



# The comparison of road safety survey answers between web-panel and face-to-face; Dutch results of SARTRE-4 survey

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## ABSTRACT

**Introduction:** In the Netherlands, a comparison of an online and a face-to-face sample of car drivers was made to study differences on a number of selected questions from the SARTRE-4 road safety survey. **Results:** Contrary to expectations, there was no indication that online respondents were more likely to come from higher educated or more privileged social groups. Confirming earlier research, the results indicated that online respondents were less inclined to give socially desirable answers and were less inclined to use more extreme ratings in their opinions about measures. Contrary to expectations, face-to-face respondents did not tend to give more positive answers in judgment of road safety measures. Weighting to make samples comparable on gender, age, and education had almost no effect on outcomes. **Conclusions:** The implications for a transition from face-to-face survey to online panel method are discussed.

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## 1. Introduction

In the field of road safety, survey research is frequently used to study traffic behavior, and underlying cognitive and motivational determinants. In 2010, as part of the SARTRE-4 project, a large scale face-to-face survey was conducted in 19 countries (18 European countries and Israel). SARTRE stands for Social Attitudes to Road Risk in Europe. This survey, also performed in 1991, 1996, and 2002, focuses on a number of core road safety issues – speeding, impaired-driving (drink-driving, drugs), and seat-belt wearing (Cauzard & Wittink, 1998; SARTRE, 1994, 2004). In 2010, several new issues were included such as ‘eco-driving’ and mobility, cross-border traffic control, driver fatigue, safety of motorized two-wheelers, risk to pedestrians in urban areas, and new traffic enforcement technologies. In 1991, 1996, and 2002 the SARTRE-surveys focused solely on car drivers. In the 2010 survey, car drivers were still the major sampling group ( $N \approx 600$  in each country), but smaller subsamples ( $N \approx 200$ ) were also obtained of motorcyclists, and of other road users who indicated that they did not use either car or motorcycle as their major travel mode. The SARTRE-4 data provide the EC and member states a European picture of road users’ self-reported behavior and opinions, with possibilities to compare between states, and over time, to identify possible reasons for differences (SARTRE-4, 2012).

Since face-to-face surveys are costly, changing the future set-up of the SARTRE-4 survey to an internet survey or to a mixed mode survey has been considered. Within the SARTRE-4 project, a study was set up in the Netherlands to compare the responses to SARTRE-4 questions

between a probability-based face-to-face survey and a non-probability based online panel survey of car drivers. It was decided to restrict the comparative analysis to car drivers since they were the major sampling group in the SARTRE-4 survey and because national statistics for this group were available (and not for the other groups), which enabled weighing results. This paper presents a comparison of demographic characteristics and substantive answers between both survey methods. Such comparisons have been conducted in various other fields, but this is the first time such a systematic overall comparison is made in the field of road safety.

The use of internet panels for purposes of survey research has grown steadily since the 1990s. Widely recognized advantages of internet surveys are the relatively low costs, the high speed, the possibility to reach difficult to contact individuals, and the increased possibilities to monitor data quality (Frippiat & Marquies, 2010). However, critical questions have been raised whether internet surveys can be considered as representative for the population and whether the specific mode of answering questions on a computer leads to different answers (Couper, 2000).

### 1.1. Representativeness of internet surveys

The Dutch SARTRE-4 online web survey of car drivers used a sample from a large volunteer online panel. Several authors have voiced concerns about the representativeness of non-probability online panels such as used in this study (Couper, 2000; Baker et al., 2010; Dillman, 2007; Smyth & Pearson, 2011). Non-probability sampling does not involve random selection and thus non-probability samples cannot depend upon the rationale of probability theory. With a probabilistic sample, the odds or probability that the population is rightly

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represented is known. Couper (2000) concluded that internet surveys are vulnerable to coverage and sampling errors. In several studies it has been found that internet surveys tend to be biased towards having more privileged social groups, with respondents more often being young, urban, having higher income, or having higher education (e.g., Couper, 2000; Baker et al., 2010; Heiervang & Goodman, 2011; Marta-Pedroso, Freitas, & Domingos, 2007). Duffy, Smith, Terhanian, and Bremer (2005) concluded that online research using panel approaches attracts a more knowledgeable, viewpoint-oriented sample than face-to-face surveys. This could be because this is a prior characteristic of internet-users or panel-members, or it could be a learned behavior from taking part in a number of surveys. In recent years, concerns about coverage have decreased somewhat as the percentage of homes with internet access has sharply risen. In 2009, one year before the fieldwork of this study was conducted, 89% of households in the Netherlands had internet access (TNS Opinion and Social, 2010).

