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Abstract

Most large-scale ongoing face-to-face surveys which began using pen and paper interviewing (PAPI) face an eventual shift to computer-assisted personal interviewing (CAPI). In preparation for such a shift in the Household, Income and Labour Dynamics in Australia (HILDA) Survey, a trial of the CAPI collection mode was undertaken in the 2007 test sample. This involved a split-sample test of 764 households, where interviewers rather than households were randomly assigned to the PAPI or CAPI mode. This paper reports on the findings of this split sample test, both in terms of the fieldwork operations and the quality of the data collected. Apart from some concerns about the length of the interview, few differences were identified in the data collected by the two modes. Where CAPI differed from PAPI, it was generally in the direction thought to enhance data quality rather than reduce it.

Keywords: Computer-assisted methods, mode evaluation, random split-sample, data quality

1. Introduction

For any large ongoing face-to-face survey using pen and paper interviewing (PAPI), the eventual shift to computer-assisted personal interviewing (CAPI) is almost inevitable. The advantages that CAPI offers are very attractive, such as eliminating routing problems and allowing more complex routing, checking inconsistencies in the data with the respondent as they occur, removing separate data entry, improving delivery timeframes, and capturing system information during the interview such as section timestamps (de Leeuw, Hox and Snijkers, 1995).

The uptake of CAPI since the initial tests conducted by Statistics Sweden in 1982 and Statistics Netherlands in 1984 (van Bastelaer, Kerssemakers, and Sikkel, 1988) has been variable. Couper and Nicholls (1998) observed that most leading government and private sector survey organizations in Europe and North America had moved to CAPI by the late 1990's, but other parts of the world were slower to adopt this technology. They further noted that cost savings was not a common outcome for organisations that made the switch during this period – improved data quality and timeliness of the data delivery were the prime motivators for the mode change rather than cost savings.

Within Australia, there are only a small number of organizations that have a large face-to-face field workforce and the move to CAPI has been more tentative. The Australian Bureau of Statistics (ABS) began using computer-assisted interviewing for their Special Supplementary Surveys in the early 1990's, but abandoned this in 1996, primarily for costs reasons (Barresi, Finlay and Sutcliffe, 2002). In 1999, the ABS reintroduced CAPI for some household surveys (Barresi, Finlay and Sutcliffe, 2002) and finally undertook a phased shift to CAPI for its flagship Labour Force Monthly Population Survey from October 2003 to August 2004 (ABS, 2004). Among survey fieldwork providers in the market research arena, adoption of computer-assisted interviewing in face-to-face settings appears to have been limited, although there is little publicly available data to allow quantification of the extent of adoption. It was not until 2008, for example, that the move to CAPI became a viable cost-effective option for the Household, Income and Labour Dynamics in Australia (HILDA) Survey, a large-scale nationally representative longitudinal survey conducted in the market research arena.

In preparation for a potential shift of the HILDA Survey from the PAPI to CAPI survey mode, a trial of CAPI methods was conducted in 2007.[1] The trial was conducted on a test sample of 764 households, which formed the Wave 7 longitudinal Dress Rehearsal sample used to test new questions and procedures each wave. To evaluate the effects of CAPI methods on survey outcomes, approximately half the test sample was assigned to the CAPI survey instrument, while the other half of the sample continued with the PAPI instrument. Importantly, assignment of households to the CAPI 'treatment' was random, allowing causal inferences to be made based on comparisons of the CAPI and PAPI samples. The PAPI and CAPI survey instruments were, furthermore, designed to obtain exactly the same information from respondents, facilitating isolation of the effects of survey mode, as distinct from other factors, on survey outcomes.

In this paper, we report on the findings from the HILDA Survey CAPI trial. In common with other studies of the effects of survey mode, we consider the effects of the CAPI survey mode compared with the PAPI mode on response rates, respondent and interviewer reactions,

[1] The HILDA Survey in fact shifted to a CAPI survey instrument in Wave 9 in 2009; see Watson (2010) for details.

interview length and missing data. We furthermore examine the effect such a mode change has on the responses provided by respondents to a range of questions we assess as most susceptible to survey mode effects. For this analysis, we consider the effects on the length of verbatim text where such text is provided and on the distributions of numeric and categorical variables, including the propensity to choose extreme and neutral values on questions requiring choice of a position on a scale (for example, as occurs for various attitudinal variables).

The HILDA Survey CAPI trial provides valuable new evidence on the implications of a move from PAPI to CAPI methods on survey outcomes. While CAPI methods have been widely adopted internationally, and evaluations of effects have been undertaken since the early 1990s, it is nonetheless the case that many current household surveys still use PAPI methods. The HILDA Survey trial provides evidence relevant to the contemporary context—and thus these PAPI surveys—in an era in which perceptions and use of computers and information technology more generally, as well as attitudes to privacy, have changed considerably since the early evaluations of CAPI methods. Most of the existing studies of the effects of CAPI pertain to the 1990s, since which time both the CAPI technology and respondent attitudes have changed. Moreover, of these studies, only a few have considered the effects on responses.

The HILDA Survey trial is, furthermore, one of a small number of evaluations of CAPI methods—and perhaps the only evaluation since the late-1990s—to adopt an experimental design (other published experiments are reported by Martin et al., 1993; Baker, Bradburn and Johnson, 1995; Lynn, 1998; and Schräpler et al., 2006). The HILDA trial also provides experimental evidence in a longitudinal study representative of the entire community (similar to Martin et al., 1993 and Schräpler et al., 2006). Longitudinal studies have important differences from cross-sectional studies and thus it is likely that not all findings for cross-sectional studies apply to longitudinal studies. For example, the 'feeding forward' into the CAPI instrument of some respondent details from previous waves is not possible in cross-sectional surveys.

Finally, the HILDA Survey CAPI trial has particular value from an Australian perspective. It provides the first evidence publicly available on the effects of the CAPI survey mode in household surveys in the Australian context.

Following a review of the literature on the impact of a change from PAPI to CAPI in Section 2, the design of the HILDA experiment and several operational issues are presented in Section 3. Section 4 discusses the impact of CAPI on the response rates and the interview situation. An assessment of the quality of the data in terms of both the completeness of the data provided and the distributions of key variables is provided in Section 5. Section 6 concludes.

2. Previous Research on the Effect of Changing from PAPI to CAPI

Tourangeau and Smith (1996) argue that there are three key variables which mediate the major effects of data collection mode on data quality: the degree of privacy permitted; the level of cognitive burden it imposes on the respondents; and the sense of legitimacy fostered by the survey. The shift from PAPI to CAPI could affect all three of these components. Firstly, some respondents will consider the computer environment to be more secure, although others will perceive it to be less so. Second, resolution of dependent text within the CAPI script (such as referring to the names of children and correctly referring to the number of jobs held by the respondent) will (positively) impact on the respondent's cognitive burden. Third, the use of computers by the interviewer may make the study appear more 'legitimate'

to some respondents. It is therefore conceivable that mode effects may be present in comparisons of data collected in a PAPI environment with data collected in a CAPI environment. Among the potential mode effects are impacts on response rates, respondent reactions, interviewer reactions, interview length, missing data, open ended questions, and responses to both objective and subjective questions.

As noted in the introduction, only a limited number of studies have been published on the effect of a change from PAPI to CAPI. Studies fall into two distinct groups, the first providing credible experimental evidence and the second group relying on comparisons of survey outcomes before and after the shift from PAPI to CAPI. Only two studies provide experimental evidence of a longitudinal nature where the effect of the change of mode on the attrition rates can be assessed (Schräpler et al., 2006; one of the studies reported by Martin et al., 1993). Other experimental studies have either occurred in one wave of a longitudinal study (Baker, Bradburn and Johnson, 1995) or in a cross-section study (Lynn, 1998; one of the studies reported by Martin et al., 1993; Fuchs et al., 2000). The second group of studies, which undertake 'before-after' comparisons, offer circumstantial evidence and cannot distinguish changes resulting from a change in mode from changes due to other factors that change over time (Laurie, 2003; Nicoletti and Peracchi, 2003).

The existing studies provide a consensus view of the effects of the introduction of CAPI on four aspects of data quality. First, a change from PAPI to CAPI does not significantly affect response rates (Martin et al., 1993; Baker, et al. 1995; Lynn, 1998; Laurie, 2003; Nicoletti and Peracchi, 2003; Schräpler et al., 2006) or attrition rates (Martin et al., 1993; Schräpler et al., 2006). Second, the vast majority of respondents are ambivalent about the change in mode and very few negative reactions are recorded (de Leeuw, et al., 1995; Martin et al. 1993). Third, interviewers are generally positive about the change and appreciate the more professional look it gives them (de Leeuw, et al., 1995; Banks and Laurie, 2000).[2] Finally, almost all previous studies recorded a lower rate of missing data in CAPI compared to PAPI due to the elimination of routing errors (for example, de Leeuw, 1995; Laurie, 2003; Schräpler, et al. 2006).[3]

There is mixed evidence on the impact of CAPI on other aspects of data quality, such as interview length, the proportion of don't know or refused responses, the length of open ended questions, and the quality of the responses provided. Findings are to some extent a function of both the nature of the survey and the type of evaluation design adopted and it is useful to classify the existing studies into one of four groups: (1) Experimental evaluation of two waves of a longitudinal survey; (2) Experimental evaluation of one wave of a longitudinal

[2] Nevertheless there are some negative aspects of CAPI that interviewers have been noted in the literature; it makes it more difficult for interviewers to grasp the overall context of the questions (Baker, Bradburn and Johnson, 1995; Couper, 2000) and it is harder to maintain rapport with the respondents when the interviewer is focused on the technical aspects of the computer (Martin et al., 1993; Couper, 2000).

