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Reaching Hard-to-Survey Populations: Mode Choice and Mode Preference

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This study assesses the effect of response-mode choices on response rates, and response-mode preferences of hard-to-survey populations: young adults, full-time workers, big city inhabitants, and non-Western immigrants. Using address-based sampling, a stratified sample of 3,496 households was selected. The first group of sample members was contacted face to face and could choose between a CAPI and web response mode. The second group, contacted by telephone, could choose between CATI and web. The third group, contacted by telephone, was randomly allocated to a response mode. Our address-based sampling technique was successful in reaching most of the hard-to-survey groups. Insufficient numbers of non-Western immigrants were reached; therefore this group was excluded from our analyses. In our mixed-effect models, no significant effects on the willingness to participate were found for mode choice. We found that full-time workers and young adults were significantly more likely to choose web over CAPI when contacted face to face.

Key words: Hard-to-survey groups; response-mode choice; mixed mode experiment.

1. Introduction

Collecting data from hard-to-survey populations is challenging; they are hard to reach and known for low cooperation rates after having been contacted (Stoop 2005). To address these data collection difficulties, survey designs have been adjusted to increase response rates for hard-to-survey groups (e.g., increasing the number of contact attempts, Feskens 2009). Obviously such designs need to be carefully selected. To achieve contact with and cooperation of hard-to-survey populations, designs need to be tailored to characteristics of the sample (Groves et al. 1992; Haan and Ongena 2014). To identify such targeted approaches is therefore an important task for survey researchers. However, there is no guarantee whatsoever that designs can actually be found that perform better for specific groups. The existing literature is ambiguous about the effects of variations in contact modes and response modes. With this article, we aim to contribute to the existing literature by simultaneously investigating the effects of contact modes and response-mode choices on response rates, and analyzing the response-mode choices of several hard-to-survey groups.

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Stoop (2005; 2007) identified groups in society that are hard to survey. In the experiment described in this article, four of Stoop's hard-to-survey groups were selected. First, young adults can be difficult to contact due to, for example, unlisted cell phone numbers (Holbrook et al. 2003) and outdoor obligations (Stoop 2005), but they are generally willing to cooperate (De Leeuw and Hox 1998). Second, households with more than one full-time worker can be difficult to contact because of their at-home pattern. However, when contacted, they are generally willing to cooperate (Goyder 1987). Third, inhabitants of highly urbanized cities may be reluctant to let strangers enter their homes and are therefore hard to reach and their attitude towards survey research can be more negative (Campanelli et al. 1997; Goyder et al. 1992; Groves and Couper 1998). Finally, non-Western first and second-generation immigrants (henceforth referred to as 'non-Western immigrants') are often thought to be difficult to survey. However, in some studies, their contact rates are low – perhaps because of periods spent abroad (Blohm and Diehl 2001) – but they can have higher cooperation rates than natives (Feskens et al. 2007; Feskens 2009). To specify the group of non-Western immigrants, the following definitions were used (Statistics Netherlands 2013a):

-*Someone with a first-generation foreign background*: "Someone born abroad with at least one parent who was born abroad."
-*Someone with a second-generation foreign background*: "Someone born in the Netherlands who has at least one parent born abroad."
-*Someone with a non-Western background*: "Someone originating from a country in Africa, South America or Asia (excluding Indonesia and Japan) or Turkey."

Previous research has shown that different sample members may have divergent preferences for modes of contact (De Leeuw and van der Zouwen 1992), or favor different modes of responding (Dillman et al. 1994; Groves and Kahn 1979). Researchers have been offering multiple response-mode options to enable contacted sample members to select the response mode of their choice (Dillman et al. 2009; Shih and Fan 2007). However, mixed-mode experiments have shown deviating results with respect to the effects that response-mode choices have on response rates: increasing response rates (e.g., Schneider et al. 2005), decreasing response rates (e.g., Millar and Dillman 2011), or no influence on response rates (e.g., Friese et al. 2010). In addition, not many studies have focused on the effects of response-mode choices on response rates of hard-to-survey populations.

The deviating results and the survey design possibilities of presenting mode choices led us to believe that offering response-mode choices still can have positive effects on response rates. Combinations other than mail/web response-mode choices and varying contact modes could increase response rates. In addition, only a few studies have explored the effects of contact modes and response modes on response rates of hard-to-survey populations. To fill in some of these blanks in survey research literature, we designed and conducted an experiment to address the following two key questions:

1. What are the effects of offering response-mode choices on the willingness to participate of hard-to-survey populations and sample members in general?
2. To what extent do hard-to-survey populations differ in response-mode choice?

Before presenting our experiment and results, we start by providing the necessary background on the advantages and disadvantages of using response-mode choices in a survey design. Then we describe different ways of how response-mode choices are implemented in concurrent survey designs. This is followed by a section on contact mode preferences of hard-to-survey groups. Finally, we discuss literature on response-mode preferences of hard-to-survey populations.

2. Theoretical Background

2.1. The Advantages and Disadvantages of Response-Mode Choices

Preferences for response modes have been expressed for face-to-face interviews (Groves and Kahn 1979), telephone interviews (Smyth et al. 2009), mail surveys (Millar et al. 2009), and web surveys (Miller et al. 2002; Ryan et al. 2002; Tarnai and Paxson 2004). Therefore it can be worth the effort to create survey designs in which hard-to-survey populations are offered specific response modes. Offering sample members a response-mode choice not only makes it possible for them to cooperate in their favorite response mode, but they are also more involved in the decision to participate in the survey. This involvement can create goodwill, resulting in greater willingness to participate in the survey (De Leeuw 2005).

