Journal of Survey Statistics and Methodology (2022) ***00****, 1–23*

EXPERIMENTS ON MULTIPLE REQUESTS FOR CONSENT TO DATA LINKAGE IN SURVEYS

SANDRA WALZENBACH
JONATHAN BURTON
MICK P. COUPER
THOMAS F. CROSSLEY
ANNETTE JÄCKLE*

It is increasingly common for researchers to link survey data to administrative data. If several administrative data sources are of interest, respondents are required to give consent to each of them, meaning that multiple consent questions have to be included in one survey. Existing literature suggests that individual consent varies widely between data sources and over time, but little is known about how respondents process multiple consent requests in a single survey. Using an online access panel in Great Britain, we conducted a set of experiments in two surveys to explore multiple consent requests (covering five domains or data

SANDRA WALZENBACH is a Postdoctoral Research Assistant with the Department of Sociology, University of Konstanz, Universitätsstraße 10, 78464 Konstanz, Germany. JONATHAN BURTON is an Associate Director for Understanding Society and is with the Institute for Social and Economic Research, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, UK. MICK P. COUPER is Research Professor with the Institute for Social Research, University of Michigan, 426 Thompson Street, Ann Arbor, MI 48104, USA. THOMAS F. CROSSLEY is Professor of Economics with the Department of Economics, European University Institute, Villa La Fonte, Via delle Fontanelle 18, 50014 San Domenico di Fiesole, Italy. ANNETTE JÄCKLE is an Associate Director of Innovations for Understanding Society and is Professor of Survey Methodology with the Institute for Social and Economic Research, University of Essex, Wivenhoe Park, Colchester CO4 3SQ, UK.

The study design and analysis were not preregistered. The data are available through the UK Data Archive (Jäckle, Burton, Couper, and Crossley 2021b). The replication materials for this study are available at https://osf.io/tmjue/?view_only=6af13af299b445c4bf3a920113a548d8. We thank our project advisory board members (Natalie Banner, Nancy Bates, Andrew Boyd, Lisa Calderwood, Mike Daly, Ben Edwards, Zoe Oldfield, Andrew Phelps, and Anya Skatova) for their valuable input. We also thank the reviewers, Associate Editor and Editor for their helpful suggestions.This research was funded by the Nuffield Foundation (www.nuffieldfoundation.org) with co-funding from the UK Economic and Social Research Council (ESRC, https://esrc.ukri.org/) (OSP/43279). The views expressed here are those of the authors and not necessarily of the Nuffield Foundation or the ESRC.

*Address correspondence to Annette Jäckle, Institute for Social and Economic Research, University of Essex, Wivenhoe Park, Colchester, Essex, CO4 3SQ, UK. E-mail: aejack@essex.ac.uk.

https://doi.org/10.1093/jssam/smab053

sources). In the first study, we experimentally varied the format of the request, testing three versions: (1) a sequence of pages (with one response per domain), (2) all five requests on the same page (with one response per domain), and (3) a single request (with one joint request covering all five domains). We also varied the order of the domains. We find that average consent rates do not differ by format, but asking a less-sensitive or easier-to-comply request first yields slightly higher average consent rates than asking a more sensitive request first. We repeated the order experiment in a second study, using an independent sample from the same panel, and adding two more order conditions. We find average consent rates are not affected much by order, but the consent to individual domains is affected by order. However, we fail to replicate the pattern of consents found in the first study. We conclude that the order in which multiple consent requests are asked does matter, but in complicated ways that depend on the particular outcomes in which one is interested. Objective knowledge and subjective comprehension of the consent process, and confidence in the decision are largely unaffected by format or order.

KEYWORDS: Administrative data; Data linkage; Informed consent; Multiple requests; Record linkage.

Statement of Significance

We conducted several experiments in two surveys in an online access panel to give practical guidance on how to ask for multiple data linkage consents within one survey. Our survey experiments examine five different administrative data sources. To the best of our knowledge, we have conducted one of the very few studies that so far have analyzed order effects in multiple consent requests, and the only one that has experimentally manipulated different presentation formats. In addition, we provide insights into the respondents' objective and subjective knowledge of the consent process, confidence in the decision, and response time. Our results suggest that format does not matter much for our key outcomes. However, the order in which a series of linkage consent requests is made affects both overall rates of consent and consent rates to individual domains.

1. INTRODUCTION

With advancements in technology and analysis methods, in recent years researchers have been faced with many potential new data sources that can be linked to survey data. These include social media data, transaction data, and sensor data. Our focus is on administrative records (namely, tax and income,

pension, energy consumption, education, and health records), typically held by government departments. Administrative records are increasingly becoming accessible to researchers and integrating longitudinal survey and administrative data provides wide-ranging opportunities for new research (Benzeval, Bollinger, Burton, Couper, Crossley, et al. 2020). For the two data sources to be combined they need to be linked and—except in the case of some government surveys—respondents must consent to such linkage. Consent, and more specifically informed consent, is a necessary requirement for exploiting the power of integrated data to address important research questions and policy issues.

While there is a growing body of research on differences between consenters and non-consenters, and emerging studies on how best to ask respondents for consent, little is known about multiple requests for linkage consent in a single survey. This paper presents evidence from several survey experiments that were designed to find out if respondents' consent can be maximized by presenting the consent requests in a certain order or format (e.g., on the same versus on separate pages). These order and format effects are examined with respect to three different outcomes: average consent rates, share of respondents who refused or agreed to all requests, and the consent rates for each domain over an individual sequence of consent requests. Additional outcomes include objective and subjective measures of knowledge, that is, how informed the consent is. The paper also touches on how respondents process such requests and which mechanisms might explain the patterns we find.

2. PREVIOUS RESEARCH AND BACKGROUND LITERATURE

So far, methodological research on data linkage has largely focused on single consent questions. Previous research has shown that the probability of consent varies by topic matter (Sakshaug, Couper, Ofstedal, and Weir 2012), between interviewers (Korbmacher and Schroeder 2013; Sakshaug, Tutz, and Kreuter 2013), and even within respondents over time (Weir, Faul, and Ofstedal 2014; Jäckle, Beninger, Burton, and Couper 2021a). This evidence suggests that people do not have strong fixed views on consent and that the decision to consent can be influenced by features of the request. However, studies examining what influences the decision to consent have had limited success. Findings on the effects of respondent characteristics on consent are inconsistent (Sakshaug et al. 2012; Sala, Burton, and Knies 2012), as is evidence of the effects of interviewer characteristics (Sala, Knies, and Burton 2014). One consistent finding is on mode, with web surveys yielding substantially lower levels of consent than interviewer-administered surveys (Sakshaug, Hülle, Schmucker, and Liebig 2017; Jäckle, Beninger, Burton, and Couper 2021a).

Experimental studies examining how the consent question is worded (Pascale 2011; Sakshaug et al. 2013), or whether it is asked in an earlier or later wave of a panel survey (Sala et al. 2014; Eisnecker and Kroh 2016) found no effects. Asking for consent after a module of questions related to the content of the data to be linked increases consent compared to asking at the end of the questionnaire (Sala et al. 2014), and asking it at the beginning of the survey rather than the end has a positive effect (Sakshaug, Schmucker, Kreuter, Couper, and Singer 2019). Several experiments have varied the framing of the request, with mixed results and generally modest effects (see Sakshaug et al. 2013; Sakshaug, Wolter, and Kreuter 2015; Kreuter, Sakshaug, and Tourangeau 2016; Sakshaug, Stegmaier, Trappmann, and Kreuter 2019; Sakshaug et al. 2019).

