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When Change Matters: The Effect of Dependent Interviewing on Survey Interaction in the British Household Panel Study

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Non-Technical Summary

Drawing on sociolinguistic research on conversations and its recent application to survey interviewing in particular, we examined a 'remind-still' dependent interviewing design used in a set of BHPS questions to ascertain current employment characteristics. Our theoretical approach applies the principle of cooperation and the tendency for agreement in conversations to the use of yes-no interrogatives in this set of questions. These principles imply that when respondents need to indicate a change in circumstances their tendency is to provide additional information than required by the question by way of explanation. This extra talk adds to the common ground of known information obtained during the interview. We argue that this leads sort of thing leads to subsequent departures from standard interviewing procedures as interviewers are then faced with explicit or inferred knowledge of answers to subsequent survey questions. Under conditions of no change, we assert that problems of respondent cognition and this conversational tendency are reduced, thereby minimising the likelihood of interviewer departures from standard procedures for these reasons.

Controlling for respondent age, sex and education, we find that dependent interviewing questions are no different from independent questions in the occurrence of cognition problems. Dependent interviewing did seem to reduce the amount of behaviour indicative of such problems, however. Also we found a weak but significant association between interviewer departures from standard interviewing practice and the occurrence of respondent cognition problems regardless of question type. Dependent interviewing did, however, impact the survey interaction itself. We found that dependent interviewing questions were nearly 6.5 times more likely to be interrupted by respondents than regular survey questions. We also found that respondents were 2.7 times more likely to engage in answer elaboration and other forms of conversation at dependent interviewing questions than routine survey questions. Such verbal action seems to occur when respondent circumstances have changed; respondents were nearly 6 times more likely to engage in elaborations at dependent questions under conditions of change in their circumstances than no change in circumstances. We found that interviewers were nearly 3 times more likely to depart from standard interviewing procedures at follow-ups to negated dependent interviewing questions, and they were almost 2.5 times more likely to depart from standard practice at subsequent points in the interview under conditions of no change in respondent circumstances.

These results suggest that under conditions of no change, dependent interviewing is consistent with conversational principles when there is no change in circumstances. We believe that this identifies a mechanism by which the observation of reduced error in the amount of change between waves of a panel survey. However under conditions of change in respondent circumstances, dependent interviewing works against conversational principles. Under conditions of change, departures from standard interviewing practice are common because respondents are more likely to engage in extraneous talk. The violations of standard interviewing procedure we observe seem to result from the tension between audience designed survey questions and the emergent common ground in the survey interview enriched by the use of dependent interviewing.

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Abstract

We examine how dependent interviewing affects verbal interaction between interviewers and respondents in questions obtaining current employment details in the British Household Panel Study. Respondents experience few cognition problems when answering DI questions, but interruption and elaboration are likely at PDI questions. These behaviours occur when respondent circumstances have changed. Departures from standardised interviewing are also likely when circumstances change. DI seems to reduce the accuracy of detail about such change since we observe interviewer behaviour that others find to produce inaccurate data. Nevertheless, these results may explain why DI reduces the odds of spurious change between waves of panels.

Keywords: dependent interviewing, BHPS, interviewer-respondent interaction

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Introduction

Dependent interviewing (DI) is a standardised questioning method particular to longitudinal surveys. It uses data gathered in previous interviews of a respondent to formulate question text or route respondents through the questionnaire. DI is becoming more widely used in longitudinal surveys for a number of reasons, particularly because DI improves data quality. A number of studies have shown that that this may in fact be the case (Lynn et al. 2006; Lynn and Sala 2006; Mathiowetz and McGonagle 2000). Although this work seems to shed light on the *nature* of DI's effects on measurement error, very little is known about the *mechanisms* by which these outcomes arise (Lynn et al. 2006). Little is known about how DI affects the interviewer task nor how DI functions in a live interview (Lynn et al. 2006). Since the goal of survey research is to measure variability in measurable characteristics, Lessler et al (1989) suggest that one mechanism accounting for error in survey measurement is variability in the interaction between interviewer and respondent. For this reason, we analyse the survey interaction across a DI protocol used in the British Household Panel Study to identify change in current employment details. We generally find that although PDI does not trigger respondent cognition problems, it seems contribute to breakdown in standardised interviewing procedures depending on whether respondents have changed their circumstances. Drawing on the sociolinguistic literature of conversations as applied to survey interviews, we find that PDI seems to provide a smooth flowing, standardised and conversationally normative interaction when no change occurs in respondent circumstances. Under conditions of changed circumstances, however, respondents engage in elaborations and other forms of talk which leads to administration errors at subsequent points in the question series. We find that these administration errors are of the type that is quite likely to result in poor quality data.

We begin by providing some background on the role of DI in reducing measurement error. We continue by describing the use of behaviour coding to observe survey interaction before laying out our argument as to why DI may have differential effects depending on respondent circumstances. We then show results from a series of regression analyses of observed survey behaviours and conclude with a discussion of these results.

1 Background

Dependent interviewing (DI) is a method of structuring questions and questionnaire routing in longitudinal surveys using computer assisted interviewing. DI draws on the data supplied by respondents at previous waves of data collection to phrase questions or direct

respondents through the survey instrument. This practice can be distinguished from independent interviewing which makes no reference to data previously collected (Lynn et al. 2006; Mathiowetz and McGonagle 2000). DI questions can be structured either *proactively* or *reactively* (Lynn et al. 2006). *Proactive* dependent interviewing (PDI) presents respondents with previously collected data and asks them to confirm or correct a status, or continue reporting from the last status. PDI questions can take one of three designs: "remind, continue", "remind, confirm" and "remind, still" designs (Jäckle 2009). The "remind, continue" design provides a boundary before continuing with an independent question. The "remind, confirm" design asks respondents to check and confirm previously recorded answers. The "remind, still" design asks about change. With *reactive* dependent interviewing (RDI), respondents are asked questions first independently before prior information is used to confirm certain responses. For example, a respondent may report their income, then receive a series of follow-up questions if their current income suggests an unlikely increase or decrease over previous reports. RDI can take the "item non response" design or the "corrective follow-up" design (Jäckle 2009). With an "item non response" RDI design, respondents who do not answer a question or answer "do not know" are reminded of their previous report and asked if that is still correct. Under the "corrective follow up" RDI design, any inconsistency between a current report and a previous report results in a consistency check on the apparent discrepancy.

Some research suggests that specific uses of DI can reduce measurement error, spurious transition in life events and item non-response (Lynn et al. 2006). DI has been found to lessen measurement error in estimates of change in employment characteristics (Hill 1994; Lynn and Sala 2006) and reduce underreporting of income sources and benefit receipt (Lynn et al. 2004; Lynn et al. 2006). PDI also appears to attenuate the likelihood of spurious transitions at the seam between yearly data collection efforts in ongoing panels (Cantor 1991; Hale and Michaud 1995; Hill 1994; Jäckle and Lynn 2007; Mathiowetz and McGonagle 2000). Though a concern with PDI, satisficing has also been shown to be an uncommon occurrence (Hoogendoorn 2004). A further concern pertains to any violations of respondent confidentiality by using data in this way. Research suggests, however, that DI seems to raise few concerns about the confidentiality (Pascale and Mayer 2004).

<FIGURE 1 HERE>

PDI used in the BHPS to obtain the details of current employment characteristics operates as a set of paired questions using a 'remind-still' design (Jäckle 2009). Figure 1 contains a schematic diagram of this approach. If data from the last wave are available for

respondents, they are first reminded of their prior status and asked a yes-no question as to whether such a status is still the case. Under conditions of no change, the respondent confirms their prior information as still accurate and moves on to the next DI question series. Under conditions of change in circumstances, the respondent would disagree with the presented information and a follow-up question would then be used to obtained the current detail. If data was not available from the prior wave and the respondent was in employment at the prior wave, respondents would initially receive the independent question. Under this scenario, a reactive check for whether this was the same detail as at last wave was administered[1]. This design was used to minimise the likelihood of observing spurious change in employment characteristics between waves under conditions of no change in employment (Jäckle, Uhrig and Laurie 2007). It is important to note that this core design, when repeated over a set of measures, can generate a significant diversity of question routing within any sample.

2 Analysis of the Survey Interaction

Observation of survey interviewing has a long history in survey methodology. Beginning with the work of Charles Cannell and associates, researchers have used behaviour coding of verbal interaction in the survey interview to monitor interviewer performance and to pre-test survey questions (Cannell, Lawson and Hausser 1975; Cannell and Oksenberg 1988; Oksenberg, Cannell and Kalton 1991). Through the observation of interviewer engagement with survey respondents, Cannell and others were able to develop and promulgate standard methods of survey interviewing.

Standardised survey interviewing employs a set of interviewing rules designed to minimise the variable component of measurement error in interviewer administered social surveys (Collins 1980; Collins and Butcher 1983; Fowler and Mangione 1990). Fowler and Mangione (1990) argue that to obtain survey answers that are amenable to statistical analysis and attributable to the respondent, each interviewer must read survey questions as worded, probe non-directively, and maintain a cooperative – but not overly friendly – relationship for the duration of the interview. In short, standardisation in survey interviewing aims to hold interviewers' behaviour constant so that the resulting data are attributable primarily to variation in the phenomenon under study rather than to variation in interviewing style across

[1] Note, this reactive check occurred very infrequently as only 3 respondents did not have useable data from the prior wave for use in PDI questions.

interviewers (Fowler and Mangione 1990; Maynard and Schaeffer 2002; Tourangeau 1990)[2]. Morton-Williams and Sykes (1984) find that when interviewers departed from standardised techniques undesirable respondent behaviour was more than five times more likely to occur (see also Cannell and Oksenberg 1988). Standardised interviewing may be particularly important in panel studies where variation in rates of change are assumed to be due to change in respondent circumstances rather than variation in question administration across waves. Though Collins (1980) finds that the portion of total item variability due to interviewers is generally small, he notes that in large surveys it is often enough to render estimates imprecise.