However, a choice in response mode could also prove overly cognitively challenging (Medway and Fulton 2012; Schwartz 2004). Too many choices can lead to 'choice overload' or 'overchoice situations', which lead to difficulties in the decision-making process (Dhar 1997; Iyengar and Lepper 2000; Toffler 1971). It is not clear whether choice overload problems also play a role in survey participation, since most studies focusing on choice overload are conducted in the field of marketing research (i.e., consumers choosing products). However, researchers have speculated on the effect the number of response-mode choices could have on response rates (Gillian et al. 2010; Martin 2011).

Furthermore, some researchers argue that if response-mode preferences really exist, then sample members should choose their preferred mode when choice is offered (Diment and Garrett-Jones 2007; Millar and Dillman 2011). Of course, being offered a choice does not imply that people also consciously make a choice. Sample members may select the response mode they have been approached in, simply because they do not want to weigh the pros and cons of alternatives or they might not have a mode preference. Moreover, it can be too much of a burden for them to switch modes and therefore they choose the response mode in which they were contacted (Lynn 2013).

2.2. Offering Response-Mode Choices in Concurrent Survey Designs

As the Internet is a widely-used medium and the low costs of offering web response modes are attractive (Dillman 2007), many organizations want to offer a web response mode to sample members in addition to the survey mode already existing (e.g., mail). When two (or more) response modes are offered simultaneously as an actual choice during the first contact moment, a so-called concurrent survey design is in use. However, according to a meta-analysis of Medway and Fulton (2012), offering concurrent web/mail response mode choices does not have positive effects on response rates. They found significantly lower

response rates for designs in which a concurrent web option was included in a mail survey than for designs in which the web option was not added. Nineteen studies were included in their meta-analysis. Two of these studies reported increased response rates when a concurrent choice was offered between mail and web (Brady et al. 2003; Schneider et al. 2005). Some experiments found almost no effects on response rates when web options were offered alongside a mail questionnaire (Friese et al. 2010; Lesser et al. 2010), but many studies conclude that the concurrent choice between web and mail reduces response rates (Brøgger et al. 2007; Gentry and Good 2008; Griffin et al. 2001; Hardigan et al. 2012; Israel 2010; Millar and Dillman 2011; Radon et al. 2002; Schmuhl et al. 2010; Smyth et al. 2010; Turner et al. 2010; Werner and Forsman 2005; Ziegenfuss et al. 2010). In an attempt to explain this outcome, Medway and Fulton (2012) argue that response-mode choices might make the survey participation process too complex and that they are a distracting factor in the response process.

However, by presenting a mode choice in a certain way, survey designers can try to ensure that the survey participation process is not overly cognitively challenging. Tancreto et al. (2012) experimented with response-mode choices to determine the best method to present the new web mode of the American Community Survey. They tested both concurrent designs and sequential designs. Their so-called prominent choice strategy, with a concurrent choice between a mail questionnaire and highlighted web mode, achieved the highest response rates. Within the concurrent choice designs, more people responded by web in the prominent choice condition than in the nonprominent choice condition (no highlighting of the web mode possibility). However, in the designs with the sequential choices, more people responded by web than in the concurrent choice designs. After asking sample members about their choice behavior, the researchers found no strong motivational indicators to explain why sample members chose a specific mode. Some did indicate that they like mail questionnaires better than web surveys, but mostly choices were made for practical reasons such as a lack of Internet access or computer issues.

Furthermore, different varieties of response-mode choices in concurrent designs could affect response rates in another way. Offering other combinations of response modes to choose from than mail and web may be more successful (e.g., a computer-assisted telephone interview (CATI) and web). Furthermore, sample members can be questioned about their response-mode preferences in advance and their preferred mode can be offered when they are approached again for another survey or a follow-up questionnaire (Hoffer et al. 2007; Olson et al. 2012). Overall, in these studies, higher response rates were found for sample members who were immediately assigned to their preferred response mode. However, when studying mode preferences in a sequential design, Olson et al. (2012) did not find differences in response rates between the sample members who were given their preferred response mode immediately and those who received their preferred mode when recontacted.

The survey design possibilities of presenting response-mode choices and the goodwill that mode choice can create led us to believe that offering response-mode choices still can have positive effects on response rates. Although concurrent web options in mail surveys seem to have negative effects on response rates (Medway and Fulton 2012), other combinations of response-mode choices in a concurrent design could increase the

willingness of sample members to participate in the survey. Therefore we expect that sample members will be more willing to participate in a survey when they can choose their response mode than when they cannot choose a response mode (*Hypothesis 1*).

2.3.   Contact Mode Preferences of Hard-to-Survey Populations

Before sample members can be offered a response-mode choice, they first have to be reached by a contact mode. Not much is known about sample members' contact mode preferences for the request to participate. For a variety of reasons, it is harder to obtain high response rates in telephone surveys than in face-to-face surveys (e.g., Groves 1977; Holbrook et al. 2003; Weeks et al. 1983). This argument is supported by results of a meta-analysis of 45 studies in which the highest completion rates were found for face-to-face surveys compared to telephone and mail surveys (Hox and de Leeuw 1994). Concentrating only on the contact moment, De Leeuw and van der Zouwen (1992) found lower response rates for telephone contacts than for face-to-face contacts. However, other researchers report no differences in response rates between telephone and face-to-face contacts (Scherpenzeel and Toepoel 2012) and between telephone and mail contacts (Wilkins et al. 1997).

