# Piggyback Survey Respondents and Mode: Lessons Learned from Design and Operations

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## Abstract
"Piggyback" surveys have at least two parts: data collected from an initial sample are used to spawn another sample. Designing the second sample so that it "piggybacks" on the first is typically much more efficient than other sampling approaches. For many piggyback surveys, data from the two parts are collected in different modes (e.g., face-to-face for one, telephone for the other). This presents a number of design and operational challenges. The same questions may be asked in both surveys; they may be designed in one mode, and then adapted for the other mode without considering mode effects. Elapsed time between the specific respondent's interview in survey A and the interview with the survey B respondent he or she identified might also be a concern. If too much time elapses, the link between the two may be broken. Errors unique to piggyback surveys may be an overlooked component of total survey error framework. The paper discusses lessons learned from a number of experiences with these types of multi-mode surveys: child/parent or care provider; medical setting and staff members in the setting; employers and employees, and disabled household members and their caregivers.

**Key Words:** Survey design, multi-mode, piggyback, sample design, total survey error

## 1. Introduction

Sometimes two household or establishment surveys enjoy a special relationship. A so-called "piggyback" design uses one survey (survey A) to derive a sample for another survey (survey B). This design links the two surveys' data. The advantages of this relationship are numerous; however, it comes with specific design and operations issues that make both surveys more complex than a standalone survey. Understanding the design, training, and data collection issues involved in implementing piggyback surveys helps ensure the collection of high quality data. This paper discusses lessons learned from various multi-mode, piggyback surveys and provides insight into planning and fielding such surveys.

### 1.1 Literature Review
The sparse methodological literature regarding piggyback surveys primarily pertains to piggyback designs as a way to identify a sample for a different survey. Tourangeau and Smith (1985) describe piggybacking as a method for sampling rare populations. They describe Kish's (1965) methods for sampling rare populations and compare two methods for selecting a national sample of African Americans. Tourangeau and Smith describe

piggybacking as an inexpensive screening method for locating rare population members who are eligible for a second survey. Moreover, successful implementation of this method is detailed as: 1) data from the first survey are available to the second survey's researchers, 2) confidentiality is assured, 3) data collection for both survey A and B is closely coordinated, and 4) screening costs for survey B are reduced by piggybacking on survey A. Other literature describes piggybacking as a screening method as well (e.g., Sin, 2006). O'Shea, Bryson, and Jowell (2002) and Smith (1987) also describe piggybacking as a method for creating omnibus surveys or for fielding supplemental surveys related to the International Social Survey Program (ISSP). However, specifics about designing and implementing piggyback surveys are largely missing in the survey methods literature.

Discussion of piggyback design-specific errors is missing. Such errors have a parallel in other classes of survey errors associated specifically with other unique survey designs. For example, "comparison error" for cross-national studies and "conditioning error" for multi-wave panel studies have recently appeared in the literature on total survey error (Smith, 2009; Groves and Lyberg, 2010). "Inter-survey error" could be considered as another design-specific addition to the total survey error framework. This error category is defined as the errors related to the "connectedness" of piggyback surveys. Coverage errors that may arise from deriving survey B's sample from survey A and measurement errors that may result from mode effects are examples of possible inter-survey errors.

Although the methodological literature is sparse, piggyback survey documentation and reports (e.g., Bercovitz et al., 2010; Squillace et al., 2007; Krebs et al., 1999; Mathiowetz and Ward, 1987; Smith, 1987) provide some information regarding design and implementation. Table 1 displays examples of household and establishment piggyback surveys. These examples reveal the major characteristics of piggyback survey designs. The documentation of these and other piggyback surveys describes issues encountered when fielding piggyback surveys.

## 1.2 Piggyback Survey Characteristics and Advantages

Piggyback survey designs have unique characteristics. These include: 1) deriving survey B's sample from survey A, 2) survey B is dependent on survey A, 3) both survey A and survey B data can be generalized to estimates of their populations, and 4) survey A and B data are linked. Often survey A's sample size is larger and survey B is its own sample with different respondents. Different modes are also often used. Piggyback designs share some characteristics with two-phase designs commonly used in clinical trials, but the Survey A design is not driven by the B design in piggybacks, and the sample design is not as constrained as it is for two-phase designs.

