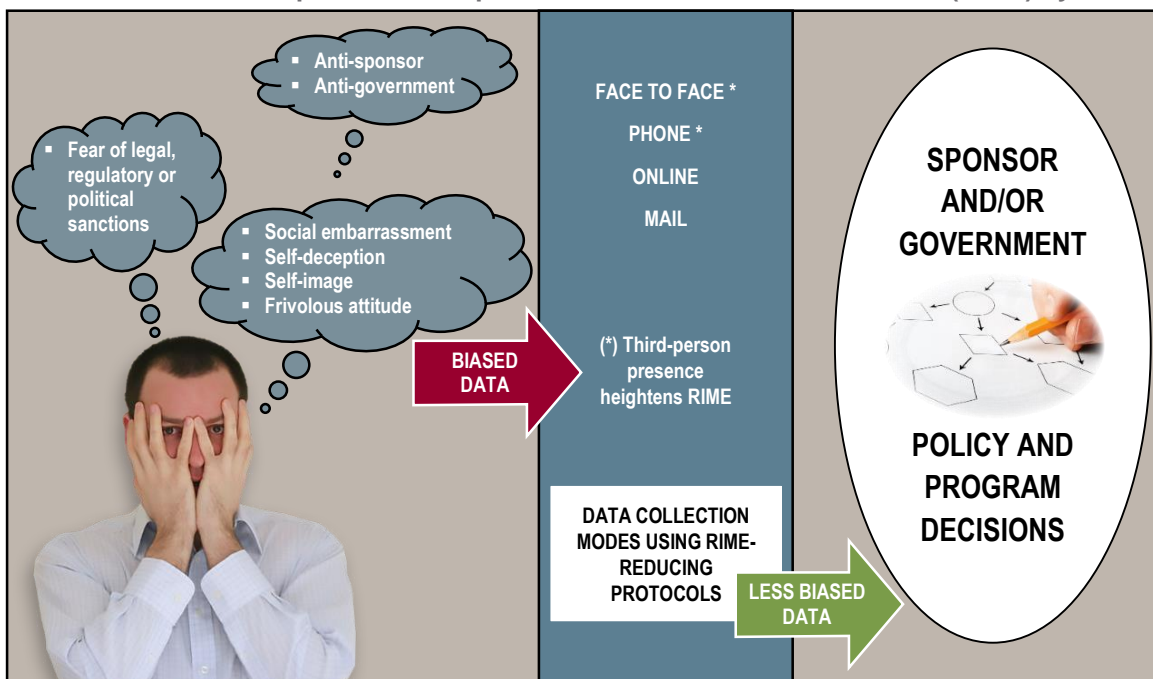


REDUCING RESPONDENT-INDUCED MEASUREMENT ERROR (RIME)

The validity of survey research relies on the accuracy of data from self-reported behavior and beliefs. But getting truthful responses from respondents in surveys is challenging, especially when studying sensitive issues such as income, corruption, illicit drug use, HIV status, trafficking, treatment of women – and the list goes on. As illustrated in Figure 1 below, many reasons influence the degree of truthfulness respondents provide. These deviations from the truth, whether intentional or unintentional, result in survey measurement error that threatens the validity of the data collected, creates bias, and subsequently compromises decisions informed by that data. It also weakens our ability to track the performance and impacts of development program interventions. NORC refers to these sources of bias collectively as **Respondent-Induced Measurement Error (RIME)**.

Figure 1: Sources and consequences of respondent-induced measurement error (RIME) by mode



RIME derives not only from respondents reactions to sensitive questions, but also from respondent gaming of questions to manipulate survey conclusions, recall bias, and self-delusion. An essential factor to mitigating or remediating RIME is to properly identify its sources and then treat them with the most effective techniques. In addition to traditional qualitative approaches to reduce measurement error in its surveys, NORC employs several state-of-the-art quantitative techniques, each of which is then tightly integrated into survey administration and enumerator training. These mitigation methods employ a combination of statistical protocols and multivariate imputation, depending on the source of bias. Key is that NORC first implements, where feasible, statistically based protocols designed to ensure – and convince – respondents of anonymity, encouraging greater honesty, higher response rates, and less manipulation.

