CHAPTER

12 Responding to Societal Change and Preparing for What Lies Ahead

Throughout this book, we have proposed an approach for conducting sample surveys that responds to the current cultural and communication environment and addresses many of the challenges faced by those conducting surveys today. The central features of this approach are summarized in these eight conclusions:

1. *The quality of sample survey results* depends upon the joint contributions of the surveyor and respondents to reducing coverage, sampling, measurement, and nonresponse error.
2. *Using tailored designs* that are customized to the survey population, topic, burden, and contact possibilities, as well as the budget and length of time available for conducting the study, will be more effective than attempting to use the same data collection procedures for all situations.
3. *Social exchange*, with its emphasis on improving trust in the legitimacy and purpose of the survey and improving the ratio of benefits to costs for respondents, provides an effective framework for improving response rates and quality.
4. *A holistic approach to design* that coordinates the multiple ways in which information is communicated to people throughout the implementation process, from the contact materials to the survey questionnaire itself (including visual design), is necessary to improve response rates and quality.
5. *Using different modes of contact* increases the likelihood that the selected sample members will receive survey communications and attend to them.
6. *Successful mixed-mode surveys* depend greatly upon how the mode of contact and mode of response are coordinated and applied.
7. *Unified mode construction* of survey questions improves data quality in mixed-mode surveys by structuring questions similarly across survey modes and attempting to overcome differences in how people process visual and aural modes of communication.
8. *Single-mode surveys are adequate* for certain studies, but many others require multiple modes. Methods for designing and implementing single-mode surveys are essential in understanding how these modes can be used in mixed-mode designs.

We believe these eight conclusions, and the practical guidance we have provided throughout this book for achieving them, will help surveyors deal with the immense challenges they currently face, such as encountering increasing demand

for more sophisticated survey data in the face of a reluctant public and constraining budgets. These challenges are closely tied to our current culture and recent technological developments. But meeting these challenges will not be simple. We also recognize that culture and the technology that is relevant to surveys are constantly changing. Cultural and technological shifts occurring in the 1970s were reflected in the first edition of this book published in 1978, and these shifts have continued to occur into the present. As a result, much of the content of this book has changed with each new edition as we have attempted to help surveyors deal with and, in some cases, take advantage of these changes. The same is true in this edition.

The constant churning of ideas and constraints impacting the conduct of surveys that has characterized the past 40 years shows little or no sign of stabilizing (Stern, Bilgen, & Dillman, in press). Despite this cultural and technological churn a couple of things have remained consistent across all editions of this book, including this one. One of these is the application of social exchange theory to the conduct of surveys. While the exact costs, benefits, and trust-inducing factors have changed somewhat with the times, the key premises and the framework this theory gives us for thinking through how to conduct surveys and for making informed strategic decisions has remained across all editions because it continues to be useful. The future may make some things more important than others in the costs, benefits, and trust balance, but we anticipate that careful consideration of these key elements in a culturally informed way will help surveyors make their data collections successful. In particular, with continued electronic data exchange and communication, we expect trust to continue to be of primary importance to convincing sample members to cooperate with survey requests and to provide accurate information.

Another element that has been consistent in this book since the 2000 edition is the importance of tailoring. It is tailored design that allows one to leverage costs, benefits, and trust-inducing factors within their cultural context to modify approaches for different survey populations, topics, and goals to make surveys more successful. This, we expect, will continue to be true well into the future.

We have talked mostly in this book about a very standard type of survey—one-time-only cross-sectional surveys primarily of individuals and households—and we have given many practical guidelines for how to make this type of survey successful. One of the key changes in the survey field that we have emphasized in this current edition is the increasing need for mixed-mode designs that give surveyors new ways of building trust, increasing benefits, and reducing the barriers to response. In order to deal with this well, we brought the telephone mode back into this edition. Aside from a few mentions here and there, it had not been discussed in this book since the 1978 edition, but we felt it was necessary to bring it back in now because it is commonly used for certain types of surveys and is important in mixed-mode survey designs.

The full integration of mixed modes, including bringing the telephone back in, meant that other topics we have devoted significant space to in previous editions had to be left out of this edition. This includes panels and longitudinal surveys, business surveys, diaries, and customer satisfaction surveys. We briefly discuss each of these and a few newer topics here in this final chapter because they represent creative ways researchers are trying to deal with some of the current challenges of collecting data, including through the increasing use of mixed-mode survey designs. Substantial resources are being invested in evaluating the potential for these methods to meet many of society's survey needs. In addition, we firmly believe that the

principles discussed in this book can and should be used to improve these types of efforts.

Because we cannot give each of these the full attention they deserve in the allotted space, we will point the reader to more thorough treatments of them where possible. We are fortunate that some very good references about several of these topics have become available since the last edition of this book was published, and we hope our readers will be able to benefit from these resources as well.

During the writing process, it was apparent that many of the strategies traditionally used to conduct sample survey data collection are viewed quite differently by surveyors and sample members. One of the underlying ideas that motivated much of the guidance we have provided in this book is that surveyors need to take a more respondent-centered approach to designing their survey data collection efforts than they have in the past. We end this chapter and the book with more discussion of this key point.

PANELS AND LONGITUDINAL SURVEYS

Panel surveys continue to play an important role in surveying today. As the costs of recruiting people to participate in surveys continue to rise, surveyors are increasingly turning to survey designs where people are asked to participate in multiple surveys, typically on different topics, over time, rather than just to complete a single survey.