[3] In principle, routing errors can still occur using the CAPI mode, since interviewers may incorrectly enter responses to questions used to route to subsequent questions. Indeed, while this can also occur in PAPI, the potential for this type of error is probably higher under CAPI because the error might be more easily spotted and corrected by the PAPI interviewer as they can see how many questions they skip. Unfortunately, this type of error is not discernable from the data. However, several studies provide some evidence on the rate of recording errors that is relevant to this issue. In a study comparing the recording errors made by interviewers using computer-assisted telephone interview (CATI) methods with errors made by interviewers using PAPI methods, Lepkowski et al. (1998) found that there were no differences in the error rates for recording responses to simple or straightforward questions (0.1 per cent for both), but when recording complex questions, the CATI error rate was significantly lower than the PAPI error rate, at 1.2 per cent versus 1.6 per cent. Consistent with these low error rates, Dielman and Couper (1995) reviewed nearly 17,000 closed-ended questions in 116 interviews in a CAPI environment and found only 16 keying errors, an error rate of 0.1 per cent.

survey; (3) Experimental evaluation of a cross-sectional survey; and (4) Before-after analysis of a longitudinal or cross-sectional survey.

Studies in the first group include Martin et al. (1993) and Schräpler et al. (2006), both of whom report on studies where the respondent or household, rather than the interviewer, was randomly allocated to CAPI or PAPI administration. The first experiment was conducted on Waves 2 and 3 of a social attitudes survey conducted for the Joint Unit for the Study of Social Trends where the respondents were first interviewed by PAPI in the British Social Attitudes Survey in 1989. Martin et al. (1993) finds that the interviews take 12 to 15 per cent longer to administer using CAPI (although this difference was eliminated in a subsequent experiment where the interviewers had greater experience with CAPI). They also find no difference in the use of 'don't know' or midpoint categories, no bias in the scale responses and some suggestion that CAPI might elicit more reliable responses over time. The second experiment was conducted in the first two waves of a new sample of the German Socio-Economic Panel which began in 1998. Schräpler et al. (2006) find higher rates of 'don't know' and 'refused' responses for income questions in the CAPI sample together with some indications of higher use of 'don't know' and 'refused' responses in other parts of the questionnaires, although the differences are not statistically significant. Such higher rates may result from respondent confidentiality concerns about computers being used, or from a different layout of the questions on the screen. Schräpler et al. (2006) did not consider the effect of CAPI on other aspects of data quality.

In the second category of study is an experiment conducted in Wave 12 of the US National Longitudinal Survey of Youth, conducted in 1990, in which the interviewers were randomly assigned to either CAPI or PAPI. Analysing the resultant data, Baker, Bradburn and Johnson (1995) find that, compared with PAPI, CAPI results in a reduction in interview length by 20 per cent, lower item non-response and a reduction of social desirability bias in questions about income, wealth, birth control and alcohol problems.

Turning to the third group of experiments, conducted on cross-sectional surveys, in a split-sample test in the 1993 British Social Attitudes survey, interviewers were randomly allocated to either CAPI or PAPI. On analysing the resultant data, Lynn (1998) found that, compared to PAPI, the CAPI interview length is 16 per cent shorter, and respondents tended to shift from using the 'don't know' category to using the mid-point of the scale in attitudinal questions. He also found mixed effects on responses to scale questions; the CAPI respondents tended to place themselves at different points on the scale than PAPI respondents (for 20 of 90 questions analysed), and they tended to use the extremes of the scales more (in 13 of the 90 questions). No discernible pattern was found in the direction of the effect. To further our understanding of the impact of CAPI on the interview length, Fuchs et al. (2000) undertook an in depth examination of question durations in 14 PAPI interviews and 37 CAPI interviewers that were recorded in 1997 as part of the National Health Interview Survey. They found that the CAPI interviews were 17 per cent longer than the PAPI interviews due to the speed of typing rather than writing and differences in the looping strategies. Finally, Martin et al. (1993) report on a cross-sectional experiment (along with the longitudinal experiment) from the Election Study Methodology project, noting no difference in the interview length (once the interviewers are experienced with CAPI), a reduction in the use of 'don't know' and 'refused' responses in CAPI, no effect on the use of middle responses or bias in scale responses, and an increase in the use of extreme responses in CAPI.

The last type of study on the effect of CAPI provides more circumstantial evidence. Laurie (2003) compares the responses provided in Wave 8 of the British Household Panel Survey (BHPS) using PAPI with those provided in Wave 9 using CAPI and finds higher rates of

'don't know' and 'refused' responses for income questions, shorter verbatim responses (particularly for occupation), but no effect on the reported levels of house value, rent paid and gross income.

3. The HILDA Experiment with CAPI

The HILDA Dress Rehearsal sample used to conduct the CAPI trial is approximately one-tenth the size of the main sample. The test sample and the procedures mimic those in the main sample in almost every way, except that households initially selected into the sample in 2001 were located only in New South Wales and Victoria, the two most populous states (together accounting for over half the Australian population). For a detailed description of the HILDA Survey, see Wooden and Watson (2007).

For the CAPI trial, the Household Questionnaire (HQ), the Continuing Person Questionnaire (CPQ – for those interviewed previously) and the New Person Questionnaire (NPQ – for those never interviewed before) were completed by CAPI, representing the vast majority of the interview duration. A separate Household Form (HF) was retained in paper form. This was because the HF had quite a complex structure and was integral to the management of the interviewer's work for a household that may be conducted over numerous visits. If for some reason, the interviewer could not complete the interview using CAPI, they could simply revert to the paper questionnaires without losing access to the critical information for the household.[4]

Experimental Design

Interviewers, rather than households, were assigned to either CAPI or PAPI delivery. Only face-to-face interviewers were split between these two modes, with the telephone interviewers trained only for PAPI delivery. Interviewers were stratified by state, urban / rural location, experience working on HILDA and computer expertise and allocated randomly to the mode wherever possible. Despite this, the proportion of interviewers who actually worked on the Dress Rehearsal were different with respect to their experience on the HILDA Survey – 1 of the 13 face-to-face interviewers trained for PAPI was new, whereas 5 of the 15 face-to-face interviewers trained for CAPI were new.

Of the 848 households in the Dress Rehearsal sample, 90 per cent (764 households) were assigned to face-to-face interviewers and therefore to this experiment. The remaining 84 households were assigned to the telephone interviewing team, either because the household was located outside the areas covered by face-to-face interviews or because this mode was requested by the household. Note, therefore, that the experiment identifies the effects of survey mode on those assigned to face-to-face interviewing; it does not inform us on the effects on telephone interviewing. Table 1 shows the quantity of HQs, CPQs and NPQs completed by the mode used and the experience of the interviewer. Interviews conducted by telephone have been excluded.[5] We find that as a result of the greater concentration of new interviewers assigned to CAPI, a greater proportion of interviews in this group were completed by interviewers who were new to the HILDA Survey.

[4] It was intended that if CAPI proved viable the HF would be fully integrated with the HQ and PQ. Indeed, this is how it was implemented in Wave 9.

[5] As we do not have a variable which records whether the HQ was completed by phone, we have classified an HQ as being done by phone if all of the PQs completed on the same day as the HQ were by phone or if the HQ was completed on a different day to the PQs and all of the PQs were completed by phone.

Table 1: Number (and %) of interviews conducted by survey mode and interviewer experience

	PAPI mode			CAPI mode		
	Experienced interviewer	New interviewer	All interviewers	Experienced interviewer	New interviewer	All interviewers
HQ	282 (93.7)	19 (6.3)	301 (100.0)	238 (70.4)	100 (29.6)	338 (100.0)
CPQ	501 (93.3)	36 (6.7)	537 (100.0)	447 (71.5)	178 (28.5)	625 (100.0)
NPQ	38 (95.0)	2 (5.0)	40 (100.0)	21 (61.8)	13 (38.2)	34 (100.0)

While households were not *directly* randomly assigned to PAPI and CAPI, the effect of the process of assigning interviewers to PAPI and CAPI (and attempting to maintain balance in the interviewer composition of the CAPI and PAPI samples) is that respondent assignment to CAPI was *effectively* random. Table 2 provides evidence in support of the contention that assignment of respondents was random, presenting comparisons of respondent demographic characteristics in the CAPI and PAPI samples. The Hotelling t-statistic indicates that the compositions of the two samples are not significantly different. Indeed, for all the characteristics examined in the table, no significant differences are evident at the 10 per cent level.[6] Thus, the study design is very likely to provide the benefits of a randomised controlled trial, whereby comparisons between the CAPI and PAPI samples provide valid estimates of the causal impact of CAPI.[7]

[6] Table 2 necessarily presents characteristics only of respondents; by excluding non-respondents it is susceptible to differences between the CAPI and PAPI samples due to differences in response rates. That is, even if the respondents assigned to CAPI were identical (up to sampling error) to the respondents assigned to PAPI, the characteristics distributions could differ between the two respondent samples. Table 3 in Section 4 presents evidence on differences in response rates.