Research on multiple consent requests within one questionnaire is still very rare. One recent exception is a survey experiment on order effects by Weiß, Beuthner, Silber, Keusch, Menold, and Schröder (2019), who hypothesized a possible fatigue or ceiling effect: "As respondents do not know how many data linkage requests they will see, they might be willing to consent to the first ones, and then reach a critical point where they are not willing to share more information. Besides such a ceiling effect, every question is an additional intrusion into privacy, so that also the contextual sensitivity of the request might increase with each question" (p. 2). They tested consent to seven different data types (e.g., administrative data, sensor data, social media data, biomeasures) in an opt-in panel. For each domain, asking that domain first resulted in higher consent rates than asking that domain later in the sequence.

Thornby, Calderwood, Kotecha, Beninger, and Gaia (2018) conducted a qualitative study on how to present multiple consent requests for administrative data linkage. They provide interesting anecdotal evidence on variables that increased reported consent in their qualitative interviews: trust, sensitivity, perceived benefits, being given assurances, the feeling of having "nothing to hide," and a linkage request referring to already collected data rather than data to be collected in the future. In addition, the authors give a hint that fatigue is a response mechanism worth thinking about in the context of multiple consent questions. They report decreasing levels of invested cognitive effort over the consent sequence. However, their study does not provide any quantitative data on trust and sensitivity levels, size of effects on consent, or the relative importance of variables.

Given the paucity of research on multiple consent requests in surveys, are there other literatures that may inform our expectations of the effects? There is a relatively large literature on sequential requests in social psychology (see Dillard 1991). Two well-studied mechanisms within this literature are foot-in-the-door (FITD) and door-in-the-face (DITF). FITD can be traced back to the research on "compliance without pressure" by Freedman and Fraser (1966, p. 195) who posited that "once a person has been induced to comply with a small request he is more likely to comply with a larger demand." The effect is

generally explained in terms of self-perception theory (see Bem 1972): complying with an easy or small request engenders the perception of being a cooperative person, which leads to compliance with larger subsequent requests (Guadagno, Asher, Demaine, and Cialdini 2001). In contrast, DITF posits that "a request made is more likely to be agreed to if preceded by the offer and refusal of a more expensive one" (Cialdini, Vincent, Lewis, Catalan, Wheeler, et al. 1975). See Dolinski (2011) for a fuller discussion of these two mechanisms.

These two contrasting views have generated a lot of research, including several meta-analyses, on the conditions under which one or the other is likely to prevail. All in all, empirical findings are inconsistent and sometimes contradictory (see DeJong 1979; Beaman, Cole, Preston, Klentz, and Steblay 1983; Dillard, Hunter, and Burgoon 1984; Fern, Monroe, and Avila 1986; Burger 1999; Pascual and Guéguen 2005).

Several FITD experiments have been conducted in a survey setting (Reingen and Kernan 1977; Allen, Schewe, and Wijk 1980; Hansen and Robinson 1980; Furse, Stewart, and Rados 1981; Groves and Magilavy 1981; Kamins 1989; Poon, Albaum, and Evangelista 1999; Guéguen 2002; Sperry, Siler, and Mull 2018, but we know of only one application that analyses multiple related requests and hence resembles our study. Acquisti, John, and Loewenstein (2012) varied the order of intrusiveness of sensitive questions to examine the effect on disclosure. They argued (p. 161) that "altering the order of intrusiveness of a set of questions is akin to asking respondents to comply with requests of different magnitude and therefore is comparable to the literature on 'foot-in-the-door' (FITD) (Freedman and Fraser 1966) or 'door-in-the-face' (DITF) techniques (Cialdini et al. 1975)." Contrary to the FITD expectation and the prevailing survey literature advocating for starting with less-sensitive questions, their results suggest that "beginning with milder questions only to move toward more intrusive questions may actually elicit lower overall willingness to divulge" (Acquisti et al. 2012, pp. 172–173).

To what extent are these mechanisms relevant for the multiple consent request situation? First, almost all of these studies examine a pair of requests, where only the second one is the outcome of interest. However, in the linkage consent setting, the goal is to maximize consent across all requests. Second, the first request in most DITF experiments is designed to be sufficiently large that most people will decline, generating reciprocal concessions when a smaller second request is made. In our case, the requests are all of relatively similar magnitude. Nonetheless, consistent with Acquisti and colleagues, we view the psychological literature on sequential requests as relevant to our research.

In summary, both the social psychological and survey literature suggest that the order in which the consent requests are made is likely to matter. Prior research on questionnaire design also suggests that the format of presentation should matter, but it is less clear on what the expected effects are. We focus on

these two elements of multiple consent requests. We formulate our specific research questions and expectations below.

3. RESEARCH QUESTIONS AND EXPECTATIONS

Given how little conceptual or empirical work has focused on sequences of similar requests within a single survey, our experiments were not designed with explicit hypotheses in mind, but are instead exploratory. Following the review of relevant literature above, we focus on three research questions.

RQ1: What effect does order of the requests have on consent rates and other outcomes?

From prior studies we know that average consent rates vary by data domain, meaning that data linkage requests differ in how readily respondents comply with them. Respondents' perceptions of the requests might be affected by a number of factors, including the sensitivity of the information held by the data holder, knowledge of the data holder and the data it has, trust in the data holder, the risk of disclosure, etc. We expect that starting with an easier-to-comply request (with higher average consent rates in prior studies) may lead to greater overall compliance relative to starting with a harder-to-comply request (with lower average consent rates in prior studies).

RQ2: What effect does format of the requests have on consent rates and other outcomes?

We focus on the three alternative formats outlined above and described in more detail below. These formats differ in whether the five consent requests are revealed one by one (*sequence of pages*) or at the same time (*same page*). Also, there is one version in which the respondents give one joint answer (*single request*) instead of answering individually to each request. Revealing each consent in turn may result in higher consent rates to the initial request, but lower rates for later requests, as the FITD nature of the requests becomes apparent. Showing all five requests at once but still letting respondents consent to each individually may encourage respondents to consent to some but not all. A single yes/no request is the easiest to answer, but the decision may exceed some cumulative threshold, being seen as a bigger "ask" overall. Given the diversity of possible mechanisms and the paucity of previous research on multiple consent requests, we did not have specific expectations about which format would yield higher rates of consent, both overall and to individual data domains.

RQ3: What mechanisms explain the effects of consent request order and format?

Our research design was not set up to explicitly test the competing mechanisms (i.e., both FITD and DITF would predict higher consent to later items),

but we can use these to help understand the results we obtain. As noted above, we expect that starting with an easier-to-comply request may lead to greater compliance with later requests (the FITD effect). We also expect to see a decline in consent across individual consent questions (regardless of order), suggesting a possible fatigue effect. With regard to format, we did not have clear expectations.

4. OUTCOMES OF INTEREST

When examining multiple consent requests, there are several outcomes of interest. Which one is most important depends on the goals of the specific research project. Should the average consent rate across all domains be maximized? Or do we want to minimize the share of respondents who do not agree to any type of linkage? Alternatively, we might want to maximize the consent rate in a specific consent domain. It is quite obvious from this example that there is not one most informative outcome, but several that might be affected by design choices in different ways. As a result, we analyze the effects of question order and format with regard to three different consent outcomes:

- the average consent rates
- the share of respondents who said YES or NO to all five requests
- the patterns of individual consent rates

It is only in the last of these analyses that we can explore the underlying mechanisms of order effects.