The debate on the representativeness and accuracy of internet surveys is not yet resolved. For various specific subjects, such as personality and well-being scales (Howell, Rodzon, Kurai, & Sanchez, 2010), attitudes towards immigration (Duffy et al., 2005), political behavior (Duffy et al., 2005; Stephenson & Crête, 2010), contingent valuation (Marta-Pedroso et al., 2007; Lindhjem & Ståle, 2010; Nielsen, 2011), risk factors associated with alcohol-related problems (Heeren et al., 2008), and willingness to pay for collective goods (Olsen, 2009; Taylor, Nelson, Grandjean, Amatchkova, & Aadland, 2009), authors have concluded that internet surveys or internet panels deliver nearly equivalent estimates or outcome patterns as more traditional probability-based surveys (telephone, face to face, or mail). However, for other subjects such as political activism (Duffy et al., 2005; Malhotra & Krosnick, 2007), knowledge about cholesterol (Duffy et al., 2005), and attitudes and preferences concerning wildlife management (Duda & Nobile, 2010; Gigliotti, 2011), authors have reported divergent findings between internet and other type surveys, and less representative or accurate results for internet surveys.

Baker et al. (2010) conclude that few studies have systematically disentangled effects from differences between samples and effects from differences in interview mode (internet, phone, mail, face-to-face) by the use of an experimental set-up. Based on the scarce number of studies that have done this, these authors conclude that non-probability samples that are used in most internet surveys are less representative and less accurate than probability samples. Comparing survey results with objective benchmarks from official government records or established high-quality surveys with high response rates, Yeager et al. (2011) also report greater accuracy for probability-based samples than non-probability based samples.

### 1.2. Mode or instrument effects

Specific mode or instrument effects such as question-order effects, social desirability biases, response-order effects, and satisficing have been found to be different according to the mode of data-collection (i.e., self-administered internet or paper-and-pencil questionnaire, interviewer-administered telephone or face-to-face interview; Ye, Fulton, & Tourangeau, 2011).

A general effect found in comparative survey research is that web surveys tend to produce less extreme, more neutrally toned responses (Frippiat & Marquies, 2010). Measuring agreement with positive statements about a target corporation, Roster, Rogers, Albaum, and Klein (2004) found that the web survey generated more negative and neutral evaluations than did a telephone survey. Measuring attitudes towards immigration, Duffy et al. (2005) found that online survey respondents were more likely to select a neutral scale-category ('neither agree nor disagree') than face-to-face respondents. In the context of a comparative survey on attitudes towards immigrants and asylum seekers, Heerwegh and Loosveldt (2008) again found that internet participants supplied more mid-scale responses than

face-to-face participants. In research on satisfaction with a long distance company, Dillman et al. (2009) found that both internet and mail respondents gave less positive answers at the scale end than respondents interviewed via phone by an interviewer or by an Interactive Voice Response (IVR) procedure.

A meta-analysis by Ye et al. (2011) used 18 comparisons based on 12 studies to determine differences in frequency of positive answers. This analysis showed that telephone respondents more frequently gave positive responses compared to mail or internet respondents, but not to face-to-face respondents. The authors posit that a positivity bias in answering questions is prompted by the actual presence of an interviewer. According to the authors, theoretical explanations underlying this effect may be that either personally interviewed respondents need to make a favorable impression by giving positive responses, or that personally interviewed respondents experience a greater burden on working memory making them more vulnerable for response-order, such as recency effects.

Social desirability refers to the tendency of respondents to provide researchers with responses that will give a favorable image of themselves, or responses they think correspond to the social norm (Frippiat & Marquies, 2010). There is consistent evidence that socially-desirable responding is more likely with interviewer-administered modes of data collection than self-administered modes (Joinson, 1999; Heerwegh, 2009; Baker et al., 2010). For example, consistent with the social desirability hypothesis, Link and Mokdad (2004) found that after correction for demographic differences, internet respondents reported higher rates of diabetes, high blood pressure, obesity, and binge drinking, and lower rates of efforts to prevent contracting sexually transmitted diseases, when compared to those interviewed by telephone.

Satisficing refers to a failure to put in the necessary effort to optimally answer a survey question (i.e., shortcutting the response process; Krosnick, 1991). The general hypothesis of a web survey inducing more satisficing than a face-to-face survey leads to the expectation that web survey respondents will use the "don't know" (DK) response alternative more frequently, and that they will differentiate less on rating scales than face-to-face respondents (Holbrook, Green, & Krosnick, 2003). Non-differentiation refers to the respondent's limited use of the available response alternatives on rating scales. In support of this hypothesis, Heerwegh and Loosveldt (2008) found that web survey respondents produced a higher "don't know" response rate, differentiated less on rating scales, and produced more item nonresponse than face-to-face survey respondents.

### 1.3. Hypotheses

Based on the literature, we expected that respondents from the online panel would tend to come from more socially privileged groups (i.e., higher income or higher education groups) (H.1), that online respondents would report more socially undesirable traffic behaviors and attitudes than face-to-face respondents (H.2), that online respondents would show more neutral ratings on traffic topics than face-to-face respondents (H.3), more specifically that online respondents would be less inclined to choose extreme positive ratings of approval for road safety measures than face-to-face respondents (H.4), and that online respondents would show less answer differentiation than face-to-face respondents (H. 5).

## 2. Method

### 2.1. Description of on-line panel

The online panel of the performing research bureau Motivaction contained approximately 80,000 Dutch respondents, who had indicated to be willing to participate in online research every now and then. A gross sample of 17,942 persons in the ages 18–70 years was drawn from the panel. From the gross sample, 12,686 respondents

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