[7] Nonetheless, in comparisons of distributions of key variables undertaken in Section 6, as a robustness check we present impact estimates controlling for differences in demographic characteristics between the two samples.

Table 2 Respondent characteristics by survey mode

	PAPI	CAPI	Diff	p-value
Male (%)	48.0	45.1	-2.9	0.302
Age (years)	43.87	44.80	0.93	0.384
New South Wales (%)	50.4	50.2	-0.2	0.943
Home-owner (%)	72.6	71.5	-1.1	0.668
Household size	3.22	3.10	-0.12	0.191
Household type				
Couple (%)	23.2	25.8	2.6	0.295
Couple with dep children (%)	40.9	38.8	-2.1	0.462
Sole parent (%)	7.6	5.5	-2.1	0.123
Single person (%)	11.1	12.8	1.7	0.372
Other (%)	17.2	17.1	-0.1	0.996
Marital status				
Married (%)	52.5	51.6	-0.9	0.747
De facto (%)	8.8	9.7	0.9	0.599
Separated, divorced or widowed (%)	14.9	15.0	0.1	0.954
Never married (%)	23.7	23.5	-0.2	0.927
English background and English proficiency				
Speak only English at home (%)	79.4	80.9	1.5	0.509
Non-English speaker - English good (%)	17.7	16.8	-0.9	0.699
Non-English speaker - English poor (%)	2.9	2.3	-0.6	0.460
Labour force status				
Employed (%)	61.9	63.3	1.4	0.611
Unemployed (%)	4.9	3.2	-1.7	0.134
Not in the labour force (%)	33.3	33.5	0.3	0.923
Sample size	577	659		
2-group Hotelling's T-squared	9.237			
F test statistic	0.609			0.870

Note: *, ** and *** indicate significantly different at the 10, 5 and 1 per cent levels, respectively.

Operational Issues

The CAPI script for the HQ and Person Questionnaire (PQ) was developed in Confirmit[8]as this was the preferred software of our fieldwork provider, The Nielsen Company. The Confirmit interface is heavily mouse dependent and is typically used by the market research industry for on-line surveys. The interviewers used laptops with either an external mouse or an inbuilt touchpad. The completed work was synchronised with a secure server over either a broadband network or a dialup connection, though many interviewers reported considerable difficulties with the dialup method.

One area where considerably more effort was expended for CAPI compared to PAPI was in testing the CAPI script (as opposed to checking the paper questionnaires for PAPI). It is impossible to test all of the different scenarios that can occur and the options for exporting the script to a hard copy version were limited, with exported documents even missing some basic information such as question routing. Ideally, this additional work prior to the fieldwork should reduce the work post-fieldwork, but this was not the case in this particular trial.

[8] See www.confirmit.com.

A final operational issue of note is that only limited use was made of dependent data in the test. The variables we carried forward from the last interview were: sex, date of birth, date of last interview, whether the respondent was employed at the last interview and the number of employers they had. Obviously, the range of dependent data could be considerably extended, as has been done in the BHPS after a detailed study of the effect (see Jäckle, 2008), and a staged introduction of dependent data has been planned for the HILDA Survey.

4. Effects of CAPI on the response rates and interview situation

In this section, we consider the impact CAPI has had on the response rates, the respondents, the interviewers, and the overall length of the interview. We cannot present any evidence from this study about transcription errors as they cannot be detected without taking a recording the actual interview and this was beyond the scope of our study.

Response Rates

Our analysis of the effect of CAPI on response rates is complicated by the fact that interviewers were assigned to a particular mode rather than households: a household originally approached by a CAPI interviewer may be followed up by a PAPI interviewer and vice versa. We address this by presenting in Table 3 person-level response rates according to the mode assigned to the initial face-to-face interviewer only. Households initially allocated to the phone interviewing team are excluded. Consistent with previous research, our test shows that the introduction of CAPI had no impact on the response rates for any of the sample member groups – none of the differences are statistically significant at the 5 per cent level (or even the 10 per cent level).

Table 3: Person-level response rates by survey mode (%)

	After initial fieldwork			*After follow-up fieldwork*		
	PAPI	*CAPI*	*Diff*[a]	*PAPI*	*CAPI*	*Diff*[a]
Previous wave respondent	84.6	84.9	+0.4	92.8	92.1	-0.7
Previous wave non-respondent	15.4	14.8	-0.6	21.8	22.2	+0.4
Previous wave child	60.0	69.2	+9.2	90.0	84.6	-5.4
New entrant	59.4	60.0	+0.6	81.2	72.0	-9.2

Note: [a] Difference between the means of the CAPI and PAPI samples (CAPI minus PAPI). *, ** and *** indicate statistical significance of the difference from zero at the 10, 5 and 1 per cent levels, respectively.

Respondent Reactions

Interviewers recorded a range of observations about the interview situation at the end of the individual interview. Table 4 presents the differences in the interviewer assessments between the modes in terms of the respondent's understanding, suspiciousness, consultation of documents, cooperation, and use of third party assistance to undertake the interview.

No difference between the modes is evident in terms of the interviewers' understanding, suspiciousness or whether the interview required assistance from a third party. There is, however, evidence of a greater tendency for the respondent to refer to documents during a CAPI interview, perhaps because the presence of the computer makes the interview seem more 'official', making it appear more important to provide precise information. Another aspect of the interview that seems to be affected by CAPI is that the interviewer's assessment of the respondent's cooperation is much lower, though it is not apparent why this might be the case.

Interviewers also recorded how the respondents reacted to CAPI at the end of the person interview (in section Z). As other studies have found, very few respondents had concerns: of the 659 respondents interviewed, 17 (2.6 per cent) mentioned they were less comfortable with CAPI but accepted it and only 5 (0.8 per cent) mentioned being unhappy with the switch. The main objections voiced by respondents were around confidentiality, dislike of computers, being unable to see the interviewer recording the correct response, and the extra time it took. More common were positive reactions, with 30.6 per cent of the respondents indicating that the move to CAPI was an improvement over the paper-based method.

Table 4: Interviewer observations about the interview by survey mode (%)

	PAPI	*CAPI*	*Diff (CAPI – PAPI)*
Excellent or good understanding	93.8	91.9	-1.9
Not suspicious	98.6	98.2	-0.4
Referred to documents	27.3	40.8	+13.5***
Excellent cooperation	91.2	77.7	-13.5***
Interview assisted by third party	4.7	3.8	-0.9

Note: *,** and *** indicate statistically significant difference at the 10, 5 and 1 per cent levels, respectively.

Interviewer Reactions

The CAPI interviewers appeared to adapt well to the new technology and reportedly enjoyed the experience. For the vast majority of the interviews, the interviewers reported that CAPI worked well and that they had no issues at all. Even when a problem did occur, the interviewers mostly managed to resolve the issue during the interview. There were only 12 interviews (1.8 per cent) where the interviewers had to sort out the problem after the interview or refer it to their supervisor to resolve. Some of these problems were hardware issues while others involved an error notification about the data entered that the interviewer could not understand or work out how to correct. In these instances, the interviewer would continue the interview on a hardcopy questionnaire and later enter the data into the CAPI system.

The interviewers seemed to have strong preferences for the type of mouse they used for their interviews. Of the 15 CAPI interviewers, 5 opted to use the built-in mouse on the laptop, 7 preferred the external mouse and the remaining 3 experimented with both but completed about 70 to 80 per cent of the interviews with the external mouse. Where the built-in mouse was used, the interviewers reported being at least as comfortable with the built-in mouse as the external mouse in 89 per cent of these interviews.

On the negative side, a couple of the interviewers felt that the laptop screen created more of a barrier between the respondent and the interviewer than using hardcopy questionnaires, but this was not a widely-held view.

Interview Length

Interview lengths under CAPI methods are of course affected by the way in which CAPI is implemented. In particular, the extent to which pre-existing information on respondents is used (fed forward) has the potential to significantly affect interview length. In the HILDA CAPI trial, a conservative approach was taken that did not allow for such time savings. Nonetheless, it is unclear *ex ante* whether the interview lengths for CAPI as implemented

should be shorter or longer than PAPI. There are several factors contributing to shorter interview lengths under CAPI, including:

1. Questionnaire routing is automated in CAPI.
2. Interviewers do not have to work out what text they should use for specific situations (such as a child's name, or text appropriate to people with two or more jobs) as this is automatically generated in CAPI.

