Helpful Reminders? Health Survey Participation and Doctor's Visits among Aging Adults

Jennifer Caputo, PhD*[1]
Maciej J. Danko[1], PhD
Henrik Brønnum-Hansen[2], MSc
Anna Oksuzyan[1], MD, PhD

[1] Max Planck Institute for Demographic Research
[2] University of Copenhagen, Faculty of Health and Medical Sciences, Section for Social Medicine
* Corresponding author contact information: Konrad-Zuse-Str. 1, 18055 Rostock, Germany; caputo@demogr.mpg.de

Running head: Health survey participation and doctor's visits

Helpful Reminders? Health Survey Participation and Doctor's Visits among Aging Adults

ABSTRACT

Objectives: Longitudinal surveys are an important source of information about the health of aging populations. While there is growing concern about how participating in these studies affects participants, assessments of survey participation effects on objectively measured behaviors are scarce.

Methods: We used register-linked data from the Danish component of the Survey of Health, Aging and Retirement in Europe, a rotating, biennial panel survey of adults aged 50+, to assess whether survey participation is associated with changes in self-reported and actual doctor's visits. New respondents were added during the second wave, allowing us to compare doctor's visits between groups who entered the survey at different times.

Results: Age-related increases in neither self-reported nor register-recorded doctor's visits significantly differed between the two rotating samples.

Discussion: Our findings add to literature about survey participation effects, suggesting that they may not be present for either self-reported or objective measures of this important health behavior.

KEYWORDS: Doctor's/physician's visits, survey participation, health behavior, panel conditioning

INTRODUCTION

Researchers across a range of disciplines have recognized that simply asking people about their attitudes, knowledge, and behaviors can alter the course of these outcomes. For studies intended to provide real-world accounts of social patterns, this can have consequences for the validity of the findings. Moreover, if study participation has measurable implications for people's lives, even researchers adhering to the most minimally invasive guidelines may need to reinvestigate ethical considerations surrounding human participants. The increased availability and usage of large-scale social surveys over the past several decades, including long-running longitudinal studies, has been accompanied by growing concerns about whether being surveyed affects individuals. Indeed, several recent studies have found that panel survey participation is associated with changes in self-reports of certain behaviors (Das, Toepoel, and van Soest 2011; Halpern-Manners, Warren, and Torche 2014; Torche et al. 2012). Explanations for these effects hinge closely upon whether the apparent changes are real or merely self-reported (Warren and Halpern-Manners 2012). However, information about whether participation in social surveys affects actual behaviors—health-related or otherwise—is currently scarce due to a lack of objective behavioral data.

In the context of research on the health of aging populations, doctor's visits are a highly salient health behavior. They increase in frequency as individuals experience age-graded health declines and are closely related to self-rated health, are often the first point-of-contact with a health professional when seeking treatment, and are an important means for preventing future health problems (Andersen and Newman 2005; Miilunpalo et al. 1997; Rosenstock 1974, 2005;

Wolinsky and Johnson 1991). What, if any, effects might participating in lengthy surveys about their health have on the frequency of aging adults' visits to doctors?

In this paper, we assess whether self-reported and population register-recorded doctor's visits change in association with participation in the initial waves of the Danish sample of the Survey of Health, Aging and Retirement in Europe, a longitudinal health survey of adults aged 50+. Because a new sample was added during the second wave of the panel, we can compare changes in these outcomes at the same time point among parallel groups who entered the study during different waves. Our study is the first that we know of to assess whether changes in a real health behavior are associated with participating in one of the major longitudinal surveys of aging adults. More broadly, the findings offer novel insights to persistent questions about how large-scale social surveys may affect participants.

BACKGROUND

Research within a variety of disciplines has documented situations in which being asked questions appears to affect individuals' attitudes and behaviors. For example, experimental research in the consumer sciences has shown that exposing potential buyers to questions about brand preferences and purchase intentions can subtly influence their buying decisions (Fitzsimons and Williams 2000; Morwitz and Fitzsimons 2004). Similarly, in health psychology, asking about individuals' plans to eat healthily, attend health screenings, receive vaccines, and purchase health insurance has increased the adoption of these behaviors (Fitzsimons and Moore 2008; Fitzsimons and Williams 2000; Spangenberg et al. 2016). The panel studies that form the basis of much current quantitative research in the social sciences generally do not contain such embedded experiments (see Torche et al. 2012 for an exception). However, a growing literature on panel conditioning—the changes in survey responses that occur as a result of repeated participation—indicates that participating in these surveys can influence self-reports of certain behaviors, including labor force participation, substance use, and criminal activities (Halpern-Manners et al. 2012, 2017; Torche et al. 2012; Warren et al. 2012).

Explanations for these changes in self-reported behaviors depend on whether they are assumed to reflect a genuine behavioral change (Warren and Halpern-Manners 2012). There are a few reasons why being surveyed may indeed change people's actual behaviors. First of all, some questions may introduce survey participants to beneficial behaviors or resources about which they were previously unaware (Warren and Halpern-Manners 2012). For example, studies based on German data indicate that being asked about participation in programs for unemployed persons increases subsequent participation in those programs; as the authors note, the surveys likely alerted some individuals to these programs' existence (Bach et al. 2017; Yan and Eckman 2012). Additionally, based on the experimental findings of consumer and health psychologists, it appears that survey questions can activate existing knowledge and beliefs about certain behaviors, particularly those that are positive, making these behaviors more accessible (Fitzsimons and Moore 2008; Fitzsimons and Williams 2000; Spangenberg et al. 2016). In other words, questions about respondents' behaviors may effectively remind them of the potential to engage in them. Studies in these fields also frequently ask about future behavioral plans in addition to past behaviors, and participants may be motivated to follow through with answers they provided (Morwitz and Fitzsimmons 2004; Spangenberg et al. 2016).

There are also explanations for why participating in panel surveys might affect people's self-reported but not their actual behaviors. Participants may disingenuously or subconsciously change answers about their behaviors as they participate in subsequent waves of a study for several reasons. For one, providing certain answers may evoke feelings of embarrassment or stigma, leading individuals to avoid giving these responses in the future (Halpern-Manners and Warren 2012; Torche et al. 2012; Williams et al. 2006). For example, Halpern-Manners and Warren (2012) found that non-working participants in the Current Population Survey were more likely to claim that they were "out of the labor force" rather than "unemployed" the more times they had already participated in the survey. Participants may also catch on to certain features of the survey design, and subsequently provide different answers as a way to minimize their time burden. Duan and colleagues (2007) showed that survey respondents were less likely to report using mental health services if screener questions were asked, likely motivated by a desire to speed up the survey. It is also possible that respondents become more comfortable with the survey process and actually give more accurate responses about their behaviors over time (Sturgis et al. 2009; Warren and Halpern-Manners 2012).