One of the key areas of growth is panel surveys in which the Internet is the primary mode of survey response. Internet panels have become especially attractive in countries where there is high penetration of reliable Internet connections, although it appears there are differences across countries in how such panels can be used. Many Internet panels recruit members through nonprobability sampling methodologies (discussed in more detail in the next section) but a substantial number also recruit members through probability sampling methods. Many also utilize multiple modes for recruitment. Although recruitment of sample members and the building and maintenance of panels represents a considerable expense, the ultimate goal is to take advantage of the low costs of contacting people by e-mail to respond to web surveys on a regular basis.

The LISS (Longitudinal Internet Studies for the Social Sciences) panel created in the Netherlands in 2007 is one of the best-known examples. The LISS panel is made up of a probability sample of Dutch households drawn from the population register by Statistics Netherlands, the nation's primary statistical agency. About 90% of Dutch households have Internet access, currently the highest of any European country (Mohorko, de Leeuw, & Hox, 2013). For those LISS panel members without Internet access, a computer and Internet connection are provided (Das, Ester, & Kaczmirek, 2010). The 5,000 panel members are asked to complete online questionnaires about once a month, and are paid a modest amount for each completed questionnaire. Attempts to develop similar panels in other countries with high Internet penetration are being considered or are now underway.

In the United States, probability-selected Internet-only household panels have also existed for some time. An example is the GfK KnowledgePanel. When the 2009 addition of this book was published, recruitment for this panel was conducted predominately by telephone using RDD sampling methodologies. Since then, the recruitment has shifted to mail and telephone using a sample

from an address-based sampling frame. This mixed-mode design was chosen to overcome some of the coverage and response rate limitations associated with telephone-only RDD surveys (GfK-Knowledge Networks, n.d.).

Similar to the LISS Panel, the KnowledgePanel also provides a computer and Internet access to recruited panelists who do not already have them. An alternative favored by some organizations is to offer those who are unable or unwilling to respond over the Internet another mode of response, such as paper or telephone, so that they can still participate in the panel. This is a model that is followed by the Gallup Organization in the United States (Rookey et al., 2008) and is being introduced by the Leibniz Institute for the Social Sciences in Germany (Gesis Panel, n.d.).

In addition to the time and costs savings of having a sample recruited and ready to answer multiple surveys, the substantial effort undertaken to recruit panelists and maintain a relationship with them opens up opportunities for other types of measurement. For example, Nielsen asks panel members to allow them to install meters on their TVs that collect what programs they watch. This viewing information is supplemented with survey information about the household, such as the demographics and interests of the people in the home. Other panels ask people to install programs on their mobile devices that track the use of different apps, their viewing behavior, online purchases, or their location and movements. It is possible to get panel members to cooperate with these types of requests, which might seem invasive in other circumstances, because a trusting relationship has been developed and sustained over time.

Panels seem to work best on a large scale (i.e., a nationally representative panel rather than one that is representative at the state or local level or of a specific population like students or members of an organization) because the costs of establishing and operating them are substantial. In addition, many surveys of both national and more localized areas have very specific population and eligibility requirements that are difficult to justify building an entire panel around. Some surveyors use panels because they can sample specific types of people (e.g., college graduates or middle-aged men), but the ability to target other low-incidence and hard-to-reach populations (e.g., low-income households, households with children of certain ages, people with specific health conditions, same-sex couples, etc.) is limited because in order to do so the panel has to be quite large. In addition, requiring sample selection methods to be somewhat general makes it difficult for many surveyors to accomplish their purpose within the constraints of the panel's normal operations and procedures. It also seems unlikely that many established surveys would be willing to abandon their independent samples in favor of one sample shared by others and controlled by an outside organization that becomes an intermediary surveyor.

Longitudinal surveys, which have been used since the early years of surveying, are another type of panel survey. In longitudinal surveys individuals are surveyed with the same or similar questions periodically over months or years, allowing researchers to track trends and understand the causes and consequences of societal and individual change. Such surveys have become of even greater interest in recent years as the technology for locating previous respondents and conducting follow-up surveys has improved and it has become increasingly evident that many conditions of human existence, from education and health to family formation and wealth accumulation, cannot be well understood without understanding change over time.

Sponsors of longitudinal surveys often find it difficult to maintain the same modes of data collection over time, particularly if their surveys continue over many years or even decades. But switching modes across different measurements presents particular challenges for longitudinal and other panel surveys. This was a major reason we introduced a discussion of mixed-mode designs in the third edition of this book. Introducing a new mode in longitudinal and other panel surveys can affect the ability to accurately measure change because response differences may be a result of the differences in modes used to survey respondents rather than actual change in people's responses (Dillman & Christian, 2005). It is for this reason that for longitudinal and panel surveys that are just beginning, it is important to try to anticipate likely mode changes up front so the questionnaire can be designed to minimize differences when it is administered in a different mode in the future (for more on unified mode design, see Chapter 11).

The complexities involved in designing and conducting longitudinal surveys are substantial. A book edited by Peter Lynn (2009) provides a much-needed overview and discussion of the multiple and complex issues involved. Topics range from designing the original sample and questionnaire construction to locating people for follow-up and the use of incentives and other procedures for gaining and maintaining cooperation. Also discussed are weighting, analysis, and the handling of attrition over time. Conducting longitudinal surveys requires additional design considerations that go beyond those needed for cross-sectional surveys in nearly all stages of development and implementation. It is a rapidly growing specialty area of surveying.

