

***Evaluation Tool*—Sample Representativeness and Nonresponse Bias: Frequently Asked Questions**

Preventionists rely heavily on high-quality surveys to inform their efforts, but the degree to which survey data accurately reflect the population of interest can be affected by many factors, including how survey questions are worded, how well the survey is structured, the mode of survey administration, the sensitivity of the survey topics, and the conditions under which the survey is conducted. Factors such as these should be taken into account in order to reduce the chance of measurement error and maximize the validity¹ and reliability² of the survey instrument.

The focus of this tool is on two factors that affect the accuracy and quality of survey data: the *representativeness* of the sample selected from the population, and the *response rate*, that is, the proportion of the selected sample that participates in the survey. While both of these factors have been receiving increased attention among federal grant programs in recent years, they also present many real-world challenges that, despite the best efforts of prevention scientists from many disciplines, continue to pose challenges to obtaining high-quality survey data.

SAMPLE REPRESENTATIVENESS: FREQUENTLY ASKED QUESTIONS

Why select a sample?

Often, it is more practical or efficient to collect data from a sample or subset of the population of interest than to collect data from the entire population (i.e., a census). This is due to the expense of measuring all population members (often referred to as “units”) and because measuring all members of a given population is usually not feasible. While the point of using a sample is to be able to make inferences about the larger population from which the sample is drawn, the increased chance of error that sampling may introduce can lead to mistaken conclusions.

Before going further, it is helpful to understand a little more about the concept of error in survey research. Even when it is possible to survey everyone in a population, it can be challenging to get results that perfectly reflect the views, feelings, or thoughts of that population. The degree of

¹ *Validity*: A valid survey should measure what it is intended to measure and have survey items that are appropriate for assessing the underlying concept.

² *Reliability*: A reliable survey consistently measures what it is intended to measure over time. For example, if a person takes the survey more than once, they should score the same each time.

imperfection that occurs even in cases when everyone is surveyed is referred to as *measurement error*, and it can occur for some of the reasons listed above, such as how questions are worded.

Using a sample introduces another kind of error that is referred to as *sampling error*.³ This type of error occurs because even the best methods of selecting a sample do not ensure that the sample will be the same in all ways as the population from which it was drawn. For example, if using the internet for recruitment, the sample that ultimately participates in the survey may overrepresent those in the entire population who have easy access to computers, smart phones, or high-speed internet services. While we can minimize sampling error by increasing sample size, it is also generally understood that sampling error cannot be eliminated, and that some degree is generally always present.⁴ Ultimately, the cost and efficiency advantages of using a sample outweigh the error it introduces *as long as steps are taken to ensure the sample is “representative” of its population.*

What is a representative sample?

An ideal *representative sample* is one that is similar to the population from which it is drawn in every conceivable way, especially in characteristics that are pertinent to the study (e.g., sociodemographics, attitudes, and behaviors). However, it is unrealistic (and perhaps impossible) to account for *every* characteristic. Even very large samples can be different from the population in important ways, and the degree to which they differ can increase the likelihood of drawing mistaken conclusions. Getting a good sample, therefore, is about more than trying to get *enough* units—it is about trying to get the *right* units. For a sample to be representative, every member of the population must be represented by that sample. For example, if the population includes all young people ranging in age from 16 to 30 in a Midwestern city, the sample should not only include all of those same ages from all areas of that city, but it should also represent the population in all other relevant ways, such as income and education level, race and ethnicity, gender, substance use patterns, religion, access to social media, and any number of other traits.

How do I select a representative sample?

Conceptually, there are two ways of selecting samples: using probability methods and using non-probability methods.

- Probability methods use *random selection* (often enhanced by other statistical methods) to ensure that samples are representative of the populations from which they are drawn. In this process, each sampled unit has an equal non-zero chance of selection. This helps to ensure that the characteristics of the population appear with a similar frequency in the sample.
- Non-probability methods do not use random selection—and it is therefore not possible to make assumptions about their sample representativeness, even if they use statistical methods to approximate a probability sample. For this reason, the remainder of this

³ These two error types, measurement error and sampling error, are described further in Table 1.

⁴ Survey results are typically shown using “confidence intervals” to indicate how much sampling error is assumed to be present.

discussion of representative samples will refer to the probabilistic process of using random selection.