Although the question of whether self-reported behavioral changes associated with participating in social surveys are real is thus an important one, researchers typically do not have access to objective measures of these behaviors. We are aware of three exceptions, all of which employ survey-linked administrative data to test whether survey participation influences economic behaviors. As previously mentioned, research assessing the effects of being surveyed about employment program use in Germany found that those surveyed were more likely to subsequently participate in the programs (Back and Eckman 2018; Yan and Eckman 2012).

Additionally, a Dutch study linking a cross-sectional savings survey to tax records found that respondents actually saved somewhat less the following year, which the authors suggest is because they realized that they were saving more than needed (Crossley et al. 2017). Information about the potential effects of participating in surveys on other objectively measured behaviors, including health behaviors, remains absent.

What is by now clear from the literature on survey participation effects is that follow-up time matters. The experimental studies that characterize the consumer and health services work on this topic generally assess behaviors immediately or up to a few months after a survey has been implemented (e.g., Conner et al. 2011; Williams et al. 2006; Wood et al. 2014). Indeed, reviews suggest that studies with shorter-term follow-up periods are more likely to find participation effects, while effects are seldom found in studies with follow-up periods longer than a year (Spangenberg et al. 2016; Warren and Halpern-Manners 2012; Wilding et al. 2016). However, follow-up times for studies investigating panel conditioning effects are dependent on when additional waves of the data were collected, and are thus often a year or even longer (e.g., Halpern-Manners et al. 2017; Sturgis et al. 2009; Toepoel et al. 2009; Torche et al. 2012; Wilson and Howell 2005). If shorter-term survey participation effects exist, they may be missed in analyses relying on the panel responses.

In this study, we investigate whether participating in a longitudinal health survey affects an actual health behavior that is highly salient to aging populations: doctor's visits. Using health care services is an important strategy for the prevention and detection of health problems (Rosenstock 2005, 1974). Visits to doctors occur for a range of health-protective and promoting reasons, including screening tests, immunizations, diagnostic consultations, and regular checkups, and visits to doctors are the first point of contact for all kinds of health concerns (Rosenstock 2005; Wolinsky and Johnson 1991). Additionally, health care utilization, including doctor's visits, increases with need and age (Anderson & Newman 2005; Wolinsky and Johnson 1991; Rosenstock 2005). Drawing on Rosenstock's work on health care use as a preventive health behavior (2005, 1974), it is possible that lengthy or in-depth health surveys act as "cues to action," triggering individuals to use health care services. In other words, we suggest that reflecting on one's current health in the process of answering extensive health status and health care use questions may cause individuals to focus on a health problem or change that they previously had not fully acknowledged, or to notice that it has been a long time since a check-up with a doctor, perhaps prompting a visit to a physician. The results of the experimental health psychology studies mentioned above, which show increases in certain health promoting behaviors after targeted surveys, are consistent with this possibility (Fitzsimons and Moore 2008; Fitzsimons and Williams 2000; Spangenberg et al. 2016). We also assess whether self-reports of this behavior differ between naive respondents participating in the survey for the first time and experienced respondents participating for a second time. The findings are thus instructive about the validity of inferences made using this and potentially other health behavior measures on social surveys, as well as whether participating in health-focused panel surveys may precipitate a real change in health behavior.

