waves two through seven. Currently, if a NCVS sample household moves, the new replacement household that takes their place in the housing unit becomes part of the sample at the same wave as the old household and without any bounding adjustment applied to their initial interview. Second, RTI examined the potential measurement error due to mode changes (i.e., initial interviews are conducted in-person while later interviews are conducted over the phone) and fatigue (i.e., reporting fewer victimizations over time in order to shorten the interview length). Findings showed that the adjustment should account for respondent fatigue in later interview waves in addition to telescoping in the first wave and that any telescoping adjustment should be applied to all first time interviews subject to potential telescoping, including replacement households. Findings also revealed that once telescoping and fatigue were taken into account, mode of interview was not significantly related to reporting victimizations (Couzens, Berzofsky, and Krebs, 2014).

2.3 Series Enumeration
As part of ongoing research efforts to improve the estimation of criminal victimization, BJS examined ways to better account for high-frequency repeat victimizations, or series victimization, into violent crime rates. The NCVS asks respondents to recall each incident and to date each incident. In some cases, this is very challenging as the victimizations are not discrete events but events of continuous duration, such as intimate partner violence or bullying. To handle these cases, the NCVS series victimization protocol is employed when a respondent experiences six or more victimizations during the reference period that are too similar to be distinguished from one another. In these instances, the respondent is asked to describe details of only the most recent incident but to provide a count of the total number of similar incidents that occurred during the period. Historically, BJS excluded series victimizations from annual victimization estimates due to concerns about the accuracy of the data. However, this practice also served to artificially reduce victimization estimates (Lauritsen et al., 2012).

In 2010 BJS assessed the impact of including series victimizations and introducing a new series enumeration rule. Findings showed that while including series victimizations in national rates resulted in increases in the level of violent victimization, the inclusion did not change trends in violence over time. Additionally, including series victimizations did not have a major impact on the distributions of relevant victim and incident characteristics (Lauritsen et al., 2012). Based on the assessment, BJS determined that series victimizations should be included as separate victimizations during the estimation process, but that the number of victimizations included would be capped at a maximum of ten victimizations. This new enumeration ensures that repeat victims are included in overall estimates without allowing extreme estimates to drive victimization patterns and trends.

2.4 Imputing Income
In general, item nonresponse is not a major problem for the NCVS since most items have less than 5% missing due to nonresponse. The one exception is the household income variable which suffers from around 30% missing data. When item nonresponse is that high, it may not be possible for an imputation approach to accurately assign income values and also take into account the uncertainty in the imputation process. Therefore, to address the high level of missing income data, BJS traditionally created an "unknown" income category for those respondents who did not provide a household income level. However, the interpretation of relationships between victimization and income are difficult to assess with the presence of a large unknown category,

Since an assessment of the feasibility of imputing income had not been conducted, BJS and RTI began examining different imputation methods and approaches to determine which, if any, provided the most accurate estimates without being overly onerous on the user (Berzofsky, et. al. 2015). The two primary methods considered were Hot Deck and Linear Model procedures and within each approach both single

imputation and multiple imputation strategies were tested (i.e. data imputed 5, 10, 15, or 20 times). After imputing the data under each of these methods the results were validated via a Monte Carlo simulation and through comparison to the known income distribution in the U.S. from the American Community Survey. The study results found that a single imputation Hot Deck approach provided point estimates that tracked closely with the distributions from the comparison sources. Additionally, compared to the multiple imputation approaches, the single imputation strategy was substantially easier to analyze and adopt. BJS issued the first report using the new income variable imputed using single imputation Hot Deck in late 2014 (Harrell et al., 2014).

3. Subnational Estimation

The NCVS has been a rich source of information about criminal victimization both reported and not reported to the police at the national level since its inception in the early 1970s. Local stakeholders, however, would find the survey data more useful if statistics could be produced at a local level as a means to reflect local crime conditions and as a tool to assess police and criminal justice services. Most local areas currently rely on data from official statistics generated from police activities, but a large portion of crime is not reported to the police. BJS is enhancing its utility by developing a subnational program for state and local victimization estimates. To address this demand for subnational victimization estimates, BJS has embarked on a multi-pronged approach for developing a portfolio of both direct and indirect estimation procedures.

Direct estimation uses current data to generate estimates from the NCVS responses, thus utilizing direct observation and allowing estimates to be easily replicated. When survey data are pooled across multiple years, the sample sizes within some subnational areas (e.g. the largest states and metropolitan areas) are sufficient to produce direct estimates with reasonable precision. However, the NCVS was designed to exclusively produce national estimates, which means that the sample selection and analysis weights were intended to produce representative estimates only at the national level without regard for smaller geographic areas. To ensure the reliability of subnational direct estimates, BJS is developing strategies to assess the representativeness of the sample within subnational areas and to re-calibrate survey weights to subnational control totals when needed, thus minimizing any potential coverage bias.

To increase the number of areas for which reliable direct estimates can be calculated, BJS is exploring the use of targeted sample boosts. Beginning in July of 2013, the Census Bureau initiated a trial boost of the NCVS sample in the 11 largest states. Boosting the sample is an attractive option since it increases the precision and representativeness of the estimate through direct observation. However, this is the most expensive option subnational estimation as it involves increases in sample sizes. With the trial boost, BJS maintains the current NCVS national sample design, but has the ability to assess the costs and quality of the data produced in each of the states.