In addition to obtaining record-linkage consent, it is important from a research ethics perspective that such consent is informed. Thus, as secondary outcomes, we also examine the effect of the experimental manipulations on indicators of objective and subjective comprehension and confidence, time taken to answer the consent questions, and whether respondents consulted additional materials describing the linkage process.

We conducted two sets of experiments. Given that the second experiment was designed to further explore some of the findings from the first experiment, we describe each of the experiments in turn.

5. EXPERIMENT 1

5.1. Data Source and Experimental Design

Experiment 1 was implemented in the online access panel PopulusLive (see https://www.populuslive.com/). This is a non-probability online panel which had around 130,000 active sample members at the time, who are recruited through web advertising, word of mouth, and database partners. Invitees were

restricted to residents of Great Britain and quotas based on age, gender, and education were set to match the characteristics of the *Understanding Society* Innovation Panel sample.[1] Once the target number of respondents for a quota was reached, the survey was closed to further respondents with that characteristic.

The implementation of these surveys was led by NatCen Social Research, in collaboration with the PopulusLive panel. Respondents were asked permission to link their survey data with five different administrative data sources: HM Revenue and Customs (HMRC; tax data), Department for Work and Pensions (DWP; benefit and pensions data), Department for Business, Energy and Industrial Strategy (BEIS; household energy data), Department for Education in England (DfE) and equivalent departments in Scotland and Wales (EDUC; education data), and National Health Service (NHS; health data).

We employed a 2×3 experimental design, varying both the order and format of the consent requests, as described earlier. With regard to order, we tested two sequences:

- HMRC—DWP—BEIS—EDUC—NHS ("HMRC first")
- NHS—EDUC—BEIS—DWP—HMRC ("NHS first")

The first sequence starts with harder-to-comply requests, whereas the second sequence starts with easier-to-comply requests. This was based on a review of observed consent rates to these domains from a variety of sources, including the Millennium Cohort Study (see Mostafa 2016), Next Steps (Thornby et al. 2018; Peycheva, Ploubidis, and Calderwood, 2021), and *Understanding Society* (Jäckle, Beninger, Burton, and Couper 2021a). The rankings were relatively consistent across these data sources, with NHS (health) and EDUC (education) achieving the highest consent rates and HMRC and DWP (economic data) the lowest. The order was also supported by evidence from qualitative interviews (Jäckle, Burton, Couper, Crossley, and Walzenbach 2021c).

With regard to format, three different versions were tested:

- Sequence of pages (with one response per domain)
- Same page (with one response per domain)
- Single request (with one joint request covering all five domains)

In the first scenario, respondents were presented with five consecutive pages with requests for consent, each page asking about one of the linkage domains. The second scenario contained the same requests but presented all of the requests on one survey page. This means that respondents had to scroll through the questions, but could see all of the requests before answering any of them. In the third scenario, all the consent domains were listed on one page, but

1. This research is part of a larger project, involving experiments on the Innovation Panel as well as the access panel. For further details, see Jäckle, Burton, Couper, Crossley and Walzenbach (2021c).

respondents were asked to make a single joint decision for linkage to all five domains. Supplementary appendix A1 contains wording of the consent questions for the sequences of pages and single request versions. The wording of the same page version is identical to that for the sequence of pages but without the page breaks.

In addition to the consent questions, we assessed objective knowledge of the consent process using eight true–false questions, subjective understanding and confidence (see supplementary appendix A2 for details on question wording).

The eight true–false items used to measure objective knowledge were based on the work of Das and Couper (2014; see also Edwards and Biddle 2021). The objective knowledge score was the sum of correct answers to the eight items. Missing responses ("don't know" or "refused") on individual knowledge items were assumed to be incorrect responses. A small number of cases (eight in Experiment 1, five in Experiment 2) were missing on all eight knowledge items; for these items the objective knowledge score was set to missing. A complete-case analysis on non-missing responses to the knowledge test items yielded equivalent results.

Subjective understanding was measured using a single item (1 = not at all, 4 = completely), as was confidence in the linkage consent decision (1 = very confident, 4 = not confident; coding reversed for analyses). All three of these measures were asked about a single domain (HMRC), which can be seen as a limitation of the study.

Paradata were used to measure response times on the consent questions and for indicators whether the respondent consulted additional materials (clicked on link). The full questionnaire and data can be downloaded from http://doi.org/10.5255/UKDA-SN-855036. We note that survey responses were not actually linked to administrative data. Respondents were informed of this at the end of the survey.

The study was conducted in June 2018. A total of 46,206 panelists were invited to the survey, of whom 6,532 started the survey and 5,633 completed it (401 broke off and 498 were screened out), for a participation rate of 12.2 percent (see The American Association for Public Opinion Research 2016). The analyses in this paper are based on the 3,099 respondents who were assigned to experimental conditions with multiple consent questions. The survey took about 11 minutes to complete (median value for the experimental groups that answered multiple consent questions; 80 percent of respondents took between 6 and 21 minutes). The fully crossed experimental design resulted in six cells, with 511–521 respondents in each (see supplementary appendix table B1).

All analyses were conducted in Stata 15. Statistical tests are tests of equal proportions (using z-statistics) and t-tests for equality of means. In the case of response times, quantile regressions were used to run statistical tests on medians. Where more than two groups needed to be compared, partial F-tests were applied after regressions. In addition, χ^2 tests are used for comparisons

between experiments. Missing data rates were very low (less than 0.6 percent for most variables).

5.2. Experiment 1 Results

As outlined above, the order and format of presentation can have effects on different outcomes of interests, namely (a) the overall average consent rates in each experimental condition, (b) the share of respondents who said yes or no to all five requests, and (c) the pattern of consent rates for the individual questions (for the respondents who could give separate answers for the five consent domains). We are also interested in the effect of order and format of asking multiple consents on (d) comprehension of the consent request, subjective understanding (how informed respondents feel), and confidence in the consent decision.

5.2.1. Average Consent Rates. Figure 1 shows the average consent rates for the six experimental groups (see supplementary appendix table B1 for additional details). For the single request version, this is the average across respondents. For the multiple request versions, this is the average across both respondents and domains. Markers in the same row stem from the same format (sequences of pages/same page/single request), while equal marker shapes indicate the same question order (HMRC (taxes) first versus NHS (health) first). Note that the horizontal axis is truncated to show the effect.

It is clear from the figure that format has little effect on average consent rates, while order does appear to have an effect, with lower average consent rates in the three HMRC-first groups (48.0 percent on average across the three format groups; indicated by squares) than in the NHS-first groups (51.6 percent on average; indicated by circles). This suggests that asking about tax data first results in lower average consent rates than asking about health data first. Tests from regression models (one with cluster-robust standard errors and the other a multilevel model) suggest that order has a significant effect on consent ($p = 0.036/<0.001$), while format fails to reach statistical significance ($p = 0.79/0.96$) (see supplementary appendix table B2 for details). The effect size is 4–7 percentage points, depending on model specification, on a baseline average consent rate of 48 percent.