Under the assumption of standardised interviewing, analysis of survey interaction has tended to focus on question pre-testing using behaviour coding. This approach picks out certain respondent verbal action that suggests difficulty in question answering. Assuming standardised question administration, this literature identifies question wording as affecting respondent's ability to answer. According to the classic cognitive model of survey question answering, respondents must first comprehend the question, then retrieve information from memory or otherwise cognitively access the information required to answer the question. This information must be evaluated for accuracy and formatted according to the question requirements before finally being stated or expressed (Sykes and Morton-Williams 1987; see also Tourangeau, Rips and Rasinski 2000). Respondent behaviour can exhibit problems with each aspect of this process (Ongena and Dijkstra 2007) and the fundamental cause of such problems is often argued to be poor question construction (Morton-Williams and Sykes 1984; Ongena 2005; Sykes and Morton-Williams 1987)[3]. Fowler (1992), for example, identifies problem questions if 15 percent of administrations contain either a respondent request for clarification or an inadequate, i.e. not immediately codeable, answer. Others focus on respondent expressions of uncertainty as indicative of problem question wording (Blixt and Dykema 1993; Oksenberg, Cannell and Kalton 1991). Once questions have been

[2] Standardised interviewing is not without its critics (Beatty 1995; Moore 2004; Schober and Conrad 1997; Suchman and Jordan 1990). For example, Beatty (1995) argues that standardisation does not allow for adequate correction of misunderstandings. Schaeffer and Maynard (1996) argue that the cognitive processing required to arrive at survey answers is rooted in survey interaction which can oftentimes deviate from strict standardisation. Indeed, Suchman and Jordan (1990) claim that surveys actually rely on conversational norms around asking and answering questions in order to succeed. At the same time, standardisation suppresses "interactional resources that routinely mediate uncertainties of relevance and interpretation" (Suchman and Jordan 1990 p. 232). The alternative to standardisation involves flexibility in interviewing (Beatty 1995; Schober and Conrad 1997), although this can introduce a variable and unknown component to measurement error (Beatty 1995; Collins 1980; Dykema 2005; Sykes and Collins 1992).

[3] Survey administration procedures can and have been examined, for example see Childs and Landreth (2006)

revised, fewer problems are observed (Calahan et al. 1997; Fowler 1989; Oksenberg, Cannell and Kalton 1991).

A second set of behaviour coding studies use validation data to examine the role of standardised survey administration in determining response accuracy. These validation studies show mixed effects however. Dykema and colleagues have found that slight modifications in question wording often enhance response accuracy (Dykema 2005; Dykema, Lepkowski and Blixt 1997). They reason that interviewers change wording in order to render questions more comprehensible when respondents have cognition problems. In an experiment, Smit and colleagues showed that suggestive probes lead to inaccurate reporting (Smit, Dijkstra and van der Zouwen 1997). Dijkstra and Ongena, also, find that interviewer 'choosing', i.e., picking a response option based on information respondents provide that is not immediately codeable, decreases data accuracy (2006).

Our work builds on these sorts of prior examinations of the survey interaction in three critical ways. First, work focusing on survey interaction has historically examined interviewer-respondent interaction in cross-sectional studies. We instead analyse the verbal interaction between interviewers and respondents in a panel survey. Panel surveys are different from cross-sectional studies because respondents and interviewers in cross-sectional surveys are unlikely to be familiar or known by one another. In panel or longitudinal surveys which take place in respondents' homes, such as in the BHPS, the same interviewers, in practice, are sent to the same data points at each wave or sweep of data collection. Familiarity may emerge over the several waves of data collection and this may alter the interview dynamic.

Since respondents are interviewed repeatedly in an on-going panel, such as the BHPS, regularity of contact also may make the interview experience routine or familiar. Respondents will undoubtedly have been trained in their role of being interviewed and will certainly be familiar with the questions they are asked. In a cross-sectional study there is no guarantee that the respondents will understand or adhere to the question answering role of a survey respondent whereas we might expect panel respondents to be more adept at sticking to a standardised form.

Third, all of the work involving behaviour coding the verbal interaction between interviewers and respondents focuses on behaviour within single question-answer sequences. Though this has usefully shown how question structure can contribute to respondent answering difficulty, administration errors and poor data quality, this work has typically failed to link behaviour at the question to the content and substance of behaviour at prior

questions[4]. Survey questions are administered often in sets of questions related to a single unifying theme. Moreover, implemented proactively or reactively, DI functions as a two-question unit. With certain PDI designs, an initial question presents prior information which is either confirmed or negated. If negated, a follow-up question about the same topic ensues. For these reasons, our investigation into the use of DI demands a broader lens.

3 Dependent Interviewing and Principles of Conversation

In recent years, continued observation of verbal interaction in surveys through the use of behaviour coding and other methods has lead to a more formally theoretical approach to how it contributes to survey measurement (Ongena and Dijkstra 2007). Sociolinguistic theory of conversation has fruitfully been applied to talk in surveys to display the mechanisms leading to accountable survey answers. Although survey answers may be derived from the cognitive processes at play in respondents' heads, it has also been shown that survey answers result from a collaborative communication between interviewer and respondent (Ongena and Dijkstra 2007; Schaeffer and Maynard 1996; Schober and Conrad 2002). Expanding the question answering process to include the interviewer and their interaction has theoretical scope to address the entire context of any given survey question.

Several conversational norms may be at work in determining the measurement properties of the PDI protocol used in the BHPS. At its core, verbal interaction between humans proceeds under a normative principle of cooperation. According to Grice:

> "[Conversants] make [their] conversational contribution such as required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which [they] are engaged" (1975 p 45)

This principle means that conversation partners should not talk too much or too little, should be truthful, should be relevant and should be unambiguous in what they say (Grice 1975). Speech partners adjust their behaviours mutually in order to achieve the exchange of information required for conversation to happen (Slugoski and Hilton 2001). Even though interviewers may be bound by the words scripted in a survey instrument, respondents are not. This can generate a tension whereby respondents approach the interview not unlike participating in a talk-show interview while interviewers are bound by the rules of standardisation (Houtkoop-Steenstra 1995; 2000; Schaeffer 1991; Suchman and Jordan 1990). Nevertheless, it is respondent engagement with the instrument and the interviewer's

[4] However, Dykema (2005) finds no effect of cumulative interviewer error on the likelihood of response inaccuracy.

application of it that gives rise to survey measurement (Lessler, Tourangeau and Beranek 1989; Suchman and Jordan 1990).

Analyses of yes-no questions in conversations find that question askers typically structure their talk so as to express a preferred response (Raymond 2003; Sacks 1987). This behaviour accords with Grice's principle of cooperation described above. Although the preferred response may be positive or negative, research finds that a preference for positive answers outnumbers negative answers nearly 3 to 1 (Pomerantz 1984; Raymond 2003). Moreover, the resulting response typically agrees with this preference (Molenaar and Smit 1996; Pomerantz 1984; Sacks 1987; Smit, Dijkstra and van der Zouwen 1997).

The 'remind-still' structure of PDI, with the intention of minimising the observation of spurious change, prefers a 'yes' answer. The question is designed with the assumption that change in circumstances is less frequent than no-change in circumstances. The question takes the form "Last time you said X, is that still the case?", to which the presumed typical response would be 'yes'. Note that the question could have instead asked, "Last time you said X, has that changed?" if the presumption was frequent change in circumstances. In order to express a change at a PDI question, respondents must disagree with the stated information. Thus, respondents are required to provide a dispreferred response in order to report truthfully. When dispreferred answers must be given, people engage in conversational buffering behaviours (Pomerantz 1984; Raymond 2003). Such behaviour includes pausing before answering, uttering hesitations (e.g., "weeelll"), delay by means of avoidance talk, prefacing with token agreement before subsequent disagreement (e.g., 'Yes, but I don't …."), appreciations (e.g., "I'd love to, but …", typically with requests), as well as explanations or apologies (Pomerantz 1984; Raymond 2003; Sacks 1987) [5].

The use of explanations in deploying a dispreferred response is of particular significance in survey interviews. What a speaker says in their turn at speaking often implies the content of the hearer's subsequent speech (Ongena 2005; Sacks, Schegloff and Jefferson 1974). Though such requested content may be made explicit, hearers often infer the sort of information that is required – that is, answering the question behind the question (Grice 1975; Houtkoop-Steenstra 2002). For example, Clark (1979) asked a sample of shop-keepers whether they accepted any kind of credit card as a simple yes-no question. In almost 90

[5] Note an alternative explanation for respondent failure to report change may be satisfycing. Respondent's may learn that answering 'no' triggers further questions and thus a utility-maximising respondent interested in minimising their response burden would be induced to lie. Work by Hoogendorn, however, finds that satisfycing does not occur (2004)

percent of cases, vendors provided more information than what was requested by volunteering which credit cards they accepted.

This sort of extra-information can lead to interactional difficulties in the standardised survey interview. The principles of standardisation require interviewers to read questions even if answers may already be apparent. Departures from standardisation can occur when interviewers hold explicit or inferred knowledge of answers to survey questions designed not for the specific recipient but instead for a wide range of survey respondents (Houtkoop-Steenstra 1995; 2000). Schaeffer and colleagues have shown that respondents can often provide quite extensive discourse before arriving upon a survey answer (Moore 2004; Schaeffer, Maynard and Cradock 1993). Ordinarily, utterances are only understood when the speaker and the hearer both agree that understanding has been achieved (Schober 1999). This process, called 'grounding', applies equally to the survey interaction. In ordinary conversation, understanding of meaning is localised and accumulative over the course of interaction (Clark and Schober 1991). This 'common ground' develops between conversation partners and the Gricean maxim of *relevance* dictates repetition of information should not occur. This is problematic in the survey interview when respondents provide information at one question which is relevant for answering subsequent questions. At subsequent questions, interviewers must depart from standardisation or risk appearing ignorant or unskilled conversation partners (Ongena 2005). Indeed, Houtkoop-Steenstra (1995; 2000) observed interviewers prefacing questions, e.g., "You've already said, but I have to ask…", paraphrasing, or completely misreading the question to fit within the common ground. Also, interviewers sometimes failed to ask the question altogether and chose or filled in answers from direct knowledge or supposition based on disclosed information (Houtkoop-Steenstra 1995; Ongena 2005). These sorts of departures from standardisation are not occasioned by respondent comprehension or recall problems, but instead by a breakdown in the survey interaction resulting from the invocation of conversational norms.

