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Human-Survey Interaction

Usability and Nonresponse in Online Surveys

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Content

PART II

INSTRUMENTS

1. Introduction

1.1 The Emerging Relevance of Online Surveys

In recent years online surveys have been accepted in the canon of possible survey modes: Web-based surveys have received unique entries in encyclopediae (ALVAREZ/VAN BESELAERE 2005). At conferences online surveys have moved from being discussed in separate sessions to being subsumed under the various topics of surveys and survey methodology (cf. changes in the AAPOR proceedings during the last years). The question of whether online surveys are to be considered as an alternative to traditional survey modes has moved to questions as under which circumstances the mode is able to play its strengths or when to consider other survey modes (EVANS/MATHUR 2005). Compared to these traditional survey modes, online surveys are a growing business sector (ADM 2004). Several organizations have written guidelines for good online survey practice (ADM/ASI/BVM/DGOF 2000) or included the mode into an overall framework for the handling of case codes and response rate calculations (AAPOR 2008). Even in population samples online surveys have taken their role as cost-cutting instruments in mixed mode approaches. The United States (SCHNEIDER et al. 2005) and Canada (ARORA/GILMOUR 2005) both had implemented online versions of the census.

Online surveys have several advantages compared to other modes as they are easier and more effective to conduct with respect to the aspects of the global availability of surveys, multilingual surveys, the timeliness of data collection, data input, available question types, cost of reminders when using e-mails, filtering or skipping questions, and edit checks during the interview. The disadvantages are a result of the employed technology. Not all people of the general population have Internet access, scientific e-mail invitations compete against spam and advertising e-mails, the computer is more difficult to use than talking to an interviewer, and additional security and data protection measures are necessary (EVANS/MATHUR 2005; WELKER/WERNER/SCHOLZ 2005). Online surveys share the problems of self-administration in that there is no interviewer available to motivate the respondent or to clarify questions. Irrespectively of the mode, all surveys share threats to data quality due to different types of survey error.

In the following, I refer to online surveys as Web-based surveys. Respondents start a survey (login) by visiting the first page of the questionnaire with a browser. Respondents then proceed through a series of questions and Web pages until the end of the survey. The pages are delivered by a server. This concept is also valid for short surveys which can be delivered as a single page. Because the questionnaire is substantially a series of Web pages, all techniques in current Web page construction can be used. This allows to use visually rich survey design (KRISCH/LESHO 2006), real-time validations (PEYTCHEV/CRAWFORD 2005), and video (FUCHS/FUNKE 2007; COUPER 2005).

1.2 Outline

The general aim of this research is to improve online surveys with respect to successful human-survey interaction. This success can be assessed on the basis of accepted quality criteria in survey methodology, specifically nonresponse (GROVES/FOWLER/COUPER/LEPKOWSKI/SINGER/TOURANGEAU 2004). The theory applied in this work combines survey methodology and human-computer interaction. The focus on the usability of surveys leads to several suggestions for survey design. These suggestions are tested and compared to current design practice.

The theoretical part combines different approaches of usability, the answer process, and response burden with the criteria of nonresponse (chapter 2). Usability principles are reviewed and extended to the context of online survey methodology. The resulting framework is termed human-survey interaction in an allusion to human-computer interaction. The human aspect mainly models the answer process, while the survey aspect includes survey design and response burden. The interaction is concerned with the communication between respondents and a survey. The literature review on usability principles shows that the main focus resides on self-descriptiveness, that is feedback and information about the system status, and error tolerance. Different feedback techniques and error tolerance will therefore be the central focus of the later chapters.

Chapter 3 and study 1 demonstrate the usefulness of the proposed framework by developing specific design guidelines and conducting a survey for visually impaired and blind people in a mixed mode setting of self-administered interviews.

The second part is concerned with further development of instruments in survey methodology. Chapter 4 identifies a lack in the conceptualization of process data, known as paradata. As there is no coherent and conclusive model of paradata, a taxonomy of paradata is developed. As part of this taxonomy a new instrument for the collection of paradata is put forward. This universal approach to paradata collection makes it possible to observe behavior which was hitherto unaccessible such as a respondent's mouse clicks which miss answer controls. This instrument is then used in study 2 which shows that the current implementation of answer buttons in online surveys is far more error-prone than expected. A solution is proposed which is tested as part of study 5.

A very common type of paradata are response times. Study 3 uses the paradata model to define different measures for response times. The developed taxonomy of paradata makes clear that researchers must choose from these different definitions which differ in terms of the time and financial investment needed for the implementation. Even more important however are possible differences in data quality between the definitions. This is problematic as researchers usually go for only a single measurement criterium and may be unaware that the others exist. Research has therefore not been able to identify the most advantageous response latency measurement. To fill this gap, study 3 compares three definitions of response latencies and identifies the best one.