Due to the high costs of recruiting people to participate in surveys, an increasing number of researchers are drawing their study samples from households that have responded to other surveys. For example, the National Survey of College Graduates (NSCG) now uses the list of households that answered the American Community Survey as its sampling frame. The NSCG is itself longitudinal, but the fact that its sample comes from respondents to a previous survey suggests that some carryover from the original survey may occur. Several Pew Research Center studies have also used lists of respondents from previous surveys as a sample source along with other sources, such as new landline and cell phone RDD numbers. In this case, the advantage of using a sample from a previous survey is that it allowed the researchers to rely on responses from the previous surveys to identify people belonging to certain hard-to-reach populations, such as Muslims and Asian Americans, for in-depth surveys of these subpopulations. While these surveys are able to leverage previous surveys to reduce the costs of sampling and ensure certain groups are included in their studies, one weakness of these designs is that any undercoverage or nonresponse that existed in the initial surveys is highly likely to carry over into the new survey. Whether or not these problems manifest in error depends on whether the differences between those who were covered and not covered and between those who responded and did not respond in the first survey are related to the items and characteristics being measured in the new survey.

All of these types of surveys (panels, longitudinal surveys, and drawing sample from respondents to previous surveys) involve repeated questioning of the same individuals over time, often relying on payments to maintain cooperation. A special concern in these types of surveys is conditioning, or how being a previous survey participant affects answers later on (Sturgis, Allum, & Brunton-Smith, 2009). This is an area that is not yet fully researched or understood, especially with respect to attitudes and opinions, which are especially sensitive to

such effects. Further, conditioning effects may be exacerbated as the time between surveys decreases. As such, panel conditioning may be particularly problematic in Internet-only panels where people are surveyed frequently (i.e., monthly, weekly, or even more often). With this high frequency of surveying, there is an increased likelihood that later answers and styles of responding to questions will be affected by earlier experiences. Do people get into a mind-set that encourages them to read questions more superficially and thus miss important details? When responding is viewed simply as an obligation for earning routine payments, does lack of interest in particular questions cause them to straight-line answers or satisfice in other ways? Do early responses on particular topics cause individuals to pay more attention to those topics in their daily lives, resulting in changes in behaviors, changes in answers to future questions on similar topics, or both? In sum, the effects of being surveyed repeatedly, sometimes in short intervals, and other times years or even decades apart, raises questions for which answers are needed if surveyors are to use these methods with confidence.

While they each have their limits and challenges, we expect these types of surveys to continue in the long run because they represent methods of responding to the difficulties being faced by individual survey modes or can answer questions that regular cross-sectional surveys cannot. The use of Internet panels seems particularly likely to increase because of the cost savings opportunities they present, especially as Internet use continues to expand. In the future, we expect to see more surveys drawing their samples from previous surveys for the same reason. Each of these methods introduces complications and challenges that go above and beyond those faced by surveyors conducting cross-sectional surveys with their own sample, and as such, drawing on social exchange theory and using tailored designs may be particularly valuable for these types of surveys.

NONPROBABILITY SAMPLING

The framework for surveying that has guided the writing of this book is probability sampling. That means that everyone in the sampling frame has a known and possible chance of being selected to participate, and a probability method is used to select the actual sample members from the frame. It is this probability sampling basis that allows surveyors to use inferential statistics to estimate the distribution of characteristics of interest in the target population. There is a long history of attempting to use alternatives to probability sampling that seek responses from volunteers or others who are recruited and selected unsystematically. Terms applied to such selection have included convenience sampling, mall or person-on-the-street intercept surveys, or simply volunteer samples.

The distinction between probability and nonprobability sampling has been diminished by the reduced coverage and high nonresponse associated with the use of some survey data collection approaches. The lack of complete coverage for telephone and Internet household samples, combined with low response rates for telephone-only and e-mail/Internet-only surveys raises serious questions with regard to whether these surveys achieve a probability sample of households, or are more akin to volunteer samples.

The problem with samples selected using nonprobability methods is that there is a high likelihood that those who do not volunteer to participate differ in important ways from those who do because no probability mechanism is used

to help ensure that the sample is representative of the target population. Also, response rates are often quite low. Most importantly, surveys that use nonprobability sampling have no scientific or theoretical basis for making meaningful statistical inference from those who were surveyed to the population they are supposed to represent, as described by Baker et al. (2013) in the recent AAPOR Task Force on Non-Probability Sampling report.

However, nonprobability methods are becoming much more sophisticated with regard to who is asked to participate. There is a substantial difference between how nonprobability methods were designed and implemented in decades past and the efforts now being made to construct samples that match the characteristics of participants to known characteristics of populations of interest. Modeling is generally used to identify the characteristics most correlated with response, and statistical adjustments are made to account for different propensities of various types of individuals to be selected and respond to the survey requests. As noted by the AAPOR task force, there is evidence that nonprobability samples have performed well in predicting elections, but their performance is less clear in other domains (Baker et al., 2013). However, it is important to note that nonprobability samples are more accepted in some areas, such as market research, and in some countries, than others.

Much of the interest in developing and using nonprobability samples has been fueled by the low costs of sending e-mails and surveying people via the Internet compared to other methods. Much of the cost is absorbed by setting up procedures for the first few respondents, so that significant economies of scale can be achieved when the decision is made to survey thousands instead of a few hundred. We expect the search for topics and situations where nonprobability surveys work and research applying sophisticated principles of selection and response encouragement that are outside of a strictly probability selection framework will continue.