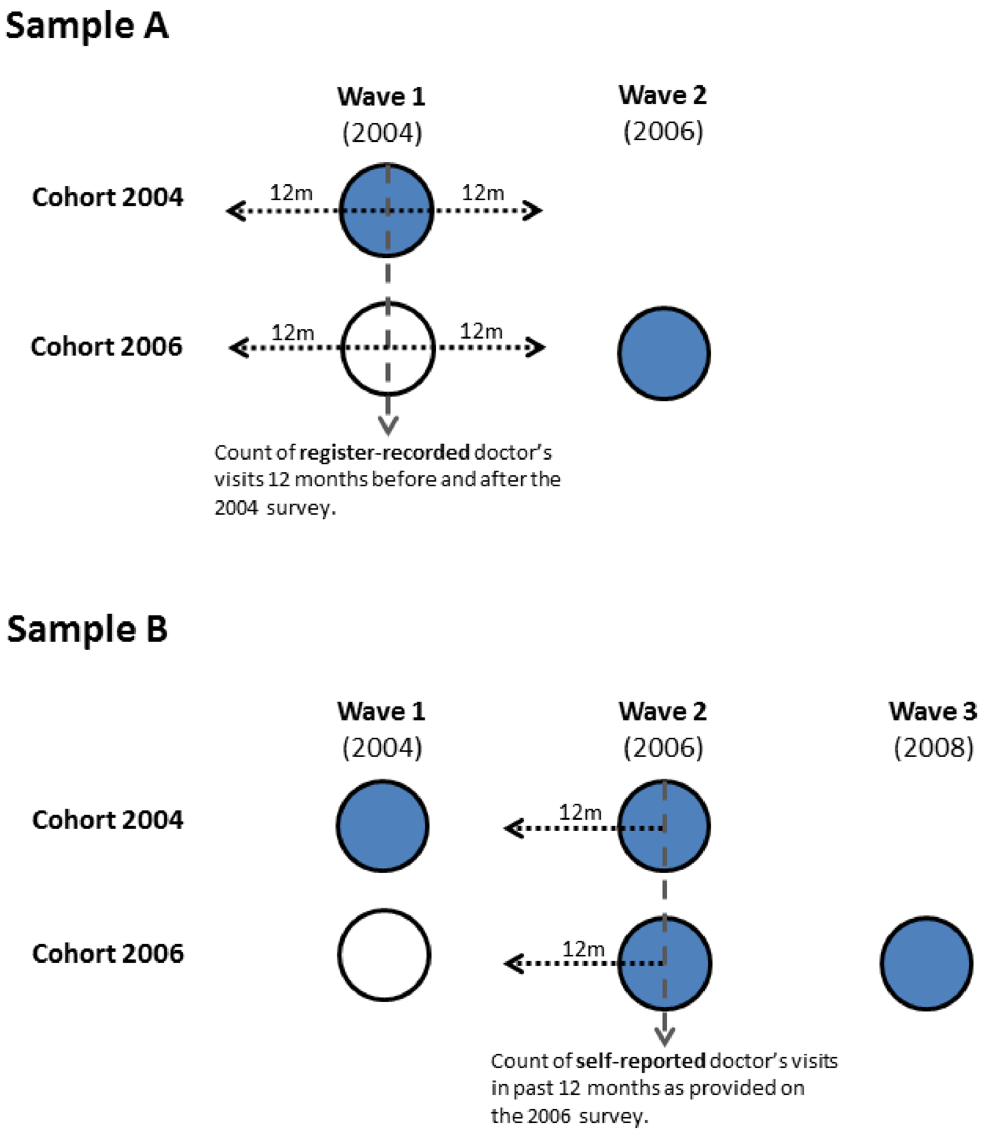
METHODS

Data and Study Design

The Survey of Health, Aging, and Retirement in Europe (SHARE) is an ongoing panel survey of European adults aged 50+ and their coresidential spouses that began in 2004 (Börsch-Supan and Jürges 2005). The study includes representative samples of adults from eleven European countries, including Denmark. Seven waves of data collection have been completed as of 2018, with the second and third waves being collected in 2006/07 and 2008/09 (hereafter 2006 and 2008), respectively. Designed to provide a comprehensive cross-national assessment of aging European adults' well-being and retirement activities, the survey includes extensive questions about respondents' current health, health histories, health care use, and other health behaviors. The REGLINK-SHAREDK project was undertaken by a consortium of Danish universities and institutions to link the Danish SHARE survey data to national register data. Through Statistics Denmark, Denmark maintains registers that provide extensive demographic information about the total population of Danish residents, including primary healthcare and hospital care registries. Denmark has had a universal, nationalized health care system since 1973, and access to hospitals and medical doctors is free for all residents (Olejaz et al. 2012; Vallgårda, Krasnik, and Vrangbæk 2001). Although there are some socioeconomic inequalities, utilization of health care resources is high across the Danish population (Olejaz et al. 2012).

1,706 individuals were interviewed at the time of the first SHARE survey in 2004 ("Cohort 2004"). In 2006, a refresher sample of 1,367 persons was added to the study ("Cohort 2006"). The distinction between these two cohorts—which divides the sample based on when they entered the study—acts as the key independent variable in our analyses. After dropping individuals from both cohorts due to linkage problems (N=50), there were 1,675 individuals in Cohort 2004 and 1,348 in Cohort 2006. Starting from this base, Figure 1 provides guidance on the selection and definition of the two different study populations (Sample A and Sample B) that we created to assess survey participation effects on register-recorded and self-reported doctor's visits, respectively. The shaded circles in Figure 1 denote the waves in which the individuals in the two cohorts must have participated to be included in each sample.

Figure 1: Study samples and design. Shaded circles denote the survey waves in which each cohort subsample participated.



Shaded circles denote the survey waves in which each cohort subsample participated.

We use Sample A to assess whether survey participation is related to register-recorded doctor's visits. Specifically, we compare changes in register-recorded doctor's visits in the year before and after the initial 2004 survey among the Danish individuals who participated in this first interview (Cohort 2004) to the change in doctor's visits during the same period that occurred among those who had not yet entered the study, but would in 2006 (Cohort 2006). From the base sample above, we dropped an additional 7 cases with missing data on income in 2004. We also dropped 628 respondents who were under 50 or over 79 at the time of the 2004 interview.[1] The resulting Sample A size was 2,388 individuals (1,396 respondents in Cohort 2004 and 992 in Cohort 2006). Table 1 shows means for all study variables and bivariate differences by survey cohort in Sample A.

---

[1] We excluded respondents aged 80+ because of imbalances between the proportion of respondents in Cohort 2004 and Cohort 2006 in this oldest age group. Supplemental analyses including all adults age 50+ produce substantively identical results.

Table 1: Descriptive statistics by survey cohort for Sample A. Mean (and standard deviation) or percentage.

	Total (N=2,388)	Cohort 2004 (N=1,396)	Cohort 2006 (N=992)
Register-recorded doctor's visits			
Year before 2004 survey (0-30)	5.53	5.76	5.20*
	(4.37)	(4.36)	(4.37)
Year after 2004 survey (0-26)	5.80	6.00	5.52*
	(4.44)	(4.47)	(4.39)
6 months before 2004 survey (0-17)	2.78	2.89	2.61*
	(2.41)	(2.41)	(2.39)
6 months after 2004 survey (0-15)	2.89	2.95	2.80
	(2.43)	(2.44)	(2.41)
3 months before 2004 survey (0-11)	1.34	1.41	1.24*
	(1.37)	(1.39)	(1.33)
3 months after 2004 survey (0-9)	1.45	1.45	1.45
	(1.39)	(1.37)	(1.42)
No register-recorded doctor's visits (%)			
Year before 2004 survey	11.43	10.24	13.10*
Year after 2004 survey	10.67	9.52	12.30*
Age in 2004 (50-79)	62.40	62.60	62.12
	(8.29)	(8.44)	(8.06)
Female (%)	51.97	51.93	52.02
Foreign-born (%)	3.22	3.30	3.12
ISCED education level (%)			
High	34.72	32.45	37.90*
Medium	42.67	44.84	39.62*
Low	22.61	22.71	22.48
Mean disposable personal income in 2004 (%)			
High	41.16	41.40	40.83
Medium	26.72	26.15	27.52
Low	32.12	32.45	31.65
Not working 2004 (%)	58.25	57.59	59.17
Parent (%)	91.50	90.04	93.55*
Civil status 2004 (%)			
Married / partnered	71.06	66.91	76.92*
Divorced / separated	11.52	13.32	8.97*
Widowed	11.52	12.61	9.98
Never married	5.90	7.16	4.13*

*= Significantly different from Cohort 2004 at $p<.05$ using two-tailed t-test for continuous variables and Fisher's exact tests for binary variables.

