

Understanding Response Rates in Random Digit Dial Surveys

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Evidence from Low- and Middle-Income Countries

Researchers focused on low- and middle-income countries (LMICs) have increasingly begun using phone surveys as the COVID-19 pandemic made face-to-face data collection risky. This has generated new interest in empirically grounded best practices for phone survey protocols, particularly for random digit dial (RDD) surveys, which are surveys that use phone numbers without knowing or needing to know who the number belongs to. Response rates and coverage bias are a primary concern for such phone surveys. Therefore, it is important to understand respondent behavior as a first step to understand and address both internal and external validity in RDD surveys.

This research methods brief presents data from RDD surveys in nine countries. We show that response rates to such surveys are typically below 60 percent and can be as low as 7 percent. We also show that most of the sample is lost at two points in the survey: non-contact, where respondents do not pick up the phone, and early refusal, where respondents terminate the interview before the survey begins. Beyond that point, cooperation is relatively high, with breakoffs during the interview ranging from effectively 0 to 10 percent across the nine countries. This evidence suggests that the most promising ways to increase response rates are strategies that increase pick-up rates and improve the first impression respondents have of the interviewer. While increasing contact and consent rates should logically improve response rates, it is not a guarantee. Future research would be needed to confirm whether respondents who are newly induced to answer and consent to the survey would be just as cooperative as those who would have consented without further intervention.

Motivation

Low response rates are a serious problem for phone surveys. Low response rates hinder the ability of any survey to describe accurately the population of interest. Understanding the *sources* of non-response is important to design protocols that maximize the coverage of a survey at a reasonable cost. This allows researchers to judge whether data are missing at random or whether non-response patterns might introduce bias to inferences about the target population.

Similar to a face-to-face survey, the response rate in a phone survey depends on two factors: reaching the respondent and convincing the respondent to participate. Getting respondents to answer a ringing phone or respond to a voicemail is behavioral. The behavior of interest involves the respondents' knowledge of and trust in who is calling as well as their availability to take the survey. It could often be related to the outcomes being studied. In a phone survey, it is harder to establish a personal connection between interviewer and respondent and is much easier for a respondent to exit the interview, with the press of a button. This is especially challenging for RDD surveys, where interviewers have no existing relationship with respondents, who are anonymous.

This note is part of a series investigating survey implementation using computer-assisted telephone interviewing (CATI) and other remote survey modes by Northwestern University's Global Poverty Research Lab (GPRL) and Innovations for Poverty Action (IPA). It was prepared by Andrew Dillon, Steve Glazerman, and Michael Rosenbaum with helpful input from Navishti Das, Dean Karlan, Chris Udry, and Shana Warren. These methods notes are made possible with the generous support from GPRL. More information is available on IPA's website about [phone survey methods](#) and GPRL & IPA's [Research Methods Initiative](#).

Literature

There is a rich literature documenting approaches to increasing unit non-response—improving completion rates for phone surveys.¹ Curtin, Presser, and Singer (2005) define three types of non-respondents: non-contacts, refusals, and other non-response. All types of non-response have increased in recent years, though non-contacts have increased most dramatically, potentially due to the rise of caller ID. Although statistical methods have been proposed to respond to these challenges, reweighting and other statistical adjustments do not necessarily eliminate bias.²

Most evidence comes from phone surveys in Europe and the U.S. We found limited evidence from LMICs in the past 10 years, even though phone surveying in such countries has been increasing.³ Researchers often lack the incentives to report on survey protocol details or on disaggregated sources of nonresponse. This makes it difficult to keep up with rapid changes in cellular network penetration and norms of mobile phone usage.⁴ The few papers that do report response behaviors—including for different modes—note that the majority of non-response occurs due to non-contact, with much smaller rates of refusal and other non-response.⁵ Questionnaire design is often a factor in eliciting cooperation. More research is needed to understand response behavior in different contexts and how to increase contact and cooperation rates.

Data

Innovations for Poverty Action (IPA) conducted RDD surveys between April and September 2020 in nine LMICs resulting in 12,145 complete surveys from 64,635 attempted numbers. Each survey was conducted in a different country: six in Africa, one in Asia, and two in Latin America. These surveys primarily covered topics relating to education, employment, health, and income in response to the COVID-19 pandemic and lasted about 33 minutes. The survey in Uganda covered digital finance usage. Sites and sample size are listed in Table 1.

The surveys had several features in common primarily relating to the sampling frame potential respondents were drawn from and eligibility criteria. All surveys dialed numbers from lists provided by the same vendor,

¹ Meyer, B. D., Mok, W. K. C., & Sullivan, J. X. (2015). Household Surveys in Crisis. *Journal of Economic Perspectives*, 29(4), 199–226.; Brick, J. M., & Williams, D. (2013). Explaining Rising Nonresponse Rates in Cross-Sectional Surveys. *The ANNALS of the American Academy of Political and Social Science*, 645(1), 36–59; Curtin, R., Presser, S., & Singer, E. (2005). Changes in Telephone Survey Nonresponse over the Past Quarter Century. *Public Opinion Quarterly*, 69(1), 87–98; Keeter, S., Hatley, N., Kennedy, C., & Lau, A. (2017). What low response rates mean for telephone surveys. *Pew Research Center Methods*, May 15, 2017.