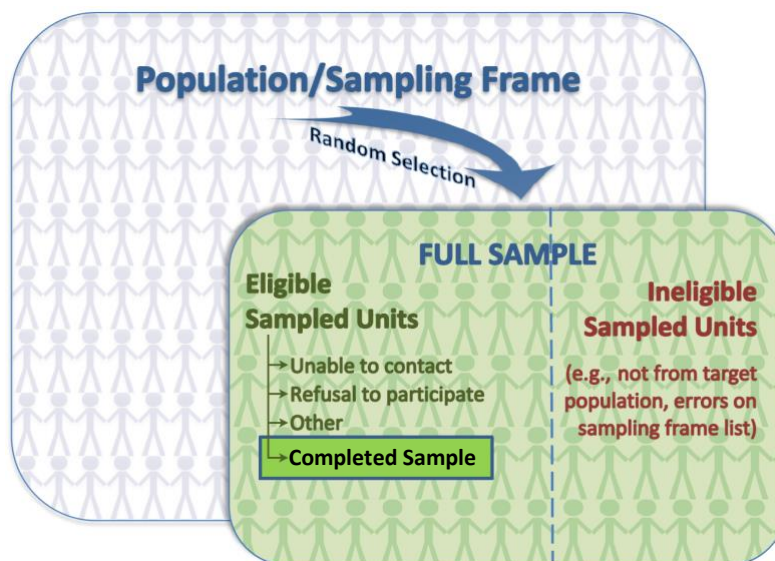
What is a sampling frame?

A *sampling frame* is the list from which we select the sample members of the population of interest. The list may be in the form of addresses, telephone numbers, or individual persons' names. Ideally, the list and the population of interest would have a one-to-one correlation (i.e., exact overlap) with all individuals on the list meeting eligibility criteria for participating in the study. However, it is rarely the case that the sampling frame successfully includes all members of the population of interest—in fact, it may include individuals who are outside of the desired population. This problem usually occurs because of flaws in the sampling frame (e.g., duplicate phone numbers, people who recently moved away from the area defined by the population, or simply inaccurate records). See the discussion of “Coverage Error” on page 4 for more on this topic.

Those individuals who are selected by the sampling process constitute what may be called the *full sample*. Within that full sample, however, there may be *ineligible sampled units*, that is, individuals who do not meet certain eligibility requirements—these units need to be removed from consideration, leaving only *eligible sampled units*. Eligibility criteria should be defined early so that ineligible members can be removed as they are identified (for example, during a screening process). These ineligible units may be replaced with new eligible units that are randomly selected, especially if there are a lot of ineligible units or it is a small sample. Even among those considered eligible, some are likely to be unreachable, while others may refuse to participate. Those eligible units who do participate are considered the respondents, or what may be called the *completed sample*.

It is important to note that in some contexts the term “sample” may refer to the full sample, and, in others, it may refer to the completed sample. Care should be taken to avoid misunderstanding. Figure 1, below, illustrates the components of a sample obtained by random selection.

Figure 1. Obtaining a sample by random selection.



How does drawing a representative sample reduce survey bias?

While increasing sample size can help reduce the *sampling error*, improving representativeness of the sample can help reduce *bias*. Bias refers to errors that are due to systematic threats or inaccuracies in the sampling frame, such as systematically omitting a segment of the population because members live farther from the survey location. Reducing survey bias is important, as bias can affect both the reliability and validity of the survey.

Ways of dealing with bias and sampling error differ. While there are statistical approaches that can be used to correct, or try to account for sampling error, correcting for bias is a more challenging task. While increasing sample size can reduce sampling error, it will have no effect on reducing bias as long as the source of the bias (e.g., omitting those who live farther away) is not addressed.

Random selection, which can be thought of as equivalent to selecting units through a lottery process, helps reduce bias by removing systematic biases from the process of selecting the sample. This lottery-like process means that all of the characteristics of the members of the population, such as the distance they live from the survey location, are equally likely to be represented in the sample as they are in the population. Due to random chance, of course, it is possible that people who live far away will be underrepresented in the sample, but it is also possible that people who live very close will be underrepresented.⁵

Poor implementation of randomization. While the process of random selection may seem fairly straightforward, there are many ways it can be implemented incorrectly, and such failures can undermine all efforts to prevent coverage errors (see below). For example, an agency that selects a sample of 100 people from their sampling frame of 1,000 could later decide to add 100 more to the sample. Unable to find the list they used the first time, their second frame might consist of a much shorter list, resulting in people on that second list being far more likely to be selected. For reasons such as this, it is important to have someone knowledgeable in statistical sampling methods involved with random selection.