Ensuring Anonymity

To address RIME, NORC starts by analyzing the relevant sources of potential bias for a given case (Figure 1). NORC then selects the most effective combination of techniques and methodically integrates them into the survey administration to establish an environment of trust and respect. NORC employs a mix of three types of statistical protocols:

- **Randomized-Response Protocol (RRP).** The respondent uses a randomization device (see picture) – whose outcome is known only to the respondent – to select whether to answer the sensitive or innocuous question (for a dichotomous RRP), or to perturb (add noise) a multi-valued response (for a Lickert or continuous RRP).
- **List (or Count) Protocol (LP).** Half the sample receives a question with a list of five statements, one sensitive and the rest innocuous. The other half of the sample receives only the innocuous four. Respondents are then asked to indicate *how many* – but not *which* – statements apply to them. The difference in average counts between the two halves of the sample reveals the proportion with the sensitive characteristic. A second sensitive question can be given with the halves of the sample reversed, leading to a “double-list experiment,” raising efficiency.
- **Three-Card Protocol (TCP).** The respondent is randomly given one of three sets of three cards, each card with a list of 3 to 4 characteristics, or their converse, such that within a set the lists are mutually exclusive and exhaustive. One list in each set contains a potentially compromising characteristic. The respondent then indicates which of the three cards (list) applies. Carefully crafted organization of the list items across the cards permits the researcher to recover statistically the prevalence of the sensitive characteristic.



Using these methods sacrifices some precision – a given respondent’s answer is no longer known – but the ensuing anonymity encourages greater truthfulness of responses and leads to mean estimates that are less biased. These protocols also lower non-response rates.

There are, of course, limitations and costs associated with using these statistically based truth-elicitation techniques – primarily the need for a large (and, therefore, costly) sample size to achieve a desired level of precision. They also take time to administer and may confuse some respondents. NORC recognizes these potential limitations and has developed and integrated methods to ameliorate them.

Improving Accuracy of Recalled Responses

Another class of RIME is bias in recalled responses. Consider the case where there is a baseline of treated households and an evaluation is subsequently sought. For a design-based evaluation, a panel is needed for a group of comparison households. (A similar need occurs due to panel attrition, regardless of the experimental group). Typically, once selected, the comparison households are asked to “recall” baseline values of outcome variables and key covariates. Unfortunately, this introduces a second source of variation in addition to the treatment under investigation, namely, recall error. Under the right conditions, NORC can reduce the risk of invalid hypothesis tests by adding a protocol to the endline that asks both comparison *and* treatment households to recall their baseline values and then computing the *true* bias for the treatment group (since their values were actually collected at baseline) to impute a unique recall correction to each comparison household’s recalled baseline response for outcomes and covariates. The result is a complete panel dataset for attribution analysis.

Addressing Other Sources of RIME

As implied by Figure 1, there are a large number of possible combinations of RIME sources. This brochure has so far focused on mitigation techniques – prospective measures to avoid RIME. Sometimes it is too late for such measures: a dataset with significant item nonresponse requires *remediation*, not mitigation. Such missing data pose a ubiquitous threat to evaluations. While most evaluators rely on *ad hoc* methods to “fix” the data, the academic literature shows that these are prone to substantial bias. Sophisticated imputation methods now available can provide a complete dataset for weighting and analysis and allow consistent results across different analyses of a completed data set. NORC typically utilizes state-of-the-art techniques, such as maximum likelihood estimation and multiple imputation methods, which are well suited for virtually any pattern of missing data.