Balanced against this, however, are factors contributing to longer interview lengths in CAPI than in PAPI:

1. Unusually high or inconsistent answers can be queried and resolved on the spot with the respondent. This may result in the interviewer having to type in an explanation of why the apparent difference is correct or they may have to work back through the questionnaire to correct some previously entered data.
2. The CAPI system will not progress to the next question until the current question is correctly filled in. (An error message is displayed whenever a response has not been filled in or has been incorrectly filled in; e.g, a start date is entered but not an end date, or the start date is after the end date.)
3. In PAPI, interviewers often read ahead and are asking the next question of the respondent while they are finishing off filling in the answer to the last question. They cannot do this in CAPI.
4. Many interviewers can write faster than they can type, though the effect of this will be limited to the number of open-ended or partially-open response categories used.
5. There would be greater learning effects for the CAPI interviewers compared to PAPI. Many of the interviewers were very experienced in the PAPI environment but none had worked on a CAPI survey before.

Further, the interview lengths can be different due to different designs of the two systems – how much use is made of data provided earlier in the interview or previous interviews, how many questions are displayed on each screen and how questions in grids on the paper questionnaire are programmed into CAPI.

It is not surprising, therefore, that previous studies have had mixed results regarding interview length. It would depend on how each of these variables play out in the particular combination employed by each study.

The average interview lengths recorded for both PAPI and CAPI in our Wave 7 test, based on the recorded start and end times of the face-to-face interviews, are provided in Table 5.[9] The interview lengths for CAPI are longer than PAPI – the HQ is 35 per cent longer and the CPQ is 24 per cent longer. These differences are more apparent amongst the experienced interviewers than the new interviewers, perhaps because some of the ways the experienced interviewers speed up the interview (such as reading ahead) are not possible in CAPI. It is also likely that the mouse-dependent nature of Confirmit, when implemented in a laptop environment, may have slowed the interview more than other CAPI software that could have been used.

[9] HQ and PQ times less than 1 minute or more than 90 minutes and PQ times less than 10 minutes or more than 90 minutes were excluded, on the assumption that these case were due to problems with the timestamps.

Turning now to the interviewer learning effects in CAPI versus PAPI, we do find evidence that there was a greater learning effect with CAPI. For many of the experienced PAPI interviewers, the questionnaire was much the same as in previous years with the exception of new questions introduced for Wave 7. For the CAPI interviewers who had worked on HILDA previously, they had to get used to the new CAPI environment as well as the new questions. Graph 1 shows the average time experienced interviewers took to interview each successive CPQ respondent. As the number of interviewers contributing to each point is relatively small (less than 20), there is considerable variation in average times. Fitting a linear trend to the observed data suggests that the length of the CAPI interviews declines markedly quicker with experience than does the length of the PAPI interviews—in the order of 2.5 minutes per 10 interviews for CAPI, compared to 1.1 minutes for PAPI.[10]

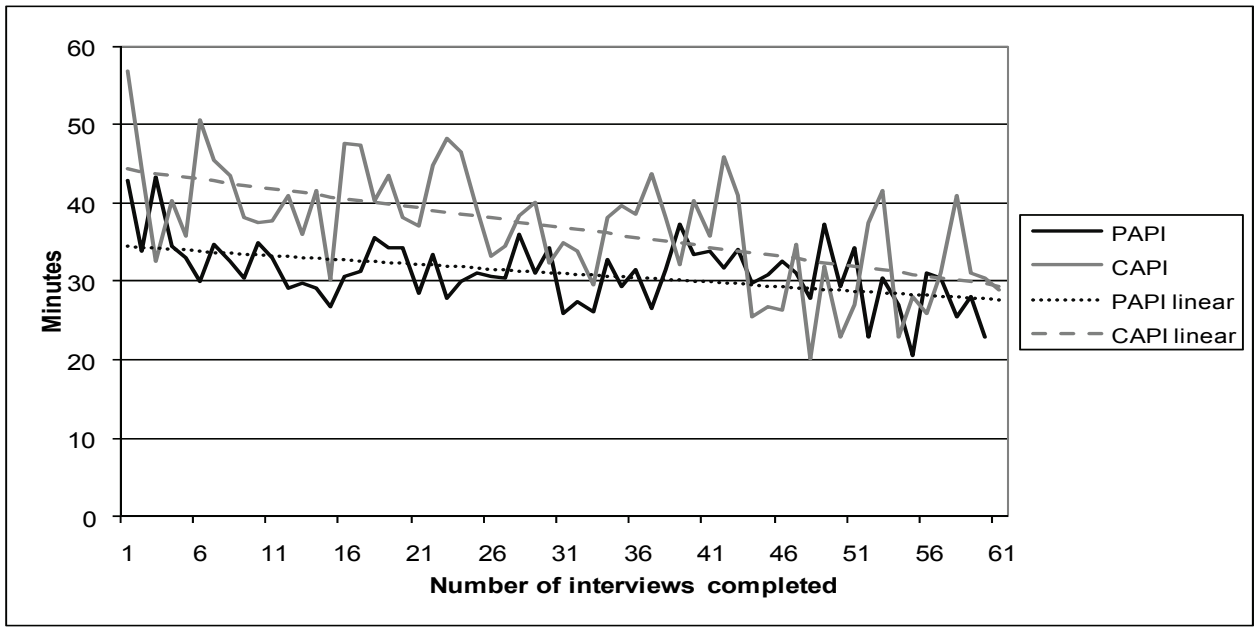
Table 5: Mean interview lengths by survey mode (minutes)

	HQ	CPQ	NPQ
All interviewers			
PAPI	4.8	32.3	40.4
CAPI	6.5	40.2	42.9
Difference (C-P)	+1.7**	+7.9***	+2.5
Experienced interviewers			
PAPI	4.7	31.7	40.0
CAPI	6.6	38.9	45.3
Difference (C-P)	+1.9**	+7.1***	+5.3
New interviewers			
PAPI	6.7	40.1	48.0
CAPI	6.3	43.6	39.1
Difference (C-P)	-0.4	+3.4*	-8.9
Target	6	35	40

Note: *,** and *** indicate statistically significant difference at the 10, 5 and 1 per cent levels, respectively.

[10] The CPQ interview lengths for new interviewers and the HQ lengths for experienced and new interviewers were also analysed. The results are similar to those reported for experienced interviewers working on the CPQ.

Graph 1: Mean CPQ interview lengths for experienced interviewers, by survey mode



5. Effects of CAPI on item responses

We now turn our attention to the data quality issues that might occur with a switch from PAPI to CAPI. We consider four key issues:

i) The rate of item non-response;
ii) The completeness of multi-response items;
iii) The completeness of the text provided for open-ended questions or questions with an 'other, specify' response; and
iv) The distributions of key variables.

As noted earlier, only those interviews completed face-to-face are included in the comparisons, since respondents interviewed by telephone (all using PAPI) were not randomly assigned to PAPI. Indeed, these respondents have particular characteristics—most obviously, their location—that led them to be interviewed by telephone. Their inclusion in the PAPI sample would therefore almost certainly produce biased estimates of CAPI impacts.

Item Non-Response

The overall rate of item non-response in the face-to-face interviews conducted by CAPI is the same as in those undertaken by PAPI for both the household or individual interview components, as shown in Tables 6 and 7. Nevertheless, we note a small reduction in the proportion of 'refused / not stated' responses, primarily in the health related questions (in section K) and this is offset by an increase in the proportion of 'don't know' responses, also in the health related questions and in the tracking sections (section T). Unfortunately, in the HILDA data we are unable to distinguish respondent 'refusal' from interviewer error ('not stated'), but we expect that the decrease in this combined category is due to the elimination of interviewer skip errors in CAPI, as the program now controls this aspect of the interview. The increase in the proportion of 'don't know' responses in the CAPI interview is likely to be due to the explicit offering of this option, together with a 'refused' option, for each question to allow the interviewer proceed to the next question if the respondent cannot provide a response. With this option now displayed on the screen, the interviewer might be more

tempted to select this response rather than probing further for a response. Running counter to this possible explanation is a slight decrease in the proportion of 'don't know' responses recorded in the questions for those not in current employment (section D) and the activity calendar (Section E), and it is not clear what might be driving this decrease.