5.2.2. Yes-to-All/No-to-All Requests. The second outcome of interest is the share of respondents who said yes or no to all five requests for data linkage. Figure 2 distinguishes between respondents who always gave consent, always denied consent, and respondents who gave mixed answers, that is, they agreed to data linkage for some domains and refused for others (see supplementary appendix table B3 for standard errors). Groups that differ in question order but share the same format are plotted next to each other. In the groups asking for

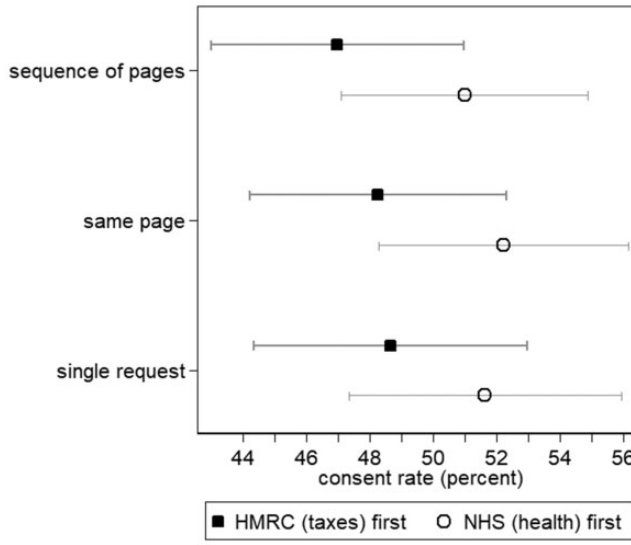

Figure 1. Average Consent Rates and 95 Percent C.I.s by Experimental Condition.

consent to each of the five domains separately, 76 percent to 87 percent of respondents say either yes-to-all or no-to-all, that is, they answer consistently to all five requests. The last pair of bars shows the groups that were asked a single consent question for all five domains together. By design, they had to say yes or no to the set of domains; mixed answers were not possible.

Comparing the share of respondents who said yes (or no) to all requests across *formats* reveals no differences between *sequence of pages* and *same page*. The s*ingle request* group differs significantly from the other two formats ($p < 0.001$ in regression models controlling for order). The single request has a higher rate of yes-to-all than the other two groups (p-values in z-score tests of equal proportions range from <0.001 to 0.02). However, it also has a higher rate of no-to-all (p-values between <0.001 and 0.06). Respondents who are unable to give a mixed answer in this group appear to distribute their answers roughly equally between these two responses. On the one hand, this suggests that asking a single yes/no consent question does not produce higher rates of non-consent. This is potentially good news, considering that respondents in the qualitative study (Jäckle et al. 2021c) had expressed a preference for separate questions for each domain over such a "catch all" or joint question. On the other hand, a sizeable minority of respondents (ranging from 12.9 percent to 23.7 percent) differentiated between domains in their consent decisions, pointing to the potential need to provide respondents with this opportunity. Further, individual data holders may not accept such a joint decision request for ethical or legal reasons. Our conclusion is that the format of presentation of multiple consent domains has little impact on the consent rates.

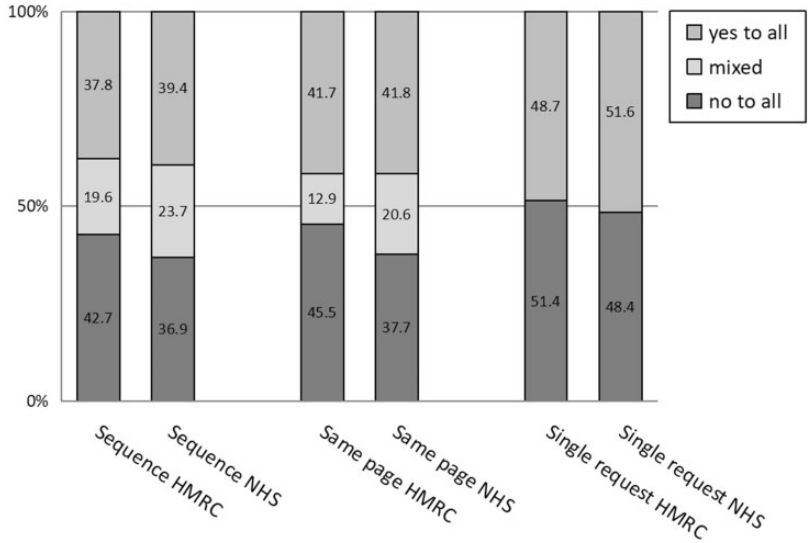

Figure 2. Yes-to-All/No-to-All Requests by Experimental Condition.

With regard to *order* effects, there are no differences between the shares of yes-to-all answers within any format group (z-score tests of equal proportions; $p = 0.59/0.97/0.34$; see each pair of adjacent bars for comparison). However, there is some evidence of significant differences in the shares of no-to-all answers in both the sequence of pages and same page formats: when HMRC consent is asked first, a higher share of respondents say no to all requests than when NHS consent is asked first ($p = 0.06$ for sequence of pages and $p = 0.01$ for same page in z-score tests and $p = 0.002$ in a regression model controlling for format).

5.2.3. Individual Consent Rates. Next we examine order and format effects across the sequence of individual consent requests. We can observe patterns of answers in the four experimental groups where respondents answered the five linkage requests separately. Figure 3 illustrates the two orders and two formats in which the five questions were asked. The individual rates are also shown in table B4 in the supplementary appendix. All statistical tests reported in this subsection are tests of equal proportions (z-score tests).

Note again that the vertical axis is truncated to illustrate the effect. An inspection of figure 3 suggests that order affects consent rates more than format. The two formats show very similar curves, while the question order is the characteristic that divides the curves into the upper and the lower part of a scissor shape: testing the differences in consent rates within the same consent domain and question order (e.g., the difference between same page and sequence of pages for BEIS linkage if HMRC was asked first), none of the comparisons yields significant format effects (p-values range from 0.29 to 0.85).

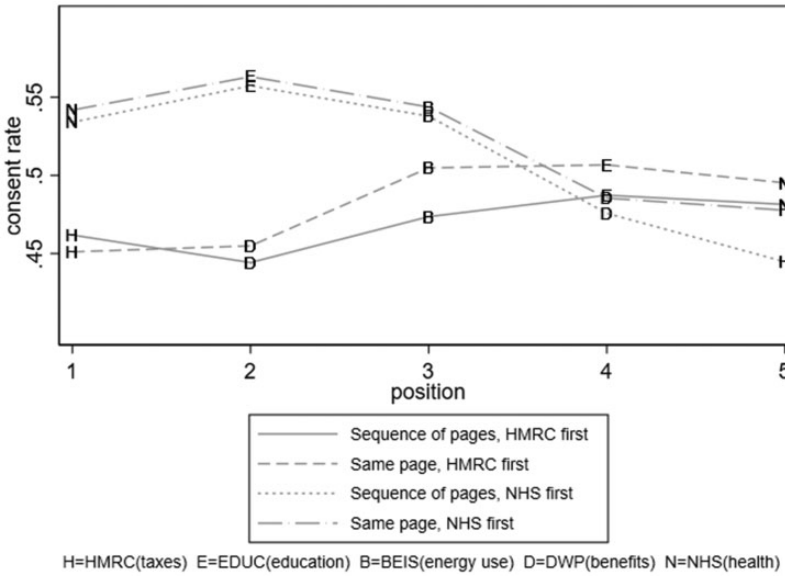

Figure 3. Consent to Individual Domains by Order and Format.