Focusing on the four hard-to-survey groups studied in this article, according to Stoop (2005) young adults can be difficult to reach in general because of their outdoor obligations. Furthermore, this group is also known for having an unlisted cell phone number instead of a listed landline number (Blumberg and Luke 2007; Holbrook et al. 2003). Therefore it is likely that young adults are easier reached face to face than by telephone. Households with more than one full-time worker are difficult to reach in both of the contact modes (face-to-face and telephone) because of their at-home pattern. For this group the timing is more important, for example calling in the evenings (Weeks et al. 1983). According to the literature, big city inhabitants may be reluctant to let strangers enter their homes (Campanelli et al. 1997; Goyder et al. 1992; Groves and Couper 1998), so it is likely that this group is easier reached by telephone than by a house visit. In general, non-Western immigrants can be difficult to reach because of periods spent abroad (Blohm and Diehl 2001). In addition, landline telephone coverage among this ethnic-minority group is relatively low (Feskens 2009). Therefore it is likely that this group is easier reached by a house visit than by telephone. Nevertheless, reaching this group might be difficult either way.

2.4.   Response-Mode Preferences of Hard-to-Survey Populations

Only a few studies have reported information about response-mode choices made by hard-to-survey sample members. As a consequence, not much is known about the mode preferences of most difficult-to-survey groups and how to target them. The one hard-to-survey group that does get attention in literature on response-mode preferences is the young adult population. Schneider et al. (2005) found that when a choice between a mail questionnaire and a web response mode was offered, young individuals in the sample preferred web. Furthermore, many other studies found that young adults prefer the web response mode (Diment and Garrett-Jones 2007; Kaplowitz et al. 2004; Millar and Dillman 2011; Stoop's 2005; Vehovar et al. 2002). An explanation for this preference can

be that young adults use web on a daily basis (De Leeuw and Hox 1998) and therefore it is a very convenient response mode for them. However, this group is also known for not owning a landline number (Blumberg and Luke 2007; Holbrook et al. 2003), so when offered response-mode choices (e.g., CATI and web) their choice can also be based on the response mode that is available to them. Other studies have not found evidence for a web preference of young adults but have found that older people prefer non-web response modes (Millar et al. 2009; Smyth et al. 2009). In a US study, senior citizens of 65 and over are assumed to be less likely to have Internet access in their homes and to use the Internet less frequently because they think it is not relevant to them or their web proficiency level is too low (Zickuhr and Smith 2012). Therefore their preferences for non-web response modes can derive from mode availability as well as mode proficiency. In another mixed mode study by Tancreto et al. (2012) in which a choice between mail and web was offered, choices for web were predominantly made by young adults but also by highly educated sample members and non-English-speaking households. These results can be explained when looking at other studies on Internet use in which age, education and income positively correlated with use of the web (Couper et al. 2007; Loges and Jung 2001). Based on these studies, we thus expect that young adults will choose the web response mode more often than older adults (*Hypothesis 2*), as this mode suits this group in terms of mode proficiency and mode availability.

It is harder to predict the response-mode preference for the other three hard-to-survey groups (full-time workers, big-city inhabitants, and non-Western immigrants) as the literature on them is less extensive. It is assumed that full-time workers are less likely to spend their time on surveys as they are busy working and prefer to spend their time on other activities after work (Groves et al. 2002). However, Stoop (2007) has argued that this group is used to multitasking, and is therefore willing to find time for survey participation when reached. In addition, Vercruyssen et al. (2013) found that survey participation among 'busy people' is mainly affected by 'feeling busy' regardless of the time spent on working. Based on this, we expect that households with more than one full-time worker will choose a self-administered mode more often than households with one full-time worker or less (*Hypothesis 3*). Choosing a self-administered mode, such as web, enables this hard-to-survey group to fill in the questionnaire at their own convenience (i.e., they can decide on their own how to manage their time). However, there is a risk that this choice may not translate to higher response rates due to the procrastination factor (i.e., putting off survey participation until the last possible moment).

With regard to inhabitants of urbanized cities, studies have shown that they are reluctant to let strangers enter their homes (Campanelli et al. 1997; Groves and Couper 1998), therefore it can be easier to reach this group by telephone than through a house visit. Furthermore, their attitude towards survey research can be more negative compared to inhabitants of other areas. For this reason, we also expect that this group will choose the web response mode more often than households from other areas (*Hypothesis 4*), as web is the response mode with the least interviewer interference and therefore suits this group the best. As this article describes an experiment that is conducted in The Netherlands, we did not include hypotheses about Internet penetration, as opposed to studies from the United States (Sylvester and McGlynn 2010). The level of Internet penetration in The Netherlands is not only very high (95% of all households), but also dominated by broadband access

(88% of all households with an Internet connection). There might be slight differences between the penetration in urbanized cities and rural areas, but overall the Internet has become a very common mode of communication in the Netherlands (Deutskens et al. 2004; Statistics Netherlands 2013b). Therefore we do not expect that differences in response-mode preferences between big city households and households from other areas are attributable to broadband access or speed, but are attributable to people's willingness to let strangers enter their homes or their attitudes towards survey research.

According to Feskens et al. (2006), non-Western immigrants are known for their low education level. As lower education levels often correlate negatively with Internet use (Couper et al. 2007; Loges and Jung 2001; Tancreto et al. 2012), it is likely that this hard-to-survey group will not choose the web response mode. Furthermore, language barriers can also constitute a problem for this group. Therefore we expect non-Western immigrants to choose interviewer-administered response modes over self-administered modes more often than natives (*Hypothesis 5*). If language problems arise, the interviewer can clarify the questionnaire if necessary (Blohm and Diehl 2001), and interviewer-administered response modes are more convenient to non-Western immigrants because of a possible low web proficiency.