What are common challenges to drawing a representative sample?

We have already discussed measurement error and sampling error. However, there are two additional types of error that are potentially much more fraught with bias. These two types are *coverage error* and *nonresponse error* (see Table 1 for how bias pertains to all four error types).

Coverage error. Coverage error occurs when there is a mismatch between the sampling frame and the target population such that the pool of participants from which you are selecting does not represent the population of interest. For example, an existing roster of high school students may still include students who recently dropped out and may not include students who recently moved to the area. Coverage error typically happens before the random selection process occurs and contributes to the inclusion of ineligible participants in the full sample—as well as the potential omission of

⁵ Under many sampling schemes there is a process of stratification. Using this process, survey researchers divide the sample frame into groups, applying the sampling approach to each group separately to ensure they are not omitted due to random chance. For example, stratifying by urban or rural ensures that members are randomly selected from both groups.

eligible ones. Coverage error threatens representativeness because it affects the chance that each person in the population of interest has of being randomly selected and thus increases the chance that the eligible sampled units will differ from the population of interest.

There are two types of coverage error: *under-coverage* and *over-coverage*.

- *Under-coverage* occurs when the sampling frame excludes members of the target population. For example, under-coverage can occur in in-person surveys when the list of addresses used in the sampling frame does not include hidden dwelling units, such as sub-leased basements. For telephone surveys, under-coverage can occur if the sampling frame only includes landline telephone numbers, which would then exclude households that do not have a telephone or that only have cellular telephone service. Members of the population of interest are thereby systematically excluded, which introduces bias.
- *Over-coverage* occurs when members outside the target population are included in the sampling frame, such as when a public housing development is used to define the population, but the frame includes people who receive services in the development but live outside its boundaries. Over-coverage also occurs in situations where there are duplicate records—that is, where the same sample member is present two or more times in the sample frame.

Coverage errors are especially problematic if the reason for the coverage error is related to the survey topic. For example, if the intent of the survey is to measure the proportion of U.S. adults who drive a motor vehicle, but the frame only includes people who own their own personal vehicle, then the survey will almost surely underestimate the percentage of adults who drive. For instance, there may be adults who drive but share a car or do not have access to a personal vehicle.

While it may not be possible to eliminate coverage error, researchers should take great care in minimizing its biasing effect through careful consideration of sample frames, that is, the characteristics and parameters that are used to identify the target population of interest.

Nonresponse error. Response rates will be discussed in further detail starting on page 8, but it is helpful to consider nonresponse error in the discussion of error types. While it is *possible* for nonresponse to have no effect on bias (this can happen when nonrespondents are no different from respondents in any ways that are related to their survey responses), it is rarely, if ever, safe to assume that it has no effect. There are two forms of nonresponse: *unit nonresponse* and *item nonresponse*.

Unit nonresponse occurs when no measures are collected for a sample “unit” or person (i.e., a sample member does not complete any part of a survey). *Item nonresponse* is where a response is not collected, or in many cases not provided, for a specific survey measure (i.e., a survey question). Both forms of nonresponse can be detrimental, but unit nonresponse is generally more serious, as it results in no measures being collected from a sample unit. Unit nonresponse can have several consequences for survey administrators:

- The most serious consequence, similar to coverage error, is the bias that unit nonresponse can produce if the lack of participation is correlated with the survey measure. For example, a group conducting a survey measuring substance misuse in a community might find that people who drink alcohol or misuse drugs are less likely to participate because they do not want to admit to how much they drink or do not want to say that they engage in illegal activity. The survey would therefore underestimate substance use within this population of interest due to the correlation between the behavior being measured and the reason for nonresponse. To reduce unit nonresponse in this example, the researchers could reassure potential respondents that the survey is anonymous or confidential and take active measures to protect their privacy.
- Another consequence of unit nonresponse can be increased administration costs and longer duration of the study period due to increased administrative and field effort. For example, such costs could include increasing interviewer effort to encourage reluctant members of the sample to participate or increasing the size of the full sample to achieve a sufficient completed sample.