It is also clear from figure 3 that asking for NHS consent first results in higher consent rates to NHS than when asking NHS last; a statistically significant difference of 5 percentage points if we pool the two format groups ($p = 0.02$). Asking HMRC consent first does not appear to change HMRC consent rates relative to asking HMRC last; an average difference of 0.5 percentage points for the pooled formats ($p = 0.83$). Focusing just on the first consent request, the fact that NHS consent rates are significantly higher than HMRC consent rates (on average 53.8 percent for NHS and 45.6 percent for HMRC; $p < 0.001$) is consistent with previous findings about differences between domains.

To test for order or position effects, we need to take into account that the experimental design was limited to only two orders. This means that the middle domain (BEIS) is the only one with a constant position. In all other cases, the consent domain and position are confounded. For this reason, table 1 focuses on the consent rates for the BEIS request by order and format. Since its location is constant throughout all experimental groups, we can get valid measures of the order effect of the preceding questions (HMRC-first or NHS-first) and format on BEIS consent. As already seen in figure 3, the differences by format are small and nonsignificant ($p = 0.32$ for HMRC first and $p = 0.85$ for NHS first), so we focus on differences by order.

In both formats, BEIS gets a higher consent rate when NHS is asked first than when HMRC is asked first. As shown in table 1, this reaches statistical significance in the sequential format ($p = 0.04$), but not in the same page format ($p = 0.21$). This suggests a carryover effect: when the more sensitive

Table 1. Order and Format Effects on BEIS Consent Rates

BEIS consent rate	HMRC first	NHS first	Difference	p-value (z-test)
Sequence of pages	47.4%	53.8%	6.4	0.04
Same page	50.5%	54.4%	3.9	0.21
Combined	48.9%	54.1%	5.1	0.02

request (HMRC) is asked first, consent to BEIS linkage is lower than when the less sensitive request (NHS) is asked first. The effect's size in sequential format is 6.4 percentage points on a baseline consent rate of 47.4 percent, or almost a 14 percent increase in consent. An effect of this size, with no resource cost, is of considerable interest to survey designers.

5.2.4. Objective Knowledge, Subjective Knowledge, and Confidence. As noted earlier, it is not sufficient to simply maximize consent *rates*. It is also important to ensure that *informed* consent is not negatively affected by experimental manipulations designed to increase rates of consent. To this end, we examined the effect of the order and format manipulations on objective knowledge of the consent process, subjective understanding of the consent request, and confidence in the linkage consent decision, all asked about a single domain (HMRC).

In results not shown here (see supplementary appendix table B5), we find no differences in these three measures by order of the consent requests. We find small differences by format, but these are not readily interpretable. For instance, we find slightly higher objective knowledge scores for the sequence of pages than for the single-page and single-request versions, but slightly higher subjective knowledge ratings for the single-request version, and no differences in confidence in the decision. We thus conclude that the format and order of presentation of multiple consent requests have no reliable effect on how well informed respondents are about the linkage process, and on how informed and confident they feel about their decision.

5.2.5. Response Time. One final factor to consider is how much time it takes to make the consent decision. Across both orders, we find that the sequence of pages takes the longest (median of 71.6 seconds), followed by the same page version (67.1 seconds) and then the single request version (44.6 seconds) (see supplementary appendix table B5). We also examined whether respondents looked at additional materials (the leaflet and diagram referred to in supplementary appendix A) at different rates by experimental condition, and found no evidence of this (z-test, $p = 0.23$; results not shown). Across all conditions, between 75.3 percent and 81.5 percent did not access the additional materials, while between 13.7 percent and 16.3 percent looked at both. These results suggest that the joint request condition (with a single yes/no question) may be

more efficient (i.e., takes less time), without compromising objective or subjective knowledge or confidence, or negatively affecting consent rates. However, such an approach may not meet the legal requirements of data holders.

6. EXPERIMENT 2

Given the limited variations of order and the confounding of order and domain (by design) in Experiment 1, we could only examine the effect of order on a single consent domain, BEIS. We had an opportunity to replicate the experiment a few months later. This second experiment is described in further detail below, focusing on differences compared to the first experiment.

6.1. Data Source and Experimental Design

Experiment 2 was implemented in the same online access panel, PopulusLive, with invitations restricted to those who had not completed the first experiment. Similar quotas and procedures were employed with the goal of keeping the two samples as comparable as possible.

We added two additional order sequences to the two used in the first experiment. In these new sequences, we switched the order of the second and fourth requests (DWP and EDUC) producing the following four sequences:

- HMRC—DWP—BEIS—EDUC—NHS ("HMRC 1st, DWP 2nd")
- HMRC—EDUC—BEIS—DWP—NHS ("HMRC 1st, EDUC 2nd")
- NHS—DWP—BEIS—EDUC—HMRC ("NHS 1st, DWP 2nd")
- NHS—EDUC—BEIS—DWP—HMRC ("NHS 1st, EDUC 2nd")

The first and last sequences are the same as those used in Experiment 1. The addition of the second and third sequences allows us to explore the effects of asking NHS or HMRC first on consent rates to DWP and EDUC, in addition to BEIS.

Given the lack of effect of the format manipulation, all four orders were asked using a sequence of separate pages. This results in a single-factor experiment with four conditions.

The study was conducted in December 2019. A total of 30,682 panelists were invited to the survey, of whom 6,459 started the survey and 3,850 completed it (301 broke off and 2,308 were screened out), for a participation rate of 12.5 percent. The survey included four additional experimental conditions (single-consent questions) not used here. Analyses for this paper are based on 1,929 respondents. Median survey completion time for the four experimental groups that answered multiple consent questions was 10 minutes. Each sequence was answered by between 479 and 487 respondents.

6.2. Experiment 2 Results

We examined the same three consent rate outcomes as in Experiment 1. Figure 4 shows the average consent rates by order (see supplementary appendix table C1 for details).

The first thing we note from figure 4 is that while the overall consent rates are similar to those from Experiment 1 (on average 49.0 percent for the sequence of pages conditions in Experiment 1 versus 48.6 percent for all groups in Experiment 2), we did not replicate the slight positive effect of asking NHS consent first. Directly comparing the two groups that were exact replications of the first study, we find an average consent rate of 50.2 percent if HMRC was asked first and 45.7 percent if NHS was asked first (although the difference was not significant; t-test, $p = 0.13$). We have conducted a number of additional analyses to explore possible errors in the implementation of Experiment 2 and disproportionate allocation of quotas across the groups, but find no evidence of errors, and no explanation for this finding (see supplementary appendix D for details).

A formal test of whether consent rates are the same across replications of the first and last treatment conditions provides modest evidence against homogeneity across replications ($\chi^2(2)=4.6$, $p = 0.10$). Additionally, a test of whether the order effect, in particular, is the same across replications reveals statistically significant heterogeneity in that effect ($\chi^2(1)=4.3$, $p = 0.04$) (see supplementary appendix E for details).

Figure 5 shows the results for yes-to-all, no-to-all, and mixed responses across the five domains, similar to figure 2 above for Experiment 1 (see supplementary appendix table C2 for standard errors). The fourth group (NHS 1st, EDUC 2nd) yielded a lower rate of yes-to-all (34.3 percent) than the other groups in Experiment 2 (40.2 percent for the third group, also with NHS first, z-test, $p = 0.056$), but also lower than the corresponding group in Experiment 1 (39.4 percent, $p = 0.09$ in z-test of equal proportions).

Figure 6 shows the pattern of consents to individual domains, by order. The differences between the consent rates for NHS and HMRC when each is asked first (i.e., unaffected by subsequent domains) are in the expected direction (on average 48.6 percent for HMRC and 53.0 percent for NHS, a 4.4 percentage point difference, $p = 0.053$) but not as large as observed in the first experiment.