Piggybacking surveys has many advantages. It can be a more practical and efficient method for locating and sampling survey B respondents compared to a standalone survey B because it eliminates the need to construct a separate sampling frame. In other words, the design reduces sampling time, cost, and effort. Moreover, by piggybacking onto a survey, survey B can more easily and cost effectively sample certain groups at numbers to achieve desired levels of statistical precision for analysis (Ezzati-Rice et al., 1998). This design might also contribute to higher response rates due to the increased legitimacy provided by connecting the two surveys. For example, the connection to the National Nursing Home Survey (NNHS) helped legitimize the National Nursing Assistant Survey (NNAS) by stating a connection to sampled nursing assistants' employers and facility residents. This increased legitimacy helped reach a population that is often difficult to

**Table 1:** Example Household and Establishment Piggyback Surveys

| | *Survey A* | *Survey B* |
|---|---|---|
| | National Health and Aging Trends Study (NHATS) | National Study of Caregiving (NSOC) |
| *Fielding Dates* | 2011 | 2011 |
| *Mode* | CAPI | CATI |
| *Sample* | Medicare beneficiaries, age 65+ | Informal caregivers |
| *Survey Description* | Physical and cognitive abilities, health, social involvement, income/assets, demographics | Care activities, caregiver's life |
| | The Workplace and Employee Survey (WES): Employer Component | WES: Employee Component |
| *Fielding Dates* | 1999-2006, annually | 1999 to 2005, annually |
| *Mode* | CATI | CATI |
| *Sample* | Canadian businesses | Workers at Canadian businesses |
| *Survey Description* | New technologies, organizational change, training, human resources, and business practices | Wages, work hours, job types, human capital, technology use, and training |
| | Early Childhood Longitudinal Study-Kindergarten Class of 1998-99 (ECLS-K) | Head Start Questionnaire |
| *Fielding Dates* | 1998, 1999, 2002, 2004, 2007 | 1998 |
| *Mode* | Face-to-face | Self-administered |
| *Sample* | 1998 public and private school kindergartners | Head Start facilities attended by children in ECLS-K sample |
| *Survey Description* | Children's home and school environments, education, teacher qualifications | When the child entered and ended the program and the type of program attended |
| | National Longitudinal Survey of Youth 1979 (NLSY79) | Armed Services Vocational Aptitude Battery (ASVAB) testing |
| *Fielding Dates* | 1979-1994, annually; then biennially | 1980 |
| *Mode* | PAPI (1979-1986, 1988-1992); telephone, face-to-face (1987), telephone (2002); telephone, web component (2004) | Self-administered |
| *Sample* | 12,686 people born January 1, 1957 to December 31, 1964 | 94% of NLSY79 respondents |
| *Survey Description* | Labor experiences, training, education, health, household composition, demographics | 10 tests in math, science, and language |

*Table 1 continued.*

| | *Survey A* | *Survey B* |
|---|---|---|
| | National Nursing Home Survey (NNHS) | National Nursing Assistant Survey (NNAS) |
| *Fielding Dates* | 2004 | 2004 |
| *Mode* | CAPI | CATI |
| *Sample* | Nursing home residents | Nursing assistants from NNHS facilities |
| *Survey Description* | Nursing home staff, residents' health, and services | Recruitment, training, jobs, and family life |
| | Early Childhood Longitudinal Study-Birth Cohort (ECLS-B) | ECLS-B: Teacher questionnaire |
| *Fielding Dates* | 2001-2007 | 2007 |
| *Mode* | In-person | Self-administered |
| *Sample* | Nationally representative sample of children born in 2001 | ECLS-B children's teachers |
| *Survey Description* | Children's social, emotional, cognitive, and physical development | Children, school, and teacher characteristics |
| | U.S. General Social Survey (GSS) | International Social Survey Program (ISSP) supplemental questionnaire |
| *Fielding Dates* | Annually since 1972 | Since 1985 |
| *Mode* | In-person | Self-administered |
| *Sample* | U.S. adults, 18+ | U.S. adults, 18+ |
| *Survey Description* | Social, political, economic phenomena | Cross-national question modules |
| | National Longitudinal Survey of Youth 1997 (NLSY97) | NLSY97: School Survey |
| *Fielding Dates* | Annually since 1997 | 1996 |
| *Mode* | CAPI (ACASI for sensitive questions) | Self-administered |
| *Sample* | Nationally representative sample of people born 1980-1984 | All schools with a $12^{th}$ grade located in a NLSY97 PSU |
| *Survey Description* | Labor market behavior, education, family, and community | School characteristics |

survey for various reasons (Squillace et al., 2007). Drawing on social exchange theory, the Tailored Design Method (TDM; Dillman, Smyth, and Christian, 2009) notes a positive effect for survey response related to legitimacy (establishing trust among respondents).