Sample B is used to assess whether self-reported doctor's visits on the 2006 survey differed between those participating for the first (Cohort 2006) and second (Cohort 2004) time. To help account for panel attrition, we impose an additional restriction on Sample B. Panel attrition is the drop-off in participation that occurs in the successive waves of a panel study due to respondents dying, not being located, or refusing to participate. Scholars have long recognized that individuals differentially attrite from panel studies based on factors that include their health (e.g., Radler and Ryff 2010). To account for differences between the two cohorts that might be driven by the fact that Cohort 2004 is a selected group of respondents who participate in the survey for the second time, we also limit Cohort 2006 respondents to those went on to participate in 2008. Thus, both Cohort 2004 and Cohort 2006 of Sample B participated in the survey at least twice. This method has been used by other scholars to help distinguish panel conditioning from panel attrition (Das et al. 2011; Halpern-Manners and Warren 2012; Halpern-Manners et al. 2017). After dropping 450 individuals of Cohort 2004 that did not participate in Wave 2 and 479 individuals of Cohort 2006 that did not participate in Wave 3, there were 1,226 individuals in Cohort 2004 and 869 in Cohort 2006. We dropped another 26 cases with missing data on reported doctor's visits or income in 2006. We also dropped 250 respondents who were under 50 or over 79 at the time of the 2006 interview. The resulting Sample B size was 1,819 individuals (1,032 respondents in Cohort 2004 and 787 in Cohort 2006). Supplementary Table 1 shows means for all study variables and bivariate differences by cohort in Sample B. There are few meaningful descriptive differences between Samples A and B.

Outcome Variables

Register-recorded doctor's visits. Register-recorded doctor's visits are the outcome for analyses using Sample A. This information comes from the National Health Service register (NHS), which documents all health services provided by private general practitioners and specialists in Denmark (Olejaz et al. 2012). We limited doctor's visits to those types that are fully covered by the national health care system, are not indicative of long-term therapeutic or non-medical visits, and that are likely to be included in respondents' answers to the self-reported medical doctor's visits question just described. Thus, we included general practitioner visits, laboratory visits and specialist visits, but not dentist, physiotherapist, chiropractor, optician, podiatrist and psychologist visits. Table 1 shows mean register-recorded doctor's visits in the *Year before 2004 survey* (5.53) and *Year after 2004 survey* (5.80), as well as 6 and 3 months before and after the 2004 survey . To calculate the pre-2004 interview visits for Cohort 2006, who had yet to enter the study at this point, we used the median survey month (15th August) for Cohort 2004. At each of the three intervals, Cohort 2006 had significantly fewer mean doctor's visits than respondents in Cohort 2004. We also provide the percentage of persons with no doctor's visits within the year before (11.43) and after (10.67) the 2004 interview; at both time points, a greater share of respondents in Cohort 2006 had not visited a doctor.

Self-reported doctor's visits in 2006. The outcome of interest for analyses using Sample B is doctor's visits as self-reported on the 2006 SHARE survey. At each wave the questionnaire prompts: "Please think about your care during the last 12 months. Since [month of last year], how many times in total have you seen or talked to a medical doctor about your health? Please exclude dentist visits and hospital stays, but include emergency room or outpatient clinic visits." As seen in Supplementary Table 1, responses on this item in 2006 range from 0-31, with a mean of just under four self-reported visits a year. This figure is significantly lower than the mean register-recorded number of doctor's visits for this period (5.86). However, the finding that survey participants substantially underreport their health care usage on surveys, particularly when they are asked to recall a year or more back, is well-documented in other studies (Bhandari and Wagner 2006; Hunger et al. 2013; Oksuzyan et al. 2009; Roberts et al. 1996). Supplementary Table 1 shows that this self-report did not significantly differ by survey cohort. The proportion of respondents who reported no doctor's visits also did not significantly differ between the two cohorts.

Control Variables

We include covariates for several other characteristics that are associated with individuals' use of physicians and may vary between the two cohorts. Age, income, employment status, and civil status are based on register information from 2004 for Sample A and 2006 for Sample B; the time periods during which all other control variables are measured is consistent across the two samples. Information about respondents' age in years (at the time of the 2004 interview for Sample A and at the 2006 interview for Sample B), gender, and nativity status all come from the Danish Civil Registration System (DCRS; Pedersen 2011). In regression analyses, age is coded into 10-year age intervals: 50-59, 60-69, and 70-79. Table 1 shows that in 2004, Sample A respondents' mean age was about 62 years and 5 months, about 52% of the sample was female, and just 3.22% were born outside of Denmark. We use information about education level as self-reported on the SHARE survey in 2006. Based on the International Standard Classification of Education (ISCED), we created three categories for education: low (ISCED levels 0-2; up to lower secondary education), middle (ISCED level 3; secondary education), and high (ISCED levels 4-5; post-secondary education). According to this classification, 34.72% of Sample A had a high education level, 42.67% had a medium level of education, and 22.61% had a low level of education. Disposable personal income data for 2004 and 2006 come from the Income Statistics Register (Baadsgaard and Quitzau 2011). This measure estimates income after taxes and interest expenses, and was coded according to the tertiles of individuals' mean income over the three years leading up to the 2004 survey for Sample A and over the three years up to the 2006 survey for Sample B. We considered the 3-year average to avoid income reduction due to temporary unemployment or retirement. Civil status in 2004 and 2006 also come from the DCRS. Most respondents were married, with 11.52% of Sample A being divorced, the same proportion being widowed, and 5.90% having never been married in 2004. Employment status comes from the Integrated Database for Labour Market Research (Petersson, Baadsgaard, and Thygesen 2011). About 58% of Sample A respondents were not working in 2004. Parental status is also taken from the SHARE responses, and was thus measured in 2006. The vast majority of respondents (about 92 percent in Sample A) had at least one child.

As seen in Table 1 and Supplemental Table 1, individuals in Cohort 2006 were, on average, better educated, higher income, and more likely to have children and be married than those in Cohort 2004. There are two differences in the sample eligibility requirements that may contribute to these descriptive differences. First, individuals aged 50+ are eligible at each wave, meaning that respondents could be born in 1955 or 1956 or earlier to be sampled in 2006, but had to be born in 1954 or earlier to be sampled in 2004, resulting in a slightly younger age distribution among Cohort 2006. Secondly, in 2004 all eligible members of a selected household and their partners could be interviewed, while from 2006 onwards only one household member and partner were recruited. To explore whether our results are sensitive to this difference between the cohorts, we conducted supplemental analyses limiting the sample to one eligible respondent per household (N=1,634; descriptive statistics shown in Supplemental Table 2). The substantive results are the same as those shown here.

Analytic Approach

We conducted two sets of multivariate regression analyses. First, using Sample A we regressed respondents' registered doctor's visits per month in the year before and after the 2004 survey on survey cohort and covariates using a Generalized Linear Mixed (GLM) model, assuming a Poisson distribution (Table 2). Model 1 includes a dummy variable for time (before or after the survey), survey cohort, and a term interacting these two measures. This model thus reveals whether there are differences in the count of individuals' monthly registered doctor's visits in the year before and after the survey for the whole sample and by survey cohort. It also indicates whether the change between the two years differs by survey cohort. In Model 2, we add sociodemographic and control variables to account for the other variations between the two cohorts that may influence doctor's visits. We also conduct identical analyses using average monthly doctor's visits over the 3- and 6-month periods before and after the survey to capture more immediate measurement windows. We calculated confidence intervals using a parametric bootstrap method.