In contrast with Experiment 1 (see figure 3), we no longer see the scissor pattern we observed (see supplementary appendix C3 for details). Recall that in figure 3, consent to NHS differed by whether it was asked first or last, while HMRC consent did not differ much by position. In Experiment 2 (figure 6), order appears to matter more for HMRC than for NHS. Comparing groups 1 and 2 to groups 3 and 4 yields significant order effects for HMRC consent (z-score test, $p < 0.001$) but no significant order effect for NHS consent ($p = 0.17$).

Finally, table 2 shows the individual consent rates for the three "target" domains (DWP, EDUC, and BEIS) for evaluating carryover or order effects.

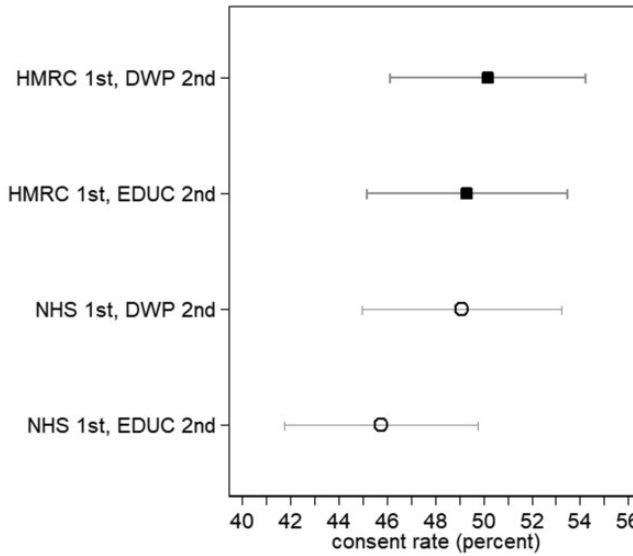

Figure 4. Average Consent Rates and 95 Percent C.I.s by Order.

We find that the results for BEIS consent also do not replicate. Recall that in Experiment 1, BEIS had a 6.4 percentage point *higher* consent rate when following NHS consent than when following HMRC consent. In Experiment 2, this difference trends in the opposite direction (1.2 percentage points *lower* when following NHS) but does not reach traditional levels of significance. A formal test for pooling BEIS consent rates (*HMRC 1st*, *DWP 2nd* and *NHS 1st*, *EDUC 2nd*) between replications does not reject parameter homogeneity ($\chi^2(2)=3.08$, $p=0.21$). There is somewhat stronger evidence of heterogeneity across replications in the order effect ($\chi^2(1)=3.08$, $p=0.08$) alone (see supplementary appendix E for details). That is, we no longer find a positive carryover effect on BEIS consent of asking NHS consent first. The results for the other two consent domains (DWP and EDUC) also do not show a consistent pattern by order. These surprising failures to replicate our earlier results suggest caution in interpreting the results from the first experiment.

We also looked at objective knowledge, subjective comprehension, confidence in the decision and time to respond by order of the consent domains (see Supplementary appendix table C4). As in Experiment 1, we find no significant differences in these outcomes by experimental treatment. In addition, we examined differences in consulting the leaflet and diagram, and again find no significant differences ($p=0.78$ in a χ^2 test based on cross tabulation of experimental condition and consultation of material (none/only leaflet/only diagram/both), results not shown).

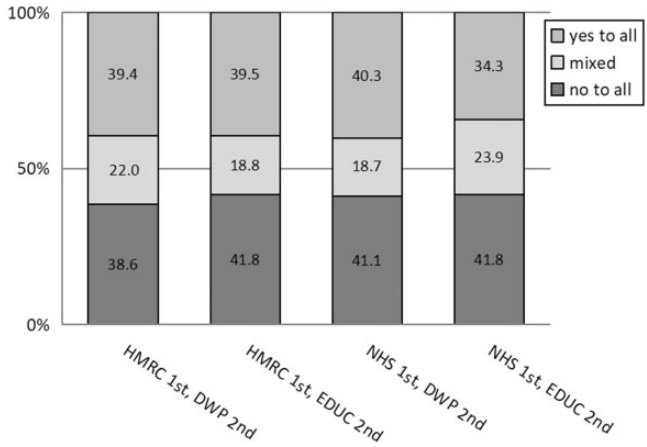

Figure 5. Yes-to-All/No-to-All Requests by Experimental Condition, Experiment 2.

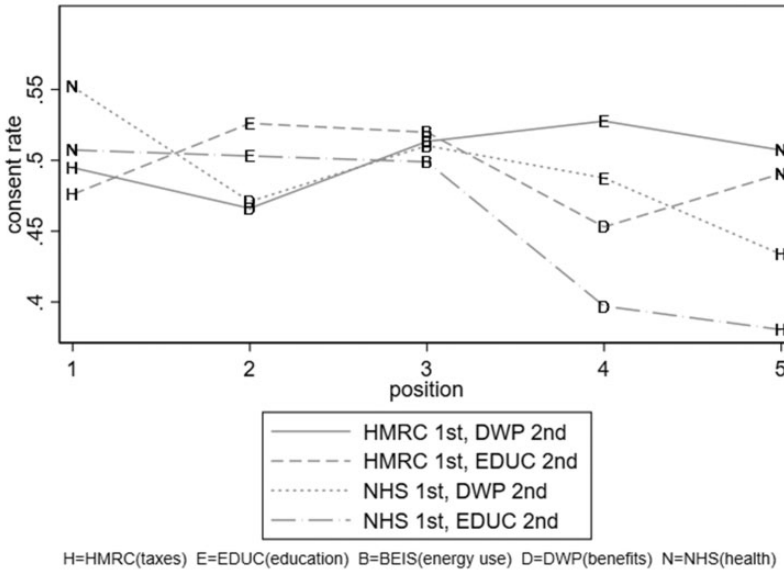

Figure 6. Consent to Individual Domains by Order and Format, Experiment 2.

7. OVERALL CONCLUSIONS AND DISCUSSION

We conducted an exploratory study to investigate the effects of multiple consent requests on key outcomes, including consent rates, objective and subjective knowledge, and confidence. It is one of only few studies to explore multiple consent requests, and (to our knowledge) the first to examine the

Table 2. Order Effects on Target Domains, Experiment 2

Domain	Position	*n*	HMRC first	NHS first	Difference	*p*-value (*z*-test)
BEIS	Third	1,929	51.7%	50.5%	−1.2	$p = 0.60$
DWP	Second	969	46.6%	47.1%	0.5	$p = 0.88$
	Fourth	960	45.3%	39.7%	−6.6	$p = 0.08$
EDUC	Second	960	52.6%	50.3%	−2.3	$p = 0.48$
	Fourth	969	52.8%	48.8%	−4.0	$p = 0.21$

effect of the order and format of multiple requests on objective and subjective knowledge and confidence in the decision.

In summary, the results of Experiment 1 suggested no format effects but consistent effects of order on most examined consent outcomes. Asking for NHS consent first was beneficial for overall consent rates and decreased shares of no-to-all answers (where respondents gave separate answers to the five consent requests). In individual sequences of consent, there was some evidence of a foot-in-the-door carryover effect and no consistent evidence on a fatigue effect.

Somewhat surprisingly, most of the order effects from Experiment 1 were not replicated in Experiment 2. Asking for NHS consent first did not help overall consent rates, shares of no-to-all answers or subsequent consent requests. Particularly, the sequence "NHS 1st, EDUC 2nd" yielded detrimental effects on consent outcomes, while order seemed to matter less for the other experimental groups.

