

Reliability of Survey Measurement

Background

This website contains information focusing on an approach to evaluating one aspect of the quality of survey data—the *reliability* (or consistency) of measurement. The project draws upon the insights of the burgeoning research literature on survey methodology developed over the past three decades, which has devoted new attention to the information gathering process in surveys.

There has been much written about the sources of measurement errors in surveys and best practices in developing high quality survey questionnaires. In recent years, a better understanding has been gained of the sources of measurement error in surveys: specifically, the attributes of survey questions; the cognitive processes of information transmission and retrieval; the motivational context of the interview setting; and the response framework in which the information is then transmitted. Until recently, little effort has been undertaken to systematically quantify the nature and extent of measurement error in the types of measures typically employed in commonly used population surveys, and therein lies the significance of the present research.

Although this research focuses on the reliability of measurement in social surveys, the overarching goal of this project is to establish a factual basis for conjectures that exist in the survey methods literature concerning the attributes of good survey questions. The project builds a publicly accessible data base of information for roughly 1,300 questions representative of typical questions used in social science surveys. The database, developed on the basis of ten nationally (or regionally) representative panel studies, contains estimates of question-specific reliabilities, along with detailed coding of attributes of the questions (e.g., content, response formats, and question length), which can be used to evaluate the optimal properties of survey questions with respect to levels of measurement error.

Through an analysis of the reliability information and the attributes of survey questions from several large-scale panel studies, practical suggestions can be made about the attributes of survey questions that will improve the quality of survey data. This reliability database will be made available to other researchers, and in addition to other materials, researchers are provided easy access to the data base for purposes of evaluating the reliability of a range of typical questions in common use in survey research.

The broader impact of this research is to significantly increase the social science research infrastructure by providing a publicly available data base on reliability estimates for a representative pool of survey questions. Given that survey measurement is a key ingredient in the majority of social science research, the broader impact of the proposed research lies in its contribution to the uses of virtually all types of survey data, which can be evaluated in terms of the results of this study. The research adds to our current knowledge by making the reliability estimates obtained in the prior NSF-supported research, along with the extensions documented here, available to the public in a manner that allows users to search, filter or query the data base in investigating the reliability of types of survey questions of interest. Thus, the long-range goal of the proposed project to create a public archive of the levels of reliability for the typical kind information gathering approaches used in surveys can have an impact on the development of survey questions for new surveys, as well as increase our understanding of the quality of existing surveys.

History and Funding

The project was originally developed by a team of researchers, headed by Duane Alwin, at the University of Michigan's Survey Research Center, where Michigan longitudinal surveys played an important role in his efforts to quantify the reliability of survey measures (see Alwin, 2007). From 1979 to 2002, Duane Alwin served as a program director / research professor at Michigan's Survey Research Center, Institute for Social Research and professor of sociology, at the University of Michigan-Ann Arbor, where he spent 23 years of his career. While at Michigan, Alwin served as the first Director of the Survey Research Center's Summer Institute in Survey Research Techniques, from 1984 to 1995, where he developed his programmatic emphasis on survey measurement and analysis.

The present project grew out of this longstanding interest in the study of measurement errors in surveys. Over a period of 30 years, the present research was supported by several grants from the National Science Foundation: (1) 1997-1999, "The Reliability of Survey Data" (SES-971043), (2) 2013-2016, "Archiving Information on the Quality of Survey Measurement" (SES-1259445), and (3) 2019-2022, "The Reliability of Survey Data: The Effects of Question Content, Context and Form"(SES-1850852). Two additional grants were obtained from the National Institute on Aging (NIH/NIA) for the study of the relationship of aging and reliability of measurement. From 1992-1995, this study was funded by an NIA grant, "Aging and Errors of Measurement" (R01-AG09747), which led to a later project supported from 2003-2006, "Aging and the Reliability of Measurement" (R01-AG020673).

Building upon these opportunities, the project has made pioneering contributions to the study of survey measurement error and has published extensively on the topic. This interest in survey measurement is reflected in numerous publications on the topic of measurement error, the editorship of several edited collections/special issues of *Sociological Methods and Research*, dealing with survey measurement: "Making Errors in Surveys" (*SMR* 1977), "Response Errors in Surveys," (*SMR* 1991) and most recently, "Investigating Response Errors in Surveys" (*SMR* 2014).

After leaving Michigan in 2002, Alwin became the inaugural holder of the Tracy Winfree and Ted H. McCourtney Professor in the College of the Liberal Arts at Pennsylvania State University, bringing the RSM project to Penn State. In addition to survey measurement, at Penn State Alwin focused on the demography of aging and the life course, and applied his interest in survey measurement somewhat more broadly.

In addition to receiving funding from the NSF and NIH for his work on survey measurement, Alwin also directed an NIH/NIA (P30) Demography of Aging Center at Penn State for five years (2005–2010), the NIH/NIA (T32) post-doctoral training program in demography of aging (2003-2006), and the Center for Life Course and Longitudinal Studies (2010-2019). While at Penn State he also edited the premier American Sociological Association's methodology journal *Sociological Methodology* (2016-2019). Alwin retired from Penn State in 2019 and is currently the Emeritus McCourtney Professor of Sociology and Demography.

Publications

The prior support from the NSF and the NIA made possible the publication of a book—*Margins of Error: A Study of Reliability in Survey Measurement* (John Wiley & Sons, 2007)—which summarizes the initial findings of the project, based on the first six of the studies listed in Table 1 [see **Sources of Data**]. This initial work was positively reviewed by survey methodologists. [See the review of this work in *Contemporary Sociology* by Peter Marsden (2011)].

Please see the **Publications** page for the publications from this project that provide detailed descriptions of sources of data and methods of reliability estimation.