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An experiment comparing grids and item-by-item formats in web surveys completed through PCs and smartphones

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ABSTRACT

Some respondents already complete web surveys via mobile devices. These devices vary at several levels from PCs. In particular, we expect differences when grid questions are used due to the lower visibility on mobile devices and because in questionnaires optimized to be completed through smartphones, grids are split up into an item-by-item format.

This paper reports the results of a two-wave experiment conducted in Spain in 2015, comparing three groups: PCs, smartphones not-optimized, or smartphones optimized.

We found similar levels of interitem correlations, longer completion times for grid questions for smartphone respondents, and sometimes less non-differentiation for PCs. Thus, using the item-by-item format for smartphones and PCs seems the most appropriate way to improve comparability.

1. Introduction

In web surveys, when a set of items share the same scale, it is common to present them in a grid. This mainly happens when the items aim to measure the same concept or at least are about a similar topic. “In grid questions, a series of items is presented (usually in rows), sharing a common set of response options (usually in columns), asking one or more questions about each item” (Couper et al., 2013, p. 322).

Using grids presents both advantages and disadvantages. First, grids have the advantage of presenting the information in a more compact way, since the scale is shown only once. This reduces the need for scrolling or changing webpage. Several studies (Couper et al., 2001; Tourangeau et al., 2013) showed that completion times are significantly shorter when grids are used instead of separate questions, both if the questions are proposed on the same webpage and on separate ones. In principle, this is attractive for the respondents (who usually prefer shorter surveys), but also for the researcher (when incentives are related to the expected survey length). Nevertheless, Thorndike et al. (2009) and Toepoel et al. (2009) showed that respondents’ satisfaction with the survey experience decreases when grids are used, even if completion time is shorter.

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Moreover, there is some evidence suggesting that using grids can increase the interitem correlation (as measured by Cronbach's α) between items measuring the same concept (Tourangeau et al., 2004). This is also considered as a positive aspect: Cronbach's α generally increases as intercorrelations among test items increase (Cronbach, 1951). Therefore, it is often used as an internal consistency estimate of the reliability of a concept. However, other studies did not find this relationship (e.g. Bell et al., 2001; Callegaro et al., 2009). In addition, an increase of interitem correlation does not necessarily indicate a higher reliability of the obtained answers: it can result from common method variance (CMV) or a higher level of non-differentiation (Peytchev, 2005). CMV occurs when there are systematic measurement errors due to the use of a common scale. The common scale affects respondents' answers creating extra correlation between observed items that is not coming from the latent construct of interest. Because of CMV, the observed correlations are over-estimated. Non-differentiation is a kind of strong satisficing (Krosnick, 1991), i.e. a tendency of not putting the maximum effort in answering the questions. In the most extreme form of non-differentiation (called straight-lining), the respondents' effort decreases by always choosing the same answer category, independently of their real opinion and of the item they are asked about. Long grids of questions in web surveys elicit particularly these kinds of undesirable behaviours. Couper et al. (2013) suggest that one reason explaining the increase of non-differentiation is that in matrices condensed information can give respondents the impression of a long, complicated task. This can discourage respondents from making every effort.

Another disadvantage of grids is that they tend to increase dropout rates (Jeavons, 1998; Puelston and Sleep, 2008). Some studies also found that grids increase the percentage of item missing values (Iglesias et al., 2001; Manfreda et al., 2002; Toepoel et al., 2009). Since it is a common practice in web surveys to force respondents to give an answer, this can also be related to the increase of dropout rates. However, these results are not confirmed by other studies (e.g. Couper et al., 2001). The differences between these findings might be related to the fact that the listed studies are based on grids with different characteristics (e.g. number of items, of answer categories, topics).

Grandmont et al. (2010) investigated how to improve grid design in order to reduce its negative effects on data quality. Going further in that direction, Couper et al. (2013) proposed to improve grid design as much as possible by limiting their size (splitting them into two or three smaller grids) and taking advantage of the possibilities the Internet provides to simplify respondents' tasks. In particular, the authors suggest using dynamic shading, such as having each row of the grid change colour as soon as an answer has been selected.

However, seeing that there seem to be more disadvantages than advantages, others recommend avoiding grids and using separate questions instead (Poynter, 2001; Wojtowicz, 2001; Dillman et al., 2009). However, in practice, grids have been and still are frequently used in web surveys (Couper, 2008; de Leeuw et al., 2008; Tourangeau et al., 2013).

Nowadays, with the recent spread of mobile devices and their increased share in terms of Internet access (see, for example, Revilla et al., 2015), a new phenomenon has risen: the "unintended mobile response" (Peterson, 2012; Wells et al., 2013; de Bruijne and Wijnant, 2014). This concept defines the attempts to complete web surveys using mobile devices (especially tablets or smartphones) when the survey is designed for PCs and is not adapted to mobile browsers. This phenomenon increased very quickly in the last years in different countries (Callegaro, 2010; de Bruijne and Wijnant, 2014; Revilla et al., forthcoming).

The fact that respondents access surveys through mobile devices generates new challenges for designing web surveys (Fuchs and Busse, 2009; Baker-Prewitt, 2013; Couper, 2013). Indeed, mobile devices differ from PCs in several aspects, like their size and direction of the screen, their kind of keyboard, and their mobility. Their screen and their keyboard characteristics can affect visibility, making it necessary to zoom or scroll. It can also affect the difficulty to select an answer (e.g. because of their smaller buttons). All this affects the level of effort respondents have to make. Mobile devices usually also show a slower Internet connection (de Bruijne and Wijnant, 2013a). Moreover, respondents' cognitive processing and comprehension of the questions can be affected by their location (Peytchev and Hill, 2010). Several studies (de Bruijne and Wijnant, 2013a; Revilla et al., forthcoming) show that a large majority of respondents answer web surveys from home or workplace even when using a mobile device. Nevertheless, a proportion of the respondents participates in surveys using mobile devices from other places, which can decrease their concentration. In addition, respondents using mobile devices to complete surveys may be more prone to multi-tasking (i.e. doing other activities while answering the survey), even when answering from home. All in all, this leads to longer perceived and objective completion times, but also to higher dropout rates for mobile web respondents. Finally, this can also affect the quality of the collected data, even if few differences have been found in some previous studies (e.g. de Bruijne and Wijnant, 2013a; Mavletova, 2013). However, despite all these drawbacks and difficulties, given that getting people involved in surveys is becoming increasingly harder and for representativeness reasons, this problem cannot be solved by simply preventing respondents from participating through their mobile devices.

Some research focused on how to adapt web questionnaires to mobile devices (Boreham and Wijnant, 2013) in order to improve both survey experience and data quality. In this framework, the case of grids is particularly challenging. If grids were not already problematic in PC web surveys, moving to mobile web surveys, disadvantages are even higher, especially if surveys are completed through smartphones. Visibility decreases and answering complexity increases. Therefore, different authors (Macer, 2011; Couper, 2013) and websites[3] recommend not using grids for surveys completed through smartphones.

[3] For instance, see http://www.survey.bris.ac.uk/support/creating-accessible-online-surveys or http://www.surveysystem.com/blog/scales-in-survey-questionnaires/.