Another factor that can affect the mode choice of sample members in general is the contact mode. We did not find studies in which this was empirically tested, but there are studies in which the effect of mode switching is analyzed. For example, Lynn (2013) found lower response rates for telephone-contacted sample members who were asked to participate in a computer-assisted personal interview (CAPI) than for face-to-face-contacted sample members who were asked to participate in the same mode (CAPI). So it would seem that sample members prefer to continue survey cooperation in the mode they were contacted in, although it is of course also possible that it was the face-to-face contact mode that increased response rates as compared to the telephone contacts. It is possible that in our study the contact mode will influence the response-mode choice of sample members.

3. Method

3.1. Sampling of Households

Based on the literature of Stoop (2005; 2007), we focused on four hard-to-survey groups: young adults (ages 15 to 34), households with more than one full-time worker, inhabitants of big cities, and non-Western immigrants. This experiment was based on a multistage sample. The fieldwork of this study was carried out from March to June 2012 by GfK Panel Services Benelux. In the first sampling stage, all 441 municipalities of the Netherlands were compared on location (12 provinces) and urbanization levels. In the second sampling stage, data from the European Social Survey (ESS) 2010 round was used to study in which municipalities the respondents lived who fulfilled at least one of the criteria of the four selected hard-to-survey groups. Based on this analysis, 283 municipalities were selected. In the third stage, 169 municipalities were selected based on the location of GfK's employed interviewers. Finally, 40 municipalities from these

169 were selected, again taking into account the location (equal selection within 12 provinces) and the urbanization levels of the municipalities.

Enriched address-based sampling was applied using databases with information on population characteristics using ZIP code areas within the 40 municipalities. The addresses with ZIP codes based on the three selection variables were obtained from Cendris (Cendris is a commercial organization that provides addresses for marketing or research purposes with specific information about households). Three selection variables were used to oversample the four hard-to-survey populations. Many full-time working couples and young adults live in newly-built neighborhoods (Raets 2008), and non-Western immigrants predominantly reside in low-income neighborhoods and urbanized areas (Feskens et al. 2007; Nicolaas et al. 2010; Statistics Netherlands 2010). Therefore the selection variables were: newly-built neighborhoods (which is likely to oversample households with more than one full-time worker and people aged 15 to 34), low-income neighborhoods (which is likely to oversample non-Western immigrants), and random selection of remaining ZIP codes to vary in location and urbanization levels so as to reach big city inhabitants and to make an effort to include more members of the hard-to-survey groups. After the data collection was completed, we defined the four hard-to-survey groups using self-reports of participating respondents.

In this way, a total of 3,496 households were randomly selected for this study within an additional round of the ESS. An adapted form of the last-birthday method was used when there was more than one individual living in the household. This standard method of the ESS entails that the interviewer asks which person in the household had his or her birthday closest to a randomly chosen date. The identified individual should then be selected for the survey (no substitute can be taken). This method entailed a difference in sample member selection in single-person households and multi-person households.

3.2. Experimental Design

To study the effects of the response-mode choices on response rates, a concurrent design was used. First, the sample members received a letter sent to their home, in which the goal of the survey was introduced and their selection for this study was explained. The sampled households were randomly allocated to three experimental groups. One group was contacted face to face and was given the choice between CAPI and a web survey. Another group was contacted by telephone and was given the choice between CATI and a web survey. Sample units in the third group were randomly allocated to CAPI, CATI, or web after being contacted by telephone. Interviewers who paid house visits were compensated per interview and telephone interviewers were compensated per hour. To take into account possible interviewer effects due to this compensation difference, sample members who were contacted face to face and wanted to participate through CAPI could not be interviewed on the spot, but had to make an appointment with the interviewer. The telephone-contacted sample members could participate on the spot or make an appointment.

In several other studies, mail/web choices are offered by mail (see meta-analysis by Medway and Fulton 2012). In our opinion, this does not present a very attractive

combination of contact and response modes to obtain high response rates. First, in a mail contact mode there is no interviewer present who can convince the sample member to participate. In our design we want to compare two contact modes with interviewers, as interviewer presence can have an impact on sample members (Bethlehem et al. 2011; Groves et al. 1992). Second, both response modes (mail/web) are self-administered, while some sample members might prefer interviewer-administered response modes. Therefore we included both interviewer-administered and self-administered response modes in the design. Due to budget constraints, there was no group randomly allocated to a response mode after being contacted face to face. Accordingly, random assignment and contact mode were partially confounded in the design.

3.3. Participating Households

Of the 3,496 households selected for this study, 824 participated in the survey. Furthermore, 327 households indicated that they were willing to cooperate. Willing households confirmed they would like to take part in the survey, but were not contacted again for interview or were not sent a link to the web survey because of budget reasons or expiration of the data-collection period. The number of willing respondents was larger for the web conditions because it was harder to find respondents that wanted to participate in CAPI or CATI. Interviewers continued visiting and calling respondents until a sufficient number was reached for all response modes. The number of households that refused to cooperate was 1,579. This group includes hard refusals as well as soft refusal households that indicated they were not interested in participating in the survey after a call back. Additionally, 428 households were known to be ineligible (e.g., due to language barriers, or selected address is business office), and for 208 households their eligibility was unknown (e.g., unable to locate address, or technical problems). Furthermore, 130 households were approached without making contact with the sample member, the so-called noncontacts.

4. Results

4.1. Outcome Rates

Table 1 shows the response rates and cooperation rates of the experimental groups.