In the context of a 'remind-still' DI protocol, subsequent survey interaction depends on whether the question identifies change in circumstances. Respondents interviewed at a prior wave who have never experienced a change in employment circumstances would receive a set of yes-no interrogatives to which they answer in accordance with the preferred response of 'yes'. This continuous agreement with the preferred response should pose little or no problems for the survey interaction. In fact, the BHPS uses the 'remind-still' design because it was believed to provide no comprehension and few or no recall problems for

respondents (Jäckle, Uhrig and Laurie 2007). With each PDI question, new information is added to the common ground but respondents merely need to assent to it in order to confirm their situation. This leads us an initial hypothesis:

> **H1**: *PDI questions should reduce the observation of respondent cognition problems as compared to independent questions.*

Under conditions of true-change, however, respondents are expected to answer 'no' to the PDI questions. Conversation theory suggests that expressing a dispreferred response will be accompanied by qualifications, elaborations or behaviour of 'answering the question behind the question'. Doing so adds information to the common ground rendering the standardised administration of subsequent survey items redundant. This discussion implies three further hypotheses:

> **H2:** *PDI can induce conversational norms such that question elaborations and explanations should be more likely at PDI questions than at IND questions.*
>
> **H3:** *Conversational norms are more likely to be invoked under conditions of change in respondent's circumstances.*
>
> **H4:** *Negation of a PDI question should lead to departures from standardisation at subsequent survey items.*

The sorts of departures from standardisation should conform with the patterns observed by Houtkoop-Steenstra (1995; 2000). Thus, we further expect:

> **H5:** *Question wording errors, question skipping and suggestive probing occur more frequently following negated PDI questions than under other routing patterns.*

4 Data

To examine our hypotheses about the effects of DI on survey interaction, we analyse a set of data and transcripts from the British Household Panel Study (BHPS) Wave 16 pilot. The BHPS is an annual panel survey begun in 1991 with a representative sample of around 5,500 households in Great Britain. Interviews are conducted via computer assisted face-to-face interviewing (CAPI) in respondents' homes. In autumn 2006, BHPS Wave 16 introduced DI and a pilot was conducted in March 2006 to test how DI performs in the field (Jäckle, Uhrig and Laurie 2007). The issued pilot sample comprised households from the former *European Community Household Panel* previously interviewed for the *Improving Survey Measurement of Income and Employment* study in 2003 (see Jäckle et al. 2004 who describe the sample in detail). Interviewing was conducted in 166 of 222 issued households for a general response rate of 74.8 percent. The pilot was designed to operate as a "dress-rehearsal" of the BHPS main-stage rather than as a means for assessing DI question formats, per se. A subset of 131 interviews were recorded, thus the pilot resulted in a complementary set of qualitative and quantitative data concerning the survey instrument's performance in a setting nearly identical to main-stage fieldwork[6].

Our analysis focuses on the application of DI in a set of questions used to obtain details of respondents' current employment characteristics[7]. This set of questions was designed using DI to minimise the observation of spurious transitions in respondent employment characteristics between waves of data collection (Jäckle, Uhrig and Laurie 2007). The set of questions obtains information about the respondent's current occupation, industry, employer name, employment status (self-employed or employed), managerial duties, employment sector and number of employees at their workplace. Table 1 shows the specific question wording and ordering. The questions obtaining occupation and industry are open-ended while the remaining current employment characteristics are obtained with closed-response questions. Any respondent interviewed at the prior wave but otherwise

[6] Not all interviews were recorded for a number of reasons including respondents not consenting to be recorded, interviewer error operating recording equipment and recording equipment malfunction. This, however, did not seem to bias the sample of recorded data (see Sala, Uhrig and Lynn 2008).

[7] DI was piloted in three further areas of questioning. First, in gathering an annual employment status history, a 'remind-continue' DI design was used to anchor respondents in their status from the last interview (Jäckle 2005). This application did not necessarily result in new data. Though such designs are not rare, we chose to focus on the more common 'remind-still' designs for evaluation. Second, in enumerating unearned income sources, including state benefits, the BHPS introduced a reactive DI check for prior listed sources not mentioned. This check was only applied in 13 recorded interviews. And third, a reactive check for significant changes in reported income over the prior wave occurred in only 6 recorded interviews. We chose to not analyse the use of reactive dependent interviewing checks due to their sparse occurrence in the pilot.

having no prior data available for DI received the IND question first and then a reactive check for whether their situation was the same as at the last wave[8].

<TABLE 1 HERE>

Of 131 recorded respondent interview only 64 contained administrations of the set current employment questions. These 64 interviews were conducted by 20 interviewers. This current employment series comprised 14 questions though respondents could pass through the series via a number of different routes depending on whether prior data were available (note Figure 1 above). The resulting data available for analysis was comprised of transcribed survey interactions for 477 question-answer sequences plus the respondent survey data itself. For a fuller description of the data see Sala, Uhrig and Lynn (2008).

5 METHODS

5.1 Initial exploration

We began our analysis with an initial qualitative examination of the survey transcripts themselves. Several regularities seemed to emerge which comply with our expectations. The excerpt in Table 2 demonstrates that under conditions of change in respondents' circumstances, the survey interaction can depart from standard practice. The upper panel of Table 2 indicates what would have appeared on the computer screen using CAPI, while the lower panel is a transcription of the interaction using standard conversation analysis notation (Maynard et al. 2002)[9]. Lines 2 and 3 show an overlap in speech between the interviewer and the respondent. The interviewer, at line 2, seems to be verbally assuming that the respondent is in the same job as last time when the respondent over-speaks saying "It's changed a bit". Consistent with tactics of disagreement, the respondent makes a disclaimer in line 5 saying "not exactly" whilst stretching out the word "exactly", with plenty of pauses

[8] Note, we excluded this reactive check as a question-sequence from our analysis because it occurred in only 3 interviews. However, any lagged covariates include these reactive DI questions.

[9] Some of the conversation analysis transcription conventions found in Tables 2 and 3 include:

- Silence denoted by (.) or (1.4), numbers indicating elapsed time in seconds
- Overlapping speech marked with brackets, [and]
- Latching of gaps between utterances with equal sign, =
- Creative spelling of words as they sound
- Sound stretching denoted with a colon, :, with more colons indicating a longer stretch
- Quickened speech with > and <.
- Intonation rising ↑ or lowering ↓
- Audible in-breath or out-breath denoted with .h or .hhhh, more 'h' mean longer breath
- Emphasis with CAPITAL LETTERS
- Missing or inaudible speech denoted by parentheses, e.g., ( )
- The sound of typing denoted with a hash, #

in the lead up to the disagreement. Note that the disagreement "not exactly" is a softer presentation of "no". At line 6, the respondent provides the job title right way. In short, they answer the follow-up IND question before the interviewer gets the chance to ask it.

Table 2 Variation from standardised interviewing under condition of true change, respondent offers forward answer

[PDI, Occupation – *as appears on screen*] And the last time I interviewed you on 22 February 2003, you said your job was a cash clerk counting money when it comes in from the check-outs. Are you still in that same occupation? **[IND, Follow-up – *as appears on screen*]** What was your main job last week? Please tell me your exact job title and describe fully the sort of work that you do.
[PDI, Occupation – *in interaction*] (1) I: A:nd your job last time I came to see you, .hhh which was the 22nd of February 2003, .h your job was a cash clerk counting money when it comes in from the check-outs= (2) I: [=Put you at the same (.)] (3) R: [Er (.) it's changed(.)] (4) I: You are not in that occupation any↑more? (5) R: Oh (.) I (.) eh (.) not exa::ctly (.)= (6) R: =I'm now a check-out operator. **[IND, Follow-up – *in interaction*]** (7) I: .hhh RIGHT. .h so. hhh now that's your job title? (8) R: Yes.

At line 7 in Table 2, we see the interviewer struggling with the wording of the follow-up question given the information that the respondent has provided previously. The survey question itself gets phrased so as to be a confirmation of the information the respondent provided. So, the respondent provides information that they tacitly believe the interviewer wants to know leading to a departure from standardisation on the part of the interviewer.

Table 3 Information Disclosed in Advance Leads to Subsequent Interviewer Error

[PDI, Occupation – *in interaction*]

(1) I: Last time we interviewed you on 27th March 2003...
(2) R: ...ummm
(3) I: You said your job was a shop assistant serving customers and ( ). Are you still in that occupation?
(4) R: No

[IND, Follow-up – *in interaction*]

(5) I: And what was your job last week .h can you tell me the exact job title?
(6) R: Umm (.) mmm (.) administrator.
(7) I: You were an administrator.
(8) R: I work in an- .hh ummmm (.) I work for a financial adviser so um (.)
(9) I: So what do you do?
(10) R: Well. (1.0) how long have you got ((laughs)) (.) hh um (.) I am a personal assistant to the financial advisor .hh whatever he wants me to do (3.0) ( )=
(11) R: =[>a list of the sort of typical things that I do or something<]
(12) I: [# use the computer (.) or what do you do?]
(14) R: .hhhh yeah (.) hhhh um (.) submit applications (.) check the progress of applications for .hh um (1.0) investments (.) pensions (.) insurance um (2.0) our office has to be compliant with the FSA as well s::o it is a case of making sure that all the files have got the necessary paperwork in. I wouldn't know really how to describe my job ((laughs)) I just do everything (.) answer the phones (.) make the tea ((laughs)) (3.0) lots of- >typical office duties< rea:lly
(15) I: mmmm

[PDI, INDUSTRY – *in interaction*]

(16) I: ( ) last time you described the firm that you worked for as a soft furnishing shop
(17) R: ↓mmm
(18) I: that is no=

[IND, INDUSTRY – *in interaction*]

(19) I: =so what does the firm you work for actually make or do (.)=
(20) I: =so are they financial ↓advisors
(21) R: yep
(22) R: an accountants
(23) I: accountants
(24) R: yeah