Item nonresponse occurs when the sample unit has agreed to participate, but then fails to provide specific information that is needed. This can be due to accidental omission, survey fatigue,⁶ or reluctance to report potentially embarrassing or sensitive information, such as sexual behavior, or illegal activity, such as illegal drug use. Item nonresponse may also reflect perceptions that the information requested is personal and not relevant to the survey (e.g., requests for personally identifying information about children, social security numbers, or income) or that a question is too difficult or confusing to the respondent. Item nonresponse is particularly concerning if many respondents skip the same questions. It can be avoided by careful pilot-testing of questions with members of the population of interest to ensure that most individuals understand the questions and feel comfortable answering them.

Many of the causes of unit nonresponse may also lead to item nonresponse. Additional causes of unit nonresponse include:

- Inability to access the person
- Inability to make contact with the person
- The person's refusal to participate
- The person's health or language impedes her/his ability to participate

It is not only important to determine the cause of nonresponse for a sample unit, but also to track these causes during the survey administration. This will help survey administrators determine what, if any, actions can be implemented to minimize the impact of nonresponse. For example, if respondents complain that the survey takes too long to complete, administrators may want to

⁶ Survey fatigue occurs when a respondent becomes tired of taking surveys or when responding to the survey questions becomes too taxing.

consider substituting long measures with shorter length measures that have the same reliability and validity as the longer measures.

Table 1. Types of Survey Error and their relationship with bias.

Error Type	Description	Traits	Factors that Affect Bias
Sampling Error	The variability inherent in using a fraction of a population to draw conclusions about a whole population.	Easier to estimate or quantify, and is often represented by <i>confidence intervals</i> or <i>margins of error</i> .	When random selection is implemented successfully, sampling error is random rather than systematic, so it is non-biasing.
Measurement Error	Error due to imperfections in the method of obtaining the measure response.	Can involve problems in different areas, including the interviewer, question wording/ordering, mode of data collection, or other external factors.	Bias depends on the degree to which the error affects answers in a particular direction, which can be difficult to discern.
Coverage Error	Error due to mismatch between the sampling frame and the target population.	Can include over-coverage or under-coverage.	When coverage errors are correlated with survey content, it can lead to bias.
Nonresponse Error	Variability due to eligible sampled units not responding to some or all of the survey.	Includes item nonresponse and unit nonresponse.	When the reason for nonresponse is related to what is being measured, it can lead to bias.

How do I know if my sample is representative?

Knowing whether or not your sample is representative requires knowledge about the coverage and quality of your sampling frame. For example, address-based sampling frames may have good coverage of some geographic areas, but may have less coverage in some rural areas. Additionally, any houses or apartments that were built after the frame was updated would not be included. A frame that is fraught with errors of this type will threaten representativeness.

The quality of the sampling frame can also affect its representativeness in other ways. For example, if the target population is first-year female college students, and your sampling frame is a list of email addresses for first-year female students from three rural colleges, your sample would only be representative of the three rural colleges—it would not be representative of all first-year female college students from all geographic varieties. Additionally, the quality of the sample would also be affected if any email addresses are missing, incorrect, or not used (e.g., the sample member uses an alternative email address).

Once you have determined the coverage properties of your sampling frame, it is important to consult with a sampling statistician in order to implement an appropriate selection method to meet the precise goals of the study. As mentioned above, this step requires care because sample representativeness can be threatened by failure to implement sound sampling procedures. After the fact, a sampling statistician may be able to identify the specific nature of the failure and therefore determine the extent of the lack of representativeness; however, it is always better to make every effort to minimize error and bias before the sample is drawn.

NONRESPONSE BIAS: FREQUENTLY ASKED QUESTIONS

What is a survey response rate?

A survey response rate is a measure of the proportion of people, households, or institutions participating in a survey who were originally selected for the survey. In its simplest form, a response rate is the number of sample units completing the survey (completers) divided by the total number of units sampled:

$$\text{Response Rate} = \frac{\# \text{ Completers}}{\# \text{ Total Units Sampled}}$$

However, this definition can quickly get ambiguous because both the “completers” and the “total number of units sampled” can be understood in different ways. Completers are usually defined as those completing the entire survey. However, partially completed cases may also be included in your data analyses if respondents complete measures of critical importance without completing the entire survey—so those cases could be considered completers as well. Also, the calculation of the total number of units sampled may sometimes exclude ineligible sampled units, or those that were selected, but later found to be ineligible due to sampling frame errors or health, language, and cognitive factors.