Table 1. Response rates and cooperation rates

Contact modes	1. Face-to-face: Choice between CAPI or web	2. Telephone: Choice between CATI or web	3. Telephone: No choice (random: CAPI, CATI, or web)	All contact modes combined
Outcome Rates				
AAPOR RR1	54.9	34.8	28.8	37.5
AAPOR COOP1	60.6	40.6	32.0	42.1

The following definitions of the American Association for Public Opinion Research (AAPOR 2011) were used to calculate the response rates and cooperation rates:

$$\text{Response Rate 1 (RR1)} = \frac{\text{Complete interviews}}{\begin{array}{c}(\text{Complete interviews} + \text{Partial interviews})+ \\ (\text{Refusal and Break off} + \text{Noncontact} + \text{Other})+ \\ (\text{Unknown if household occupied} + \text{Unknown Other})\end{array}}$$

$$\text{Cooperation Rate 1 (COOP1)} = \frac{\text{Complete interviews}}{\begin{array}{c}(\text{Complete interviews} + \text{Partial interviews})+ \\ (\text{Refusal and Break off} + \text{Other})\end{array}}$$

In the calculation, the willing sample members were included in both the numerator and the denominator, as these sample members did agree to cooperate with the interview which is the variable of interest in our analyses. The highest outcome rates were found for the households in Group 1, who were contacted face to face and could choose a response mode. We found significant differences for the response rates obtained in Group 1 compared to the response rates in Group 2, who were contacted by telephone and could choose a response mode (χ^2 (1, $N = 1{,}696$) $= 69.57$, $p = .00$), as well as for the cooperation rates (χ^2 (1, $N = 1{,}493$) $= 59.95$, $p = .00$). However, it is difficult to determine if these differences are the result of the contact mode or the offered response-mode choices. Significant differences were also found comparing the response rates of Groups 2 and 3 (χ^2 (1, $N = 2{,}251$) $= 8.83$, $p = .00$) and the cooperation rates (χ^2 (1, $N = 1{,}990$) $= 15.24$, $p = .00$). Therefore it would seem that offering response-mode choices has a positive effect on the willingness to participate, corroborating Hypothesis 1; however, this will be analyzed further in Subsection 4.2.

Table 2 shows the numbers and proportions of sample members in each experimental group. When comparing Groups 1 and 2, face-to-face-contacted households seem to be more prepared to cooperate than households approached by telephone, as the proportion of refusers is lower in Group 1 (33.1%) than in Group 2 (43.5%). We should take into account that these proportions can be affected both by the contact mode and by the combination of response-mode choices. The same can be found when comparing the refusal proportions of Group 1 (33.1%) and Group 3 (allocated to CAPI 58.8%, allocated to CATI 54.9%, and allocated to web 44.5%), but again this result can also be influenced by the fact that Group 3 was not offered a response-mode choice and by the different contact mode. Looking at Groups 2 and 3, higher refusal proportions were found in the telephone-contact groups in which sample members were allocated to CAPI (58.8%), CATI (54.9%), or web (44.5%) in comparison to Group 2 (43.5%). As households were contacted with telephone in both groups, offering a choice in response mode seems to positively affect the refusal proportions (however, see Subsection 4.2).

Table 3 shows the proportions of the hard-to-survey sample members that were reached in the neighborhoods that were used in the selection process, and it shows the proportions of sample members in the three experimental groups.

Focusing on the neighborhoods, for young adults and households with more than one full-time worker we found the highest proportions in the newly-built neighborhoods (54% and 46% respectively), and for the non-Western immigrants we found the highest

Table 2. *Proportion of sample members per group*

	Group 1 Letter by mail / Face to face / CAPI or Web		Group 2 Letter by mail / Telephone / CATI or Web		Group 3 Letter by mail / Telephone / No: randomly allocated to CAPI		Group 3 Letter by mail / Telephone / No: randomly allocated to CATI		Group 3 Letter by mail / Telephone / No: randomly allocated to Web	
Introduction / Contact / Mode choice	N	%	N	%	N	%	N	%	N	%
Respondents:										
CAPI	117	13.3	-	-	100	15.8	-	-	-	-
CATI	-		100	9.7	-	-	106	25.4	-	-
Web	171	19.4	125	12.2	-	-	-	-	105	19.5
Other:										
CAPI willing	17	1.9	-	-	15	2.4	-	-	-	-
CATI willing	-	-	10	1.0	-	-	6	1.4	-	-
Web willing	144	16.3	71	6.9	-	-	-	-	64	11.9
Refusal	291	33.1	447	43.5	373	58.8	229	54.9	239	44.5
No contact	65	7.4	34	3.3	16	2.5	4	0.9	11	2.0
Known ineligibility	63	7.2	149	14.5	80	12.6	59	14.1	77	14.3
Unknown eligibility	12	1.4	92	8.9	50	7.9	13	3.1	41	7.6
Subtotal	N = 880	100	N = 1,028	100	N = 634	100	N = 417	100	N = 537	100
Total	3,496									

Table 3. Hard-to-survey sample members in neighborhoods and experimental groups

| | | | **Proportions of sample members** | | |
	Young adults (<35)	Full-time workers	Big-city inhabitants	Non-Western immigrants	Other respondents
Neighborhoods					
Low income	23.0	18.0	37.7	45.8	29.4
Newly built	54.0	46.0	26.2	29.2	31.8
Other	23.0	36.0	36.1	25.0	38.8
	100	100	100	100	100
Experimental groups					
Group 1 (f2f + choice)	43.2	40.0	34.4	50.0	41.1
Group 2 (phone + choice)	23.6	36.0	29.5	20.8	25.4
Group 3 (phone + no choice)	33.5	24.0	36.1	29.2	33.5
	100	100	100	100	100

proportions in the low-income neighborhoods (45.8%). This is what we aimed for when using the neighborhood selection variables in our design. The highest proportions of big-city inhabitants were found in low-income neighborhoods (37.7%) and neighborhoods in the 'other' category (36.1%).