Across two experiments we found that asking multiple consents across several separate pages versus asking them together on one page did not seem to affect consent rates or other key outcomes. While quicker, asking a joint consent request (yes-/no-to-all five domains) did not have significant advantages in terms of consent rates or understanding and confidence.

While our experiments contribute to a promising strand of research where methodological studies are extremely scarce, it has some limitations. First, we used a non-probability (opt-in) panel for the experiments. This means that our respondents have volunteered to participate in the survey and are likely to be cooperative in their survey responses as well. However, NatCen confirmed that PopulusLive Panel members had not previously been asked to consent to link their survey answers to administrative data, which may dampen consent rates. In fact, we find slightly higher rates of consent to the request to link to HMRC (tax) data in the access panels (49.0 percent and 51.0 percent in the two samples when asking a single request) compared to equivalent consent questions asked of web respondents in the probability-based *Understanding Society* Innovation Panel (IP; 44.6 percent), but substantially lower than for face-to-face respondents in the IP (73.6 percent; see Jäckle, Burton, Couper, Crossley, and Walzenbach 2021d). Nonetheless, we urge caution in generalizing these results to probability-based samples of the general population.

Second, our experiments were not designed to explicitly test hypotheses about possible mechanisms (foot-in-the-door, door-in-the-face, or fatigue effects) on observed outcomes. For example, we did not fully randomize all possible sequences of the five consent requests. This was done to limit the number of cells in the design and because we had expectations about the effect of starting with an easier-to-comply-with request versus a harder-to-comply-with request, consistent with prior literature. That is, we cannot fully disentangle the effect of order on overall consent rate or consent to individual requests. While we find little evidence of fatigue effects, an experiment with full randomization of order is needed to test this further.

Third, we are surprised by the failure to replicate using the same instruments in independent samples drawn in the same way from the same population of access panel members. We have no ready explanation for these differences. We explored a number of possible explanations for the divergent findings (see supplementary appendix D), but found nothing that would suggest a technical error or incomplete randomization.

From a practical perspective, it is clear that practitioners need to take care when asking for consent to multiple domains within a single survey. The order in which these are asked has potential consequences for the consent rates obtained for each of the domains. While the effect is not yet clearly understood, and does not replicate across the two experiments, it is clear that order matters. This conclusion parallels the little existing research on order effects in consent requests discussed earlier (Weiß et al. 2019) as well as recent studies on consent to share passively collected smartphone (sensor) data (Keusch, Struminskaya, Antoun, Couper, and Kreuter 2019; Struminskaya, Toepoel, Lugtig, Haan, Luiten et al. 2020). To reiterate, order matters but in ways not yet clearly understood. Further research is needed to understand the mechanisms behind these order effects.

Supplementary Materials

Supplementary materials are available online at academic.oup.com/jssam.

REFERENCES

Acquisti, A., L. K. John, and G. Loewenstein (2012), "The Impact of Relative Standards on the Propensity to Disclose," *Journal of Marketing Research*, 49, 160–174.

The American Association for Public Opinion Research (2016), *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys* (9th ed.), Washington, DC: AAPOR.

Allen, C. T., C. D. Schewe, and G. Wijk (1980), "More on Self-Perception Theory's Foot Technique in the Pre-Call/Mail Survey Setting," *Journal of Marketing Research*, 17, 498–502.

Baker, R., S. J. Blumberg, J. M. Brick, M. P. Couper, M. Courtright, J. M. Dennis, D. Dillman, M. R. Frankel, P. Garland, R. M. Groves, C. Kennedy, J. Krosnick, P. J. Lavrakas, S. Lee, M. Link,

L. Piekarski, K. Rao, R. K. Thomas, and D. Zahs; prepared for the AAPOR Executive Council by a Task Force operating under the auspices of the AAPOR Standards Committee (2010), "Research Synthesis: AAPOR Report on Online Panels," *Public Opinion Quarterly*, 74, 711–781.

Beaman, A. L., C. M. Cole, M. Preston, B. Klentz, and N. M. Steblay (1983), "Fifteen Years of Foot-in-the-Door Research: A Meta-Analysis," *Personality and Social Psychology Bulletin*, 9, 181–196.

Bem, D. J. (1972), "Self-Perception Theory," in *Advances in Experimental Social Psychology* (Vol. 6), ed. L. Berkowitz, p. 125, New York: Academic Press.

Benzeval, M., C. R. Bollinger, J. Burton, M. P. Couper, T. F. Crossley, and A. Jäckle (2020), "Integrated Data: Research Potential and Data Quality," Understanding Society Working Paper 2020-02, Colchester: University of Essex, available at https://www.understandingsociety.ac.uk/sites/default/files/downloads/working-papers/2020-02.pdf.

Burger, J. M. (1999), "The Foot-in-the-Door Compliance Procedure: A Multiple-Process Analysis and Review," *Personality and Social Psychology Review*, 3, 303–325.

Callegaro, M., R. Baker, J. Bethlehem, A. Göritz, J.A. Krosnick, and P.J. Lavrakas (eds.) (2014), *Online Panel Research: A Data Quality Perspective*, New York: Wiley.

Cialdini, R. B., J. E. Vincent, S. K. Lewis, J. Catalan, D. Wheeler, and B. L. Darby (1975), "Reciprocal Concessions Procedure for Inducing Compliance: The Door-in-the-Face Technique," *Journal of Personality and Social Psychology*, 31, 206–215.

Das, M., and M. P. Couper (2014), "Optimizing Opt-Out Consent for Record Linkage," *Journal of Official Statistics*, 30, 479–497.

DeJong, W. (1979), "An Examination of Self-Perception Mediation of the Foot-in-the-Door Effect," *Journal of Personality and Social Psychology*, 37, 2221–2239.

Dillard, J. P. (1991), "The Current Status of Research on Sequential-Request Compliance Techniques," *Personality and Social Psychology Bulletin*, 17, 283–288.

Dillard, J. P., J. E. Hunter, and M. Burgoon (1984), "Sequential-Request Persuasive Strategies: Meta-Analysis of Foot-in-the-Door and Door-in-the-Face," *Human Communication Research*, 10, 461–488.

Dolinski, D. (2011), "A Rock or a Hard Place: The Foot-in-the-Face Technique for Inducing Compliance without Pressure," *Journal of Applied Social Psychology*, 41, 1514–1537.

Edwards, B., and N. Biddle (2021), "Consent to Data Linkage: Experimental Evidence from an Online Panel," in *Advances in Longitudinal Survey Methodology*, ed. P. Lynn, pp. 181–203, New York: Wiley.

Eisnecker, P. S., and M. Kroh (2016), "The Informed Consent to Record Linkage in Panel Studies: Optimal Starting Wave, Consent Refusals, and Subsequent Panel Attrition," *Public Opinion Quarterly*, 81, 131–143.

Fern, E., S. Monroe, and R. Avila (1986), "Effectiveness of Multiple Request Strategies: A Synthesis of Research Results," *Journal of Marketing Research*, 23, 144–152.

Freedman, J. L., and S. C. Fraser (1966), "Compliance without Pressure: The Foot-in-the-Door Technique," *Journal of Personality and Social Psychology*, 4, 195–202.

Furse, D. H., D. W. Stewart, and D. H. Rados (1981), "Effects of Foot-in-the-Door, Cash Incentives, and Followups on Survey Response," *Journal of Marketing Research*, 18, 473–478.