Given these additional considerations, a more specific definition of response rate is the number of sample units completing the survey (or completing sufficient measures) divided by the number of eligible sampled units.

$$\text{Response Rate} = \frac{\# \text{ Completers (i.e., completed survey or sufficient measures)}}{\# \text{ Total Eligible Units Sampled}}$$

This definition accounts for sampled units that cannot be completed due to factors outside the researcher’s control, but it also requires knowing what proportion of the sampled units that could not

be contacted, or that refused, would have been ineligible. This proportion is rarely known for all sampled units, so it usually either needs to be estimated (see below) or assumed that all nonresponding units are eligible. In many cases, an estimate of eligibility proportions can be based on responding units, on other data sources, or on similar surveys of the same population.

Why are response rates important?

A survey's response rate is generally understood as an important indicator of the quality of the survey results—that a high response rate reflects a high degree of accuracy in the results and is a reflection of the effort and resources invested in the survey. Indeed, if a response rate gets very close to 100% (which is rare in practice), it makes the likelihood of bias due to nonresponse practically negligible. The higher the response rate, the lower the chance that respondents differ from nonrespondents in ways that could influence your findings. In general, higher response rates are preferred as they provide researchers with a more complete picture of the sample (i.e., more data) and *suggest* less bias due to nonresponse.

However, some caution should be exercised in drawing too many conclusions based on response rates alone, as there are many high-quality surveys with low response rates that required a significant investment of resources and may have generated high-quality results. Indeed, surveys with very high response rates (e.g., 90 percent) can have estimates with very large biases, while surveys with very low response rates (e.g., 30 percent) can have no evidence of bias (Groves, 2006).

One reason for added concern about nonresponse bias is that decades of research have confirmed a decrease in response rates over time. In recent years, these declines have accelerated, particularly for telephone surveys (Brick & Williams, 2013; Curtin, Presser, & Singer 2005). The declining trends for survey response should not be taken to mean that lower response rates should be accepted, but rather that survey administrators will be faced with new challenges due to societal changes and technology. To address these challenges, survey administrators will need to judiciously monitor how resources are used, implement procedures for monitoring field work, and plan ahead for dealing with common barriers to response.

How could nonresponse bias my survey and how can bias be estimated?

In order for nonresponse bias to be present, nonresponding sampled units must be different from responding units on the survey measures of interest. Stated another way, the source of nonresponse must be correlated with the survey topics. For example, if smokers were hypothetically less willing to respond to a survey than non-smokers (or vice versa), then there would be a high degree of bias present if the survey was about smoking or other behaviors known to be associated with smoking. On the other hand, the fact that smokers refused to participate might not be a problem at all if the survey was about a different topic in which smokers and non-smokers did not differ at all (e.g., favorite birds).

Determining precisely how a survey's low response rates are affecting the survey's bias can only be done by conducting a nonresponse bias study. In practice, this typically involves comparing respondents with nonrespondents using demographic data, such as gender, age, and race/ethnicity.

One limitation of this approach is that it requires data on nonrespondents, and that data may not be available. Even when data are available, a more significant limitation is that the two groups may still differ in some important way that is not being measured.

How is a response rate calculated?

Response rates are calculated by determining the final response category, or *disposition*, for each sampled unit. Final dispositions can generally be described as a) completers, b) eligible non-responders, c) ineligible, or d) cases of unknown eligibility (i.e., potential respondent does not respond to repeated contact for participation; thus, it is unknown whether that respondent is eligible). These dispositions are then used to calculate a survey response rate.

The industry- and academically-accepted resource for determining and assigning dispositions codes and calculating response rates is the American Association for Public Opinion Research Standard Definitions (AAPOR, 2016). Currently in its ninth edition, the AAPOR's Standard Definitions was originally introduced in 1998 to address the lack of standards and lack of comparability of response rates across surveys. It offers six response rate formulas, based on whether or not partially completed sampled units are included, and different cases addressing known or unknown eligibility of nonresponding sampled units. Survey administrators should follow the definitions and the most appropriate response rate formula provided by this reference when providing response rates for their studies.

What methods are available to improve response rates?

There are a number of steps practitioners and evaluators can take to help maximize response rates. Influencing one or all of these will not guarantee a higher response rate, but will establish that survey administrators have put forth a good-faith effort within budgetary and resource constraints to achieve the highest possible survey response.