NEW MOBILE DEVICES AND TECHNOLOGY

Technological changes and their adoption are occurring at an unprecedented rate. The Apple iPad was released in April 2010, more than a year after the third edition of this book was published. Within 3 years more than 170,000,000 iPads had been sold (Panzarino, 2013) and 35% of U.S. adults owned a tablet computer of some kind (Rainie & Smith, 2013). Also, as of May 2013, 56% of American adults had a smartphone, with roughly equal proportions having iPhones and Android phones, which were first released in October 2008, and far fewer using other types of smartphones (Smith, 2013a). Fully 91% of adults have a cell phone of some kind, 81% of whom send or receive text messages on their cell phone, 60% of whom access the Internet, and 52% of whom send or receive e-mail on their phones (Brenner, 2013). These mobile devices have advanced and been adopted quite quickly, and we expect changes in them to continue, as well as for new devices to be developed, although it is uncertain which new devices will catch on and which will not.

Mobile devices with small screens present special challenges to surveyors because they have changed the ways in which people communicate and how survey questionnaires need to be designed. Many of the traditional question formats relied on by web surveyors are difficult to display on these small screens. An example is the grid format, which is usually too large to display on smartphone screens. For such questions to work on smartphones, it is generally necessary

to instead ask them as a series of individual questions. In addition, open-ended questions that ask for lengthy detailed answers, which can easily be provided on computers, are likely to obtain greatly abbreviated answers, more akin to a texting response, by people responding on mobile devices. Adapting questions from full-size computer screens or paper questionnaire pages is challenging because of the space constraints, the touch input methodology that most mobile devices use, and the wide variety of devices that must be accommodated. But, it also raises issues with regard to finding a unified mode construction that works the same across different devices and modes.

New electronic devices not only change how people respond to individual survey questions but also when and where they can respond. Someone may receive a survey request while checking e-mail on her mobile device. If she tries to access the survey and is unable to because of connectivity issues, or cannot understand or navigate the questionnaire because it is not optimized for mobile, then she must remember to go back and access the survey from a desktop or laptop computer to respond. The need to switch devices is an additional barrier and cost associated with responding, which will reduce the chances she will respond.

Mobile devices are not always compatible with completing complex tasks that require sustained concentration. While smartphones have been constrained to a size people can comfortably carry nearly everywhere, work and home offices are equipped with large screens or multiple screens that allow people to simultaneously see and process multiple pieces of information. Thus, a division of labor often develops between what people feel they can do effectively on their mobile device and what they feel they can do effectively on a computer with a larger screen. Paper is also used in many situations because it helps people better understand the geography of the argument contained within (Sellen & Harper, 2002, as cited in Korkki, 2012). In the near term, how people divide their tasks across different means—whether smartphone, landline, tablet, desktop, or paper—is part of the environment that must be considered when selecting and using modes to contact and survey people. It also illustrates how the development of technology, and how people learn to depend on it, introduces new possibilities and constraints for surveying.

So far, attempts to convince people on a widespread basis to use their smartphone for responding to surveys have only been modestly successful (Callegaro & Macer, 2011). Our own attempt to obtain smartphone survey responses in 2011 took place in an undergraduate student population in which about half of the students were known to have smartphones. Each of four contacts encouraged students with a smartphone to respond on it. Although about half of the students sampled responded to the survey, only 7% of those who responded did so over a smartphone (Millar & Dillman, 2012).

However, the expectation that mobile devices will eventually be used by many to answer surveys and the optimism about their potential is reflected in the fact that those conducting several large national surveys have begun to seriously consider and test whether mobile devices can be used to improve data collection. For example, a recent report from the National Research Council (2013) that detailed the difficulties of obtaining consumer expenditure reports using interviews and paper diaries in the U.S. Bureau of Labor Statistics–sponsored Consumer Expenditure Survey recommended testing tablets to produce more accurate and timely reporting. Additional research is being conducted under the BLS Gemini project to examine how smartphones may be used in such reporting (Edgar,

Nelson, Paszkiewicz, & Safir, 2013). It will take several years to work through and appropriately test a new methodology to replace the current design that was developed and has been used since the early 1980s. Nielsen has also tested using a mobile app and website where people can self-report their TV viewing behavior as an alternative to the paper diary that is currently used today (Link, Lai, & Bristol, 2013). As these examples of trying to develop electronic reporting suggest, there is a compelling need to think constantly about how new devices and technologies can improve surveys and about the prevalence of their use in coming years.

One of the obstacles survey research faces is how to successfully connect the request to complete a survey with the unprecedented availability of devices that can be used for responding. The challenges associated with achieving that suggest to us that future surveying is likely to remain mixed-mode and involve not only contacting people by one survey mode to encourage them to respond to another, as emphasized in this book, but also contacting them by one device and encouraging them to go to another device to respond.

SUPPLEMENTING QUESTIONNAIRES WITH MEASUREMENT USING ELECTRONIC DEVICES

The willingness of respondents to use and carry electronic devices has not gone unnoticed by surveyors. Nielsen Audio (formerly Arbitron), which for decades has used paper diaries to identify which radio stations people were listening to, developed a new device to measure listening passively so people do not have to self-report what radio stations they listen to and when. The Portable People Meter (PPM) is a device that people carry with them throughout the day that detects audio codes inserted in radio and television broadcasts. The PPM has replaced the self-reported paper diary methodology in many cities. Nielsen utilizes a similar approach for measuring TV viewing in which devices are installed on TV sets and computers in the home. Using devices such as these means that the listening and viewing estimates are less subject to recall error and individual differences in reporting.

This is a highly specialized use of a technology, and it can work because the television and radio stations have a vested interest in obtaining accurate measurement of what programs and stations people are watching and listening to (and thus are willing to embed codes in their broadcasts that can be picked up by these devices). Self-reporting viewing and listening information at the level of detail requested in the TV and radio paper diaries over the time period requested (usually about a week) can be quite difficult and prone to error because people may not always know, with accuracy, what programs and stations are watched or listened to at all times of the day.