² Brick, J. M. (2013). Unit Nonresponse and Weighting Adjustments: A Critical Review. *Journal of Official Statistics*, 29(3), 329–353; Massey, D. S., & Tourangeau, R. (2013). Where Do We Go from Here? Nonresponse and Social Measurement. *The ANNALS of the American Academy of Political and Social Science*, 645(1), 222–236; Peytchev, A. (2013). Consequences of Survey Nonresponse. *The Annals of the American Academy of Political and Social Science*, 645(1), 88–111.

³ L'Engle K., et al. (2018) Survey research with a random digit dial national mobile phone sample in Ghana: Methods and sample quality. *PLoS ONE* 13(1): e0190902.; Ballivian, A., Azevedo, J. P., & Durbin, W. (2015). Using Mobile Phones for High-Frequency Data Collection. Ubiquity Press; Leo, B., Morello, R., Mellon, J., Peixoto, T., & Davenport, S. T. (2015). Do Mobile Phone Surveys Work in Poor Countries? *Center for Global Development Working Paper*

⁴ Measuring Digital Development: Facts and Figures 2020. (2020). International Telecommunication Union.

⁵ Lau, C., Cronberg, A., Marks, L., & Amaya, A. (2019). In Search of the Optimal Mode for Mobile Phone Surveys in Developing Countries. A Comparison of IVR, SMS, and CATI in Nigeria. *Survey Research Methods*, 13(3), 305–318; Amaya, A., Lau, C., Owusu-Amoah, Y., & Light, J. (2018). Evaluation of Gaining Cooperation Methods for IVR Surveys in Low- and Middle-income Countries. *Survey Methods: Insights from the Field (SMIF)*.

Sample Solutions, which pre-verified that numbers from their lists were active. They all surveyed whichever person answered the phone, as long as they were at least 18 years old.

A few countries had different eligibility criteria. The Mexico survey required respondents to reside in Mexico City and only dialed area codes from Mexico City. The Philippines survey only sampled numbers from a prepaid phone provider in an attempt to oversample lower income respondents. Finally, the Uganda survey required respondents to have used mobile money and used quota sampling, which is a method that determines respondents with certain demographic characteristics to be ineligible once thresholds have been met for each category of respondent. Sampling quotas were imposed on two characteristics in the Uganda survey: educational attainment and geographical area.

The simplest way to understand the sources of nonresponse in an RDD survey is to determine where in the survey respondents exit the form. For example, someone could refuse to take the survey when the call is answered or during the consent script. Tracking when respondents leave the survey can help determine where there is potential to increase response rates.

Findings

We find that in most RDD surveys the majority of attempted respondents fail to reach the start of the survey. The biggest limitation on response rates is respondents not answering the phone no matter how many times the interviewer calls. Nearly all respondents complete the survey once the respondent answers the phone, completes any screening questions, and offers consent to participate. These findings are shown by country in Table 1. For example, in Colombia, the final response rate is 24 percent. This is because 61 percent answered the phone but only 25 percent of the original sample made it to the start of the survey, with nearly all of those sample members completing the survey.

Table 1: Respondents Retained in Sample at Each Stage

Milestone (% of attempts reaching)	Burkina Faso	Colombia	Ghana	Mexico City	Philippines	Rwanda	Sierra Leone	Uganda	Zambia
% Working number	99.4%	97.3%	94.4%	97.9%	95.4%	86.5% [†]	98.8%	99.6%	95.7%
% Contacted	75.5%	60.5%	54.9%	50.1%	43.6%	51.4%	55.4%	62.1%	64.2%
% Fully screened for eligibility ^{††}	60.6%	28.4%	33.8%	8.2%	23.8%	n.a.	49.8%	41.1%	42.6%
% Started the survey	58.9%	24.8%	22.2%	6.7%	16.7%	38.8%	39.0%	10.9%	40.0%
% Completed the survey	58.9%	24.3%	21.0%	6.3%	16.6%	38.6%	37.7%	10.4%	39.9%
N (attempted)	2,328	6,184	7,806	21,391	8,378	3,862	3,410	8,024	3,252
N (completed)	1,371	1,504	1,637	1,337	1,389	1,489	1,284	831	1,296

[†]We had to define a “working number” more narrowly in Rwanda, where we could not distinguish unreachable phone numbers that were recognized by the network from non-working numbers.

^{††}Screening criteria and methods were similar for most countries, with three exceptions. In Ghana and Rwanda, respondents were screened for age after the start of the survey. In Uganda, the screening criteria were more stringent because unlike all other sites, it focused on consumer financial protection and required eligible respondents to be users of digital financial services and for the sample to match certain demographic criteria.

