Does panel conditioning affect data quality in ego-centered social network questions?

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ABSTRACT

This article investigates the data quality of ego-centered social network modules in web surveys. It specifically examines whether these modules are subject to the effects of the repeated measurement of the same questions known as panel conditioning effects. Ego-centered social network modules are especially at risk of panel conditioning effects because many of the components in these modules are repetitive. Based on the theories of motivated underreporting and survey satisficing, we hypothesized that respondents reduce the length of the module by underreporting their network size and/or network density. To systematically test for panel conditioning effects, we experimentally varied the treatment frequency in a longitudinal study design, which included three panel waves. The results of our study showed that we generally obtained high quality data with relatively large reported network sizes and densities, low rates of item non-response, and low non-differentiation. In contrast to our expectations, the reported average network sizes were not smaller, and the network densities were not lower when respondents were asked to answer the same social network module multiple times. We found, however, patterns of individual change in network sizes that might be due to panel conditioning. Respondents with large network sizes in a panel wave reported smaller network sizes in the subsequent wave, while respondents with small network sizes reported larger network sizes in the subsequent wave. Respondents' ability and motivation did not affect these results. Thus, we would like to encourage researchers to further explore the opportunity of implementing ego-centered social network modules in cross-sectional as well as longitudinal self-administered surveys, while being cautious that in longitudinal surveys the chance of panel conditioning effects may increase with the average network size and the response burden of the network module.

Introduction

Panel conditioning effects have been defined as changes in actual behavior, attitudes, or knowledge; or changes in response behavior as a result of previous survey participation (e.g., Sturgis et al., 2009) and are a major methodological concern of panel studies (e.g., Kroh et al., 2016; Lynn, 2009; Warren and Halpern-Manners, 2012). This concern is especially problematic because panel conditioning effects endanger one of the most important aims of longitudinal research—the valid measurement of stability and change (Halpern-Manners et al., 2014).

With respect to ego-centered social network questions, a series of studies have demonstrated the impact of panel conditioning effects on reported network size and other question characteristics in interviewer-administered modes (e.g., Eagle and Proeschold-Bell, 2015; Groves and Magilavy, 1986; Marsden, 2003; Valente et al., 2017; van Tilburg, 1998). For example, Marsden (2003) and van Tilburg (1998) found a strong impact of panel conditioning on network questions and showed that changes in the reported network size across waves could not be explained by respondents' characteristics, but were due to interviewer effects; that is effects of interviewer behavior and interviewer characteristics on respondents' answers. Valente et al. (2017) showed that both interviewer and respondent learning can occur individually or collectively as a result of interviewers or respondents communicating with each other, which, on the one hand, can lead to reducing the number of names provided and thus also the interview length or, on the other hand, can lead to interviewers gaining experience in gathering the network data thereby increasing the reported network size. The collection of social network data via an interviewer-administered survey

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mode has advantages because interviewers can guide respondents through the often rather complex modules and prompt for additional names. However, other modes of data collection, especially the online mode, are becoming more wide-spread (Couper, 2000, 2013), and therefore, a question arises as to whether this mode is similarly affected by panel conditioning effects. An additional advantage of studying panel conditioning effects in self-administered surveys compared to interviewer-administered surveys is that panel conditioning effects due to respondents are not confounded with panel conditioning effects due to interviewers.

This paper focuses on the open research question as to whether panel conditioning effects are a threat to the data quality of ego-centered social network modules when data are collected via the web. With this aim in mind, the study implemented a longitudinal study design with three waves as well as an experimental study design wherein the treatment group received the identical ego-centered social network module twice; whereas the control group first received a series of filler questions on other topics and in the second wave received the social network module for the first time.

Background and previous research

Ego-centered social networks are usually measured through a set of network generator questions, which may include a name generator question[2] (e.g., "Please tell me the names of the persons with whom you have discussed political issues during the last week."), name interpreter questions (e.g., "How old is Peter?" or "Where does Peter live?"), questions on ego-to-alter ties (e.g., "How close are you to Peter?"), and questions on alter-to-alter ties (e.g., "Do Peter and Clara know each other?"). In general, network generators can be characterized as repetitive questionnaire blocks, in which respondents have to answer the same questions over several rounds.