Similar use of devices to supplement survey measurement seems likely for surveys on various other topics. Pocket or clip-on devices—sometimes called wearable devices—are now used to measure physical activity such as walking and running, routes walked, and sleeping duration and soundness. Information from those devices can be uploaded and analyzed daily if people are willing to allow researchers to access the data. People can also apply self-administered medical tests to themselves, the results of which can be shared with those participating in research studies. Cell phones can now track individuals' movement from one location to another via GPS, which has great potential for transportation and consumer

behavior surveys. In fact, survey methodologists are currently using this capability to study how face-to-face interviewers travel between sampled households to complete their workload (Olson & Wagner, 2013). In addition, cell phones can be used to pay for purchases, making it possible to collect and transmit transaction information using this technology instead of consumer diaries to measure consumer purchases.

Efforts to use such devices to record behaviors are likely to continue to involve mixed-mode survey designs because most participants in this research are recruited using a variety of modes. Further, survey questions are usually asked of these participants with the survey data being used to better understand the data recorded by the devices. Participants are asked to report demographic characteristics, interests or attitudes, and additional information about the behaviors recorded by the devices. For example, a phone's GPS might be used to collect data about where the person goes, but it cannot tell why he goes there or how satisfied he is with what he encounters there, which is information that can be collected in a survey. In fact, the ability to combine survey data with data from the electronic devices is a powerful strength of these approaches. As such, it seems quite likely that the survey design and implementation methods described in this book, and especially those for mixed-mode surveys, will continue to be used to both enable the use of electronic devices for data collection (i.e., recruitment, building trust to gain cooperation, etc.) and to supplement and make the data collected by these devices more useful.

BIG DATA AND ADMINISTRATIVE RECORDS

In addition to devices that measure different behaviors passively, there is a variety of existing organic or big-data sources available to be used to better understand behavior. Organic data are collected as part of people's interactions in daily life such as registering for a driver's license, purchasing items, engaging in online searches, and posting content on social media sites. As more of our transactions become computerized and communication moves online, more and more data are collected in large databases that record these interactions and transactions, as well as supplementary information (such as the date, time, or location of the transaction or posting) also available at the time of the interaction. These databases can now easily be preserved for decades.

After learning about the availability of these data, a student in a survey design class posed what seemed like a straightforward question, "With big data, why would we ever need or want to do a survey?" The response to that question was equally straightforward. Surveys are undertaken because we have a question for which we do not have an answer. Surveys can be used to collect information that does not exist for the population the survey sponsor is interested in or information that is needed to understand relationships among variables but that is not available in a single existing data source. In addition, surveys might be used when the desired information exists, but is not available from those who have previously collected it, or when it is enormously difficult and costly to extract. Also, surveys are particularly useful for collecting information about what people are thinking or doing now. This type of information is generally not available in most databases. The exception is data from social media posts which are very good for capturing what people are thinking or doing at a particular time, but in many instances are limited

to only those who use these sites (i.e., to the extent that users and nonusers of social media sites differ, the conclusions drawn from such data may only generalize to social media users).

Despite the explosion of information that is recorded each second of every day in highly automated systems, the resultant data have not proved to be an effective substitute for survey data to answer a large number of questions that researchers attempt to answer. Rather, as with data collected by electronic devices, the most exciting possibilities for big data might be using them in conjunction with survey data to learn things that neither data source on its own can reveal or to reduce the number of questions that need to be asked on questionnaires in order to ease the burden of responding to them. Big data that are available at the individual level where they can be more easily linked or matched to survey data may be particularly effective for these types of uses. However, additional research about how to integrate big data with survey data is needed.

In sum, there can be little doubt that businesses, government, and other organizations will increasingly attempt to answer questions on a variety of topics through the analysis of big data. However, it's not likely that this will eliminate the need for sample surveys. The more likely scenario for the immediate future is that administrative records collected on individuals and other types of big data will be connected with survey data, which will require collaboration across agencies and organizations and surveyors to work with those who manage big data, which can be a substantial undertaking.

Because using existing administrative data can reduce the amount of information that must be collected in surveys, linking administrative records and survey data across different government agencies is of particular interest for government survey efforts. Doing so requires individual agency approval and also may require informed consent on the part of individuals whose records are being matched to their survey responses (Sakshaug, Couper, Ofstedal, & Weir, 2012). Research has suggested that many respondents are willing to approve the linkage of their answers to government-sponsored surveys with data obtained from administrative records in other agencies (Bates, 2005). Yet, the potential for linking data from different sources goes far beyond government. Such linkages can be done with membership and customer lists, credit history files, customer transaction and loyalty program data, and many other sources of information. However, trust in the legitimacy of the research being conducted with such linkages and a belief that the benefits of allowing the linkage outweigh the costs of doing so will be key to obtaining the public's cooperation with such efforts.

One of the challenges associated with both big data and administrative records as replacements for surveys is that the populations for which they are covered are inherently limited (e.g., to a specific store's customers, people who post to a particular social media site, etc.), and it is often difficult to estimate the coverage of the target population by the data source. Because of this limitation of using data from a single source, it is often helpful to combine data from multiple sources (e.g., purchasing behavior across several stores to track the food a family buys or license data across several states). However, working with these large data sets to standardize formats and combine data can be quite difficult and the barriers to convincing people and organizations to permit large-scale transfers of information are substantial. Further, data are often collected with a certain regularity or may cover only a certain time period. Taken together, these errors that may arise from a variety of sources and the sheer size and complexity of the data, as well as

data security issues raise huge challenges. These challenges mean that substantial research is still needed about how big data can be used alone and in combination with other data sources, including surveys.