To assess whether self-reports differ between those participating in the survey for the first and second time, the second set of multivariate analyses uses Sample B to regress doctor's visits reported by respondents during the 2006 survey on sample cohort status and control variables using GLM negative binomial regression (Table 3). We choose negative binomial model over Poisson model due to excessive over-dispersion of self-reported visits. The two models presented here are analogous to those assessing registered visits in Table 2.

RESULTS

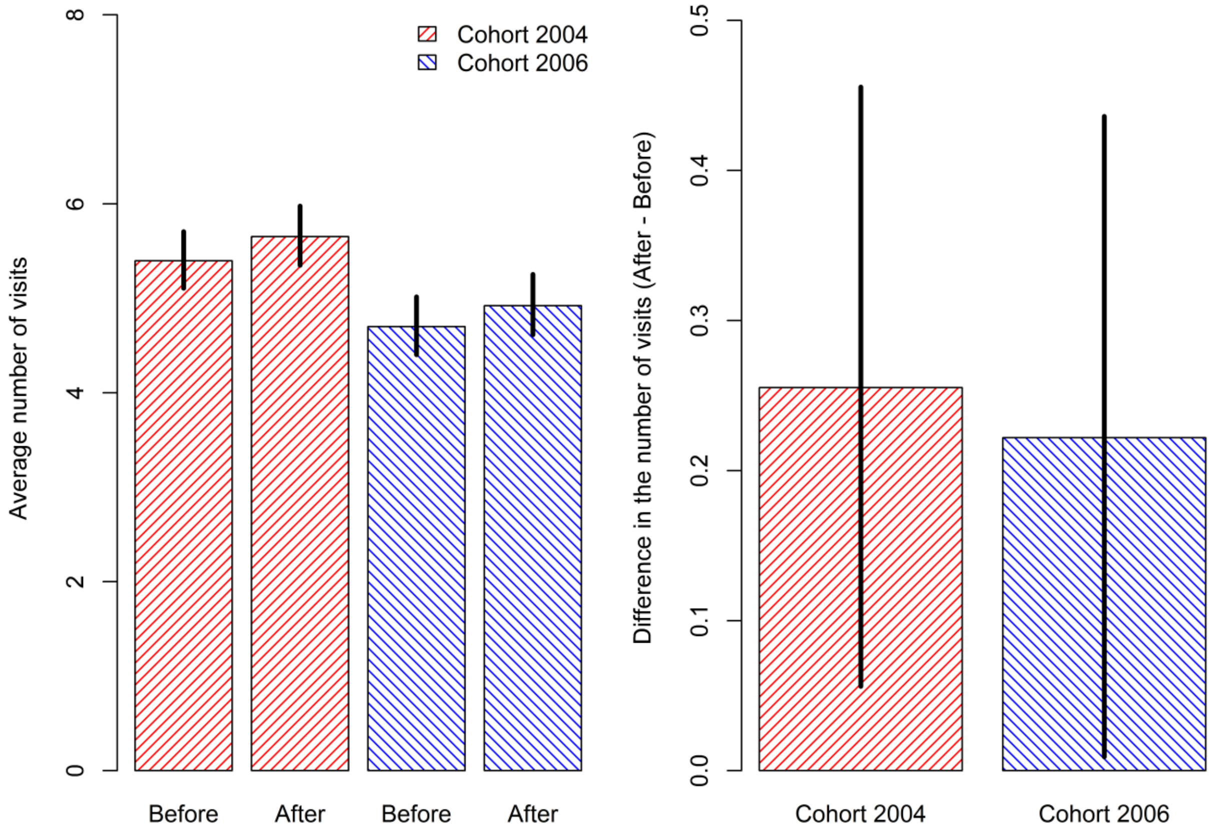
Table 2 shows the exponentiated coefficients from Poisson regressions of registered monthly doctor's visits in the years before and after the 2004 survey on survey cohort within Sample A. Model 1 first shows that study participants had an average of 4.1 percent fewer monthly doctor's visits in the year before the 2004 interview than in the year after the 2004 interview (1.000-.959=.041). Additionally, Cohort 2006 had 10.8 percent fewer monthly visits during this two-year period than Cohort 2004 (1.000-.892=.108). However, the non-significant interaction term indicates that the difference in doctor's visits in the years before and after the 2004 interview did not vary by survey cohort. That is, the increase in doctor's visits from one year to the next did not statistically differ between Cohort 2006, who had yet to enter the study, and Cohort 2004, who were interviewed between these two years. This can be seen graphically in Figure 2. The left panel shows the average number of doctor's visits per month over the 12 months following the 2004 interview for Cohort 2004 and Cohort 2006, and the right panel shows the difference in visits 12 months before and after the interview for each cohort. While Cohort 2006 has somewhat fewer visits than Cohort 2004 (left panel), the increase in monthly visits between the year before and after the interview does not significantly differ between the two cohorts (right panel).

Table 2: Exponentiated coefficients from GLM Poisson regressions of mean registered doctor's visits per month in the years before and after the 2004 survey on survey cohort (Sample A; N=2,347).

	Model 1	Model 2
Intercept	0.392***	0.258***
Before 2004 interview	0.959**	0.959**
Cohort 2006	0.892**	0.895**
Before 2004 interview * Cohort 2006	0.982	0.982
Age in 2004 (Ref.: 50-59)		
60-69		1.027
70-79		1.428***
Female		1.281***
Foreign-born		1.200*
ISCED education level (Ref.: High)		
Medium		0.948
Low		0.914
Mean disposable personal income 2004 (Ref.: High)		
Medium		1.085
Low		1.143**
Not working 2004		1.353***
Not a parent 2004		1.022
Civil status 2004 (Ref.: Married/partnered)		
Divorced / separated		1.057
Widowed		0.945
Never married		0.941

*=p<.05, **=p<.01, ***=p<.001

Figure 2: Registered doctor's visits 12 months before and after 2004 survey by survey cohort (Sample A).