One restricting feature of CAPI is the inability to look ahead at the upcoming questions or quickly skip back to earlier questions. A section that could have been particularly adversely affected by this is the income section (section F), but we note that while we did see a modest increase in item non-response in this section, the increase was not statistically significant. Despite this, a change in reporting behaviour was noted at one question in particular which collects annual or fortnightly benefit information for the previous financial year. At this question, the CAPI interviewers were more likely to record annual financial year amounts whereas the PAPI interviewers were more likely to record fortnightly amounts. It is expected that this difference was due to the layout of the question in CAPI where the interviewer could not look forward to see that they would ask about the fortnightly payments if they could not enter an answer for the annual amount. It is likely the interviewer either encouraged the respondent to provide an annual amount or helped convert a fortnightly figure to an annual amount. For the PAPI interviewer, the annual amounts and fortnightly amounts are next to each other on the questionnaire and they can readily choose which box to fill in. As we will see in Table 11 presented later, there was a significant increase in the incidence of 'don't know' responses for annual benefit income in the CAPI sample, most likely because of the screen layout adopted.

Table 6: Item non-response in the Household Questionnaire

	PAPI				CAPI				CAPI-PAPI		
Section	Ave. items asked	% don't know	% ref / not stated	% non-resp	Ave. items asked	% don't know	% ref / not stated	% non-resp	% don't know	% ref / not stated	% non-resp
Q: Child care	13.6	0.01	0.22	0.23	13.3	0.06	0.03	0.08	0.04	-0.19	-0.15
R: Housing	12.8	0.84	0.14	0.98	12.4	0.80	0.12	0.91	-0.04	-0.02	-0.06
All	26.4	0.57	0.16	0.74	25.7	0.64	0.09	0.73	0.07	-0.07	0.00

Note: *,** and *** indicate statistically significant difference at the 10, 5 and 1 per cent levels, respectively.

Table 7: Item non-response in the Person Questionnaire

Section	PAPI				CAPI				CAPI-PAPI		
	Ave. items asked	% don't know	% ref / not stated	% non-resp	Ave. items asked	% don't know	% ref / not stated	% non-resp	% don't know	% ref / not stated	% non-resp
AA: Country / language	0.2	0.02	0.00	0.02	0.2	0.06	0.00	0.06	0.03	0.00	0.03
BB: Family background	1.3	0.45	0.04	0.49	0.9	0.25	0.01	0.26	-0.20	-0.03	-0.23
A: Education	10.5	0.03	0.00	0.03	10.9	0.00	0.00	0.00	-0.03	0.00	-0.03
B: Emp. status	3.4	0.00	0.12	0.12	3.4	0.04	0.00	0.04	0.04	-0.12	-0.08
C: Current employment	31.3	0.29	0.01	0.30	30.9	0.21	0.02	0.24	-0.07	0.01	-0.06
D: Not in employment	7.0	0.07	0.00	0.07	8.5	0.03	0.00	0.03	-0.04*	0.00	-0.04*
E: Activity calendar	112.9	0.02	0.01	0.03	115.1	0.00	0.00	0.00	-0.01*	-0.01	-0.02*
F: Income	47.6	0.52	0.02	0.54	46.6	0.54	0.09	0.63	0.03	0.06	0.09
G: Children	17.4	0.11	0.05	0.16	19.3	0.11	0.03	0.14	0.00	-0.02	-0.02
H: Partnering	13.4	0.02	0.05	0.07	13.4	0.09	0.00	0.09	0.07	-0.05	0.01
K: Health	56.9	0.25	0.13	0.38	55.3	0.40	0.03	0.43	0.15**	-0.09**	0.05
L: Retirement	32.0	0.46	0.10	0.57	37.2	0.50	0.06	0.57	0.04	-0.04	0.00
T: Tracking	2.4	2.36	0.00	2.36	1.5	3.64	0.04	3.68	1.28**	0.04	1.32**
All	336.3	0.32	0.06	0.38	343.0	0.34	0.03	0.36	0.01	-0.03**	-0.02

Note: *,** and *** indicate statistically significant difference at the 10, 5 and 1 per cent levels, respectively.

Completeness of Multi-Responses

One way that the PAPI and CAPI datasets can differ is in the number of responses recorded for questions seeking multiple responses. Table 8 shows the average number of responses recorded at multi-response questions routinely included in the questionnaires by the mode the interview was administered. There were only two questions for which the number of response options recorded in CAPI was different on average to the number recorded in PAPI at the 5 per cent significance level: the types of non-employment related care used for children not yet at school (Q16) and long term health conditions (K1). There is no clear message from the direction of the effect—in the first question, fewer responses were recorded in CAPI, whereas in the second more responses were recorded. Furthermore, we note that these two items have only just reached significance and given we are testing a large number of items, it is likely this has occurred by chance alone.

Table 8: Mean number of responses at multi-response questions[a]

Question	PAPI	CAPI	Diff (C-P)	P-value (diff=0)
Household Questionnaire				
Employment related childcare during term (Q8)	2.76	3.36	0.60	0.339
Employment related childcare during school holidays (Q9)	3.04	3.32	0.28	0.658
Employment related childcare for those not yet at school (Q11)	1.87	2.39	0.52	0.106
Non-employment related childcare for those at school (Q14)	2.00	1.91	-0.09	0.776
Non-employment related childcare for those not yet at school (Q16)	2.17	1.31	-0.85**	0.048
Method of CCB payment (Q18)	1.00	1.00	0.00	-
Method of FTB payment (Q20)	1.00	1.01	0.01	0.320
Person Questionnaire				
Qualification lists (A8a, A10 in CPQ; A7a, A7c, A7e, A12 in NPQ)	1.56	1.53	-0.03	0.752
Days usually worked (C8)	4.07	4.01	-0.05	0.831
Aims of training (C35, D36)	2.68	2.98	0.30*	0.079
Activities to look for work (D2)	2.47	3.21	0.74	0.109
Reasons trouble getting work (D7)	1.94	2.18	0.24	0.508
Reasons not looking for work (D12)	1.83	1.33	-0.49*	0.084
Requirements of Centrelink (E9)	1.11	1.07	-0.04	0.529
Current pensions (F14)	1.02	1.02	0.00	0.967
Financial year pensions (F31a)	1.07	1.10	0.02	0.397
Other income (F32a)	1.02	1.00	-0.01*	0.050
Changes in marital status (H1a CPQ only)	1.00	1.00	0.00	-
Long-term health problems (K1c)	2.12	2.51	0.39**	0.049
Who care for in or out of household (K8, K11)	1.10	1.06	-0.04	0.530
Reasons for leaving last address (K48)	1.65	1.44	0.21	0.138

Note: [a] The number of responses per case is only calculated for cases who answered the questions (people that are skip past the question are excluded from the analysis). *,** and *** indicate statistically significant difference at the 10, 5 and 1 per cent levels, respectively.

Completeness of Open-Ended Text

Interviewers tended to record more text on the CAPI system compared to the hardcopy questionnaires for occupation and industry questions (see Table 9). This is a positive outcome in terms of data quality as there is more (and hopefully more useful) information to code these responses (though this may be one small factor contributing to increased interview times). Despite this, the CAPI interviewers tended to record responses that were 23 per cent shorter in the 'other, specify' fields that are associated with partially open questions (such as questions about reasons, types of qualifications or payments that were not already listed on the questionnaire). It is possible that the length of the field displayed on the screen was a

contributing factor to this – the length of the field displayed for the 'other, please specify' responses was considerably smaller than those used to collect industry and occupation details.[11]

Table 9: Mean number of characters recorded in open-ended text fields[a]

	PAPI	CAPI	CAPI-PAPI	p-value
Occupation description	20.7	21.3	+0.5	0.470
Occupation main tasks	43.2	57.1	+14.0***	<0.0001
Industry	21.9	26.6	+4.7***	<0.0001
Other, please specify text	33.0	25.3	-7.7***	0.001

Note: [a] *,** and *** indicate statistically significant difference at the 10, 5 and 1 per cent levels, respectively.

Distributions of key variables

Although in principle any data item could be affected by the form of the survey instrument, effects, if any exist, are likely to be strongest for questions that collect information that is relatively sensitive, that is subject to 'social desirability' bias, that relies on subjective assessments by the respondent, or that requires the respondent to recall past events.[12] Correspondingly, in this section we compare distributions of key variables likely to have one or more of these properties. We also restrict attention to variables applicable to a reasonably large proportion of respondents, since—recalling that there are approximately 600 respondents in each sample—statistical precision will be low for data items applicable to only a small proportion of respondents.

We consider responses to both 'factual' or 'objective' questions and attitudinal or 'subjective' questions. Topics covered for objective data items comprise recalled labour market activity, income, benefit receipt, home value, rent, smoking history and current smoking behaviour and eating habits (diet). Subjective data items include working time preferences, subjective probabilities of job leaving, job loss and job acquisition, job satisfaction, subjective wellbeing, self-reported health, likelihood of marrying, preferences for and expectations of (more) children and self-assessed reading and maths skills. Variables from both the HQ and the PQ are included.

Depending on the nature of the variable, comparisons are made of means, standard deviations, prevalence of 'don't know' responses and prevalence of extreme (minimum or maximum possible) values. Note that for attitudinal questions, the standard deviation, by providing a measure of dispersion of responses, informs on the propensity to give neutral responses.