DATA SECURITY

Data security is a fundamental concern for nearly all survey undertakings. The attention being given to data security of all types is probably greater now than at any time in history. This is likely because increased electronic connectivity has led to the rapid transfer of large amounts of electronic information, including a lot of highly sensitive information (e.g., telephone records, credit card transactions, medical records, Internet use, etc.). Information, including sensitive information, can be compromised on an enormous scale.

There are several types of security concerns relevant to conducting surveys. First, entering and answering web surveys sometimes requires remembering and typing complicated security codes and other information that itself becomes a barrier to responding. Examples include lengthy codes that entail random combinations of capital and lowercase letters, numbers, and symbols, such as this 12-digit code one of us was asked to use to enter a survey: NuC4$&@K?Z0c. We have also observed surveys in which a URL that was 50 or more characters had to be transferred from a paper letter to a computer browser to access the survey.

A different type of security concern is raised when Internet surveys are hosted and data are collected using servers that are not controlled by the surveyor, as is the case with many free online survey hosting sites. Institutional review boards and sponsoring organizations often require that surveyors promise data protection and confidentiality, but because of its storage location some of that protection is outside the surveyor's control. It is important to understand data ownership when promising confidentiality to survey respondents. Additionally, no matter how many layers of security are in place to protect survey data from outsiders, organizations may always be open to the occasional "inside job" whereby someone who works for an organization steals survey data.

These types of data security threats worry surveyors and respondents alike that confidentiality cannot be kept as promised, which likely dampens people's willingness to respond to surveys in general and to answer certain questions, especially sensitive ones. The magnitude of the threat to survey data security in the coming years seems especially difficult to predict as it depends on what happens with worldwide electronic connectedness, the efforts of governments, security developments in the private sector, the ability and willingness of individuals to take steps to protect their transactions with others, and the creativity and determination of those with nefarious intent to overcome these efforts as technology also changes. How these issues will change and affect surveyors in coming years remains to be seen.

SPECIALIZED PURPOSE SURVEYS

Some uses of surveys are so specialized that they have become a subfield of survey methodology. An example is business or establishment surveys, in which the unit of analysis is a business or establishment and people provide answers as a

representative of that organization rather than as individuals representing themselves (Cox et al., 1995). The application of social exchange concepts and the use of tailored design strategies may be more important in business and establishment surveys than in many other types of surveys. For a business the costs of doing a survey are real financial costs (i.e., someone has to complete the survey while on the company clock) that can reduce productivity and cut into the bottom line. Additionally, the information requested is often quite complex, difficult to obtain and report, and oftentimes sensitive (Snijkers, Haraldsen, Jones, & Willimack, 2013).

Despite their incredible difficulty, business surveys are among the most critical surveys done in societies throughout the world. They are used to assess many important phenomena such as the amount of new housing constructed, employment practices, money borrowing, research and development expenditures, the societal production of scientists and engineers, energy use, manufacturing output, and imports and exports, among many other things. In the United States, they are relied upon to provide information that is critical to providing statistical guidance to the Federal Reserve Board and other entities responsible for maintaining the smooth operation of national and international economies. They also provide information relied on for developing new laws and government regulations. Thousands of such surveys are conducted each year in the United States and elsewhere.

Traditionally, business surveys were conducted by paper with forms sent to organizations to be completed and returned. Because the adoption rate for the Internet has been much faster in businesses, some business surveys have been moved directly from paper to web. However, the process of contacting businesses and obtaining responses has and continues to be inherently mixed-mode, leveraging mail, web, and telephone as needed to ensure a high quality result.

The tradition of conducting business surveys by self-administered modes inspired considerable research and development of the visual design and layout principles reported in Chapter 6 of this book and elsewhere (Dillman, Gertseva, & Haft, 2005; Morrison, Dillman, & Christian, 2010). A recent book, *Designing and Conducting Business Surveys* by Snijkers et al. (2013), has expanded on those principles. In addition, it summarizes the key issues that one needs to attend to when designing business surveys, including how surveying businesses differs from surveying individuals (with explicit consideration of the different cost, benefit, and trust issues encountered in business surveys) and considerations involved in listing and sampling businesses, questionnaire design, and implementation. This work provides much-needed detailed methods for conducting business surveys, including emphasis on electronic reporting and mixed-mode methods where appropriate.

Another specialized form of surveying, and one that is rapidly changing, is the customer behavior and satisfaction survey. The Internet has helped fuel a substantial increase in the number of customer satisfaction surveys conducted, and the variations in the type of customer satisfaction surveys has also expanded greatly. Some surveys are aimed at providing regular feedback about satisfaction with a product, such as one's cable or telephone service or a store's loyalty program. Others are aimed less at assessing customer satisfaction and more at shaping the customer experience. It is increasingly likely that one's travel will be followed by a request to comment on that experience, especially if travelers have shared their e-mail addresses when making travel arrangements.

We have also observed that many customer satisfaction surveys have changed from a random sample survey used to assess experiences with a company to feedback devices employed after every transaction (e.g., trip, visit, purchase, etc.) or only when there has been a problem. Instead of a periodic general survey to assess satisfaction, some organizations now conduct special surveys of all customers who have experienced a problem. For example, we commonly receive e-mails asking us for feedback about flights that experienced problems like late departures or mechanical issues, but rarely receive such requests when all goes well. In other cases, we have had a hotel company survey us after every visit to one of their hotels. Data collected via these mostly electronic surveys are also connected immediately to administrative records maintained by the organization, sometimes leading to personalized responses. Companies have also shifted to greater use of electronic modes of contact and response with mail and telephone interspersed in support of such methods to measure customer satisfaction.