Model 2 adds sociodemographic and status controls. Respondents aged 70-79 had 42.8% more average monthly doctor's visits than those aged 50-59, women had 28.1% more doctor's visits than men, and foreign-born respondents had 20% more visits than native Danes. Those in the lowest education group had 8.6% fewer average monthly visits than the most educated, while respondents with the lowest incomes had slightly more visits than those in the highest income category (14.3%). Non-working respondents also visited doctors 35.3% more than working respondents. However, the relationships between monthly doctor's visits and interview time, cohort, and the cohort-interview time interaction remain essentially unchanged with the addition of these covariates. In short, Table 2 provides no evidence for the hypothesis that participating in the SHARE survey affected respondents' actual doctor's visits.

To investigate whether changes in monthly doctor's visits occur over shorter time spans, we also conducted analyses using 3- and 6-month follow-up periods. The results of the analyses covering doctor's visits 3 months before and after the 2004 survey are summarized graphically in Figure 3. The left panel again shows the mean monthly doctor's visits before and after the survey by survey cohort, and the right panel shows the difference in doctor's visits before and after the survey for each cohort. Mean monthly visits do not significantly differ between the two cohorts (left panel), and while the difference between the cohorts is again not significant, Cohort 2006 actually had a greater increase in monthly doctors' visits from 3 months before to 3 months after the interview than Cohort 2004 (right panel). The results for the 6-month interval (not shown) reveal the same patterns. Again, there is no support for the hypothesis that individuals increase the frequency of their doctor's visits after participating in a health-focused survey relative to their peers who will go on to participate in the survey, even during this relatively short follow-up period.

Figure 3: Registered doctor's visits 3 months before and after 2004 survey by survey cohort (Sample A).

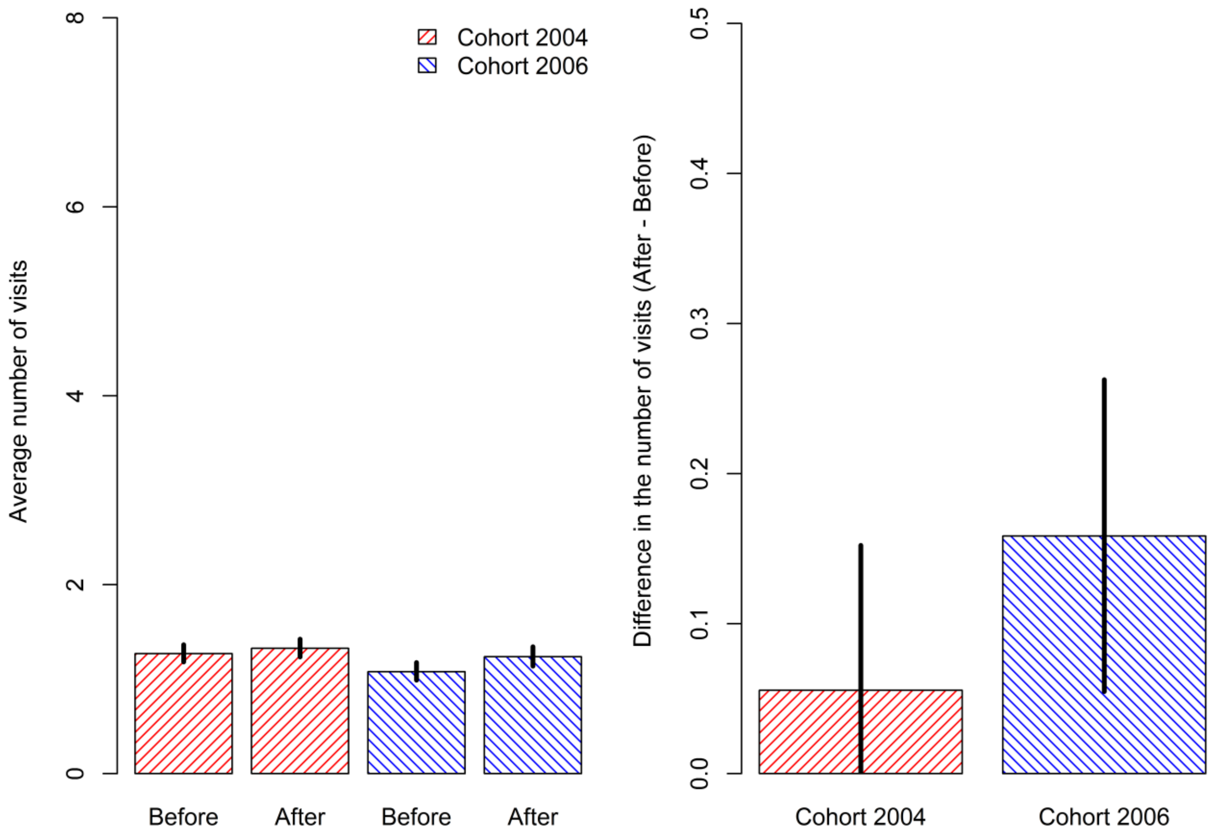


Table 3 shows exponentiated coefficients from negative binomial regressions of the number of times respondents reported that they visited a doctor in the 12 months before the 2006 survey on survey cohort and covariates among Sample B. Recall that both Cohort 2004 and Cohort 2006 are limited to respondents who participated in the SHARE survey at least twice. Model 1 includes cohort only, and shows that self-reported doctor's visits did not differ between Cohort 2006 and Cohort 2004. Model 2 adds sociodemographic controls, which do not change the relationship between cohort and self-reported visits and, in fact, are largely unrelated to self-reports, except for that respondents in the 60-69 age group reported 13.8%

more doctor's visits than those who were 50-59, and unemployed respondents reported 53.4% more visits than working respondents. In short, Table 3 shows that individuals who had already participated in the SHARE survey once approximately two years earlier (Cohort 2004) did not report any more or fewer visits than those participating for the first time (Cohort 2006).

Table 3: Exponentiated coefficients from GLM negative binomial regressions of self-reported doctor's visits in the year before the 2006 survey on survey cohort (Sample B; N=1,819).