When looking at the proportions in the experimental groups, we found the highest proportions for young adults (43.2%) in Group 1. This is in line with the literature, which states that this group is easier to reach face to face than by telephone. The difference between Group 2 (23.6%) and Group 3 (33.5%) is more difficult to interpret. It is possible that telephone calls are harder when an interviewer needs to explain the mode choice to the sample member compared to calls to randomly-allocated sample members where only the request to participate needs to be communicated. Furthermore, young adults might be too impatient to listen carefully to what is being said over the telephone; mode choice may be not attractive enough to them. However, it is also possible that these differences between Groups 2 and 3 are caused by coincidence because of differences in the sample. For households with more than one full-time worker, we did not find major differences between Group 1 (40.0%) and Group 2 (36.0%). According to the literature, this group is hard to contact but the ones reached are willing to cooperate. The proportions for full-time workers were lower in Group 3 (24.0%), so it is possible that mode choice had a positive effect on this group. For big-city inhabitants, we found no major differences comparing the three groups. The highest proportion of non-Western immigrants was found in Group 1 (50.0%); this is in accordance with the literature discussed. However, just as with the young adult group, we found higher proportions in Group 3 (29.2%) than in Group 2 (20.8%). It is possible that non-Western immigrants have no mode-choice preferences when contacted over the telephone because they may have language difficulties.

4.2. The Effect of Mode Choice and Neighborhood on the Willingness to Participate

In the present study, we deal with the dichotomous dependent variable 'willingness to participate' (non-normally distributed), and a partially-crossed data structure. Sample members (n = 1,502, including: actual respondents, willing sample members, and refusers) are nested within interviewers (n = 21) and interviewers are crossed with municipalities (n = 40). Based on reviews of statistical software for mixed-effect (multilevel) modeling (e.g., Li et al. 2011; Quené and Van den Bergh 2008), generalized linear mixed models (GLMM) were fit using the *lmer* function in package lme4 (Bates 2005), which is an extension package to R.

Our models in Table 4 only include the sample members that were contacted by telephone. We excluded the group that was asked to participate in the CAPI response mode contacted by telephone (the no-choice group) to make the choice group and no-choice group more comparable (i.e., including only telephone and web as response modes). Our dichotomous variable 'willingness to participate', coded 'one' when willing to participate and 'zero' when not, is included in our model as the dependent variable. Fixed-effect and random-effect factors are distinguished in the models. We have three fixed-effect factors of interest. The first fixed factor is mode choice. By including this fixed factor in our model, we can report some results on the effect of mode choice in our experiment, and

Table 4. Prediction of the likelihood of being willing to participate in the survey

	Model 1		Model 2		Model 3	
Fixed-effect factors						
Intercept	− 0.4781***	(0.0994)	− 0.3380*	(0.1614)	− 0.3310*	(0.1670)
Choice	0.1584	(0.1067)	0.0551	(0.1210)	0.04621	(0.1216)
Low income	− 0.3614**	(0.1228)	− 0.3763**	(0.1357)	− 0.3933**	(0.1364)
Newly built	0.1793	(0.1255)	0.1469	(0.1289)	0.1487	(0.1295)
Random-effect factors						
Intercept (interviewer)			0.4743		0.4821	
Intercept (municipality)					0.2237	
Model fit						
AIC	2000		1967		1967	
Empty models (intercept only)						
Intercept (fixed effect)	− 0.4439***	(0.05288)	− 0.3634**	(0.1360)	− 0.3653**	(0.1410)
Intercept (interviewer)			0.4855		0.4910	
Intercept (municipality)					0.2019	

The significance of the fixed-effect factors was evaluated by means of the Wald test for the coefficients in the models, *p* < .05, **p* < .01, ***p* < .001

contribute some additional insights to the mode choice discussion. The second and third fixed factor describe the neighborhood situation of the sample member, living in a low-income neighborhood, or living in a newly-built neighborhood. The living environment of sample members is associated with willingness to participate (Groves and Couper 1998), which is why we were interested in neighborhood effects in our sample.

All our fixed factors were binary, coded 'one' when having a mode choice, living in a low-income neighborhood, or living in a newly-built neighborhood, and coded 'zero' when not having a mode choice or not living in a low-income or newly-built neighborhood.

The random factors in our model are interviewers and municipalities. By including these two random factors, the structural variability associated with these factors can be taken into account. Sample members are not included as a random factor, since there is no variance linked to sample members as there is only one value for each sample member. Including the interviewer as a random factor in our model was necessary, because an individual interviewer can cause systematic variation on the willingness of a respondent to participate in the survey (Couper and Groves 1996). Although sample members could have been in contact with multiple interviewers, each sample member was only linked to the interviewer who undertook the last telephone contact attempt for this sample member. Furthermore, we also included the municipality as a random factor to take into account possible geographical systematic variance (e.g., sample members from a certain municipality could be more willing than others). Since interviewers conducted interviews in multiple municipalities, interviewers are associated with multiple municipalities, whereas sample members are nested under the interviewer that last reached them.

Furthermore, there can be variability in the effect the three fixed factors (slopes) have. For example, interviewers (random-effect factor) could have been more successful in obtaining cooperation in one neighborhood than in another neighborhood. It is important to take into account these so-called random slopes as they make the formula of the

mixed-effect model as precise as possible. However, the random slopes in our analyses did not affect our model. Therefore we excluded the random slopes from the models.