Increasing Effort

One of the most effective means of improving response rates is to increase the level of effort directed at making contact with sampled units. These increases in effort should be strategic and planned to increase the likelihood of success. For example, if sampling working adults, it may be more strategic to call potential respondents at night or on the weekend when they are less likely to be working (vs. multiple daytime efforts that are repeatedly unsuccessful). The difficulty with this approach is that it requires extra understanding of the targeted population and a flexible schedule of data collection staff. Another solution would be to add additional hours to data collection or to expend additional resources to try to reach potential survey participants for a response (e.g., sending reminder post cards). However, survey budgets may make it difficult to implement additional efforts to reach potential survey respondents. There is also a point of diminishing returns from these additional contact attempts that may not justify the increase in costs.

To address the increased costs that come with increased effort, survey administrators can balance this effort with effective management of survey contacts. In many cases, survey contact attempts are limited to help control costs. Survey administrators should implement programs that monitor contact

attempts to ensure they are made over a range of times and days of the week to maximize the likelihood of effectiveness, but should also rely on subjective assessments by survey staff to determine which cases should continue to be pursued.

Increases in effort also have the potential to create a *negative feedback loop*, whereby increased attempts to contact a sampled unit leave them feeling bothered or harassed and less likely to respond. Studies have found that longer intervals between contacts can improve propensity to respond (Mayfield, Amaya, & Carris, 2013). It is therefore important for survey administrators to carefully plan the amount and frequency of additional contacts.

Providing Incentives

Incentives are another effective means of improving response. Substantial research demonstrates that monetary incentives (cash) yield better response rates than non-monetary incentives, and that up-front incentives are associated with better response rates than promised incentives (Singer, Groves, & Corning, 1999). Further increasing amounts of incentives can be more effective, but the return on this increase diminishes quickly. For example, Mercer and colleagues (2015) found in their meta-analyses that the largest gains to response rate occurred when increasing the incentive by only 1 dollar. When the incentive was increased by 2 dollars the gains due to incentive increase to the response rate tapered off considerably (Mercer, Caporaso, Cantor, & Townsend, 2015). When cash is not an option for practical or other reasons, other incentives such as gift cards, entries in prize drawings, special privileges (e.g., free passes from homework for classroom surveys), or small prizes may also have some impact. The incentive offered should feel appropriate relative to what is being asked of the respondent.

There are several theories explaining the increased effectiveness of prepaid over promised incentives. One feature of prepaid incentives is that they are immediately realized, whereas for promised incentives, the respondent must believe or have faith that they will receive the incentive after they participate. While prepaid incentives are costly because they are sent to everyone who is sampled, the initial cost investment can pay off because it may result in the need for fewer follow-up contacts, saving the time and effort of field staff. The advantage of promised incentives, on the other hand, is that larger amounts can be offered, since they are given only to participants who respond. Also, researchers can be certain the incentive was received and not accidentally discarded (e.g., thrown away in unopened mail). Promised incentives may also work better for some modes of administration than others. For example, for in-person surveys, the interviewers themselves can be a legitimizing factor for promised incentives, compared to telephone or mail data collection modes, and therefore pre-paid incentives may not be as necessary to increase response rates.

There are also other important considerations when incorporating incentives into survey efforts. Studies that require federal approval through the Office of Management and Budget (OMB) will require that any incentive be offered to all groups, and not to specific demographic or socio-economic groups. Internal Review Boards will also require (as well as OMB) that the incentive amount not be so high as to potentially be coercive.

Incentives are a simple and effective tool for improving response. It is important for survey administrators to carefully assess how to include incentives in a way that maximizes their impact while minimizing costs. For example, a low-cost, prepaid incentive may be best for screening surveys identifying eligible household members, while larger, promised incentives may be better for surveys that incur a high burden on respondents (e.g., lengthier survey instruments) or only apply to small or rare population groups that may be less likely to respond.

Creating a Favorable Survey Climate

People are more likely to participate in a survey when they feel that the topic is important and that the survey results will benefit them individually, or will benefit society more generally. Yet researchers often implement surveys without taking any steps to educate the community about the benefits these surveys may generate. Usually, a limited amount of information about the survey is provided to potential participants after they agree to participate, or while they are considering whether or not to participate. The problem with this approach is that it does nothing to address those who refuse to participate before they hear anything about the survey and its purpose.