Piggyback designs also enhance quality through the linkage between survey A and survey B data. Data linkage allows for exploration of more research questions (e.g., Sanchez et al., 2008). Linked data from Statistic Canada's Workplace and Employee Survey (WES) allow examination of employee-workplace associations (Dionne and Dostie, 2007; Krebs et al., 1999). Analyzing nonresponse and making nonresponse adjustments with the linked data might also be possible (Ezzati-Rice et al., 1998; Cohen, 2005).

## 2. The National Health and Aging Trends Study (NHATS) and the National Study of Caregiving (NSOC)

The National Health and Aging Trends Study (NHATS) and the National Study of Caregiving (NSOC) have a piggyback relationship. NHATS is a longitudinal survey that collects data from about 9,000 Medicare beneficiaries age 65 and older. The National Institute on Aging (NIA) funds the survey through a cooperative agreement with the Johns Hopkins Bloomberg School of Public Health. Westat is responsible for sample design and data collection. NHATS is a two-hour long CAPI survey that measures physical and cognitive functioning, respondents' self-reported disability, health conditions and treatments, social participation, economic well-being, quality of life, and income and assets.

NHATS asks respondents to provide names, telephone numbers, and addresses for up to five people identified during the interview as providing help with at least one activity and who are not paid for their help. These caregivers are typically family members and friends. NSOC is a 30-minute CATI survey of these informal helpers conducted by Westat's Telephone Research Center (TRC). NSOC collects data about how the caregiver helps the NHATS respondent with everyday activities and about the caregiver's health, family, employment, and income.

Lessons learned from designing and fielding NHATS and NSOC and similar surveys (see Table 1) shed light on the design and operations issues unique to piggyback surveys.

## 3. Lessons Learned

### 3.1 Design Issues

When piggyback surveys are different modes, mode effects must be considered. De Leeuw (2005), de Leeuw, Hox, and Dillman (2008), and Dillman, Smyth, and Christian (2009) explain when and why surveys are designed with multiple modes. A primary reason is that multi-mode designs can increase data quality. Multi-mode survey designs can reduce coverage error, measurement error, and nonresponse error and positively affect response rates. Multiple modes can also improve survey timeliness. Often advance letters, incentives, and follow-up materials are delivered via a different mode than the survey itself (e.g., mailing an advance letter and incentive as part of a telephone survey).

De Leeuw (2005) and de Leeuw, Hox, and Dillman (2008) categorize mixed-mode survey designs into three "systems" based on contact phase, response phase, and follow-up phase. Each category within these phases has its own rationale for use and specific effects on survey quality. Piggyback survey designs that use different modes fit best into the category, "different samples, different modes". This category is further qualified with "often at different times with different questionnaires". The "different samples, different mode" design is described as useful for comparative research, different research traditions, different coverage, and different cost structures. This type of design is similar to piggyback designs. For example, two different samples received two different questionnaires in NHATS/NSOC. The same is true of other examples of piggyback surveys. Furthermore, in the ISSP designs, the comparative research aspect and "different research traditions" come into play because each country piggybacks the ISSP

questionnaire onto a national survey in their country (O'Shea, Bryson, and Jowell, 2002; Smith, 1987).

Studies show that mode characteristics influence question wording and the responses questions gather (Dillman, Smyth, and Christian, 2009; Dillman and Christian, 2005; de Leeuw, 2005). Different communication channels (i.e., visual versus aural) influence how questions are worded and delivered and might contribute to measurement error. The presence or absence of an interviewer and the locus of control influence responses: More social interaction means more potential for bias because of social desirability, acquiescence, and other social norms. For instance, Dillman and Christian (2005) report research about how mode influences respondents' self-reports of their health in socially desirable ways. The research cited shows face-to-face surveys record more positive self-reports of one's health compared to telephone surveys. Self-administered questionnaires were found to produce lesser amounts of positive reports of health. Extending these findings to piggyback designs, one might expect NHATS, a face-to-face survey, to collect more positive self-reports of health than the NSOC telephone survey. Different social desirability levels and other response effects attributed to mode can be expected when different modes are used in piggyback designs. These mode effects, nevertheless, can be used strategically to reduce measurement error. For instance, the National Longitudinal Survey of Youth 1997 (NLSY97) is a CAPI survey but uses ACASI for sensitive questions about criminal activity, drug use, and sexual behaviors (Overview of the NLSY97, 2005).