Grounding need not only occur as a result of answering the yes-no interrogative negatively. Information may also be disclosed in open-ended question interactions which renders subsequent questions redundant for similar reasons (see for example Houtkoop-Steenstra 1995; 2000; Suchman and Jordan 1990; Sykes and Collins 1992). The excerpt in

Table 3 shows how responding to an open-ended question can add to the common ground of information. Here, the information is not necessarily an explicit answer to a subsequent survey question but is instead information which leads to the presumed answer to a subsequent survey question. Lines 1-4 contain the initial PDI question. Note that at line 4 the respondent simply answers "No" without any buffering. The respondent, however, struggles with the answer to the job title question at line 6, the prolonged "mmm" with pauses between them before providing an answer suggests uncertainty. At line 8, the respondent says "I work for a financial advisor" which does not answer the question about their own occupation, but however is information relevant for answering the subsequent industry question. We see in line 16 the interviewer fails to ask the industry question as scripted and instead reads only the information fed forward into the question. The respondent utters a low pitched "mmm" to which the interviewer responds "that is no". The interviewer continues with what we have classed a new utterance at line 19, which is an adequate read of the industry independent follow-up question, but then the interviewer continues at line 20 by answering the question itself with a statement. This sort of self-repair is not uncommon even in supposedly standardised survey interviews (Houtkoop-Steenstra 1995). The respondent then adds information already known at line 22 which is never probed for the accuracy required to assign an adequate industry code. Instead it is simply accepted as stated and assumed to be sufficient by the interviewer. This interaction shows how information disclosed at one point in the interview which is outside the remit of the question posed leads to subsequent interviewing anomalies.

5.2 Categorising Survey Interaction

To quantitatively assess the effects of DI on the interaction between interviewers and respondents, we coded respondent and interviewer verbal behaviour from the verbatim transcriptions of recorded interviews. We assigned codes to pragmatically complete utterances in question-answer sequences (Q-A sequences) adopting a multivariate code scheme using Sequence Viewer[10] (Dijkstra and Ongena 2006; Ongena 2005). This approach allowed us to identify and count behaviours representing departures from standardised interviewing on the part of interviewers, behaviours indicating respondent cognition problems, and respondent behaviours indicative of conversational norms.

[10] Sequence Viewer is MacIntosh software available free of charge. It can be downloaded from the following web site http://home.fsw.vu.nl/w.dijkstra/SequenceViewer.html.

Behaviours indicating problems with question answering. We defined four behaviours as indicating that the respondent may have some problem with the question answering process. Although not all cognitive problems due to poorly structured questions are expressed verbally, we follow Fowler (1992) who argues that if a question is problematic then one should observe a non-negligible occurrence of such behaviour[11]. Our goal is not to identify which respondents have cognitive problems, but instead to identify questions as cognitively problematic from the occurrence of respondent behaviours. Table 4 contains the distribution of these behaviours in Q-A sequences. First, problems of question understanding or comprehension could occur and be expressed as respondent requests for clarification or the meaning of the survey question. These occurred in only about three percent of sequences. Next, problems with recall or information retrieval could be expressed with hesitation or uncertainty over the response provided. Table 4 shows that these occurred in only about seven percent of sequences. Failure to judge, format and provide an answer could result in a mismatch answer, i.e., an answer that is not immediately codeable into requested response options but is nevertheless an answer to the question[12]. Only about six percent of sequences contained mismatch answers. Sometimes the behaviour of respondents triggers the interviewer to request clarification of the answer provided. Explicit interviewer requests for clarification occurred in only two percent of sequences. A question-answer sequence was defined as containing a respondent cognition problem if any of these four behaviours occurred. In sum, approximately 16 percent of sequences contained indicators of respondent cognition problems.

<TABLE 4 HERE>

Respondent invocation of conversational norms. We defined three respondent behaviours that may invoke the principles of conversation. As with cognitive difficulty, we treat the occurrence of any of these behaviours as a property of the question answer sequence. First, we identified respondent interruption of the question as a conversational issue because such behaviour is a departure from a strict question-response role and interruption is not otherwise a clear indicator of a cognition problem. Instead, interruption may indicate that the question itself is too long or too repetitive in the context of the developing interaction between interviewer and respondent. We see in the bottom panel of Table 4 that interruption occurred in about 15 percent of sequences. Next, respondents could

[11] Note that Fowler suggests that a question is judged cognitively difficult if problems occur in 15 percent of cases (Fowler 1992).
[12] Mismatch answers could also result from problems of comprehension or recall (Ongena 2005; Ongena and Dijkstra 2007).

engage in stray talk, i.e., talk that is off task, including commentary, digressions and elaboration of answers provided. Stray talk occurred in about 12 percent of sequences. And finally, such talk may result in explicit answers to subsequent survey questions. This occurred in about three percent of sequences. As with cognition problems, a question answer sequence was defined as containing conversational respondent behaviour if these verbal actions occurred. Approximately 25 percent of sequences contained any of these indicators.

<TABLE 5 HERE>

Behaviour representing departures from standardisation. We observe nine behaviours which represent departures from standardised interviewing behaviour. The distribution of these behaviours across all sequences is shown in Table 5. First, a set of four behaviours indicate departures from standardised questioning which include slight changes to question wording (also called mismatch questioning), paraphrasing, asking a question invalidly by changing its meaning, and posing a question as a statement resulting in no verbal answer by the respondent. The most frequent of these was asking a mismatch question in about 22 percent of sequences, whereas paraphrasing and questions posed as statements each occurred in about 14 percent of sequences. Invalid questions occurred in six percent of sequences. Though these behaviours may represent a gradation in departure from standardisation, they are nevertheless departures because the question is not read exactly as scripted. Next, the interviewer could skip reading the question altogether and choose the answer without reading the question. This occurred in about seven percent of sequences. Third, the interviewer could suggest answers or otherwise engage in suggestive probing of provided answers. Suggestive probing was quite frequent, occurring in about 26 percent of sequences. Related to this, the interviewer may misstate a follow-up acknowledgement of the respondent's answer and this occurred in only about three percent of sequences. Finally, interviewers are instructed to maintain a friendly and cooperative demeanour, but not overly friendly. To this end, interviewers may engage in off-task talk, including digressions, commentary, or non-scripted question elaboration. Interviewers engaged in stray talk in about four percent of sequences. We also defined failure to read the date reference in PDI questions as a departure from standardisation. This occurred in about 34 percent of sequences. A question answer sequence was defined as departing from standardisation if any of these behaviours occurred and, taken together, departures from standardisation occurred in roughly 75 percent of sequences.

5.3 Modelling Survey Behaviour

Our hypotheses imply that both question type and question routing resulting from a change in circumstances affect the occurrence of respondent cognition problems, the invocation of conversational norms by respondents, and departures from standardisation by interviewers. To assess whether our hypotheses hold, we estimate a set of logistic regressions where the dependent variable is a simple binary indicator of the occurrence of each of these phenomenon. The odds, ϑ, of any of the identified behaviours occurring, Y, are defined as the ratio of the probability of the event Y, say "Cognition Problem", occurring to the probability of that same event not occurring:

$$\vartheta(Y = 1) = \frac{\Pr(Y = 1)}{1 - \Pr(Y = 1)}$$

Given that probabilities range from 0 to 1, the odds can range from 0, when Pr(Y = 1) = 0, to infinity when the Pr(Y = 1) = 1. By taking the natural logarithm of the odds, we obtain a *logit* which can be expressed as a linear function of X variables:

$$L = \log_e \vartheta,$$
$$L = \beta X$$

Since a *logit* is a linear function of the X variables, the distribution of recovered probabilities associated with a binary outcome is a nonlinear function bounded by 0 and 1. Logistic regression, therefore, is a superior modelling strategy to an ordinary least squares (OLS) model of any binary outcome which can predict values which are out of range and can violate the OLS assumption of homoskedastic errors.

To assess the degree to which problematic respondent cognition, normative action and departure from standardisation occur, we also estimate a set of count models which are useful for assessing the intensity of action in a unit of observation (see for example Olzak and Olivier 1998). The most common method of analysing count data assumes the observed count of events, y_t, results from a Poisson process whereby events are generated within units of observation, *t*, according to an assumed constant rate λ_t. This rate λ_t can only take non-negative values, so it is parameterized as a log-linear function of the covariates X_t:

$$\lambda_t = \exp(X_t)$$

This model assumes that observed counts are generated from a process whose rate per unit is given by:

$$\Pr(Y_t = y_t \mid \lambda_t), y_t \geq 0 = \frac{\lambda_t^{yt} - \lambda_t}{y_t!}$$

where λ_t is the mean and the variance of the distribution of the dependent variable, i.e.,

$$E(Y_t) = Var(Y_t) = \lambda_t$$

The assumption that the expected value of Y_t is equal to its variance is often not justified (see Cameron and Trivedi 1986). As an alternative to Poisson regression, negative-binomial regression models the count of any event when the count is over-dispersed. Negative-binomial regression treats the data as derived from a Poisson process but for an omitted variable *v*. This variable, *v*, is assumed to follow a gamma distribution with a mean 1 and variance α. The larger the value of α, the greater the over-dispersion. Insofar as α is not significantly different from zero, a Poisson model is appropriate for the data. We estimate negative-binomial regression models in the first instance and if the over-dispersion parameter is not significant we estimate and present results from Poisson regression.

5.4 Independent Factors

The models we used to test our hypotheses contain five types of measures. These measures are question type, question format, question routing, other interviewer or respondent behaviour and a set of controls. Our hypotheses can be tested by examining the effects of question type, the type of prior question and interviewer or respondent behaviour occurring at a prior question.

Question Type. Questions can take the form of either PDI questions or independent questions. Our hypotheses 1 and 2 described above imply that PDI questions should exhibit lower odds of cognition problems on the one hand and increased odds of conversational norms on the other. Moreover, we would expect that PDI would have fewer behaviours indicative of cognition problems and more conversationally normative behaviour.