While differences in the characteristics of people in the PAPI and CAPI samples are not statistically significant, as a robustness check we also estimate regression adjusted differences in means. The adjusted difference is the coefficient on a CAPI dummy in a regression of the relevant variable. The regressions contain controls for sex, age (13 dummies), household size, household type (4 dummies), marital status (4 dummies) and whether English is the main language spoken at home. The CAPI dummy is equal to one if the observation belongs to the

[11] The lengths of these fields were increased for Wave 9.

[12] Changes to survey mode could also affect data items that are gathered in a different way, for example via different questions or via a different ordering of questions. However, the CAPI survey instrument was designed to closely replicate the PAPI instrument, such that there is very little potential for effects from this source.

CAPI sample and zero if the observation belongs to the PAPI sample. The coefficient provides an estimate of the difference in means controlling for differences in the sex, age, household size and type, marital status and language spoken composition of the two samples.

For each distributional comparison, we exclude observations with 'missing' values (due to non-response or non-applicability of the data item), although note that 'don't know' is treated as a valid response (and therefore not missing). For continuous financial variables, we also exclude observations with top-coded values.

Objective data

Table 10 compares means and standard deviations of various labour market-related variables that require the respondent to recall past events. While there is some potential for sensitivity and social desirability bias, for example in relationship to unemployment experience and leave taken, the most likely source of difference between PAPI and CAPI responses is differences in the way past events are recalled. The top two panels of Table 10 are derived from responses to the employment and education calendar, which requires respondents to report on labour market and education activity in each third of each month since the beginning of the previous year. The variables reported in the table relate to the 2006 calendar year. No significant differences in means or standard deviations are evident for the percentage of time spent in each labour force state, but there is a difference in the mean reported number of jobs of 0.07, which is significant at the 10 per cent level in the case of the raw difference and significant at the 5 per cent level in the case of the regression-adjusted difference. The mean number is higher for CAPI, but it is not clear whether this translates to more or less recall bias.

The second panel presents comparisons for reported number of days of each of three types of leave taken in the 12 months leading up to the interview. PAPI and CAPI means are not significantly different, but it appears that dispersion in reports of unpaid leave taken is greater for the CAPI mode. The bottom panel compares total length of tenure in current job and in current occupation. In both cases, the estimated mean is not significantly different between the two survey modes, but the standard deviation is significantly greater for CAPI. Greater dispersion in reported tenure might reflect more accurate reporting, or simply greater random variation (noise).

Table 10: Distributions of variables for recalled labour market activity

	Mean						Standard deviation			
	PAPI	CAPI	Diff[a]	p-value[b]	Adj diff[a]	p-value[b]	PAPI	CAPI	Ratio[c]	p-value[d]
No. of jobs last year	0.79	0.86	0.07	0.084*	0.07	0.050**	0.66	0.74	1.12	0.247
Percentage of last year…										
…employed	61.6	61.9	0.3	0.919	-0.1	0.954	46.9	46.2	0.99	0.213
…unemployed	3.4	4.2	0.8	0.393	0.9	0.341	15.2	16.3	1.07	0.134
…not in the labour force	35.0	33.9	-1.0	0.692	-0.7	0.726	46.1	45.9	1.00	0.497
Annual leave taken (days)	8.5	8.8	0.3	0.758	0.1	0.579	12.4	12.2	0.98	0.777
Sick leave taken (days)	2.1	2.3	0.3	0.454	0.2	0.641	5.7	4.9	0.86	0.330
Unpaid leave taken (days)	1.2	2.4	1.2	0.103	1.0	0.161	4.6	13.5	2.93***	0.002
Job tenure (years)	6.6	7.0	0.4	0.477	0.0	0.934	7.6	8.7	1.14**	0.045
Occupation tenure (years)	8.8	9.8	1.0	0.169	0.6	0.347	10.0	10.6	1.06*	0.053

Notes: a. Difference between the means of the CAPI and PAPI samples (CAPI minus PAPI). *, **, *** indicated statistical significance of the difference from zero at the 10, 5 and 1 per cent levels, respectively.

b. p-value is the significance level of the difference in the means from zero.

c. Ratio of the CAPI standard deviation to the PAPI standard deviation. *, **, *** indicate the ratio of the standard deviations is significantly different from one at the 10, 5 and 1 per cent levels, respectively, based on Levene's (1960) statistic.

d. p-value is the significance level of the difference of the ratio of the standard deviations from one.

Table 11 presents comparisons of means, standard deviations and 'don't know' responses for several income and earnings variables. Income is one of the most sensitive questions for respondents, and recall problems are also likely to arise for income in the preceding financial year. No significant differences are evident for means and standard deviations of total income and wage and salary income. However, while the proportion reporting receiving government benefits in the previous financial year is quite similar for the PAPI and CAPI samples, the mean value of benefits received by recipients is significantly lower in the CAPI sample. Administrative data on government benefit payments indicate the HILDA survey does a reasonable job of capturing government benefits (see Headey, 2003), with a slight tendency to under-report some benefit types. The lower mean in the CAPI sample might therefore suggest that there is under-reporting under CAPI. We can also see in Table 11 that CAPI respondents were significantly (at the 10 per cent level) more likely to respond 'don't know' to the question on the value of the government benefits received last financial year: 4.3 per cent of CAPI respondents who indicated they received benefits answered don't know' to the amount, compared with only 1.2 per cent of PAPI respondents. Together, these findings suggest that CAPI provides inferior data on government benefits to PAPI. We note, however, that this may be at least partially attributable to the particular way in which annual government benefit income was collected in the CAPI trial. Respondents were initially only given the option to report income for the year as a whole, and only if they responded 'don't know' were they given the option of reporting benefit income on a fortnightly basis. Under PAPI, while the question sequence is the same, it is evident to the interviewer that the fortnightly option is available and so it is more likely this option is chosen in the event that the respondent is more certain about the fortnightly amount than the annual amount.

Table 11: Distributions of income variables

	Mean					
	PAPI	CAPI	Diff[a]	p-value[b]	Adj diff[a]	p-value[b]
Annual personal income ($)	34017	35109	1092	0.639	1175	0.567
Received government benefits last year (%)	29.5	28.7	-0.8	0.763	-0.4	0.846
Annual government benefits of recipients ($)	10244	8841	-1403**	0.036	-1370**	0.040
Annual wages and salaries of employed persons ($)	46096	45508	-588	0.841	-76	0.977
Current wages and salaries of employed persons ($)	908.11	942.77	34.66	0.528	40.79	0.414

	Standard deviation				Percentage 'don't know'			
	PAPI	CAPI	Ratio[c]	p-value[d]	PAPI	CAPI	Diff[a]	p-value[b]
Annual personal income ($)	35912	40843	1.14	0.386	8.9	10.4	1.5	0.358
Received government benefits last year (%)	-	-	-	-	0	0	0	-
Annual government benefits of recipients ($)	7020	5205	0.74	0.657	1.2	4.3	3.1*	0.081
Annual wages and salaries of employed persons ($)	38260	39836	1.04	0.975	3.5	3.5	0	0.989
Current wages and salaries of employed persons ($)	647.01	751.98	1.16	0.246	3.8	3.3	-0.5	0.722

Notes: a. Difference between the means of the CAPI and PAPI samples (CAPI minus PAPI). *, **, *** indicated statistical significance of the difference from zero at the 10, 5 and 1 per cent levels, respectively.

b. p-value is the significance level of the difference from zero.

c. Ratio of the CAPI standard deviation to the PAPI standard deviation. *, **, *** indicate the ratio of the standard deviations is significantly different from one at the 10, 5 and 1 per cent levels, respectively, based on Levene's (1960) statistic.

d. p-value is the significance level of the difference of the ratio of the standard deviations from one.

Table 12 considers two housing-related data items obtained from the HQ. Here, each observation is a household rather than an individual. The adjusted differences are obtained using the characteristics of a household ‘reference person’, who in couple-family households is defined to be the male member of the couple, and who is otherwise the oldest member of the household. CAPI does not appear to impact on respondent reports of house value, with the mean respondent-assessed value of owner-occupied houses very similar across the two samples. Among renters, the mean reported monthly rent payment is $72 higher in the PAPI sample, but this is not statistically significant and in fact reduces to $50 when we control for basic demographic characteristics.

Table 12: Distributions of housing variables

	Mean					
	PAPI	CAPI	Diff[a]	p-value[b]	Adj diff[a]	p-value[b]
Home value of home-owners ($)	521812	513012	-8800	0.751	-14157	0.582
Weekly rent of renters ($)	848.37	776.45	-71.92	0.231	-50.23	0.317

	Standard deviation				Percentage 'don't know'			
	PAPI	CAPI	Ratio[c]	p-value[d]	PAPI	CAPI	Diff[a]	p-value[b]
Home value of home-owners ($)	266617	297866	1.12	0.470	3.8	2.7	-1.1	0.523
Weekly rent of renters ($)	433.12	358.4	0.83	0.500	1.2	1.1	-0.1	0.930

Notes: a. Difference between the means of the CAPI and PAPI samples (CAPI minus PAPI). *, **, *** indicated statistical significance of the difference from zero at the 10, 5 and 1 per cent levels, respectively.

b. p-value is the significance level of the difference from zero.

c. Ratio of the CAPI standard deviation to the PAPI standard deviation. *, **, *** indicate the ratio of the standard deviations is significantly different from one at the 10, 5 and 1 per cent levels, respectively, based on Levene's (1960) statistic.

d. p-value is the significance level of the difference of the ratio of the standard deviations from one.