The findings in Table 1 are similar in sources of non-response to the work cited above from high-income country contexts. Though, the response rates themselves are higher in LMICs. For comparison, the Pew Research Center’s 2016 Nonresponse Survey for USA reports response rates—adjusted to match the

definition used here—of approximately 6 percent of all attempts.⁶ Counting only working numbers, 49 percent of attempts were non-contacts and 35 percent were refusals.

Table 2 presents the same data but with each response disposition conditional on reaching the previous stage. The second panel reports response behavior using standard methods to facilitate external comparisons.⁷ Of the working numbers, most sites contact more than 50 percent of potential respondents but still lose between 24 percent and 44 percent of the sample. There is wide variation in rates of starting the survey once respondents pick up the phone. Some of these differences appear to be regional variation: cooperation rates were higher in Africa than in Latin American and Philippines. However, this mixes variation in eligibility criteria, norms around refusals, and other factors such as respondent trust for survey firms. For example, in Uganda, the researchers intentionally excluded over half of potential respondents because the study was intended to survey consumers of digital financial products only.

Table 2: Conditional Response Rates

Response Disposition	Burkina Faso	Colombia	Ghana	Mexico City	Philippines	Rwanda	Sierra Leone	Uganda	Zambia
<i>Panel 1: Conditional Rates (percentage reaching each stage, given that they reached the previous stage)</i>									
% Working numbers	99.4%	97.3%	94.4%	97.9%	95.4%	86.5%	98.8%	99.6%	95.7%
% Contacted, of working	76.0%	62.1%	58.2%	51.1%	45.7%	59.4%	56.1%	62.4%	67.1%
% Started, of contacted	78.0%	41.0%	40.5%	13.3%	38.2%	75.6%	70.4%	17.6%	62.3%
% Complete, of started	99.9%	98.2%	94.4%	93.9%	99.6%	99.3%	96.5%	95.0%	99.6%
<i>Panel 2: AAPOR-defined Rates</i>									
AAPOR Response Rate 1	60.0%	25.4%	22.5%	6.4%	17.7%	44.6%	38.6%	14.6%	42.0%
AAPOR Cooperation Rate 1	99.1%	88.7%	63.0%	80.3%	75.2%	88.1%	77.3%	81.8%	95.2%
AAPOR Refusal Rate 1	0.5%	1.1%	11.9%	0.9%	3.8%	5.7%	3.8%	1.3%	1.9%

Note: Panel 1 presents conditional rates on the prior disposition. Panel 2 presents response rates according to American Association of Public Opinion Research (AAPOR) guidelines. Working numbers is the percentage of respondents that have at least one number which can be connected to overall attempts. Started is the percentage of surveys that have a valid response, including refusal, to the first question after consent.

Implications

This brief provides some initial guidance about what to expect in terms of response behavior based on nine countries from three continents. These data can be used to set expectations for response rates in future RDD surveys in LMICs. These results also provide guidance on how response behavior may vary across LMICs. The finding that partial survey completion is low—in other words, that respondents tend to complete surveys once they complete the consent—has some practical implications. Conventional wisdom that phone surveys should be 20 minutes or shorter may need to be revisited. Further research on survey length, respondent attention, and fatigue can confirm this.

⁶ Keeter, S., Hatley, N., Kennedy, C., & Lau, A. (2017). What low response rates mean for telephone surveys. Pew Research Center, 15, 1-39.

⁷ We use American Association of Public Opinion Research (AAPOR) [standard response definitions](#) to code response rates so that these reports are comparable to other publications. These definitions describe the disposition of each response and provide clear guidance on how to display response rates. We use minimum response rates that do not estimate ineligibility rates for unknown eligibility respondents to facilitate comparisons between actual calls made so that these data can be more easily used to estimate sample sizes for future data collection.

There are also lessons learned for research teams seeking to improve response rates. From a design perspective, converting non-contacts to respondents has potential to return the highest yield in response rates. Interventions such as SMS messaging, pre-scheduling interviews, as well as protocol modifications such as increased call hours may be effective. Likewise, a large portion of respondents drop-off occurs before the survey starts. This suggests that greater care must be taken to design introductory scripts and to train interviewers to immediately gain respondent trust in the legitimacy of the survey and research team, or to capture respondent interest and attention in some other way.

Although non-response may be controlled through protocol and questionnaire design, the ultimate test will be the degree to which the resulting sample looks like the target population. We are conducting more research to determine how losing respondents at each stage affects sample composition. Even if the response rate is very low, the sample could be representative if data are missing at random with respect to outcomes of interest. More research is needed to understand if these surveys are providing representative samples, or samples that can be weighted to provide information on the national population. Further research to validate the results in this brief in other contexts or time periods is needed, especially given the possibility that the COVID-19 pandemic may have been an unusual context in which to study respondent behavior.