	Model 1	Model 2
Intercept	4.091***	3.006***
Cohort 2006	0.909	0.952
Age in 2006 (Ref.: 50-59)		
60-69		0.862*
70-79		0.928
Female		1.075
Foreign-born		1.060
ISCED education level (Ref.: High)		
Medium		1.034
Low		1.060
Mean disposable personal income (Ref.: High)		
Medium		0.981
Low		1.061
Not working 2006		1.534***
Not a parent 2006		0.875
Civil status 2006 (Ref.: Married/partnered)		
Divorced / separated		1.114
Widowed		1.041
Never married		1.220

*=p<.05, **=p<.01, ***=p<.001

DISCUSSION

Our study is the first we know of to assess whether participating in a major health-focused social survey – the Survey of Health, Aging, and Retirement in Europe (SHARE)—predicts a change in an objectively-recorded health behavior. We found that the age-related increase in register-recorded doctor's visits did not differ between Danish adults aged 50-79 who participated in the SHARE survey for the first time and their peers who had yet (but would go on) to participate. We also found that doctor's visits as self-reported on the second wave of the survey did not differ between individuals being interviewed for the second time and a refresher sample being interviewed for the first time.

The finding that respondents' actual doctor's visits did not increase along with participation in the SHARE survey is somewhat inconsistent with expectations informed by several experimental studies in consumer and health psychology, which show increases in preventive health behaviors—including visits to doctors—among individuals who are questioned about these behaviors (Conner et al. 2011; Sandberg and Conner 2009; Wood et al. 2014; Zwane et al. 2011). There are several key differences between the designs of these studies and surveys like SHARE that likely explain much of this inconsistency. First, because they are experimental, the consumer/health psychology studies on this subject give researchers substantial control over factors that could interfere with subtle behavioral effects. Additionally, the questionnaires in these studies tend to be brief and targeted to the particular behaviors being assessed, which is why researchers quite reasonably argue that they may bring these behaviors to the forefront of study participants' consciousness. Although much of the comparatively lengthy SHARE questionnaire concerns health, it also focuses on other domains, and the question about doctor's visits represents a small part of the survey. Additionally, questions in the experimental psychological studies often prompt respondents to state their plans to engage in certain behaviors, which may compel them to act in consistent ways. By contrast, surveys like SHARE are not aimed at directly testing or evoking behavioral changes, and do not ask about intended behaviors. For all these reasons, it is possible that the SHARE survey—along with other major health-focused panel studies—simply does not have the effect of acting as a “cue to action” (Rosenstock 2005) that may activate respondents’ beliefs about and future engagement in this and potentially other health behaviors.

The focus on doctor’s visits may also help explain why we do not observe behavioral effects. As described earlier, people often visit doctors as a means to prevent serious health problems and maintain good health (e.g., Rosenstock 1974, 2005). However, individuals also visit doctors simply because they are already ill, and visits increase in frequency when people age and are on declining health trajectories (Liao et al. 2001; Miilunpalo et al. 1997). Doctor’s visits that occur because of health crises or that reflect acute health declines are less likely to be responsive to a hypothetical “reminding” effect of health-based questions. Unfortunately, there is no clear-cut way to distinguish between visits for the purposes of obtaining medications, preventive visits and visits prompted by serious health issues in these data. Future studies should explore objectively-measured health behaviors which may be more sensitive to changes from being surveyed, including specific preventive behaviors such as cancer screenings or changes in lifestyle behaviors.

The finding that respondents’ self-reported doctor’s visits did not differ by the number of times they had participated in the survey also runs counter to expectations supported by some existing studies, which find changes in self-reported behaviors across waves of panel surveys (Halpern-Manners and Warren 2012; Torche et al. 2012). However, the literature also points out that these changes rarely appear in studies with a gap of more than one year between waves (Spangenberg et al. 2016; Warren and Halpern-Manners 2012; Wilding et al. 2016). It is thus perhaps expected that by 2006, responses from those who participated in the survey two years earlier would not differ from those of new participants. Additionally, studies that do find changes in self-reports generally focus on behaviors or statuses which may be embarrassing or stigmatizing, such as drug use (Torche et al. 2012) and unemployment (Halpern-Manners and Warren 2012), which is less likely to be the case for a failure to visit doctors. Further research focusing on health outcomes which may be more likely to motivate changes in responses over time, especially those which when persistent may illicit feelings of shame, is needed.

Our study is particular to the sample and population it represents. With a healthcare system that has been nationalized for decades, Denmark experiences high utilization of physicians across segments of the population (Olejaz et al. 2012), and preventive doctor's visits may be comparatively immune to further increases. Additionally, at age 50+, many SHARE respondents may be encountering significant age-related health declines that have a direct impact on their health behaviors, including visits with physicians. Patterns may differ in other countries or among individuals of different ages.

Even so, the findings provide an important contribution to the literature on study participation effects by showing that in the case of this widely-used longitudinal health survey, participation was unrelated to the aging adult respondents' self-reported or actual uptake of an important health behavior. Thus, they provide a counterpoint to recent concern about panel conditioning effects and their potential to undermine measurement validity by re-emphasizing that they are likely limited to select behaviors and question formats. More broadly, our results indicate that at least for this survey and behavior, participation did not affect respondents' subsequent actions—an auspicious conclusion for researchers who may be concerned about the consequences of participating in such studies for individuals' lives.

REFERENCES

Andersen, Ronald and John F. Newman. 2005. "Societal and Individual Determinants of Medical Care Utilization in the United States." *Millbank Quarterly* 83(4):1–28.

Baadsgaard, Mikkel and Jarl Quitzau. 2011. "Danish Registers on Personal Income and Transfer Payments." *Scandinavian Journal of Public Health* 39(7):103–5.

Bhandari, Aman and Todd Wagner. 2006. "Self-Reported Utilization of Health Care Services: Improving Measurement and Accuracy." *Medical Care Research and Review* 63(2):217–35.

Börsch-Supan, Axel and Hendrik Jürges. 2005. *The Survey of Health, Ageing and Retirement in Europe – Methodology*.

Conner, Mark, Gaston Godin, Paul Norman, and Paschal Sheeran. 2011. "Using the Question-Behavior Effect to Promote Disease Prevention Behaviors: Two Randomized Controlled Trials." *Health Psychology* 30(3):300–309.

Crossley, Thomas F., Jochem de Bresser, Liam Delaney, and Joachim Winter. 2017. "Can Survey Participation Alter Household Saving Behaviour?" *Economic Journal* 127(606):2332–57.

Das, Marcel, Vera Toepoel, and Arthur van Soest. 2011. "Nonparametric Tests of Panel Conditioning and Attrition Bias in Panel Surveys." *Sociological Methods & Research* 40(1):32–56.

Fitzsimons, Gavan J. and Sarah G. Moore. 2008. "Should We Ask Our Children about Sex, Drugs and Rock & Roll? Potentially Harmful Effects of Asking Questions about Risky Behaviors." *Journal of Consumer Psychology* 18(2):82–95.