Data collected in the PQ on smoking behaviour comprises both information that requires the respondent to recall past events (in some cases many years ago) and information that may be sensitive or subject to 'social desirability' bias. These properties all create a tendency to under-report smoking activity. Table 13 indicates that there are no differences between CAPI and PAPI in responses to questions about current smoking behaviour, suggesting that under-reporting due to sensitivity or social desirability bias equally affects PAPI and CAPI modes. However, there are some differences evident with respect to questions on smoking history. In particular, the proportion reporting that they had ever smoked more than 100 cigarettes was six percentage points higher in the CAPI sample than in the PAPI sample, a difference that is statistically significant at the 5 per cent level; after controlling for differences in basic demographic characteristics, this reduces only slightly to 5.3 percentage points, a difference still significant at the 10 per cent level. This difference may derive from better recall of the past for CAPI respondents, although there is no clear reason why CAPI should improve recall. Alternatively, it may reflect lower social desirability bias in CAPI, with a higher proportion of ex-smokers willing to admit to having ever been a smoker, possibly because of the more 'official' impression created by the use of a computer. This second explanation is perhaps supported by the finding that means of age first smoked and age started smoking regularly do not differ significantly between the two samples.

Information on current smoking behaviour is also gathered in the Self-Completion Questionnaire (SCQ), allowing for a difference-in-difference analysis—that is, comparison of the difference between the CAPI and PAPI samples in the difference between the PQ and the SCQ responses. While slightly fewer respondents disclose that they smoke in the PQ than do in the SCQ, the difference is very similar for the PAPI and CAPI samples. This is consistent with the finding from comparison of PQ responses only that there is no difference between the survey modes in reporting of current smoking status.

Table 13 also presents mean and standard deviation comparisons for responses to questions on level of consumption of vegetables and fruit. These variables clearly have the potential to be subject to social desirability bias, which acts to increase reported consumption relative to actual consumption. Reported vegetable consumption is higher in the PAPI sample than in the CAPI sample. Social desirability bias may therefore be somewhat lower when using the CAPI instrument, which is consistent with the finding in respect of smoking history.

Responses to questions on fruit consumption do not differ significantly between the two samples. This may be because the level of social desirability bias in the PAPI sample is lower to begin with, because fruit consumption is not perceived to be socially desirable to the same extent that vegetable consumption is.

Table 13: Distributions of smoking and diet variables

	Mean					
	PAPI	CAPI	Diff[a]	p-value[b]	Adj diff[a]	p-value[b]
Ever smoked (%)	45.3	51.3	6.0**	0.036	5.3*	0.051
Age when first smoked (years)	15.8	15.8	0.0	0.879	0.0	0.883
Age when started smoking regularly (years)	24.0	23.4	-0.6	0.732	-0.4	0.814
Currently a smoker: PQ (%)	19.6	20.4	0.8	0.744	0.8	0.717
Currently a smoker: PQ – SCQ (%)	-1.5	-1.7	-0.2	0.846	-0.2	0.827
Cigarettes per day: PQ (number)	14.2	14.1	-0.1	0.964	0.4	0.811
Cigarettes per day: PQ – SCQ (number)	3.8	2.8	-1.0	0.477	-0.4	0.782
Serves of vegetables per week (number)	15.5	14.5	-1.0**	0.044	-1.2***	0.010
Serves of fruit per week (number)	10.4	10.2	-0.2	0.701	-0.4	0.368

	Standard deviation			
	PAPI	CAPI	Ratio[c]	p-value[d]
Ever smoked (%)	-	-	-	-
Age when first smoked (years)	3.8	3.9	1.03	0.718
Age when started smoking regularly (years)	20.6	20.1	0.98	0.645
Currently a smoker: PQ (%)				
Currently a smoker: PQ – SCQ (%)				
Cigarettes per day: PQ (number)	13.4	10.8	0.81	0.453
Cigarettes per day: PQ – SCQ (number)	10.0	8.0	0.80*	0.052
Serves of vegetables per week (number)	8.9	8.4	0.94*	0.064
Serves of fruit per week (number)	7.8	8.2	1.05	0.198

Notes: a. Difference between the means of the CAPI and PAPI samples (CAPI minus PAPI). *, **, *** indicated statistical significance of the difference from zero at the 10, 5 and 1 per cent levels, respectively.

b. p-value is the significance level of the difference in the means from zero.

c. Ratio of the CAPI standard deviation to the PAPI standard deviation. *, **, *** indicate the ratio of the standard deviations is significantly different from one at the 10, 5 and 1 per cent levels, respectively, based on Levene's (1960) statistic.

d. p-value is the significance level of the difference of the ratio of the standard deviations from one.

Subjective data

Effects of CAPI on responses to attitudinal variables are examined by comparing means, standard deviations and the prevalence of extreme values. In Table 14, stated working time preferences, subjective assessments of job prospects and satisfaction with various aspects of the (main) job are examined for employed persons. No significant differences are evident for preferred working hours and satisfaction with various aspects of the job, but significant differences are evident in respect of subjective probabilities of leaving the current job, losing the current job and getting another job in the event of loss of the current job. The differences suggest there was somewhat greater pessimism about job prospects under the CAPI mode. The assessed probability of finding another job tended to be lower under the CAPI mode, and in particular nearly twice as many respondents reported a zero probability of finding another job (9.5 per cent compared with 5.5 per cent under the PAPI mode). For probabilities of

leaving the current job and losing the current job, the mean was lower under CAPI, but the differences are not statistically significant. However, the proportion reporting a 100 per cent probability was significantly higher under CAPI for both job leaving and job loss. A further difference between CAPI and PAPI in respect of subjective assessments of job prospects is greater dispersion in assessments under CAPI, with the standard deviation significantly higher at the 5 per cent level for percentage chance of losing one's current job and significantly higher at the 10 per cent level for percentage chance of leaving one's current job.

Table 14: Distributions of subjective labour market variables

	Mean						Standard deviation			
	PAPI	CAPI	Diff[a]	p-value[b]	Adj diff[a]	p-value[b]	PAPI	CAPI	Ratio[c]	p-value[d]
Preferred weekly working hours of employed persons	34.5	33.2	-1.3	0.157	-1.0	0.261	12.8	13.0	1.02	0.424
% chance of leaving current job	22.5	25.5	3.0	0.265	3.7	0.165	32.4	35.7	1.10*	0.052
% chance of losing current job	9.0	10.4	1.4	0.360	1.5	0.345	17.7	20.7	1.17**	0.043
% chance of getting another job	68.1	63.8	-4.3*	0.090	-1.5	0.559	31.3	32.9	1.05	0.218
Satisfaction on a 0-10 scale with…										
…job overall	7.6	7.6	0.0	0.736	-0.1	0.645	1.8	1.7	0.94	0.667
…pay	6.7	6.7	0.0	0.772	0.0	0.865	2.1	2.2	1.05	0.607
…job security	7.8	7.8	0.0	0.910	0.0	0.913	2.1	2.2	1.05	0.335
…the work itself	7.5	7.4	-0.1	0.642	-0.1	0.404	2.0	2.0	1.00	0.676
…the hours of work	7.0	7.0	0.0	0.999	0.0	0.866	2.2	2.3	1.05	0.159
…work/non-work flexibility	7.5	7.5	0.0	0.729	-0.1	0.701	2.3	2.4	1.04	0.557

	Percentage choosing lower extreme				Percentage choosing upper extreme			
	PAPI	CAPI	Diff[a]	p-value[b]	PAPI	CAPI	Diff[a]	p-value[b]
% chance of leaving current job	53.2	50.4	-2.8	0.491	5.4	9.7	4.3**	0.038
% chance of losing current job	58.5	61.7	3.2	0.412	0.3	1.8	1.5*	0.081
% chance of getting another job	5.5	9.5	4.0*	0.057	24.6	20.2	-4.4	0.186
Satisfaction on a 0-10 scale with…								
…job overall	0.3	0.0	-0.3	0.282	13.4	12.8	-0.6	0.792
…pay	1.4	1.2	-0.2	0.810	7.9	9.2	1.3	0.517
…job security	0.6	1.0	0.4	0.523	22.8	24.9	2.1	0.479
…the work itself	0.8	0.2	-0.6	0.249	16.2	15.2	-1.0	0.696
…the hours of work	0.6	0.5	-0.1	0.882	11.8	12.6	0.8	0.737
…work/non-work flexibility	0.8	1.4	0.6	0.433	21.3	22.0	0.7	0.816

Notes: a. Difference between the means of the CAPI and PAPI samples (CAPI minus PAPI). *, **, *** indicated statistical significance of the difference from zero at the 10, 5 and 1 per cent levels, respectively.

b. p-value is the significance level of the difference from zero.

c. Ratio of the CAPI standard deviation to the PAPI standard deviation. *, **, *** indicate the ratio of the standard deviations is significantly different from one at the 10, 5 and 1 per cent levels, respectively, based on Levene's (1960) statistic.

d. p-value is the significance level of the difference of the ratio of the standard deviations from one.