NORC’s RIME-Reduction Services

Analysis Consulting. NORC is available to estimate and interpret the underlying RIME-based sub-population statistics and to apply its data analytics to test and refine sensitive-question protocols thereby offering its clients higher data quality and less missing data from their surveys. We also offer options to compare the RIME estimates from multi-protocol instruments (including the naïve protocol) to provide robustness and to identify possible protocol-specific residual bias.

Survey Design and Administration. NORC develops survey instruments, analyzes the RIME reduction needs to develop appropriate RIME reduction protocol(s), and provides tailored training to data collection teams to administer the survey.

Sampling. NORC has extensive experience designing and conducting studies that incorporate the additional RIME requirements within sophisticated blocked and/or clustered multi-stage, stratified, sampling strategies to achieve the maximum level of precision possible for a given budget.

Multi-mode Data Collection Programming: RIME requires special adjustments to data collection, depending on the survey mode. NORC has developed its own proprietary software and enumerator training materials that ensure integration of RIME protocols into the programming and administration of multi-modal complex surveys, optimizing cost-effectiveness, data quality, and schedule. Examples include:

Paper-and-pencil interviews (PAPI) using scan technology. This approach speeds data delivery (also allowing immediate review and editing of captured data), preserves scanned records, and increases data quality by allowing easy comparability of questionnaires with the data file.

Web-based surveys. NORC was among the pioneers and first organizations to use Web-based data collection in social research, implementing Web options in projects as far back as the mid-1990s. NORC’s experience places it in the first rank of organizations that design and manage easy-to-use, web-based tools as integral components of cost-effective data collection.

Tablet- and Android-based surveys. Appreciating the need for flexibility across platforms, NORC has adapted our Web survey capability to function on mobile browsers, laptops, and tablets. Where continuous connectivity cannot be assured, NORC programs applications for interviewers or respondents’ own mobile devices. These applications synchronize with a central database upon establishing a Wi-Fi or cellular connection. The result is that NORC has successfully employed mobile-device surveys in countries that have never used such technology in data collection.

Highest ethical standards. Even where RIME is inappropriate NORC ensures that all qualitative and quantitative protocols and methods meet the highest standards for human-subject protections. Its Institutional Review Board is registered with the U.S. Health and Human Services Office of Human Research Protection and has a Federal-wide assurance (FWA 00000142). For example, staff is annually required to pass several training modules on data collection ethics and chain-of-data-encryption possession.

Quality assurance and transparency. Three criteria guide NORC's data quality assurance – data need to be complete, accurate, and internally consistent. NORC has augmented best-practice with RIME-specific instrument piloting, RIME training of enumerators/supervisors, and RIME-adjusted statistical verification (including sophisticated outlier detection). NORC datasets and metadata are compliant with the Data Documentation Initiative (e.g., through the World Bank's Microdata Management Toolkit and Nesstar) to ensure the highest standards of documentation and preservation of all data. NORC was a founding member of AAPOR's Transparency Initiative, in which all staff are certified.

ABOUT NORC AT THE UNIVERSITY OF CHICAGO

NORC at the University of Chicago is an independent research institution that delivers reliable data and rigorous analysis to guide critical programmatic, business, and policy decisions. Since 1941, NORC has conducted groundbreaking studies, created and applied innovative methods and tools, and advanced principles of scientific integrity and collaboration. Today, government, corporate, and nonprofit clients around the world partner with NORC to transform increasingly complex information into useful knowledge. NORC is headquartered in downtown Chicago with offices in the D.C. Metro area, Atlanta, Boston, and San Francisco. Its five primary research areas are Economics, Markets, and the Workforce; Education, Training and Learning; Global Development; Health and Well-Being; and Society, Media, and Public Affairs.

Headquartered in downtown Chicago, NORC works in over 40 countries, with additional offices on the University of Chicago campus, the DC metro area, Atlanta, Boston, and San Francisco.

To learn more about how NORC's RIME-reducing protocols can help your survey needs, please contact Jeffrey Hackett, Office of Business Development, Hackett-jeffrey@norc.org, (312) 759-4266.