Visual versus aural survey delivery can also lead to primacy or recency effects. Respondents tend to choose from the first response options listed in visual formats but tend to choose later response options when they are communicated aurally (Dillman, Smyth, and Christian, 2009). Thus, common questions on piggyback surveys might elicit different response merely if one survey presents questions visually and the other aurally.

Moreover, when interviewers have the locus of control, there is a better opportunity to provide respondents additional explanation, information, and motivation to participate. For example, it is harder for respondents to break off from face-to-face surveys. Therefore, in piggyback designs, face-to-face surveys have a better chance of building rapport, providing information about the survey, and motivating respondents to participate. The piggyback surveys in telephone or self-administered modes have less of an ability to build rapport and motivate participation. This can affect response rates of each survey if different modes are used.

In addition to the response effects, mode influences question wording and questionnaire design. Face-to-face surveys can incorporate visual communication in the form of show cards. For example, the NHATS survey used show cards for frequency lists and response options for income and asset questions. Interviewers also can adapt to respondent body language in face-to-face surveys. This is not possible in telephone surveys where only paralinguistic communication is possible to respond to and use. Mode also affects survey length. Face-to-face surveys can use longer questionnaires compared to telephone and self-administered modes (Dillman and Christian, 2005). Mode's relation to questionnaire length is evident in NHATS and NSOC's design. NHATS included questions about care requirements:

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- In the last month, when you showered/took a bath/washed up, how often did you do this by yourself and without help? Would you say most times, sometimes, rarely, or never?
- In the last month, when you used the toilet, how often did you do this by yourself and without help? Would you say most times, sometimes, rarely, or never?
- In the last month, did anyone ever help you get dressed, for instance, by getting clothing over your head, helping with clothing behind your back like a belt, or helping put on socks or shoes?

NSOC, however, used only the question:

- In the last month, how often did you help {NHATS Sampled Person (SP)} with personal care such as eating, showering or bathing, dressing or grooming, or using the toilet? Would you say every day, most days, some days, rarely, or never?

## 3.2 Training Issues

All surveys that use interviewers to collect data require at least some interviewer training. Piggyback surveys that use interviewers, though, come with additional training considerations. For example, the NHATS and NSOC interviewer training was holistic. Both NHATS and NSOC interviewers received training about NSOC respondent eligibility and both surveys' objectives and processes. It was important that both surveys' interviewers understood who are considered NSOC respondents.

The NHATS interviewer had to know who was considered an eligible NSOC sample member to gather contact information from the NHATS respondent. NHATS interviewers also had to be informed about the NSOC survey to be able to relay to NHATS respondents what the NSOC survey is about and why the information is needed. The NHATS interviewers were trained to use both the NSOC letter and fact sheet to help address any NHATS respondents' concerns or questions about the NSOC survey and the request to provide contact information for their helpers.

The NSOC interviewers had to learn enough about NHATS to explain the connection between NHATS and NSOC when calling respondents and gaining their cooperation. In addition, because the two surveys are connected, NSOC interviewers were trained to answer NSOC respondents' questions about how their contact information was gathered and why they were included in the survey.

## 3.3 Data Collection Issues

The data collection operations in piggyback survey designs have some unusual requirements. Krebs and colleagues (1999) said of the WES: "The unique content and methodology of WES placed unusual demands on survey operations. Many of the required operations had no recent precedents at Statistics Canada" (p. 11). However, the lessons learned from WES's survey operations and others like NHATS/NSOC, can help guide future piggyback survey operations.

Collecting survey B respondent contact information is an important survey A objective. The quality of the contact information affects survey B data collection timeliness and

implementation. If the quality is poor, more review of contact information is required—including tracing accurate information, identifying duplicates, and determining eligibility. This adds cost and time, but is necessary to avoid detrimental impact on the survey. For example, in the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), extensive evaluation and tracing of contact information was needed before some of the childcare providers could be contacted; sometimes followup with the ECLS-B parent was necessary to collect additional contact information. These activities were labor-intensive and resulted in some delay in fielding the childcare providers survey. Duplicate names appearing in the NSOC sample also had to be identified to avoid contacting the same individual more than once and to avoid including duplicates in response rate calculation.