In Table 4 three models are presented: a single-level model with fixed factors (Model 1), a two-level model (Model 2) with fixed factors and one random factor, and a three-level model (Model 3) with fixed factors and two random factors. For the fixed-effect factors, each coefficient is shown with its accompanying standard error in parentheses. For the random-effect factors, the standard deviation is presented. We found that offering a choice in response mode did not have a significant effect on the willingness to participate in the survey. This result was compared with our results from Subsection 4.1 where we found a significant difference for cooperation rates (χ^2 (1, $N = 1{,}990$) = 15.24, $p = .00$) between experimental Groups 2 and 3, and lower refusal rates in Group 2 than in Group 3. When removing the telephone-contacted sample members from the analysis that were randomly allocated to CAPI, the effect of mode choice on the willingness to participate is no longer significant. A possible explanation for this finding is that the sample becomes too small in the analysis. Nevertheless, based on our mixed-effect models we did not find support for Hypothesis 1. The likelihood of being willing to participate in the survey was significantly lower for households in low-income neighborhoods than for households in other neighborhoods. No significant effects on willingness to participate were found for households in newly-built neighborhoods compared to households in other neighborhoods. Models including interactions did not yield additional significant effects. We saw a decrease in the Akaike Information Criterion (AIC) when the random factors were included in Models 2 and 3, which means the goodness of fit improved. The random factors did not yield additional significant effects. According to the AIC, Models 2 and 3 perform equally well. However, the municipality random effect factor does not cause much systematic variance. Therefore Model 2 is preferred.

4.3. Response-Mode Choices

Analyses were performed to assess the response-mode preferences of hard-to-survey respondents in comparison with other respondents. As shown in Table 5, supported by a marginally significant difference (χ^2 (1, $N = 288$) = 3.60, $p = .06$), the hard-to-survey households (young adults, full-time workers, and big-city inhabitants combined) were more likely to choose web when contacted face to face than the other respondents. Furthermore, young adults were more likely to choose web over CAPI when contacted face to face compared to the older respondents – a significant difference was found (χ^2 (1, $N = 288$) = 5.33, $p = .02$). This provides evidence for Hypothesis 2 for the face-to-face-contacted young adults. Households with more than one full-time worker were also more likely to choose the web response mode when contacted face to face than households with other work hours, this is also supported by a marginally significant difference (χ^2 (1, $N = 288$) = 3.79, $p = .05$). This result is in accordance with Hypothesis 3 for the face-to-face-contacted households with more than one full-time worker. No significant difference was found for big-city inhabitants contacted face to face in comparison with non-big-city inhabitants (χ^2 (1, $N = 287$) = 2.51, $p = .11$). Therefore, Hypothesis 4 does not hold for the face-to-face-contacted big-city inhabitants. When sample members were contacted by telephone, no significant differences were

Table 5. *Response-mode choices of hard-to-survey populations*

Response-mode choices

Hard-to-survey	Face-to-face contact			Telephone contact		
	CAPI	Web		CATI	Web	
(all groups combined)	32.6 %	67.4 %	100 %	36.8 %	63.2 %	100 %
Other respondents	44.4 %	55.6 %	100 %	47.0 %	53.0 %	100 %
Chi square	$\chi^2 (1, N = 288) = 3.60, p = .06$			$\chi^2 (1, N = 225) = 1.79, p = .18$		
Young adults ($<$35)	28.1 %	71.9 %	100 %	34.3 %	65.7 %	100 %
35 and older	44.2 %	55.8 %	100 %	46.3 %	53.7 %	100 %
Chi square	$\chi^2 (1, N = 288) = 5.33, p = .02$			$\chi^2 (1, N = 225) = 1.73, p = .18$		
Full-time workers	20.0 %	80.0 %	100 %	33.3 %	66.7 %	100 %
Non-full-time workers	42.2 %	57.8 %	100 %	45.4 %	54.6 %	100 %
Chi square	$\chi^2 (1, N = 288) = 3.79, p = .05$			$\chi^2 (1, N = 225) = 0.97, p = .32$		
Big-city inhabitants	57.1 %	42.9 %	100 %	38.9 %	61.1 %	100 %
Non-big-city inhabitants	39.5 %	60.5 %	100 %	44.9 %	55.1 %	100 %
Chi square	$\chi^2 (1, N = 287) = 2.51, p = .11$			$\chi^2 (1, N = 225) = 0.24, p = .62$		

found (respectively for all four hard-to-survey groups (χ^2 (1, $N = 225$) = 1.79, $p = .18$), for young adults (χ^2 (1, $N = 225$) = 1.73, $p = .18$), for full-time workers (χ^2 (1, $N = 225$) = 0.97, $p = 0.32$), and for big-city inhabitants (χ^2 (1, $N = 225$) = 0.24, $p = .62$)). Thus we only found support for Hypotheses 2-4 for the face-to-face-contacted groups. In comparison with other ESS rounds conducted in the Netherlands (www.europeansocialsurvey.org), only a very low number of non-Western immigrants were reached for this experiment. Consequently, this group was excluded from our analyses. Thus we did not find support for Hypothesis 5 for the non-Western immigrants, neither in the face-to-face-contacted group nor in the telephone-contacted group.

5. Discussion

In this article, an experiment was described in which the effects of offering response-mode choices on the willingness to participate were examined and response-mode choices of hard-to-survey households were studied: respectively young adults, households with more than one full-time worker, big-city inhabitants, and non-Western immigrants.