Data quality of ego-centered social networks in cross-sectional studies

Research has shown that name generator questions are predisposed to interviewer effects (Brüderl et al., 2013; Fischer, 1982; Groves and Magilavy, 1986; Marsden, 2003; Paik and Sanchagrin, 2013; van Tilburg, 1998). A likely source of interviewer effects is uneven prompting by interviewers (Bearman and Parigi, 2004). Some interviewers fail to follow instructions and do not ask respondents for the names they may have missed, whereas others follow the instructions correctly.

Another line of research has also shown that the answers given to name generator items depend on their placement within a survey. For instance, studies have shown that when items are placed near the end of the survey, respondents report that they have fewer friends (Paik and Sanchagrin, 2013; Yousefi-Nooraie et al., 2017). In addition, experimental studies on the use of name generators in online surveys have found that the higher the number of fields available to enter names on a web form, the higher the number of names given by respondents (Manfreda et al., 2004; Vehovar et al., 2008). Another study has shown that changes in question wording can impact the number of persons named (Bidart and Lavenu, 2005).

The evidence is scarce on the comparison of differences in data quality between self-administered and interviewer-administered data

collection of ego-centered network data. A study, which included an experimental mode comparison, found that using an online mode negatively affected data quality compared with a face-to-face survey (Matzat and Snijders, 2010). Specifically, respondents of online surveys showed a higher drop-out rate (percentage of respondents who start, but do not complete a survey), more item non-response (questions left unanswered by respondents), more non-differentiation (respondents provide their answers to a series of questions in the same place of a rating scale), and a lower network density.

Panel conditioning in ego-centered social networks

In general, the repetition of questionnaire blocks has been shown to affect respondents by producing more measurement error since respondents learn how to skip filter questions to reduce questionnaire length (Duan et al., 2007; Eckman et al., 2014) and interviewers might learn how to reduce their burden as well (Josten and Trappmann, 2016; Valente et al., 2017). Similar effects can be expected for network generator questions when information is asked about every friend named as well as the relationship between friends. This effect can be aggravated in a panel survey when respondents are repeatedly asked to provide information about their friends.

With respect to ego-centered social network questions, the evidence on panel conditioning is sparse. Struminskaya (2016) implemented an experimental study design that included a name generator question with follow-up questions—on gender, age, relationship to the respondent, closeness to the respondent, the economic situation of named friends—and found no evidence of panel conditioning. In contrast, for their network module, Eagle and Proeschold-Bell (2015) found panel conditioning effects. Specifically, they saw a decline in network size over the course of three waves of surveys with a two-year duration. However, both these studies were not designed specifically to measure panel conditioning effects. While Eagle and Proeschold-Bell (2015) did not use an experimental design with control and treatment groups to control for other factors that may have triggered the decline in network size, Struminskaya (2016) implemented an experimental design in which respondents varied in survey experience, but neither of the experimental groups had multiple exposures to the network module. Given these limitations and the contradictions of the findings, the question as to whether panel conditioning affects ego-centered social network modules remains unanswered.

Theoretical framework

Panel conditioning in network modules can be caused by motivated underreporting (e.g., Tourangeau et al., 2012) and survey satisficing (e.g., Krosnick, 1991). Some respondents tend to use previous information about the survey process to employ certain response strategies that reduce their response burden (Nancarrow and Cartwright, 2007). Specifically, respondents may show a response behavior called *motivated underreporting* by avoiding follow-up questions of the type known as loop (i.e., questions based on those answers specific questionnaire blocks are repeated), filter, and screening questions (e.g., Kreuter et al., 2011). For example, in cross-sectional studies, Eckman et al. (2014) and Kreuter et al. (2011) have shown that asking filter questions in a grouped format, in which the filters are asked in a block and the triggered follow-up questions later, produces less underreporting than asking each follow-up question immediately after the filter question. With respect to screening questions, Tourangeau et al. (2012) have shown, in a cross-sectional study, that respondents tend to underreport the number of household members eligible for survey participation.

Since respondents only learn about additional questions after they complete the name generator question of a social network module, motivated underreporting of names—due to knowledge about the additional interview burden—is impossible; although underreporting due

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[2] Name generators can be based on four different types of ties between an ego and an alter (see, for example, Marin and Hampton, 2007). First, on role-relation ties, which refer to the role of a tie in a specific social domain (e.g., neighbor or colleague); second, on interaction ties, which refer to a tie with whom the ego is in contact (e.g., discussion about politics); third, on affective ties, which refer to the emotional value of a tie (e.g., an alter to whom the ego feels close); fourth, on ties based on an exchange, which refer to the supportive content between an ego and an alter (e.g., personal advice).