Fitzsimons, Gavan J. and Patti Williams. 2000. "Asking Questions Can Change Choice Behavior: Does It Do so Automatically or Effortfully?" *Journal of Experimental Psychology: Applied* 6(3):195–206.

Halpern-Manners, Andrew and John Robert Warren. 2012. "Panel Conditioning in Longitudinal Studies: Evidence From Labor Force Items in the Current Population Survey." *Demography* 49(4):1499–1519.

Halpern-Manners, Andrew, John Robert Warren, and Florencia Torche. 2014. "Panel Conditioning in a Longitudinal Study of Illicit Behaviors." *Public Opinion Quarterly* 78(3):565–90.

Halpern-Manners, Andrew, John Robert Warren, and Florencia Torche. 2017. "Panel Conditioning in the General Social Survey." *Sociological Methods & Research* 46(1):103–24.

Hunger, Matthias, Larissa Schwarzkopf, Margit Heier, Annette Peters, and Rolf Holle. 2013. "Official Statistics and Claims Data Records Indicate Non-Response and Recall Bias within Survey-Based Estimates of Health Care Utilization in the Older Population." *BMC Health Serv Res* 13(1):1–11.

Liao, Youlian, Daniel L. Mcgee, Guichan Cao, and Richard S. Cooper. 2001. "Recent Changes in the Health Status of the Older U . S . Population : Findings from the 1984 and 1994 Supplement on Aging." 443–49.

Miilunpalo, Seppo, Ilkka Vuori, Pekka Oja, Matti Pasanen, and Helka Urponen. 1997. "Self-Rated Health Status as a Health Measure : The Predictive Value of Self-Reported Health Status on the Use of Physician Services and on Mortality in the Working-Age Population." *Journal of Clinical Epidemiology* 50(5):517–28.

Morwitz, Vicki G. and Gavan J. Fitzsimons. 2004. "The Mere-Measurement Effect: Why Does Measuring Intentions Change Actual Behavior?" *Journal of Consumer Psychology* 14(1–2):64–74.

Oksuzyan, Anna, Inge Petersen, Henrik Stovring, Paul Bingley, James W. Vaupel, and Kaare Christensen. 2009. "The Male-Female Health-Survival Paradox: A Survey and Register Study of the Impact of Sex-Specific Selection and Information Bias." *Annals of Epidemiology* 19(7).

Olejaz, Maria, Annegrete Juul Nielsen, Andreas Rudkjøbing, Hans Okkels Birk, Allan Krasnik, and Cristina Hernández-Quevedo. 2012. "Denmark - Health System Review. in: Health Systems in Transition." 14(2):14(2):1-192.

Pedersen, Carsten Bøcker. 2011. "The Danish Civil Registration System." *Scandinavian Journal of Public Health* 39(7):22–25.

Petersson, Flemming, Mikkel Baadsgaard, and L. A. U.Caspar Thygesen. 2011. "Danish Registers on Personal Labour Market Affiliation." *Scandinavian Journal of Public Health* 39(7):95–98.

Roberts, Rosebud O., Erik J. Bergstrulh, Luanne Schmidt, and Steven J. Jacobsen. 1996. "Comparison of Self-Reported and Medical Record Health Care Utilization Measures." 49(9):989–95.

Rosenstock, Irwin M. 1974. "The Health Belief Model and Preventive Health Behavior." *Health Education Monographs* 2(4):354–86.

Rosenstock, Irwin M. 2005. "Why People Use Health Services." *Millbank Quarterly* 83(4):1–32.

Sandberg, Tracy and Mark Conner. 2009. “A Mere Measurement Effect for Anticipated Regret: Impacts on Cervical Screening Attendance.” *British Journal of Social Psychology* 48(2):221–36.

Spangenberg, Eric R., Ioannis Kareklas, Berna Devezer, and David E. Sprott. 2016. “A Meta-Analytic Synthesis of the Question-Behavior Effect.” *Journal of Consumer Psychology* 26(3):441–58.

Sturgis, Patrick, Nick Allum, and Ian Brunton-Smith. 2009. “Attitudes Over Time: The Psychology of Panel Conditioning.” *Methodology of Longitudinal Surveys* (November):113–26.

Toepoel, Vera, Marcel Das, and Arthur van Soest. 2009. “Relating Question Type to Panel Conditioning: Comparing Trained and Fresh Respondents.” *Survey Research Methods* 3(2):73–80.

Torche, Florencia, John Robert Warren, Andrew Halpern-Manners, and Eduardo Valenzuela. 2012. “Panel Conditioning in a Longitudinal Study of Adolescents’ Substance Use: Evidence from an Experiment.” *Social Forces* 90(3):891–918.

Vallgårda, Signild, Allan Krasnik, and Karsten Vrangbæk. 2001. “Health Care Systems in Transition: Denmark.” *European Observatory on Health Care Systems* 3(7):1–92.

Warren, John Robert and Andrew Halpern-Manners. 2012. “Panel Conditioning in Longitudinal Social Science Surveys.” *Sociological Methods & Research* 41(4):491–534.

Wilding, Sarah, Mark Conner, Tracy Sandberg, Andrew Prestwich, Rebecca Lawton, Chantelle Wood, Eleanor Miles, Gaston Godin, and Paschal Sheeran. 2016. “The Question-Behaviour Effect: A Theoretical and Methodological Review and Meta-Analysis.” *European Review of Social Psychology* 27(1):196–230.

Williams, Patti, Lauren G. Block, and Gavan J. Fitzsimons. 2006. “Simply Asking Questions about Health Behaviours Increases Both Healthy and Unhealthy Behaviours.” *Social Influence* 1(2):117–27.

Wolinsky, Fredric D. and Robert J. Johnson. 1991. “The Use of Health Services by Older Adults.” 46(6):345–57.

Wood, Chantelle, Mark Conner, Tracy Sandberg, Gaston Godin, and Paschal Sheeran. 2014. “Why Does Asking Questions Change Health Behaviours? The Mediating Role of Attitude Accessibility.” *Psychology and Health* 29(4):390–404.

Zwane, Alix Peterson, Jonathan Zinman, Eric Van Dusen, William Pariente, Clair Null, Edward Miguel, Michael Kremer, Dean S. Karlan, Richard Hornbeck, Xavier Giné, Esther Duflo, Florencia Devoto, Bruno Crepon, and Abhijit Banerjee. 2011. “Being Surveyed Can Change Later Behavior and Related Parameter Estimates.” *Proceedings of the National Academy of Sciences* 108(5):1821–26.