Question Format. An important control for the effects of PDI relative to independent questions is the format of the question. PDI questions are closed-response questions insofar as there are only two potential answers to a yes-no question. However, among independent questions, the format varies between open-ended for occupation, industry and employer name to closed-response for other current employment characteristics. Though we make no explicit hypotheses about the role question format plays in predicting cognition problems, conversational behaviour and departure from standardised questioning, we expect open-response questions to generally increase the likelihood of observing each of these types of behaviours.

Question Routing. We argue that routing that results from negating a PDI question matters for the observed behaviour at subsequent survey items. Our hypothesis 3, described

above, implies that for PDI questions only, we would more likely observe conversational behaviour when the respondent answers 'no' than when the respondent answers 'yes'. Moreover, we would expect the amount of conversational behaviour to be higher under conditions of 'no' saying than 'yes' saying at PDI questions. Sequences could be divided into three categories: (i) independent questions that are follow-ups to negated PDI questions, (ii) questions that follow a prior topic's DI question, and (iii) sequences that follow a prior topic's independent question. A fourth category is the first question in the protocol. Hypothesis 4 suggests that the occurrence of departures from standardisation are more likely at independent follow-ups to negated PDI questions than to questions administered following other routes. We test this argument by coding the prior question type into the three categories just described with the first question asked in the series as the omitted category.

Other Behaviour and Controls. To better isolate the effects of question type and question routing, we use various controls for the behaviour of interviewers in models of respondent behaviour and for respondent behaviour in the models of interviewer action. Other controls in these models include the respondent's age, gender and educational qualifications. We also control for interviewer-assessed cooperation, and a set of subjective assessments interviewers make regarding the ease or difficulty of administering the DI questions and the ease or difficulty respondents have with answering the DI questions.

6 Results

Table 6 contains estimates from models predicting respondent cognition problems and respondent conversational behaviour. Column I in Table 6 contains maximum-likelihood estimates from a logistic regression predicting the odds of respondent cognition problems with question type, format, routing, interviewer behaviour and a set of controls entered as covariates. Column II contains maximum-likelihood estimates from a negative-binomial regression predicting the count of respondent cognition problems on the same set of factors. Note in Column II that the over-dispersion parameter is significantly large thus we did not fit a Poisson regression model. We find that PDI questions as distinct from independent questions have no effect on the odds of observing respondent cognition problems. At the same time, we see that PDI has no effect on the number of cognition problems. Question format also has no effect on either the odds or the count. Question routing, however, does seem to have some effect. For questions following a prior topic's DI question, the odds of a respondent cognition problem are significantly reduced ($\hat{b}$ = -1.24, p < 0.001 in Column I). Similarly, following a prior topic DI question shows a significant

reduction in the count of behaviour suggesting a respondent cognition problem ($\hat{b}$ = -0.96, p < 0.001 in Column II). It is important to highlight the effect of the interviewer-assessed ease of answering control. Respondents assessed as finding the DI questions easy by interviewers were significantly less likely to produce question sequences with behaviour indicative of cognition problems ($\hat{b}$ = -1.51, p < 0.01 in Column I; $\hat{b}$ = -1.19, p < 0.001 in Column II). Taken together, these results suggest that the use of PDI generates few cognition problems for respondents relative to other types of questions. The finding that routing following PDI questions reduces the observation of cognition problems does imply that PDI has a positive effect on response burden.

<TABLE 6 HERE>

Columns III and IV in Table 6 each show the results of models of respondent conversational behaviour. Column III contains maximum-likelihood estimates from a logistic regression predicting the odds of respondent conversational behaviour while Column IV contains maximum-likelihood estimates from a negative-binomial regression predicting the count of respondent conversational behaviours. Here, also, the over-dispersion parameter is significantly large so we did not fit a Poisson regression. Unlike cognition problems, we see that PDI increases the odds of respondent conversational behaviour significantly ($\hat{b}$ = 1.29, p < 0.05 in Column III). Moreover, PDI seems to increase the amount of conversational action occurring at the question ($\hat{b}$ = 1.11, p < 0.05 in Column IV). Respondent conversational behaviour is more likely at open-ended questions ($\hat{b}$ = 1.20, p < 0.01 in Column III) as well as more intense at open-ended questions ($\hat{b}$ = 0.88, p < 0.05 in Column IV). Conversational behaviour is significantly less likely to occur at questions following a prior topic, regardless of the question type – DI or independent ($\hat{b}$ = -1.35, p < 0.01 and $\hat{b}$ = -1.55, p < 0.01 in Column III) . On the other hand, the coefficient for independent follow-up to a negated DI is not significant. These coefficients need to be interpreted relative to the first question asked to a respondent in the current employment protocol. Here, the lack of statistical significance for independent follow-ups to negated DI questions means that conversational behaviour is more common at both the first question and at independent follow-ups than in other situations.

In addition to these, several other findings are worth noting. First, interviewer departures from standardisation seem to be weakly associated with the odds of respondent conversational behaviours ($\hat{b} = 0.71$, $p < 0.05$ in Column III) although, all things considered, respondent conversation is more than twice as likely to occur when interviewers depart from standardised interviewing as when they do not ($e^{0.71} = 2.03$). Next, women are consistently and significantly less likely to engage in conversational behaviour than men, the negative coefficients shown in Columns III and IV will be seen in the remaining models of respondent conversational behaviour.

The association between PDI and respondent conversational behaviour may be due to respondent interruption. Note in Table 1 the set of questions obtaining current employment details in their PDI form repeats the same basic question structure over 10 items. Also, recall from Table 4 that interruptions were the most frequently occurring conversational behaviour on the part of respondents. This behaviour is distinct from engaging in elaborations and forward answering which adds to the common ground of the survey interview. For these reasons, we examined the occurrence of respondent conversational behaviour with stray talk separate from interruption. These results are shown in Table 7.

<TABLE 7 HERE>

Columns I and II in Table 7 both show maximum-likelihood estimates from logistic regressions with Column I containing results from a model predicting the odds of elaboration and forward answering, i.e,. "Stray Talk", while Column II contains results from a model of respondent interruption only. PDI as a question type seems to have no effect on respondent stray talk whereas PDI is mildly associated with the odds of respondent interruption ($\hat{b} = 1.87$, $p < 0.05$ in Column II). As one might expect, elaborations are more common in open-ended questions than in closed-response questions ($\hat{b} = 1.37$, $p < 0.01$ in Column I). Elaborations are significantly less likely at questions following a prior topic regardless of format ($\hat{b} = -1.30$, $p < 0.01$ and $\hat{b} = -1.15$, $p < 0.01$ for DI and independent respectively in Column I), relative to the first question in the current employment protocol or follow-ups to negated PDI questions. Also, elaborations are significantly associated with interviewer departures from standardisation but respondent interruptions are not ($\hat{b} = 0.90$, $p < 0.05$ in Column I versus $\hat{b} = 0.17$, $p = n.s.$ in Column II).

Several other findings are interesting to note in Table 7. First, men are more likely to engage in elaborations and other stray talk at questions than women ($\hat{b}$ = -0.67, $p < 0.05$ in Column I) and age is positively associated with interruptions ($\hat{b}$ = 0.03, $p < 0.05$ in Column II). We find a negative association between interviewer-assessed ease of answering the questions and the occurrence of respondent elaborations ($\hat{b}$ = -1.06, $p < 0.001$ in Column I). At the same time, we find a positive association between interviewer-assessed difficulty of asking questions and respondent interruption ($\hat{b}$ = 2.05, $p < 0.01$ in Column II). Similarly, interviewer-assessed difficulty in answering was negatively associated with interruption ($\hat{b}$ = -1.72, $p < 0.01$ in Column II). These results imply that while the question type, format and routing may play a role in determining respondent behaviour, interviewer evaluation of the survey interview is clearly related to the question answering behaviour of respondents.

<TABLE 8 HERE>

We have argued that respondent elaborations are more likely when the negation of a PDI question is necessary. That is, under conditions of change in respondent circumstances, respondents will elaborate on their negated answer or otherwise engage in conversational action which buffers dispreferred responding. In Table 8, we show maximum-likelihood estimates from logistic regressions predicting elaborations in Column I and interruptions in Column II. In these models, however, the sample is restricted to only 268 PDI question-answer sequences. We would expect that elaborations would be significantly more likely when negating the PDI question. We see that this is, in fact, the case ($\hat{b}$ = 1.78, $p < 0.001$ in Column I). Respondents are 5.9 times more likely to elaborate at PDI questions when they answer 'No' as compared to answering 'Yes'. Note, that respondents are also 2.5 times more likely to interrupt with a 'No' response as opposed to a 'Yes' response ($\hat{b}$ = 0.92, $p < 0.01$ in Column II). Both elaborations and interruptions are significantly less likely when following a prior topic's independent question ($\hat{b}$ = -1.50, $p < 0.05$ in Column I and $\hat{b}$ = -1.44, $p < 0.05$ in Column II). This finding may be consistent with the hypothesised relationships. An independent question at a prior topic would only occur if the PDI question was negated. Insofar as this prior PDI question contains elaborations, elaborations would subsequently not necessarily be required as the common ground in the interview may already contain all the relevant information for answering subsequent questions.

Our results show that PDI is not associated with cognition problems, per se. In fact, routing following PDI question seems to be associated with reduced odds of cognition problems. Respondent elaborations are highly likely at PDI questions, specifically when answering with a dispreferred response. Interruptions are also likely at PDI questions where the answer is 'No'. Routing in the question is associated with the occurrence of cognition problems and conversational behaviour, notably all forms of behaviour examined occur less frequently at questions following a prior topic regardless of DI or independent question, relative to the first question in the protocol. All of this evidence seems to support the hypothesised relationships derived from a conversational approach to understanding survey interviewing. Namely, PDI eases respondent burden but respondent conversational norms are likely to occur as a result of PDI and in particular under conditions of respondents needing to provide a dispreferred response. What, then, are the consequences for interviewers?