Confidentiality is an important consideration in all surveys. Piggyback surveys, though, come with an added layer of confidentiality because of the surveys' interrelationship. Survey respondents must be assured that their responses are not shared with the other survey's respondents. In NHATS and NSOC, respondents in both surveys were told that their answers would not be shared with anyone. Special consideration was necessary because some survey questions asked about the participant in the other survey. Similarly, employee surveys such as National Home Health Aide Survey (NHHAS), National Nursing Assistant Survey (NNAS), and the WES employee component that are piggybacked on employer surveys require that the respondents be assured their responses will not be shared with their employers.

Because survey B's sample is derived from survey A, survey A respondents can provide advance materials to survey B respondents and help recruit them to participate. NHATS respondents were asked to provide a copy of the NSOC advance letter and fact sheet to individuals they identified as helpers. This helped further establish a connection between the surveys and increase NSOC legitimacy. Similarly, agencies in the NHHCS were asked to distribute advance materials to selected home health aides without contact information in the NHHAS (Squillace et al., 2007).

Survey A respondents do not always provide complete or accurate survey B contact information nor do interviewers always accurately record the contact information. Therefore, data collection operations must include a contact information review and tracing step. Returning to survey A respondents to ask for additional information for missing or inaccurate survey B respondent contact information is sometimes an option. When fielding the National Home Health Aide Survey, some of the National Home and Hospice Care Survey agencies were asked to provide additional contact information for health aides who were difficult to reach (Bercovitz et al., 2010). However, this may not be an appropriate approach for some piggyback surveys. For example, returning to NHATS respondents to garner additional NSOC respondent contact information for difficult-to-reach respondents or cases where information was missing or inaccurate was deemed not preferable because of the longitudinal nature of NHATS. Returning to NHATS respondents might be too burdensome and thus negatively impact participation in future rounds of the longitudinal survey.

Evaluating contact information goes beyond merely checking for accurate telephone numbers and addresses. Eligibility must also be reviewed. During the NHATS survey, interviewers collected information about the relationship of the caregiver to the NHATS respondent. Interviewers commented on the caregivers' helping activities. This information was valuable during the review phase for determining issues of suspect eligibility. Having a clearly defined survey B respondent and enforcing standard

eligibility rules are vital to producing high quality linked data. Clearly defining respondent eligibility for NHHAS helped assure that home health aides' responses to questions about agency supervision, policies, and characteristics would reflect the sampled agencies in NHHCS (Squillace et al., 2007).

Response rates can also be impacted by survey mode. For instance, in face-to-face surveys interviewers have more control over the process, but the respondent controls self-administered surveys. Interviewers in face-to-face surveys have more ability to persuade respondents to participate and to provide additional information, explanation, and motivation (de Leeuw, 2005). Difficulty reaching respondents might also be a mode issue. For example, it might be more difficult to obtain contact information needed for a mail or telephone survey for some respondents compared to a different mode.

A unique operations issue might also occur in piggyback surveys when the same respondent is in both surveys. The NHATS survey, for example, allowed the use of proxy respondents. Sometimes caregivers of the NHATS respondent were the NHATS proxy. As a caregiver they were also eligible for NSOC. The respondent might, therefore, enter the NSOC survey with preconceived expectations about length—thinking NSOC might be also require two hours of time. These expectations might affect whether or not the respondent agrees to participate in NSOC because of perceived burden or the proxy's feeling that giving two hours of time to NHATS is enough.

A related mode issue that can affect the quality of linked piggyback survey data is the difference between in-person interviewers and telephone interviewers. A "cultural effect" of the different types of interviewers could impact the degree of standardization. For example, telephone interviewers might be more apt to follow standardized interviewing procedures with the NSOC interview compared to in-person interviewers with NHATS. TRC interviewers can be closely monitored for quality in asking questions. In-person interviewers are observed much more rarely, although technology such as computer audio-recorded interviewing (CARI) can be used to assess measurement error related to interviewers and instruments (Hicks et al., 2010).