Chapter 5 identifies technical features which should be used to turn design principles into practice. Researchers can choose among a variety of technologies such as JavaScript, Java, Flash, and cookies. Several survey methods require at least one of these technologies, for example when controlling multiple participation or using visual analog scales in questions. Unfortunately, due to fast-changing Internet technologies not all users have all possible technical features available in their browsers. The challenge in surveys is to use features which have a very high coverage among the respondents while maintaining high survey quality standards. This is necessary to minimize nonresponse due to technical inaccessibility. Study 4 assesses the availability of different technology in respondents' browsers. The results show that JavaScript is widely available and allows for the implementation of both the universal client-side paradata instrument and design principles without increasing nonresponse. Later chapters test different survey designs which were implemented with this technology to reduce nonresponse.

The third part beginning with chapter 6 applies the design suggestions from the framework and the previous chapters to online surveys and tests their effects on nonresponse and other quality criteria. Studies 2 and 5 apply concepts of usability to reduce items missing which are an aspect of nonresponse. The design suggestions addressed enhance feedback in survey questions. This is done using interactive color cues which highlight the item that a respondent is about to answer and the items that have already been answered. The results show that good interface design reduces item nonresponse.

Chapter 7 with studies 6 and 7 aims to reduce dropout by means of enhancing self-descriptiveness, and feedback. This is achieved by utilizing progress indicators. The use of filter questions commonly results in wrong feedback that becomes visible as ›jumping‹ progress indicators as soon as a major part of a questionnaire was omitted because it was not applicable for the respondent at hand. An algorithm is developed to overcome problems in the calculation of progress in all kinds of surveys with filter questions, irrespective of survey software. Study 6 shows a positive effect of the algorithm on completion rates, expected time till completion, perceived burden, and perceived time flow. The algorithm allows for two different calculations: a ›conservative, accelerated‹ and a ›progressive, decelerated‹ feedback. Thus, study 7 compares the effects of both approaches and recommends the usage of a progressive, decelerated feedback algorithm that overestimates rather than underestimates the progress at the beginning of a survey to maximize response rates.

Concluding, this work consists of three parts. The first part develops the theory around the framework of human-survey interaction. The second part develops instruments for research within the framework. Finally, the third part uses the framework to develop survey design strategies which are expected to enhance usability and reduce nonresponse. The instruments are employed to test these survey design strategies against current design practice. The next section explains how this work fits into the broader area of survey methodology.

1.3 Sources of Error in the Life Cycle of Online Surveys

This section positions the content of this work into the broader picture of survey methodology by examining the different sources of error in the life cycle of online surveys. Sources of error are the most prominent problems online surveys face and share with other surveys. The life cycle approach ascribes the types of error to the different steps of a survey and thereby allows a better understanding of the process of conducting a survey. Here, the focus of this work is step three, types of nonresponse error where respondents are interacting with questionnaires.

The concept of total survey error is composed of several error types which occur during the different life cycle stages of a survey project.[1] According to Groves et al. (2004: 49)

> »the job of a survey designer is to minimize the gap between two successive stages of the survey process. This framework is sometimes labeled the ›total survey error‹ framework or ›total survey error‹ paradigm.«

The most prominent types of error are (GROVES et al. 2004: 48):

1. Coverage error: Identify target population and define sampling frame, for example students and list of e-mails of first year students.
2. Sampling error: Draw sample from sampling frame, for example *n*th visitor sampling on a Web site.
3. Nonresponse error: Contact respondents, for example refusals.
4. Measurement error: Respondents response, for example acquiescence.

1 This section approaches the different stages from an error perspective. Nevertheless, the survey life cycle approach has been used in other contexts as well: ICPSR (2005) uses the data life cycle as a framework to explain the necessary data documentation during a project. Kaczmirek (2008) discusses the many decisions involved in survey design from a software tools perspective. The life cycle model of online surveys integrates other views such as the phases of empirical research (DIEKMANN 2007) and research process (SCHNELL/HILL/ESSER 2004).

5. Processing error: Postsurvey data editing, for example imputation of missing data.
6. Adjustment error: Postsurvey adjustments, for example weighting.

Each error type marks an important step towards the next phase in the life cycle of a survey. Survey costs are weighted against the quality features to design the best possible survey under the given circumstances and constraints of a project (GROVES/HEERINGA 2006).

Although the different concepts of error have been discussed extensively (GROVES et al. 2004; BIEMER/LYBERG 2003), a summary of the relevant work explains how my research fits into the life cycle of a survey and the overarching survey error paradigm. Figure 1.1 shows the typical tasks for conducting a survey concerning the data. Each task is associated with a possible source of error which will be discussed in the next sections with respect to online surveys.

FIGURE 1.1
The life cycle of online surveys in the total survey error framework