<TABLE 9 HERE>

Shown in Table 9 are the results from a set of three models of interviewer behaviour. Column I shows maximum-likelihood estimates from a logistic regression predicting the odds of interviewer departure from standardisation. Here we see that PDI is not associated with departures, but that question routing is. All three covariates categorising the routing paths to the question examined are positive, meaning that interviewers are significantly more likely to depart from standardisation at all items after the first item in the current employment protocol. The relative size of the coefficients can be compared implying that standardisation is more likely to break down at questions following a prior topic's DI than at independent follow-ups to negated PDI questions ($\hat{b} = 1.53$, $p < 0.01$ following a negated PDI versus $\hat{b} = 2.09$, $p < 0.001$ following the prior topic's DI, both in Column I). However, the most frequent departure on the part of interviewers is failure to read the date of the last interview which is repeated in all PDI questions. When this behaviour is removed from the indicator of standardisation departures, these coefficients reverse order in magnitude and the coefficient for sequences following a prior topic's independent question is no longer significant ($\hat{b} = 1.07$, $p < 0.05$, and $\hat{b} = 0.91$, $p < 0.01$, respectively in Column II). A Wald Test shows that these coefficients are not, however, significantly different from one another ($F_{(1,19)} = 0.13$, $p = n.s.$). Column II also shows that PDI questions are unlikely to be associated with standardisation departures when failure to read the date is excluded from the departures

measure. Taken together, these findings indicate that interviewers are more likely to depart from standardisation at independent questions rather than dependent questions and that departures are highly likely at sequences following dispreferred responses. In fact, interviewers are 2.9 times more likely to depart from standardised interviewing procedures at questions following a negated PDI than they are at the first question in the protocol and about 2.5 times more likely to depart at sequences following the prior topic's DI.

Column III of Table 9 contains the results from a Poisson regression predicting the count of interviewer departures from standardisation not including failure reciting the prior interview date. Here, too, PDI questions are associated with significantly fewer instances of interviewer standardisation departures ($\hat{b}$ = -0.46, $p < 0.01$). Interestingly, the results in Columns I and II suggest that respondent conversational behaviour is not related to the occurrence of interviewer standardisation violations at the question. However, the occurrence of respondent conversational behaviour of any type increases the count of standardisation violations ($\hat{b}$ = 0.23, $p < 0.05$).

<TABLES 10 HERE>

We expect that certain interviewer behaviours may be associated with inaccurate survey data (Dijkstra and Ongena 2006; Molenaar and Smit 1996; Smit, Dijkstra and van der Zouwen 1997). Table 10 shows the results from analyses of question type, format and routing on specific interviewer administration errors according to rules of standardisation. The results presented are all maximum-likelihood estimates from logistic regressions predicting whether certain interviewer behaviours occur in the 477 question-answer sequences. Note that for reasons of multi-collinearity, question type and format were entered into the model separately from question routing and we used an abbreviated set of covariates. Focusing first on the effects of question type, we see that PDI questions are significantly more likely to have slight wording changes, i.e., mismatches ($\hat{b}$ = 1.52, $p < 0.01$), but are significantly less likely to be skipped ($\hat{b}$ = -1.52, $p < 0.01$) or to have suggestive probing used ($\hat{b}$ = -1.15, $p < 0.01$). Follow-up questions to negated PDI questions are significantly less likely to have slight wording changes ($\hat{b}$ = -0.90, $p < 0.05$), but are very likely to be asked invalidly ($\hat{b}$ = 2.12 $p < 0.05$), be posed as statements ($\hat{b}$ = 0.87, $p < 0.05$), and to contain suggestive probing ($\hat{b}$ = 1.30, $p < 0.01$). Indeed, these results show that independent follow-

ups to negated PDI questions are more than 8 times more likely to be posed invalidly than the first question in the series, all things considered.

7 Discussion

We found no effect of PDI questions on the likelihood of respondent cognition problems as compared to independent questions. However, questions following DI questions at a prior topic seem to pose fewer cognition problems. This is an important finding because it shows that DI is not cognitively burdensome for respondents. Moreover, the flow from positively answered questions does not raise respondent cognitive burden.

We found that PDI can induce conversational norms such that question elaborations and explanations are more likely at PDI questions than at IND questions. Moreover, conversation is less likely following a prior topic than following a negated PDI. However, interruption and elaboration are distinct from one another. Interruption is common in PDI questions – suggesting they are too long or redundant. Elaboration and forward answering occurs more often at first questions and independent follow-ups to negated PDI questions. This means that elaboration is likely to occur early in the protocol rather than at subsequent items.

Our results establish that conversational norms are more likely to be invoked under conditions of change in respondents' circumstances. Elaboration, forward answering, and interruption are all common at PDI questions under conditions of changed circumstances but not under conditions of no change in circumstances. Note that conversation does not happen at DI questions following a prior topic's DI. This implies a smooth flowing interaction under conditions of no-change. This is consistent with what might be expected as responding 'yes' is agreeing with the preferred response. But, conversation and interruption are significantly less likely at PDI questions following a prior topic's independent question. This would occur when respondents negate the prior topic's DI, thus receiving its independent follow-up. In this situation, respondents are less likely to engage in conversational behaviour at subsequent items. We suggest that common ground may play a role in this finding. Since conversation is highly likely at negated PDI questions but not when following a prior-topic's DI question, conversation occurs early in the protocol if at all. The common ground is set at that point and the Gricean maxim of *relevance* implies that further elaboration of answers is not necessary at subsequent points. A more nuanced analysis with a larger set of cases would be required to demonstrate the extent of this sort of response process.

Negation of a PDI questions clearly leads to departures from standardisation at subsequent survey items. Departures are significantly more likely at follow-ups to negated DI questions but also at any question following a prior topic's DI. If the respondent has no-change in circumstances, conversational behaviour is unlikely, but interviewers may take to answering questions on their behalf under the presumption that everything is still the same. Moreover, the questions can become repetitive to ask under situations of no-change in circumstances so interviewer could be engaging in short-cutting based on a presumption of stasis. The results for the specific types of interviewer departure do not support this argument, however. Mismatch questions are significantly less likely following a prior topic's DI question, while paraphrasing and other types of question administration errors are unrelated to this specific question routing. This, therefore, remains an open question.

We found mixed results when analysing the occurrence of specific departures from standardisation though our hypothesis is generally supported. Invalid questions, questions as statements and suggestive probing are all common at independent follow-ups to negated PDI questions, but slight wording changes are significantly less likely. Independent questions, regardless of whether they are follow-ups to negated PDI or otherwise, are generally likely to be skipped altogether. The types of administration errors observed are not of the type that might suggest interviewers altering question wording to make question answering more accurate for respondents. Indeed, we found that cognition problems were unlikely with this question set. Instead, the departures from standardisation seem to result from conversational problems arising from the negation of yes-no questions. Questions as statements and suggestive probing are both ways of leading respondents to a given answer. Smit et al (1997) find that data inaccuracies are significantly more likely when interviewers engage in suggestive behaviour. Asking questions invalidly, i.e. changing the question's meaning, signifies data of a type completely unintended by the question. Invalid questions occur in about 6 percent of question-answer sequences and are more than 8 times more likely to occur at independent follow-ups than in other circumstances. Taken together, these results imply that although the PDI protocol may facilitate the accurate identification of change or stasis in circumstances, the details of change may be highly inaccurate.

8 Conclusion

We have shown how direct observation of the survey interaction can reveal that both the administrability and answerability of question sets using DI contribute to data quality. Moreover, the conversational approach to survey interviewing provides a distinct and useful

approach to predicting how questions will work in live interviews. Our results encourage the use of PDI as a method for reducing the observation of spurious change in respondent circumstances between waves of longitudinal data collection. PDI seems to impart few problems for respondents and interviewers under conditions of no change in circumstances.

The results presented here point out at least two areas for further investigation. First, we examine only the 'remind-still' PDI design and further work should be conducted to explore the mechanisms underlying other PDI and RDI strategies. We only examined PDI and independent questions and have excluded any RDI that may have been administered in this question set. The reactive check was rarely used amongst this set of respondents so including these sequences is unlikely to affect our results significantly. Nevertheless, further investigation into survey behaviour around RDI questions may be fruitful. And secondly, the departures from standardisation we identified we feel result not from respondent cognition problems but instead from a conversational tension in survey interviews. Further work with validation data should be conducted to examine whether such conversational flaws result in inferior data.

Table 1 DI Question Protocol on Current Employment Characteristics[13]

5.PDI	Last time we interviewed you, on <INTDATE>, you said your job was <OCCUP>. Are you still in that same occupation? YES → 6.PDI NO → 5.IND
5.IND	What was your (main) job last week? Please tell me the exact job title and describe fully the sort of work you do. What was your (main) job last week? Please tell me the exact job title and describe fully the sort of work you do.
6.PDI	Last time we interviewed you, on <INTDATE>, you described the firm/organisation you were working for as <INDUS> Is that still an accurate description of the place where you work? YES → 6a.PDI NO → 6.IND
6.IND	What does the firm/organisation you work for actually make or do (at the place where you work)?
6a.PDI	Last time we interviewed you, on <INTDATE>, you said that you were working for <EMPLOYER>? Are you still working for the same employer or trading name? YES → 7.PDI NO → 6a.IND
6a.IND	What is the exact name of your employer or the trading name if one is used?

Continued

[13] NOTE: If prior survey data were available for a respondent, then they received the PDI version of the question set. Otherwise, they received the IND version of the question set. If the respondent was interviewed at the prior wave and PDI could not be used, an RDI check was issued after the IND question. We did not analyse this RDI check.

