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Online Surveys are Mixed-Device Surveys. Issues Associated with the Use of Different (Mobile) Devices in Web Surveys

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1 Issues in Mixed-Device Surveys

Survey research is changing in a more rapid pace than ever before, and the continuous and exponential growth in technological developments is not likely to slow down. Online surveys are now being completed on a range of different devices: PC, laptops, tablets, mobile phones or hybrids between these devices. Each device varies in screen sizes, modes of operationalization and technological possibilities. We define online surveys that are in practice being completed on different devices as mixed-device surveys. This special issue discusses issues in the design and implementation of mixed-device surveys, with the aim to bring survey research to the next level: in our view all web surveys should from now be thought of as mixed-device surveys.

Theory and best practices for mixed-device surveys are still in its infancy. The current state of knowledge about the dynamics of taking surveys on mobile devices is not as advanced as necessary in times of rapid change. While current technology opens great possibilities to collect data via text, apps, and visuals, there is little scientific research published about the actual uses and best practices of these applications to increase data quality. Researchers and survey methodologists in particular need to find ways to keep up with fast changing technologies.

1.1 Mobile Penetration Rates and Mobile Survey Completion

The penetration rate of mobile phones with Internet connection has increased dramatically in the last couple of years. Europe tops the global market on smartphone penetration. In the Netherlands, for example, there has been an increase from around 36% of the population owning a mobile phone with Internet access in 2010 to 72% in 2013 (SN, 2013). In the United States, figures increased from 35% in 2011 to 56% in 2013 (PEW, 2013). Although the majority of the population owns a smartphone, only a small part of the population is actually using it for survey completion. This is probably related to the fact that online surveys are often not yet adapted to be completed on small devices. However, if the questionnaire is dynamically programmed and suitable for completion on small devices, more people are inclined to use a mobile device for survey completion. We found for example that 57% of panel members with a mobile phone used it when being prompted in a dynamically programmed survey (Toepoel & Lugtig, 2014).

1.2 Mixed Device Surveys – a Research Agenda

Representation

The main drawback of online surveys has always been the lack of a sampling frame of email addresses for the general population. Mobile devices, and especially mobile phones, may in the future be used to overcome this problem, because they offer so many channels of communication.

For example, mobile surveys can draw on the advantages of probability-based sampling via Random Digit Dialling (RDD). Second, mobile surveys can easily switch between self-administered and interviewer-administered questions and approach respondents using multiple methods (apps, sms, e-mails and calls). This can be especially useful in the context of a panel study. When respondents are interviewed multiple times, respondents can be approached in multiple ways. On top of this, the mode of survey administration can also be switched within measurements. We know little about what works in practice, and formal studies that document the combined effects on coverage and nonresponse error of different sampling methods for mobile devices are to our knowledge non-existent.

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Measurement

Earlier studies have shown that some survey questions are better asked in a particular survey mode. Data quality is generally higher in self-administration modes (Saris & Gallhofer, 2007; Campanelli et al., 2013), especially when the topic of interest is in some way sensitive (Kreuter et al.). On the other hand, an interviewer may lead to better data when questions are complicated; for example when working out a respondent's life history.

Mobile surveys can draw on technological innovations that come with big data. Sensor data such as GPS, accelerometers, or biomarkers are available on almost all mobile phones and tablets. They offer new and better ways to collect data on specific questions, and can be used to investigate how context affects data quality (see Link et al., 2014). In addition, sensor data can alleviate the burden of survey completion for respondents in time-consuming time budget, health and travel studies.

Although mobile devices offer new possibilities, they are not without their pitfalls. The screen size is smaller than on traditional computers, there is a variability in how questions are displayed (depending on the type of device, personal preferences and browsers) and entering data works differently.

In addition, people use mobile devices differently from traditional computers. People are used to using mobile phones for short messaging, not for taking long surveys. This means that questionnaires should probably be shortened, or split into multiple short questions. In the future, surveys on mobile phones may consist of only a few questions at a time, asked in several bursts.

The fact that available studies often show mixed findings on for example response timings, break-off rates, and survey evaluation in mixed-device studies , can be (partly) an outcome of the rapid changes in technology over time in addition to increased societal learning and growing comfort with devices and their many features (AAPOR Taskforce Report on Mobile Technologies, 2014). The fact that respondents complete online surveys on traditional desktop PCs as well as new mobile devices makes designing surveys a challenge. Issues associated with mixed-mode surveys – for example whether the questionnaire should be optimized for each mode versus a generalized design- can be extended to a mixed-device context.

1.3 Moving from Online Surveys to Mixed-Device Surveys

In order to adapt our surveys to new technologies, we need to redesign our surveys. For example, we have to rethink the use of some question formats. It took time before survey methodologists understood how to redesign paper-and-pencil surveys to online surveys. Now, we have to redesign online surveys to become mixed-device surveys.

Long matrix questions are not suitable for small devices. For example, slider bars, and especially Visual Analogue Scales that work on a point-and-click-principle, save space on the screen (Toepoel, 2016). In addition to question formats, questionnaire length is important to take into account when designing a multi-device survey. Research shows mixed results when it comes to measurement differences between devices (e.g., Bosnjak et al., 2013; de Bruijne & Wijnant, 2013; Buskirk, 2015; Busse & Fuchs, 2012; Lynn & Kaminska, 2013; Peytchev & Hill, 2010; Lugtig & Toepoel, 2015; Vehovar, Berzelak & Lozar-Manfreda, 2010). If questions are dynamically programmed and designed for mixed-devices, measurement differences seem to be minimal.