Groves, R. M., and L. J. Magilavy (1981), "Increasing Response Rates to Telephone Surveys – A Door in the Face for Foot-in-the-Door," *Public Opinion Quarterly*, 45, 346–358.

Guadagno, R. E., T. Asher, L. J. Demaine, and R. B. Cialdini (2001), "When Saying Yes Leads to Saying No: Preference for Consistency and the Reverse Foot-in-the-Door Effect," *Personality and Social Psychology Bulletin*, 27, 859–867.

Guéguen, N. (2002), "Foot-in-the-Door Technique and Computer Mediated Communication," *Computers in Human Behavior*, 18, 11–15.

Hansen, R. A., and L. M. Robinson (1980), "Testing the Effectiveness of Alternative Foot-in-the-Door Manipulations," *Journal of Marketing Research*, 17, 359–364.

Jäckle, A., K. Beninger, J. Burton, and M. P. Couper (2021a), "Understanding Data Linkage Consent in Longitudinal Surveys," in *Advances in Longitudinal Survey Methodology*, ed. P. Lynn, pp. 122–150, New York: Wiley.

Jäckle, A., J. Burton, M. P. Couper, and T. F. Crossley (2021b). *Understanding and Improving Data Linkage Consent in Surveys* (Data Collection), Colchester, Essex: UK Data Service, http://doi.org/10.5255/UKDA-SN-855036.

Jäckle, A., J. Burton, M. P. Couper, T. F. Crossley, and S. Walzenbach (2021c). "Understanding and Improving Data Linkage Consent in Surveys," Understanding Society Working Paper 2021-01, Colchester: University of Essex, available at https://www.understandingsociety.ac.uk/sites/default/files/downloads/working-papers/2021-01.pdf

———. (2021d). "How and Why Does the Mode of Data Collection Affect Consent to Data Linkage?" Understanding Society Working Paper 2021-04, Colchester: University of Essex, available at https://www.understandingsociety.ac.uk/sites/default/files/downloads/working-papers/2021-04.pdf

Kamins, M. A. (1989), "The Enhancement of Response Rates to a Mail Survey through a Labeled Probe Foot-In-the-Door Approach," *Journal of the Market Research Society*, 31, 273–283.

Keusch, F., B. Struminskaya, C. Antoun, M. P. Couper, and F. Kreuter (2019), "Willingness to Participate in Passive Mobile Data Collection," *Public Opinion Quarterly*, 83, 210–235.

Korbmacher, J. M., and M. Schroeder (2013), "Consent When Linking Survey Data with Administrative Records: The Role of the Interviewer," *Survey Research Methods*, 7, 115–131.

Kreuter, F., J. W. Sakshaug, and R. Tourangeau (2016), "The Framing of the Record Linkage Consent Question," *International Journal of Public Opinion Research*, 28, 142–152.

Mostafa, T. (2016), "Variation within Households in Consent to Link Survey Data to Administrative Records: Evidence from the UK Millennium Cohort Study," *International Journal of Social Research Methodology*, 19, 355–375.

Pascale, J. (2011), "Requesting Consent to Link Survey Data to Administrative Records: Results from a Split-Ballot Experiment in the Survey of Health Insurance and Program Participation," Technical Report, Survey Methodology Series 2011-03, United States Census Bureau.

Pascual, A., and N. Guéguen (2005), "Foot-in-the-Door and Door-in-the-Face: A Comparative Meta-Analytic Study," *Psychological Reports*, 96, 122–128.

Peycheva, D., G. Ploubidis, and L. Calderwood (2021), "Determinants of Consent to Administrative Records Linkage in Longitudinal Surveys: Evidence from Next Steps," in *Advances in Longitudinal Survey Methodology*, ed. P. Lynn, pp. 151–180, New York: Wiley.

Poon, P., G. Albaum, and F. Evangelista (1999), "An Empirical Test of Alternative Theories of Survey Response Behaviour," *International Journal of Market Research*, 41, 1–20.

Reingen, H., and J. B. Kernan (1977), "Compliance with an Interview Request: A Foot-in-the-Door, Self-Perception Interpretation," *Journal of Marketing Research*, 14, 365–369.

Sakshaug, J. W., M. P. Couper, M. B. Ofstedal, and D. R. Weir (2012), "Linking Survey and Administrative Records: Mechanisms of Consent," *Sociological Methods & Research*, 41, 535–569.

Sakshaug, J. W., S. Hülle, A. Schmucker, and S. Liebig (2017), "Exploring the Effects of Interviewer- and Self-Administered Survey Modes on Record Linkage Consent Rates and Bias," *Survey Research Methods*, 11, 171–188.

Sakshaug, J. W., A. Schmucker, F. Kreuter, M. P. Couper, and E. Singer (2019), "The Effect of Framing and Placement on Linkage Consent," *Public Opinion Quarterly*, 83, 289–308.

Sakshaug, J. W., J. Stegmaier, M. Trappmann, and F. Kreuter (2019), "Does Benefit Framing Improve Record Linkage Consent Rates? A Survey Experiment," *Survey Research Methods*, 13, 289–304.

Sakshaug, J. W., V. Tutz, and F. Kreuter (2013), "Placement, Wording, and Interviewers: Identifying Correlates of Consent to Link Survey and Administrative Data," *Survey Research Methods*, 7, 133–144.

Sakshaug, J. W., D. Wolter, and F. Kreuter (2015), "Obtaining Record Linkage Consent: Results from a Wording Experiment in Germany," *Survey Insights: Methods from the Field*, available at: http://surveyinsights.org/?p=7288.

Sala, E., J. Burton, and G. Knies (2012), "Correlates of Obtaining Informed Consent to Data Linkage: Respondent, Interview and Interviewer Characteristics," *Sociological Methods and Research*, 41, 414–439.

Sala, E., G. Knies, and J. Burton (2014), "Propensity to Consent to Data Linkage: Experimental Evidence on the Role of Three Survey Design Features in a UK Longitudinal Panel," *International Journal of Social Research Methodology*, 17, 455–473.

Sperry, B. R., E. Siler, and T. Mull (2018), "Application of the 'Foot-in-the-Door' Compliance Technique for Traveler Intercept Surveys," *Transportation Research Record*, 2672, 23–32.

Struminskaya, B., V. Toepoel, P. Lugtig, M. Haan, A. Luiten, and B. Schouten (2020), "Understanding Willingness to Share Smartphone-Sensor Data," *Public Opinion Quarterly*, 84, 725–759.

Thornby, M., L. Calderwood, M. Kotecha, K. Beninger, and A. Gaia (2018), "Collecting Multiple Data Linkage Consents in a Mixed-mode Survey: Evidence from a Large-scale Longitudinal Study in the UK," *Survey Methods: Insights from the Field*, available at https://surveyinsights.org/?p=9734.

Weir, D. R., J. D. Faul, and M. B. Ofstedal (2014), "The Power of Persistence: Repeated Consent Requests for Administrative Record Linkage and DNA in the Health and Retirement Study," presented at the Panel Survey Methods Workshop, Ann Arbor, MI.

Weiß, B., C. Beuthner, H. Silber, F. Keusch, N. Menold, and J. Schröder (2019), "Consenting to Data Linkage: The Role of Data Domain, Framing, Device, Incentives, and Respondent Characteristics," Presented at the Mobile Apps and Sensors in Surveys (MASS) workshop, University of Mannheim and Utrecht University.