Table 1 ***Continued***

7.PDI	Last time we interviewed you, on <INTDATE>, you said you were <JBSEMP>. Are you still <JBSEMP>? YES, employee → 8.PDI YES, self-employed → out of DI protocol NO → 7.FOL
7.FOL	So now you are <AN EMPLOYEE / SELF-EMPLOYED>? (text fill is opposite JBSEMP text from fed forward category) YES, employee → 8.PDI YES, self-employed → out of DI protocol NO → 7.IND
7.IND	Are you an employee or self-employed? Employee → 8.PDI Self-employed → out of DI protocol
8.PDI	Last time we interviewed you, on <INTDATE>, you said you were <MANAG>. Is that still the case? YES → 9.PDI NO → 8.IND
8.IND	Do you have any managerial duties or do you supervise any other employees? Manager Foreman / Supervisor NOT manager or supervisor

Continued

Table 1 ***Continued***

9.PDI	Last time we interviewed you, on <INTDATE>, you said you were working for <SECTOR>. Is that still the case? YES → 10.PDI NO → 9.IND
9.IND	Which of the types of organisations on this card do you work for (in your main job)? Private Firm/company/plc Civil Service or central government (not armed forces) Local government or town hall (inc local education, fire, police) National Health Service or State Higher Education (inc polytechnics) Nationalised Industry Non-profit making organisation (include charities, co-operatives etc) Armed forces Other **(PLEASE GIVE DETAILS)**
10.PDI	Last time we interviewed you, on <INTDATE>, you said that <SIZE> people were employed at the place were you work. Is that still the case? YES → Out of DI protocol NO → 10.IND
10.IND	How many people are employed at the place where you work? **INCLUDE ALL EMPLOYEES INCLUDING PART-TIME AND SHIFT WORKERS** 1 - 2 3 - 9 10 - 24 25 - 49 50 - 99 100 - 199 200 - 499 500 - 999 1000 or more Don't know but fewer than 25 Don't know but 25 or more

Figure 1 Logical Schematic of DI Questions on Employment Characteristics

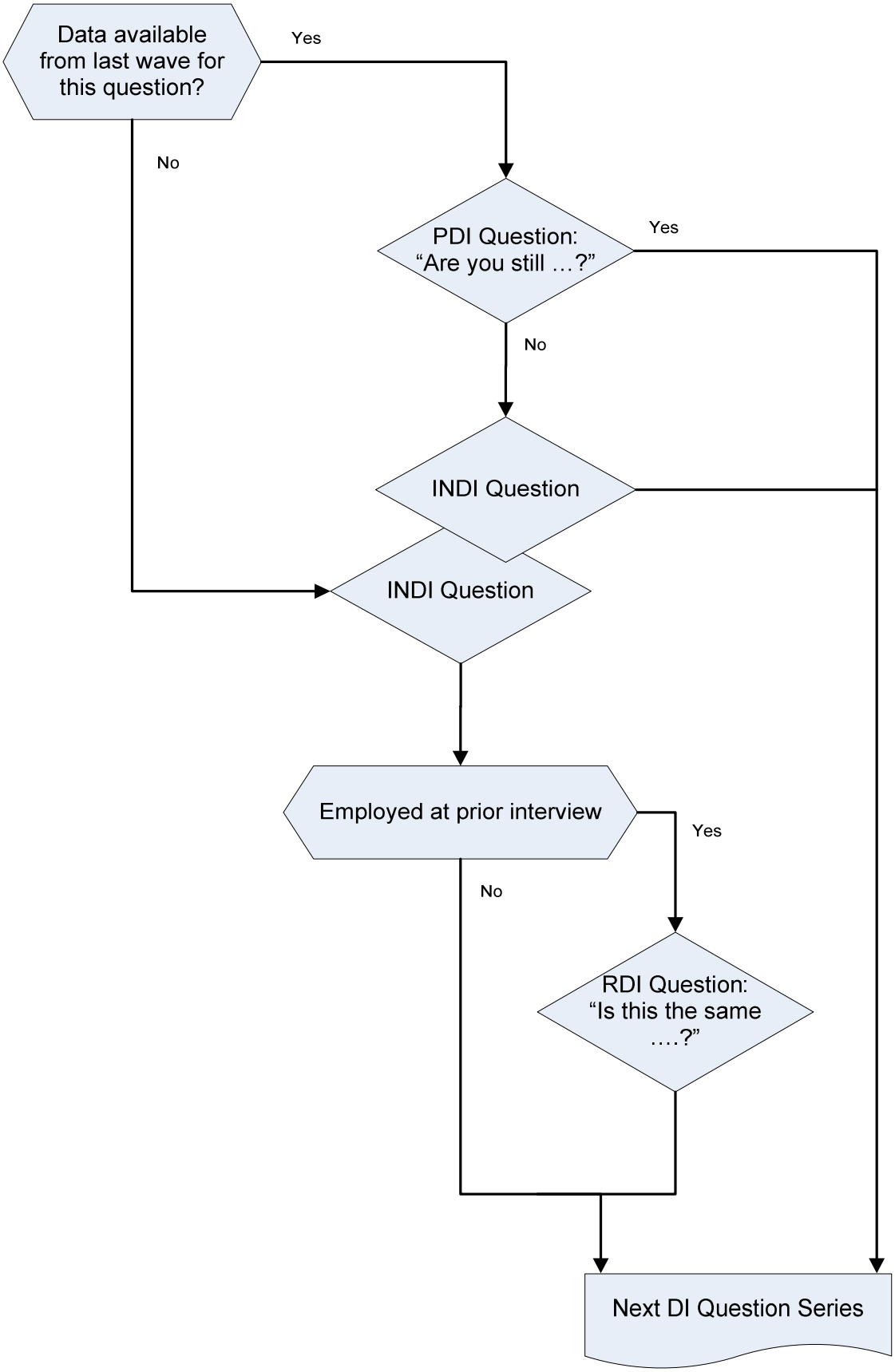

Table 4 Distribution of indicators of respondent cognition problems and conversational engagement across question administrations

Indicators of Cognition Problems	Proportion	Std. Err.	95 % Confidence Interval	
Respondent Request for Clarification	3%	1%	1%	5%
Expressed Uncertainty	7%	2%	3%	11%
Mismatch Answer	6%	1%	4%	8%
Interviewer Request for Clarification	2%	0.9%	0.4%	4%
Any cognition problem	16%	1.7%	12%	19%
Indicators of Conversational Norms				
Interruption	15%	2%	10%	20%
Straying talk	12%	1%	10%	14%
Forward answers	3%	1%	1%	4%
Any conversational behaviour	25%	2%	21%	29%

Notes: N = 477 question administrations, standard errors reflect question clustering within interviewers.

Table 5 Distribution of interviewer departures from standardisation across question administrations

Interviewer Behaviours	Proportion	Std. Err.	95 % Confidence Interval	
Mismatch question	22%	3%	17%	28%
Paraphrased question	14%	2%	10%	18%
Invalid question	6%	1%	3%	8%
Question as statement	14%	2%	10%	18%
Skipped question	7%	2%	3%	10%
Suggestive probing	26%	3%	20%	31%
Mismatch echo	3%	0.8%	1%	4%
Stray Talk	4%	1%	2%	6%
Missing date reference	34%	4%	26%	43%
Any Interviewer Behaviour	75%	4%	67%	84%

Notes: N = 477 question administrations, standard errors reflect question clustering within interviewers.

Table 6 Models of respondent cognition problems or conversational behaviour

	I	II	III	IV
PDI vs independent	-0.54	-0.66	1.29*	1.11*
	(0.49)	(0.38)	(0.47)	(0.45)
Open-ended vs closed-response	0.12	-0.21	1.20**	0.88*
	(0.46)	(0.37)	(0.32)	(0.33)
Independent follow-up vs first question	-0.40	-0.25	-0.64	-0.17
	(0.54)	(0.41)	(0.44)	(0.25)
Following a prior topic's DI vs first question	-1.24***	-0.96***	-1.35**	-0.93**
	(0.31)	(0.24)	(0.45)	(0.29)
Following a prior topic's independent question vs first question	-0.85	-0.67	-1.55**	-0.99**
	(0.53)	(0.37)	(0.43)	(0.30)
Interviewer departures from standardisation	0.67	0.52	0.71*	0.43
	(0.34)	(0.32)	(0.33)	(0.28)
Respondent age	0.01	-0.00	0.02	0.02*
	(0.01)	(0.01)	(0.01)	(0.01)
Respondent sex, female	0.37	0.27	-0.55*	-0.45*
	(0.27)	(0.28)	(0.25)	(0.20)
School qualification vs higher	0.01	-0.18	-0.09	-0.08
	(0.35)	(0.24)	(0.43)	(0.30)
Other qualification vs higher	-0.50	-0.44	0.27	0.20
	(0.40)	(0.33)	(0.38)	(0.26)
No qualification vs higher	-0.05	-0.02	-0.08	-0.10
	(0.65)	(0.59)	(0.40)	(0.31)
Very good cooperation vs good cooperation	0.06	0.20	-0.67	-0.40*
	(0.39)	(0.30)	(0.37)	(0.17)
Asking questions was easy vs neither easy nor difficult	-0.06	0.12	-0.76*	-0.52*
	(0.52)	(0.32)	(0.35)	(0.23)
Asking questions was difficult vs neither easy nor difficult	-1.47	-1.25	1.28	1.00*
	(1.11)	(0.83)	(0.79)	(0.46)
Answering questions was judged easy vs neither easy nor difficult	-1.51**	-1.19***	-0.45	-0.26
	(0.45)	(0.25)	(0.22)	(0.14)
Answering questions was judged difficult vs neither easy nor difficult	-0.52	-0.21	-1.72**	-1.17**
	(0.72)	(0.48)	(0.50)	(0.34)
Constant	-0.21	-0.31	-0.44	-1.17*
	(1.11)	(0.70)	(0.81)	(0.56)
Over-dispersion parameter		-12.44*		-13.38***
		(4.81)		(1.41)

Notes: * $p<0.05$, ** $p<0.01$, *** $p<0.001$. Standard errors in all models are adjusted for Q-A sequences clustering within interviewers. Columns contain as follows: *I* – ML estimates from a logistic regression predicting the odds of respondent cognition problems; *II* – ML estimates from a negative-binomial regression predicting the count of respondent cognition problems; *III* – ML estimates from a logistic regression predicting the odds of respondent conversational behaviour; and *IV* – ML estimates from a negative-binomial regression predicting the count of respondent conversational behaviours.