Some researchers have found it worthwhile to promote the survey in the community in advance, in order to create a culture of support for it. For example, researchers conducting a school-based survey could take a number of steps to inform the public, including: sending letters home to parents weeks in advance of the survey, working with the local newspaper to generate an article about the benefits of the survey, appearing on a local radio station to discuss the survey, posting short notices in school publications, holding a short workshop for teachers, and advertising on a billboard in the community near the school. It may also be helpful to make the survey materials appealing by, for example, personalizing all mailings or using recognizable logos. These efforts may help get community buy-in and support; however, be sure not to reveal so much information that it might influence how respondents would answer survey items.

Preparing the Interviewer

In the case of face-to-face or phone surveys, the field interviewer is the face (or voice) of the survey. They represent the survey organization, the sponsor, as well as the goals of the survey. Interviewers should be professional in their appearance and representative of both the survey organization and the sponsor. However, it is important for interviewers to also present themselves in ways that are appropriate to their environments. For example, a well-dressed interviewer may be viewed with suspicion in neighborhoods with low socio-economic status. It may help if the interviewer is a member of the target population and familiar with their customs and culture.

In their seminal work, Groves and Couper (1998) outline a number of influences and theories on survey participation, including two approaches commonly used by successful interviewers. The first is tailoring, in which the interviewer tailors their approach based on cues provided by the respondent. Interviewers can do this by listening to reactions or statements made by the respondent and adapting their approach or response appropriately. For example, if a potential respondent seems particularly anxious and shows physical signs of nervousness (e.g., fidgeting, not making eye contact), the interviewer may take the visual cue and approach them slowly, talk with them one-on-

one, and provide intentional opportunities for the respondent to ask questions to help dispel some of their anxiety. Another common approach that interviewers use is maintaining a causal conversation with the respondent at first, rather than immediately pursuing approval to begin the survey. This approach may help build rapport with the respondent so that they are less likely to decline the survey request.

Interviewers gain important skills as their experience increases, and many may use approaches like those described above without even realizing it. Survey administrators can leverage interviewer experience by having more successful or experienced interviewers share their experiences and techniques with new interviewers or with interviewers who appear to be having more difficulty. It may also be helpful for new interviewers to receive formal training that provides opportunities to role-play interactions with potential respondents and receive feedback from other, more experienced interviewers on how to improve their approach. However, implementing these types of trainings and techniques not only requires experience and skill, but also time. Therefore, it is important to be cognizant of interviewer workload.

Other Factors

There are a number of other factors, listed below, that may also affect response rates. Some of these have inadequate research support but are still considered good survey practice. Others may be outside of your control, but it can still be helpful to be aware of them.

- **Quality of the sampling frame (in terms of population coverage).** For example, if you are conducting a web-based survey of college undergraduates, then you might use college email directories as your sampling frame. However, in order to avoid coverage error, you should be aware of factors such as whether the college email directories distinguish between graduate and undergraduate students, include only the addresses that had been assigned by the college, include email addresses that students say they use most frequently, or only include students who gave explicit permission to be included.
- **Time between frame creation and contact with respondents.** For example, if you wait too long from the time you created the sampling frame to the time you actually contact potential respondents, then some respondents may no longer be eligible to be part of your original frame or may have become unreachable. Alternatively, new people may have become part of your population, but not part of your frame.
- **Method of data collection.** For example, Web-based surveys typically have lower response rates than in-person interviews.
- **Time of year.** For example, if you are surveying students, it might be helpful to avoid holidays, testing days, and summer breaks, when students are less likely to participate.
- **Length of collection period.** Your response rate is likely to be greater if you are able to extend data collection over several weeks versus several days. However, extending a collection period too much can result in small additional yields and can even lead to the loss of some respondents who would have been more likely to respond if given a sense of

urgency. In addition, a long collection period can affect your data if you expect that respondents' behavior might change over time (e.g., increase in initiation of substance use among high school students).