Business and consumer satisfaction surveys are only two examples of the many areas of specialized surveying that now exist and are likely to expand in future years. Both involve mixed-mode designs but also illustrate how e-mail and web are shouldering greater portions of the data collection responsibility. And the success of both can be greatly improved through the application of social exchange concepts to tailor the survey designs for these very particular types of surveys.

INTERNATIONAL AND CROSS-CULTURAL SURVEYS

Archimedes, an ancient mathematician and physicist, is reputed to have said, "Give me a place to stand I will move the earth" (Pappus of Alexandria, AD 340, quoted in *The Lever*, n.d.). His description referred to the power of the lever and fulcrum for moving heavy objects. The imagery of a lever so long that when manipulated with an appropriately-placed fulcrum it could move an impossibly large object is powerful. It might also serve as a good metaphor for using a small sample of the Earth's 7 billion people to describe their characteristics. Collecting sample survey information that would make it possible to estimate on a worldwide basis the interests, opinions, and problems people face, including differences within countries, and to compare these estimates across different countries and regions is an intriguing challenge. Yet, from a sampling theory standpoint is quite feasible.

Our interconnected world now makes it possible for news media to report events from and to nearly every place on the globe on a daily, and sometimes on an hourly or minute-by-minute basis. Decisions of national and international leaders increasingly reflect events happening in other countries. In our global economy, countries compete with one another for the development and retention of jobs. Terrorist threats are as likely to originate from far places as they are locally. The effective monitoring of behaviors, economic conditions, environmental concerns, and well-being is no longer just a local or even a country-specific concern.

Like moving the earth, the challenges of undertaking worldwide surveys are by no means small. The large number of languages and the cultural differences in how people respond to surveys need to be understood for cross-national surveys to be effective (Harkness et al., 2010; Harkness, van de Vijver, & Mohler, 2003; de Leeuw et al., 2007). As people continue to move between countries, understanding language and cultural differences that affect response is critical even for surveys of a single country. Other challenges include understanding and working with the

governments that have to provide permission to conduct the survey and ensuring the safety of survey staff in some countries among many other things. Nonetheless, steady progress is being made. In the European Social Survey, the same survey questions are now being asked regularly in over 30 countries (European Social Survey, n.d.). The Pew Research Center also conducts surveys in many different countries throughout the world, from which they regularly release results (Pew Research Center's Global Attitudes Project, n.d.)

One of the most ambitious global surveying efforts is the Gallup World Poll, which routinely conducts sample surveys in up to 160 countries (Gallup, n.d.). Most countries on all continents are now being surveyed regularly. This effort, like all cross-national surveys, requires the use of different sampling strategies and survey response modes appropriate to the country, ranging from in-person to telephone and the Internet. Gallup reports have provided country-by-country estimates of the participation of people in paid work, their interest in migrating to a different country, satisfaction with their local and national governments, the number of children parents would like to have, and other characteristics of widespread interest. Reports from the Gallup World Poll sometimes make worldwide estimates. In other cases, they focus on comparisons between countries and regions of the world (Ray, 2013).

The countries in which Gallup surveys for the World Poll include both the richest and poorest in the world and have populations that vary from the most to the least literate and who speak a wide variety of languages. A great deal of effort has been made to try to make the survey questions meaningful and answerable across all of these languages and cultures and in the different modes used across countries. Work focused on meeting that challenge continues, but great progress is being made in producing survey results that can provide a meaningful knowledge base for better understanding the human condition across the globe and affecting public policy decisions across country boundaries. The power of survey sampling, as a lever for understanding the people and conditions around the globe, and perhaps acting on that knowledge, no longer seems an impossible dream.

Thinking about costs, benefits, and trust and tailoring design is essential to being able to conduct effective international surveys. As an extreme but all too common example, in some countries the personal costs of criticizing one's government are such that questions about the government should not even be asked, and if they are, the data collected will certainly be biased. What is considered sensitive information or taboo in one country may be a perfectly acceptable topic to discuss in another. Likewise, things that motivate people in one country to respond may discourage people in another from responding. Balancing these cultural and national differences with the need for a minimal level of standardization is the primary challenge of these surveys. It is a challenge on which a lot of progress has been made and on which considerably more work and research is needed.

THE CHALLENGE OF CONNECTING WITH EMPOWERED BUT DIVERSE RESPONDENTS

Too often the methods used by surveyors have treated sampled households and individuals as being willing to serve the study and interviewer needs in an unquestioning way. In addition the surveyor has sometimes forgotten to view the process from the perspective of the respondent, deciding to use long and

difficult-to-answer questionnaires that greatly exceed people's willingness and even ability to answer. Surveyors have also tried to minimize the burden and costs to themselves of implementing their surveys. That has sometimes meant restricting survey designs to a single mode of contact and response and treating all respondents exactly the same irrespective of what is best for them.

For many years the surveyor had the upper hand and was able to work in this way. People were inclined to give those who approached them with a request to answer questionnaires the benefit of the doubt. They were also more likely to think of answering survey questions as an extension of how they interacted cooperatively with others who approached them with requests for help. It made it easier that people were also typically accessible by different means, so that surveyors seldom needed to use multiple means of contact in order to locate and gain the attention of individuals. In addition, the cadence for conducting and reporting survey results was somewhat slower by comparison to today's rapid-fire communication environment.

Surveyors can no longer think of a sampled household or individual as becoming a participant only on the surveyor's terms, while giving no recognition to the sample member's desires or interests. Responding to nearly all surveys is voluntary, and the respondents' power to say "no" and the likelihood of their acting on that ability have never been greater. When recipients of survey requests sense that this norm of voluntary cooperation is being violated, reactions are sometimes public, in addition to being privately expressed. Today's surveyors must work within this voluntary culture in order to conduct successful surveys.