Table 7 Models of respondent conversational behaviour excluding interruption

	I	II
PDI vs independent	0.91	1.87*
	(0.54)	(0.83)
Open-ended vs closed-response	1.37**	0.63
	(0.40)	(0.81)
Independent follow-up vs first question	-0.59	0.20
	(0.55)	(0.50)
Following a prior topic's DI vs first question	-1.30**	-1.04
	(0.40)	(0.60)
Following a prior topic's independent question vs first question	-1.15**	-1.31*
	(0.31)	(0.62)
Interviewer departures from standardisation	0.90*	0.17
	(0.37)	(0.46)
Respondent age	0.01	0.03*
	(0.01)	(0.01)
Respondent sex, female	-0.67*	-0.35
	(0.27)	(0.37)
School qualification vs higher	-0.13	-0.13
	(0.36)	(0.56)
Other qualification vs higher	-0.07	0.26
	(0.37)	(0.46)
No qualification vs higher	-0.21	-0.29
	(0.49)	(0.56)
Very good cooperation vs good cooperation	-0.30	-0.91*
	(0.30)	(0.34)
Asking questions was easy vs neither easy nor difficult	-0.49	-0.81
	(0.37)	(0.40)
Asking questions was difficult vs neither easy nor difficult	0.47	2.05**
	(0.84)	(0.64)
Answering questions was judged easy vs neither easy nor difficult	-1.06***	0.73
	(0.20)	(0.37)
Answering questions was judged difficult vs neither easy nor difficult	-1.19	-1.72**
	(0.66)	(0.54)
Constant	-0.79	-2.79
	(0.67)	(1.35)

Notes: * $p<0.05$, ** $p<0.01$, *** $p<0.001$. Standard errors in all models are adjusted for Q-A sequences clustering within interviewers. Columns contain as follows: *I* – ML estimates from a logistic regression predicting the odds of respondent elaborations and other stray talk; *II* – ML estimates from a logistic regression predicting the odds of respondent interruption.

Table 8 Models of respondent conversational behaviour excluding interruption; PDI questions only

	I	II
PDI question answered negatively	1.78***	0.92**
	(0.35)	(0.28)
Following a prior topic's DI vs first question	-0.74	-0.95
	(0.73)	(0.56)
Following a prior topic's independent question vs first question	-1.50*	-1.44*
	(0.65)	(0.55)
Interviewer departures from standardisation	0.82	0.33
	(0.79)	(0.41)
Respondent age	0.03	0.02
	(0.02)	(0.01)
Respondent sex, female	-0.90*	-0.33
	(0.41)	(0.48)
School qualification vs higher	-0.17	0.01
	(0.85)	(0.58)
Other qualification vs higher	0.22	0.30
	(0.63)	(0.50)
No qualification vs higher	-0.06	-1.15
	(0.65)	(0.67)
Very good cooperation vs good cooperation	-0.53	-0.46
	(0.42)	(0.46)
Asking questions was easy vs neither easy nor difficult	-0.22	---
	(1.27)	
Asking questions was difficult vs neither easy nor difficult	-0.21	---
	(1.52)	
Answering questions was judged easy vs neither easy nor difficult	-1.40	---
	(0.86)	
Answering questions was judged difficult vs neither easy nor difficult	-0.02	---
	(0.39)	
Constant	-1.53	-1.28
	(1.24)	(0.94)

Notes: * $p<0.05$, ** $p<0.01$, *** $p<0.001$. Standard errors in all models are adjusted for Q-A sequences clustering within interviewers. The columns contain as follows: *I* – ML estimates of a logistic regression predicting the odds of respondent conversational behaviour excluding interruptions; *II* – ML estimates of a logistic regression predicting respondent interruption.

Table 9 Models of interviewer departures from standardised interviewing procedures

	I	II	III
PDI vs independent	-0.06	-0.86*	-0.46**
	(0.49)	(0.39)	(0.13)
Open-ended vs closed-response	0.38	0.23	0.35**
	(0.34)	(0.34)	(0.09)
Independent follow-up vs first question	1.53**	1.07*	0.04
	(0.53)	(0.48)	(0.15)
Following a prior topic's DI vs first question	2.09***	0.91**	0.17
	(0.36)	(0.26)	(0.12)
Following a prior topic's independent question vs first question	1.04*	0.29	-0.26
	(0.42)	(0.35)	(0.15)
The occurrence of respondent cognition problem behaviour	0.62	0.30	0.14
	(0.39)	(0.35)	(0.10)
The occurrence of conversational behaviour	0.48	0.15	0.23*
	(0.27)	(0.20)	(0.08)
Respondent age	0.03	0.02	0.00
	(0.02)	(0.01)	(0.01)
Respondent sex, female	-0.03	-0.07	0.04
	(0.34)	(0.31)	(0.12)
School qualification vs higher	-0.04	0.24	0.12
	(0.48)	(0.48)	(0.18)
Other qualification vs higher	-0.14	-0.05	0.02
	(0.46)	(0.46)	(0.19)
No qualification vs higher	0.39	0.36	0.16
	(0.66)	(0.66)	(0.22)
Very good cooperation vs good cooperation	-0.18	-0.18	-0.02
	(0.60)	(0.56)	(0.20)
Asking questions was easy vs neither easy nor difficult	-0.11	0.33	0.03
	(0.29)	(0.30)	(0.11)
Asking questions was difficult vs neither easy nor difficult	1.69	0.82	0.24
	(1.27)	(0.96)	(0.32)
Answering questions was judged easy vs neither easy nor difficult	1.07	0.47	0.21
	(0.65)	(0.53)	(0.26)
Answering questions was judged difficult vs neither easy nor difficult	0.05	0.38	0.14
	(0.73)	(0.58)	(0.26)
Constant	-2.43*	-1.31	-0.52
	(1.11)	(1.05)	(0.45)

Notes: * $p<0.05$, ** $p<0.01$, *** $p<0.001$. Standard errors in all models are adjusted for Q-A sequences clustering within interviewers. Columns contain maximum-likelihood estimates from models as follows: *I* –a logistic regression predicting the odds of departure from standardisation; *II* –a logistic regression predicting the odds of departure from standardisation other than missing the date reference in PDI questions; *III* –a Poisson regression predicting the count of departures from standardisation other than missing the date reference in PDI questions.

Table 10 Models of interviewer departures from standardised question administration

	Mismatch Questions		Paraphrasing		Invalid Questions	
PDI vs independent	1.52**	-----	-0.31	-----	-0.78	-----
	(0.48)	-----	(0.46)	-----	(0.59)	-----
Open-ended vs closed-response	1.45**	-----	0.69	-----	-0.40	-----
	(0.40)	-----	(0.43)	-----	(0.53)	-----
Independent follow-up vs first question	-----	-0.90*	-----	0.24	-----	2.12*
	-----	(0.36)	-----	(0.45)	-----	(0.92)
Following a prior topic's DI vs first question	-----	-2.23***	-----	-0.23	-----	1.36
	-----	(0.40)	-----	(0.35)	-----	(1.20)
Following a prior topic's independent question vs first question	-----	-0.28	-----	-0.27	-----	1.14
	-----	(0.34)	-----	(0.34)	-----	(1.06)
Respondent age	0.00	-0.00	0.01	0.00	0.02	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Respondent sex, female	-0.00	0.02	-0.15	-0.17	-0.47	-0.56
	(0.20)	(0.21)	(0.25)	(0.27)	(0.40)	(0.39)
School qualification vs higher	-0.00	0.07	-0.16	0.00	-0.19	0.04
	(0.46)	(0.47)	(0.40)	(0.39)	(0.51)	(0.47)
Other qualification vs higher	-0.23	-0.34	-0.44	-0.41	-0.06	0.09
	(0.45)	(0.45)	(0.53)	(0.53)	(0.57)	(0.59)
No qualification vs higher	0.40	0.56	-0.84	-0.61	0.08	0.31
	(0.46)	(0.48)	(0.61)	(0.58)	(0.80)	(0.63)
Constant	-2.63***	-0.31	-1.88*	-1.50*	-2.91**	-4.51***
	(0.66)	(0.60)	(0.77)	(0.71)	(0.97)	(1.08)

Notes: * p<0.05, **p<0.01, *** p<0.001. Standard errors of all models have been adjusted for clustering within interviewer. All results are from maximum-likelihood estimation of logistic regressions.

(Continued)

Table 10 Models of interviewer departures from standardised question administration (continued)

	Questions as Statements		Skipped Questions		Suggestive Probing	
PDI vs independent	-0.40	-----	-1.52**	-----	-1.15***	-----
	(0.41)	-----	(0.44)	-----	(0.29)	-----
Open-ended vs closed-response	0.37	-----	-0.64*	-----	0.60*	-----
	(0.31)	-----	(0.30)	-----	(0.26)	-----
Independent follow-up vs first question	-----	0.87*	-----	0.63	-----	1.30**
	-----	(0.42)	-----	(0.33)	-----	(0.39)
Following a prior topic's DI vs first question	-----	-0.01	-----	-----	-----	0.11
	-----	(0.40)	-----	-----	-----	(0.27)
Following a prior topic's independent question vs first question	-----	0.28	-----	-----	-----	-0.00
	-----	(0.31)	-----	-----	-----	(0.21)
Respondent age	0.01	-0.00	0.03	0.01	0.01	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)
Respondent sex, female	0.81	0.73	0.36	0.28	0.20	0.06
	(0.41)	(0.39)	(0.65)	(0.62)	(0.28)	(0.25)
School qualification vs higher	0.45	0.65*	-0.21	0.10	0.60	0.94*
	(0.34)	(0.30)	(0.62)	(0.62)	(0.39)	(0.37)
Other qualification vs higher	0.49	0.54	-0.02	0.02	0.22	0.31
	(0.41)	(0.42)	(0.54)	(0.54)	(0.39)	(0.41)
No qualification vs higher	0.80	1.05*	0.33	0.65	0.49	0.94*
	(0.38)	(0.38)	(0.51)	(0.46)	(0.32)	(0.36)
Constant	-3.06**	-3.05**	-3.24*	-3.70*	-1.47*	-1.51*
	(0.94)	(0.90)	(1.31)	(1.36)	(0.65)	(0.67)

Notes: * p<0.05, **p<0.01, *** p<0.001. Standard errors of all models have been adjusted for clustering within interviewer. All results are from maximum-likelihood estimation of logistic regressions.

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