Mobile phones are rapidly replacing key tasks formerly done on PC and laptops. It seems a matter of time that mobile phones or mobile devices in general are preferred for survey completion over regular desktop PCs. For example, Toepoel (2016) shows that respondents evaluate the completion of surveys on mobile phones better when they have more experience in mobile phone survey completion.

2 Papers in this Special Issue

The papers in this special issue on mixed-device surveys all study the issues mentioned in the previous section, and provide a start for understanding how to design mixed-device surveys. They offer a unique view on questionnaire design in an era where researchers will not know in advance what device a respondent is going to use to complete a survey, let alone how the questionnaire looks on the respondent's device. We can, however, try to predict respondent behavior, in addition to designing our online questionnaires with care.

The first paper in this special issue by Axinn, Gatny, and Wager is titled "maximizing data quality using mode switching in mixed-device survey design". Since the advantages of the web mode for studies with frequent re-interviews can be offset by the serious disadvantage of low response rates and the potential for nonresponse bias, the authors examine the potential for a mixed-device approach with active mode switching to reduce attrition bias. The Relationship Dynamics and Social Life (RDSL) study design allows panel members to switch modes by integrating telephone interviewing into a longitudinal web survey with the objective of collecting weekly reports. The authors found that allowing panel members to switch modes kept more participants in the study compared to a web only approach. In addition, they found that the characteristics of persons who ever switched modes were different from those who did not. Mode options and mode switching can therefore be important for the success of longitudinal web surveys to maximize participation and minimize attrition.

In the second paper, Arn, Klug, and Kolodziejski look at the challenge of optimizing survey layout in online research to enable multi-device use. This paper presents results of the implementation of a new adapted design at the panel of DemoSCOPE that allows the participants to take part in a survey on multiple (especially mobile) devices. To evaluate this adapted design, the authors compare interview data and question timings of panellists who participated before and after the design transition. The key outcomes in this study are the completion rate, item non-response, open questions, straightlining, timing of single question and the length of the total interview are presented. In addition, the authors have presented examples of both old and new designs to the panel community and invited them to assess these examples concerning orientation, colour, design and usability. The authors evaluate the differences in these assessments before and after the design transition for smartphone and desktop users. They end with suggestions for best practices for online studies on different devices.

Andreadis shows in the third contribution to this special issue that computer users and smartphone users give responses of almost the same quality. Combining a design of one question in each page and innovative page navigation methods, we can get high quality data by both computer and smartphone users. The two groups of users are also compared with regard to their precisely measured item response times. The analysis shows that using a smartphone instead of a computer increases the geometric mean of item response times by about 20%. The data analyzed in this paper were collected by a smartphone-friendly web survey. As a result, there are no significant interactions between smartphone use and either the length of the question or the age of the respondent. Thus, the longer response times among smartphone users should be attributed to other causes, such as the likelihood of smartphone users being distracted by their environment.

Buskirk, Saunders, and Michaud note that survey researchers are still trying to understand which online design principles directly translate into presentation on mobile devices and which principles have to be modified to incorporate separate methods for these devices. One such area involves the use of input styles such as sliding scales that lend themselves to more touch centric input devices such as smartphones or tablets. Operationalizing these types of scales begs the question of an optimal starting position and whether these touch centric input styles are equally preferred by respondents using less touch capable devices. While an outside starting position seems optimal for slider questions completed via a desktop computer, this solution may not be optimal for completion via mobile devices. The experiment presented in the paper by Buskirk, Saunders and Michaud moves the mixed device survey literature forward by directly comparing outcomes from respondents who completed a collection of survey scales using their smartphone, tablet or computer. Within each device, respondents were randomly assigned to complete one of 20 possible versions of scale items determined by a combination of three experimental

factors including input style, length and number formatting. Results from this study suggest more weaknesses than strengths for using slider scales to collect survey data using mobile devices and also suggest that preference for these touch centric input styles varies across devices and may not be as high as the preference for the more traditional radio button style.

Struminskaya, Weyandt, and Bosnjak use the data from six online waves of the GESIS Panel, a probability-based mixed-mode panel representative of the German population to study whether the responses provided using tablets or smartphones differ on indicators of measurement and nonresponse errors than responses provided via personal computers or laptops. They extend the scope of past research by exploring whether data quality is a function of device-type or respondent-type characteristics using multilevel intercept-only models. Overall, they find that responding with mobile devices is associated with a higher likelihood of measurement discrepancies compared to PC/Laptop survey completion. For smartphone survey completion, the indicators of measurement and nonresponse error tend to be higher than for tablet completion. However, the effects are relatively small and some indicators (such as straightlining) are not related to a device but are attributable to a respondent.

In all, this special issue on mixed-device surveys in *methods, data, analyses* offers food for thought on how to design surveys in the modern era. The future will tell us whether the design principles discussed in this issue will hold when new devices arise. Until then, we are happy that we live in exciting times for survey methodology.

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