The creation of "generic area" profiles allows direct estimates to be calculated in aggregate for areas in which sample sizes do not support direct estimation individually. A generic area typology is created using available geographic, demographic, economic, or other identifiers to create "like places." As the term implies, these categories are not specific to any one area, rather, these generic areas represent places that are share the same general geographic characteristics. For example, a "city with a population of 250,000-500,000 in the northeast" represents places such as Buffalo, NY, and Pittsburgh, PA. This approach to dividing up the country is similar to that used by the Acorn consumer classification in the UK (see http://acorn.caci.co.uk) and the Nielsen Prizm market segmentation (see http://www.claritas.com/MyBestSegments/Default.jsp).

Generic areas are limited by sufficient sample sizes, the assumption of homogeneity shared within categories, and whether sample cases properly represent the targeted places. Estimates can be prone to relatively lower statistical precision due to small sample sizes and estimates are not specific to a unique

area. However, because this approach uses direct estimation with the existing sample design, this is an inexpensive option that allows researchers to address a broad range of research questions

Indirect estimation, or small-area estimation (SAE), provides an alternative estimation approach for areas with small or nonexistent sample sizes where reliable direct estimates cannot be produced. Given the rare nature of crime, even relatively large and costly boosts to the sample may not produce measures with reliable precision in all subnational areas. An alternative approach is to use indirect methods that involve modeling techniques to create estimates with ancillary information related to victimization at the local level. These SAE techniques use information from direct sample cases when available, but primarily rely on the performance of secondary indicators to the produce the local victimization rates. A critical concern is identifying proper covariates that perform well in the modeling efforts. In addition, since these estimates are partially or completely based on modeling rather than direct observation, the value to local stakeholders is a concern. Currently BJS has been developed initial model-based estimates for all states. Work is being conducted to assess the validity of these estimates compared to direct estimates and to explore the feasibility of expanding the model-based approach to produce sub-state estimates.

A key challenge facing BJS is to determine which subnational estimation approach produces the most reliable estimates and is most appropriate for each type of geographic area, taking into account the budget implications of each approach. BJS is developing a data dissemination strategy for releasing direct and model-based subnational estimates based on the findings from each of these evaluations.

4. Survey Instrument Redesign

The NCVS Instrument Redesign and Testing Project is a major multi-year effort to overhaul the existing survey instrument. Through this project, BJS aims to evaluate and modernize the organization and content of the NCVS; improve the efficiency of the instruments and the current core-supplement design; and develop a procedure for introducing routine improvements to the survey in order to capture emerging crime types and time-relevant topics.

One of the first steps in the project was a comprehensive assessment of the instrument to determine which survey items are being utilized and how, which survey items are problematic in their language and placement, and where there are gaps in the content of the instrument. The current version of the instrument has been in the field since 1992, meaning that many of the items are dated and additions to the content over the years have altered the original flow of the questions and resulted in a lengthy, unwieldy instrument. The initial assessment provided a better understanding of the substantive and procedural issues with the instrument and helped to identify areas where the content could be improved to enhance current knowledge of victimization and its correlates.

Through the initial assessment work, several major areas of focus for the redesign effort became apparent. The first involves enhancing the socio-demographic information collected about respondents to better address policy-relevant questions about victimization. The types of socio-demographic variables being considered for inclusion are veteran status, citizenship, sexual orientation, and expanded information about cognitive and physical disabilities. For each of these items, attention must be given to question wording, placement, and the potential impact on response rates. The second area of focus involves the addition of 'noncrime' questions. The 'noncrime' questions will address issues related to fear of crime, perceptions of social disorganization in the respondent's neighborhood, and perceptions of police performance and police legitimacy. These items will be administered to all respondents and are intended to increase the relevance of the survey for the majority of respondents who never experience a victimization. Because the items are answered by all respondents the estimates are expected to have stronger precision at the subnational level compared to victimization rates. The information provided on variations in perceptions of safety and satisfaction with police also has utility for a broad range of stakeholders.

A third area of focus is on improving the measurement of and increasing the crime types covered by the survey. The current NCVS captures rape and sexual assault, robbery, physical assault, burglary, larceny, and motor vehicle through the core survey instrument and uses routine supplements to collect information on other crime types like identity theft and stalking. However, the rates of victimization for these supplemental crimes are not incorporated into the overall victimization rates. Other growing crimes like financial fraud are not measured by the survey at all. One of the goals of the redesign is to expand the crime screener to incorporate a broader range of crimes, including some, like fraud, that are not typically reported through official police statistics. Additional efforts are on improving the measurement of highly sensitive crimes like rape and sexual assault and intimate partner violence.

A final broad area of focus for the instrument redesign is to enhance the capacity of the survey to measure both formal and informal victim help-seeking behaviors. The U.S. government allocates billions of dollars a year to provide assistance to victims of crime, yet the current NCVS instrument asks only two questions related to whether the victim received victim services. The redesigned instrument will expand on the information collected about why victims do or do not receive formal services, and among those that do, the type of assistance they received. It will also improve on current questions about the receipt of medical and mental health care following a victimization and will add questions about informal help-seeking behaviors, such as speaking to a family member, friend, or religious leader.

5. Conclusions

The NCVS is an important but costly and resource-intensive survey. Although it has been successfully used since the 1970s to paint a more complete picture of the level, nature, and consequences of criminal victimization in the US, BJS must continually assess the survey methodology and estimation processes to ensure that it is operating as efficiently and effectively as possible and that the utility of the data is maximized. BJS has recently engaged in several major efforts aimed at containing survey costs, improving the precision and reliability of victimization estimates, and increasing the utility of the survey for stakeholders at the state and local level. Much has been learned from these efforts to date and these lessons learned will become part of the continuous approach to assessment and improvement of the NCVS.

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