Other data collection considerations are the effects of time that elapses between fielding survey A and B. For example, nursing assistants no longer employed by the nursing homes in the National Nursing Home Survey (NNHS) were unable to respond to the follow-up piggyback survey, the NNAS (Squillace et al., 2007). A similar issue occurred with the NNHAS (Bercovitz et al., 2010). Other time-lapse effects can occur too. O'Shea, Bryson, and Jowell (2002), writing about the ISSP, note that, "even within a four-month fieldwork period…major events can influence or shape attitudes" (p. 11). Political, economic, and social events might affect the data collected. For the ISSP, piggybacking onto surveys in different countries, sometimes at different times, impacts the comparability of the data collected. Similar issues might occur with piggyback surveys in other contexts. For instance, increased or decreased care needs because of changes in health (e.g., having surgery) or moving in to or out of a residential care facility, and death of the NHATS respondent could all affect NSOC caregivers' responses relative to NHATS respondents' answers collected previously. Season could also affect the amount of care provided: winter might require more help with driving and tasks such as shopping. Many questions common to NHATS and NSOC also reference "in the last month", which means the surveys should be fielded close together to have a similar reference period. This affects the quality of the data's connectedness and the value of survey B for augmenting survey A data. Thus, to reduce time-lapse effects, the NSOC

survey was fielded as closely as possible after the completed NHATS interview. The goal was to complete NSOC interviews within two weeks of the NHATS interview. However, this degree of integration requires tight coordination, which can be especially difficult to achieve across different modes, data collection settings, or survey organizations.

## 4. Best Practices

Lessons learned from piggyback surveys are a step toward best practices for their design and implementation:

**Overlap the design of survey A and B.** Common questions on both surveys might have to be adapted for different modes or other reasons like respondent characteristics and context.

**Clearly define survey B eligibility** in order to identify respondents during survey A and to address suspect eligibility during data collection.

**Tailor advance materials specific to the piggyback design.** Highlighting the connectedness of the surveys informs both survey A and B respondents about the surveys. Making a connection to survey A might also increase legitimacy and help induce response to survey B (Squillace et al., 2007). Using incentives for both surveys is also recommended.

**Consider mode issues** when designing piggyback surveys. Mode influences question wording and the responses obtained. This means mode must especially be taken into account when the same questions are asked on piggyback surveys that use different modes. Further, questions designed for one mode might have to be adapted for surveys in a different mode. Mode of piggyback surveys might also influence disavowals and refusals.

**Provide holistic training** of both survey A and B to all interviewers. The interviewer training should encompass eligibility rules, processes, confidentiality issues, and objectives of both surveys. Such training helps ensure the correct survey B respondents are identified in survey A. Additionally, it helps connect the two surveys and means interviewers can answer respondent inquiries about both surveys to secure cooperation.

During survey B data collection, **review contact information and eligibility**. Collect enough information in survey A when identifying survey B respondents (e.g., interviewer comments) to help resolve cases of suspect survey B eligibility. Also, develop a contact information tracing protocol. Accurate contact information—specifically contact information required for the survey mode—is important because even respondents who lack contact information are included in the sample. This will affect response rates because they are in the sample but cannot be contacted. Furthermore, design the tracing protocol consistent with overall survey objectives. Going back to survey A respondents is sometimes useful for obtaining better contact information for difficult-to-reach respondents. However, the increase contact and burden for survey A respondents could negatively affect response in future waves of longitudinal studies. Other tracing methods might be more appropriate in some instances.

**Provide survey B information to survey A respondents** and clearly elucidate survey B eligibility to help accurately identify survey B's sample. Confirming eligibility of survey B respondents during fielding of survey B is important for data quality. This allows for indentifying and removing ineligible and duplicate respondents from the sample.

**Recognize the possibility of disavowals** when fielding survey B. Respondents might deny being eligible for the survey even though they were identified during survey A. Mode can contribute to this if survey B's mode does not provide opportunities to build rapport, effectively inform the respondent about the surveys, and motivate response. Moreover, simply breaking off the interview might be easier because of survey B's mode (e.g., telephone instead of face-to-face).

**Consider effects of time** that elapses between fielding surveys A and B. Issues of nonresponse and disavowals are possible. Other effects on data quality could also occur. Care should be taken to identify possible time-lapse effects and plan data collection times for optimal data quality.

## 5. Conclusion

Household and establishment surveys are likely to continue using piggyback designs because of the design's unique advantages. More research, however, is needed to better understand how to design and field such surveys. Lessons learned from piggyback surveys like NSOC indicate areas of consideration for design, interviewer training, and data collection operations. Experience with piggyback surveys also reveals other issues to consider, such as mode effects. More research is needed to expand the methodological literature on piggyback surveys beyond merely discussing it as a method for deriving a sample from another survey. Topics such as coverage issues, mode effects, measurement errors, and other possible inter-survey errors should be explored.

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