5.1. The Effect of Response-Mode Choice and Neighborhoods on the Willingness to Participate

Our first research question focused on the effects of offering response-mode choices on the willingness to participate of hard-to-survey populations and sample members in general (Hypothesis 1). We expected that sample members would be more willing to participate in a survey when they could choose a response mode. Although at first response-mode choice seemed to have a positive effect on the willingness to participate in our analysis of Subsection 4.1, this effect disappeared when we excluded the CAPI group that was contacted by telephone from the analysis in Subsection 4.2. It is possible that this result was caused by the sample size. For future studies, besides including more sample members, we would recommend including similar response modes in both experimental groups to further study the effect of response-mode choice on the willingness to participate.

Our mixed-effect models did show that sample members from low-income neighborhoods were less likely to be willing to participate than sample members from other neighborhoods. We did not find such an effect for sample members from newly-built neighborhoods. As we have no more specific data on the nonrespondents we can only speculate about these effects. Groves and Couper (1998) argued that the living environment of sample members has been associated with the willingness to participate. We think it is likely that the personal characteristics of people in the neighborhoods differ, and that these characteristics correlate with the willingness to participate in surveys. For example, it is likely that the number of less-educated persons in low-income neighborhoods is higher than in other neighborhoods, since education is positively associated with income (De Gregorio and Lee 2002). Moreover, many low-income neighborhoods in the Netherlands are close to big cities (Ament 2008). As less-educated people and big-city inhabitants are known for low response rates, such personal characteristics could explain why the willingness to participate is lower in low-income neighborhoods than in other neighborhoods.

5.2. *Response-mode Choices of Hard-to-Survey Populations*

Regarding our second research question on the extent to which hard-to-survey populations differ in response-mode choices (Hypotheses 2-5), we only found significant results for the face-to-face-contacted groups. For young adults and households with more than one full-time worker, we found response-mode preferences for web. It seems it would be useful to offer these hard-to-survey groups their preferred single response mode in future surveys. However, we think it is likely that our positive outcomes are not only influenced by response-mode preferences but also by the opportunity of getting involved in the survey by making personal choices. Future studies should investigate if it is the response-mode preference or the choice offering that makes it attractive for sample members to cooperate. This could be tested in experiments using public records (such as Municipal Basic Administrations) for stratified sampling, offering subgroups the dominantly-preferred mode within a stratum, compared with subgroups that are offered response-mode choices.

   The possible burden of switching from a contact mode to a different response mode (e.g., sample members are approached face to face and are asked to participate in a web survey) might suggest a larger proportion of sample members staying in the same mode when provided a choice. However, we found higher proportions of sample members choosing the web response mode in experimental groups 1 and 2 than choosing the response mode that was similar to the contact mode (face-to-face or telephone). It seems that the preference for the web response mode is stronger than the effect of the possible burden to switch modes. However, we found higher refusal rates for the telephone-contacted sample members that were allocated to CAPI than those that were allocated to the CATI response mode. Still, the lowest refusal rates were found for sample members that were allocated to the web response mode. Thus, it seems that switching to another interviewer-administered mode leads to lower response rates as was found by Lynn (2013), but switching to web (or maybe other self-administered modes) is not a burden. However, to draw more firm conclusions on the effects of mode switching, we recommend that new experiments be conducted.

5.3. *Directions for Future Studies*

To reach hard-to-survey populations we used neighborhood selection variables in the sampling design; young adults, households with more than one full-time worker, and non-Western immigrants were reached in the expected neighborhood. We want to propose studying this sampling possibility further. However, it is likely that these neighborhood-selection variables are country specific. Therefore, researchers should obtain information from governmental institutions or statistical agencies on neighborhood characteristics in their country of interest. Furthermore, interviewer observations of household characteristics (e.g., presence of children or non-natives) can be used to adapt strategies for contacting specific groups (Durrant and Steele 2009). However, interviewer observations in nonresponse adjustments and the targeting of survey features based on such observations should be used with care, since observations may be prone to error (West 2012). In addition, we suggest studying which contact mode is the most effective in reaching hard-to-survey populations, and whether there are contact-mode preferences for specific difficult-to-survey groups.

Another important arena for additional research would be investigating the costs of concurrent designs versus the obtained response rates and possible errors. Whereas many studies focus on response rates' expenses, the cost of the contact mode is an important outcome-rates indicator that is worth investigating (Porter and Whitcomb 2007; Sinclair et al. 2012; Tse 1998). Furthermore, mixed-mode designs are used because of the lower risk of selection error in comparison to single-mode designs. However, according to Vannieuwenhuyze (forthcoming 2014) the higher fixed costs and risks of higher measurement errors in mixed-mode designs could counteract the advantage of lower selection errors. For future research, it might be interesting to consider a study that concentrates on the trade-off between selection error, measurement error, and costs (Vannieuwenhuyze forthcoming 2014). When focusing on hard-to-survey populations in the sample, such a study can be particularly interesting. Researchers interested in hard-to-survey groups might be willing to accept certain risks in their survey design to reach these populations and to obtain their cooperation. Furthermore, a cost-benefit assessment could be conducted including experimental groups with two or more response-mode choices and no choice in order to assess the outcome rates.

As mode choice can create goodwill (De Leeuw 2005), it could have positive effects on respondents' answering behavior. Conrad et al. (2013) found less satisficing (rounding numerical answers and nondifferentiation) when sample members could choose a response mode than when they were allocated to a mode, so the data quality of the survey improved. Furthermore, the choice group enjoyed participating in the survey more than the no-choice group. In addition, it is also possible that mode choice could decrease social-desirability effects. Sample members who are offered a mode choice might be more willing to give honest answers to sensitive questions, since they were able to choose the mode that feels most comfortable for responding. Therefore we recommend exploring the effects of mode choice on data quality further.

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