- **Response load imposed by a survey (e.g., length, difficulty, or sensitivity of subject matter, frequency of survey participation), as well as total load across all collections (total burden on the respondent).** For example, participants may be more likely to start a survey if they know that it will take 30 minutes, rather than one hour, to complete, or if the topic is one that they care about. They might also be more willing to participate in a one-time survey versus one that requires repeating the survey various times over a pre-determined time period.
- **Questionnaire design and layout.** Participant-friendly surveys characterized by easy-to-follow instructions, clear and simple language, and shading and grids may encourage completion. Online survey services offer numerous suggestions for increasing response by changing even simple design elements like the number of questions asked before a respondent can move on to a new page.
- **Follow-up (i.e., methodology and targeting).** For example, sending a replacement questionnaire to participants who have not responded (i.e., targeting them) may help increase response rates. It may also be helpful to send reminders, like an attractive postcard, in order to keep the need to complete the survey in the respondent's memory.
- **Prior respondent experience with the survey and the agency delivering it.** For example, respondents who have participated in previous survey waves may be more committed to participating in subsequent waves. Agencies that have established credibility and trust in the community are likely to have better response rates, all else being equal.
- **Legal obligations (for respondents and the agency implementing the survey).** Response rates will be greater for surveys that are required. For example, the U.S. Census Bureau survey, which Americans are required to answer by law, typically has response rates greater than 90%.⁷ In addition, agencies may be more driven to recruit respondents when they are required to document information about their clients to funders.
- **Ensuring that information will be protected.** Assuring potential participants that you have procedures in place to protect their confidentiality and anonymity may help improve response rates. For example, do not ask respondents to write their name on the actual paper survey; instead, create a numeric or other systematic way to connect respondents with their survey that removes personal identifiers. It may also be helpful to have envelopes in which respondents can place surveys and personally seal them.

⁷ Source: <https://www.census.gov/acs/www/methodology/sample-size-and-data-quality/response-rates/>

- **Budget.** Recruitment and survey contacts are relatively labor-intensive processes. If limited dollars have been dedicated to these tasks, it could poorly affect the response rate.
- **Language.** For example, if your sample includes a large portion of respondents whose primary language is Spanish, then offering respondents the option to complete the survey in Spanish and having Spanish-speaking staff conduct follow-up will likely increase response rates.
- **Cultural background of respondents.** For example, persons with “individualist” orientations are less likely, and persons with “collectivist” orientations are more likely, to participate in surveys (Johnson, O’Rourke, Burris, & Owens, 2001). Some cultures value and practice collectivism more than others. For example, diverse peoples from Asia, Central America, South America, and Africa tend to be more collectivistic than North Americans. Also, people from cultures that have been exploited or otherwise mistreated by agencies in authority are less likely to be trusting of an agency survey.

CONCLUSION

In summary, selecting a representative sample of the population and ensuring that a substantial proportion of the selected sample participates in the survey help to ensure the accuracy of the data collected and the ability of practitioners and researchers to draw appropriate conclusions based on that data. The questions and answers supplied above highlight the variety of methods available to improve data collection and evaluation efforts. Major takeaways include the following:

- It is often more practical or efficient to measure a sample of the population of interest rather than to collect data from the entire population.
- An ideal sample is representative; that is, similar to the target population in every conceivable way.
- Using a sample introduces potential for error—for example, sampling error, coverage error, and nonresponse error. Reducing coverage error or nonresponse error increases the representativeness of the sample.
- While increasing sample size can reduce sampling error, it will not necessarily increase representativeness or reduce systematic error called “bias.”
- There are generally two ways of selecting samples: using probability methods and using non-probability methods. Probability methods are generally preferable because, when executed well, it’s possible to draw conclusions about their level of representativeness. With non-probability methods such conclusions are not possible.
- Reducing coverage error requires the use of high-quality sampling frames and rigorous sampling methods.
- Reducing nonresponse error requires working to ensure nonresponders and responders are not different from each other on factors related to what you are studying.

- Higher response rates provide researchers with a more complete picture of the sample (more data) and *suggest* less bias due to nonresponse.
- Lower response rates do not necessarily indicate bias, and vice versa: Surveys with very high response rates can have estimates with very large biases, while surveys with very low response rates can have no evidence of bias.
- In order for bias to be present, nonresponding sampled units must be different from responding units, particularly on the survey measures of interest.
- It is not only important to determine the cause of nonresponse for a sample unit, but also to track these causes during the survey administration.
- The industry- and academically-accepted resource for calculating response rates is the American Association for Public Opinion Research (AAPOR) Standard Definitions (AAPOR, 2015).
- There are a number of steps practitioners and evaluators can take to help maximize response rates, such as increasing effort, providing incentives, creating a favorable survey climate, and preparing data collectors.

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