This does not mean, as we have shown in this book, that we must abandon our efforts to design and carry out successful probability-based sample surveys. However, it does mean that we must design and implement our surveys in ways that take into account people's needs and preferences. Surveyors must be responsive to sample members' needs just as businesses and other enterprises that depend on customers must be responsive to their customers' needs. The survey requests and the questions themselves need to be seen by the empowered sample members as understandable, reasonable, and, when possible, interesting. The approach we have offered is a respondent-centric one—to utilize our social exchange framework to design surveys that offer benefits while reducing the costs associated with responding and improve trust in the legitimacy of the survey and that the eventual rewards will outweigh the costs.

One of the biggest current challenges to achieving this is reducing respondent burden. The surveyor's appetite for additional questions has at times seemed insatiable. We have observed a blank page in paper questionnaires suddenly be filled with new questions during a final review. Similarly we have observed survey investigators come to periodic review meetings with new questions to be asked, but seldom arrive with proposals for eliminating as many questions as they hoped to add. More recently, we have witnessed investigators expressing their pleasure that the Internet makes the number of questions mostly invisible to respondents, thinking that they could pretty much ignore length considerations. When in-person interviews were dominant in society, surveyors felt impunity with regard to number of questions. Extending the interview a few minutes was unlikely to reduce response rates, and the costs of going back to collect additional data later was substantial. That world has disappeared twice—first with the telephone, and second with the Internet. People today expect communication to be shorter and to occur in more frequent bits.

More than 40 years ago the director of the nation's most prominent survey research center made the observation, "We always seem to end up collecting far more data than ever gets analyzed" (P. Rossi, personal communication, 1971). This is still true today. Recently, a doctoral student went through a year-long process of developing a dissertation mail questionnaire. Each meeting with her advisers and pretest volunteers resulted in adding additional questions. These additions were defended with comments about only some of the respondents needing to answer them; it was reasoned that they were not really making the questionnaire longer for most respondents. Ultimately the additions led to the need to reduce the font size and fill all blank spots until the maximum content for a 12-page booklet questionnaire had been reached. After her dissertation defense, she was asked what she would have done differently if she were starting the project over. Her answer was simply, "I would have asked fewer questions. I only analyzed some of the data, and the sample sizes were so small for some of the branched questions that I did not think the analyses would be meaningful."

A somewhat different survey situation existed when one of us was part of a group reviewing a national survey about energy use in residences. Many new questions were proposed in order to update the survey, but strong defenses were offered for keeping nearly all of the current questions. However, it was also noted during these meetings that many of the more detailed questions of less current relevance were deemed lower priority by the agency. Results for these questions were not released until several years after the data were collected. For this survey and many others, there are constant pressures to keep old questions and add new ones, which come from investigators who want increasingly comprehensive but precise analytic models, interest groups who want specific data for their purposes, and survey professionals who care about maintaining trend lines over many years. These pressures have often meant sacrificing explanations and other trust- and benefit-inducing features in favor of asking an additional question or two without having to increase the stated length of the survey. The respondents are those who ultimately pay the price of accommodating everyone's wishes, unless they choose not to respond at all. Like many things in life, questionnaire design needs to strike a balance between competing interests with the goal of keeping questionnaire length to a minimum in order to minimize respondents' burden and avoid wasting their time collecting data that will never be used.

There is a broad cultural appeal for making questionnaires shorter than many surveyors would like for them to be. There is also broad cultural appeal in the United States for token cash incentives that can be included with the request to complete surveys; both response rate improvements and the general lack of objections suggest that sending them fits with the general culture. Also a general part of the culture is to communicate politely, identify oneself honestly, provide contact information, and inform people how they can get answers to questions. Efforts to be helpful and make responding easier also have general appeal. These and other considerations can positively affect some recipients of survey requests without negatively affecting most others.

At the same time, there are many differences among those asked to respond to a particular survey. Some may be attracted to colorful questionnaires with pictures, while others see no difference from black-and-white renditions. Some people are skeptical of anything government. Others are equally skeptical of all things business. The mode of contact, whether by telephone, mail, or web, may make some people apprehensive, but not others. Also, some people are very community

oriented, and others are much more oriented to their own self-interest. It is important to appeal to these different types of people in our survey requests to reduce the risk of nonresponse error. Doing so means incorporating a number of respondent-centric features into our designs.

Early research has suggested that adaptive designs, which develop later implementation procedures and contact materials to try to obtain responses from different kinds of people than those who have already responded, can help reduce nonresponse error (Wagner, 2008). Strategies offered here under the social exchange framework for carrying out adaptive design include obtaining contact information for as many modes as possible and communicating the survey request using multiple modes, offering different modes of response, and packaging requests so that each introduces new elements of potential value into the communications to affect the balance of benefits, costs, and trust. A half century ago it was observed for mail surveys that multiple contacts are the most effective means of improving survey response rates (e.g., Scott, 1961). Mixed-mode designs with emphasis on changes in mode of contact and response and the coordination among them represent a means of achieving even greater effectiveness and quality because they allow adaptations to be made that have great potential to appeal to different types of sample members. In other words, they allow the surveyor to respond to needs and desires.

As surveyors react to the continued technological changes that affect how people communicate, it will remain ever important to be appreciative of the contribution that respondents make to the success of surveys. We must also be respectful of their needs and desires as well as how those needs and desires might differ among various groups in our survey populations.