Subjective wellbeing measures—overall life satisfaction and satisfaction with various aspects of life—and prevalence of self-reported long-term health conditions are compared in Table 15. As in Table 14, the upper panel compares means and standard deviations, while the lower panel compares the relative frequencies of extreme values. Means and standard deviations of most subjective wellbeing measures do not significantly differ between the CAPI and PAPI

samples. The notable exception is that mean satisfaction with employment opportunities is substantially lower in the CAPI sample, and the standard deviation for this variable is considerably higher in the CAPI sample. This may suggest less propensity to give a neutral response to this question, with this decrease in neutrality more often leading to a more negative assessment than a more positive assessment.

The results on percentages reporting extreme values show that no respondent in the CAPI sample selected the lowest value for satisfaction (complete dissatisfaction) with any aspect of life—including employment opportunities. Percentages choosing this option in the PAPI sample were also low, but in all cases exceeded zero and in fact were in all but two cases significantly different from the CAPI sample. There is thus some indication of lower propensity to report (low) extreme values under CAPI, although it is curious that this is not found in relation to job satisfaction of employees (Table 14).

Information on the presence of a long-term health condition is available for each respondent from both the HF and the PQ. PAPI-CAPI comparisons of the proportion of respondents with a long-term health condition are presented for the PQ variable. The proportion reporting a condition is 5.2 percentage points higher in the PAPI sample, a difference which is significant at the 5 per cent level. Controlling for differences in basic demographic characteristics, the difference increases to 6 percentage points, which is significant at the 1 per cent level. One interpretation of this CAPI-PAPI difference in PQ responses is that there is a slightly lower propensity to report long-term health conditions when the survey is CAPI administered. For example, it may be that the presence of a computer creates a greater sense of formality or that the survey is somehow more 'official', causing respondents to be less likely to report less-serious health conditions.

Another interpretation of the difference in the PQ measure of the presence of a long-term health condition is that the CAPI and PAPI samples genuinely have different proportions with long-term health conditions. We can investigate this interpretation by drawing on the HF measure of the presence of a long-term health condition in a similar manner as was done with smoking status using the SCQ. Specifically, using the fact that the HF was administered by PAPI methods in both the PAPI and CAPI samples, we can examine whether the difference between the HF and PQ measure is different for the PAPI and CAPI samples. Thus, Table 15 presents this 'difference-in-difference'. As might be expected, in both samples the proportion of respondents classified as having a long-term health condition is higher when the PQ is used, since the HF information is gathered for all household members from only one member of the household. However, the raw difference-in-difference estimate of 0.2 is not significantly different from zero, while the regression-adjusted difference-in-difference estimate is zero. That is, the difference between the HF and the PQ is essentially the same for the PAPI and CAPI samples.

The HF-PQ difference-in-difference finding supports the contention that the CAPI sample does genuinely have a lower incidence of long-term health conditions. However, a counter argument is that the use of CAPI for the PQ could still affect HF responses, because of the presence of the computer, or because the survey mode of the PQ affects how interviewers record HF information. We cannot determine which of the two hypotheses is correct – although, if the difference was a mode effect, one would expect it to be stronger for the PQ than the HF, which it is not.

Table 15: Distributions of subjective wellbeing and health variables

	Mean						Standard deviation			
	PAPI	CAPI	Diff[a]	p-value[b]	Adj diff[a]	p-value[b]	PAPI	CAPI	Ratio[c]	p-value[d]
Satisfaction on a 0-10 scale with…										
…life overall	7.9	7.9	0.0	0.848	0.0	0.811	1.6	1.5	0.94	0.770
…home	8.1	7.9	-0.2	0.133	-0.2*	0.099	1.8	2.0	1.11	0.115
…employment opportunities	7.0	6.6	-0.4***	0.008	-0.2	0.116	2.3	2.7	1.17***	0.000
…financial situation	6.3	6.3	0.0	0.858	0.0	0.781	2.2	2.2	1.00	0.812
…safety	8.1	8.1	0.0	0.892	0.0	0.842	1.7	1.7	1.00*	0.079
…local community belonging	6.6	6.5	-0.1	0.459	-0.1	0.583	2.2	2.3	1.05	0.116
…health	7.2	7.2	0.0	0.986	0.0	0.852	2.0	1.9	0.95	0.297
…neighbourhood	7.8	7.7	-0.1	0.796	-0.1	0.629	1.9	1.8	0.95	0.896
…amount of free time	6.3	6.4	0.1	0.447	0.1	0.554	2.7	2.6	0.96	0.967
Long-term health condition:										
PQ (%)	27.7	22.5	-5.2**	0.034	-6.0***	0.009				
PQ minus HF (%)	4.9	4.7	-0.2	0.931	0.0	0.977				

	Percentage choosing lower extreme				Percentage choosing upper extreme			
	PAPI	CAPI	Diff[a]	p-value[b]	PAPI	CAPI	Diff[a]	p-value[b]
Satisfaction on a 0-10 scale with…								
…life overall	0.5	0.0	-0.5*	0.064	13.2	15.7	2.5	0.213
…home	0.2	0.0	-0.2	0.286	27.6	26.2	-1.4	0.586
…employment opportunities	1.8	0.0	-1.8***	0.001	13.3	14.6	1.3	0.547
…financial situation	1.7	0.0	-1.7***	0.001	5.4	6.4	1.0	0.453
…safety	0.3	0.0	-0.3	0.131	21.0	22.2	1.2	0.604
…local community belonging	2.1	0.0	-2.1***	0.000	8.5	9.4	0.9	0.563
…health	1.0	0.0	-1.0***	0.009	9.5	9.1	-0.4	0.803
…neighbourhood	1.0	0.0	-1.0***	0.009	16.5	17.8	1.3	0.541
…amount of free time	2.1	0.0	-2.1***	0.000	15.1	14.7	-0.4	0.869

Notes: a. Difference between the means of the CAPI and PAPI samples (CAPI minus PAPI). *, **, *** indicated statistical significance of the difference from zero at the 10, 5 and 1 per cent levels, respectively.

b. p-value is the significance level of the difference from zero.

c. Ratio of the CAPI standard deviation to the PAPI standard deviation. *, **, *** indicate the ratio of the standard deviations is significantly different from one at the 10, 5 and 1 per cent levels, respectively, based on Levene's (1960) statistic.

d. p-value is the significance level of the difference of the ratio of the standard deviations from one.

Intentions, preferences and expectations in respect of marriage and children are examined in Table 16. As well as being attitudinal variables, these are potentially sensitive questions, especially in the context of the longitudinal nature of the survey. The first two items in Table 16 are respondent assessments of the likelihood of marrying (for those not currently married) and the likelihood of marrying their current partner for those not married and living with a partner. The second two items are respondent views on strength of preference for a child or an additional child for those with children already) and expectations on the likelihood of having a child (or another child). In general, responses appear to be similarly distributed in the PAPI and CAPI samples. There are indications of greater propensities under CAPI to report low extreme values for marriage intentions and fertility plans and expectations, but none of the differences is significant at the 10 per cent level.

Table 16: Distributions of family and children variables

	Mean						Standard deviation			
	PAPI	CAPI	Diff[a]	p-value[b]	Adj diff[a]	p-value[b]	PAPI	CAPI	Ratio[c]	p-value[d]
Likelihood on a 1-5 scale of…										
…marrying	3.4	3.3	-0.1	0.756	-0.1	0.470	1.5	1.6	1.07	0.130
…marrying current partner	2.6	2.3	-0.3	0.256	-0.1	0.795	1.4	1.4	1.00	0.768
Having (more) children:										
- preference (0-10 scale)	4.7	4.6	-0.1	0.848	0.1	0.846	2.9	2.8	0.97	0.306
- expectation (0-10 scale)	4.0	3.9	-0.1	0.805	0.1	0.747	3.2	3.0	0.94*	0.074

	Percentage choosing lower extreme				Percentage choosing upper extreme			
	PAPI	CAPI	Diff[a]	p-value[b]	PAPI	CAPI	Diff[a]	p-value[b]
Likelihood on a 1-5 scale of…								
…marrying	16.7	20.7	4.0	0.320	36.8	39.4	2.6	0.598
…marrying current partner	31.1	39.2	8.1	0.335	14.8	12.2	-2.6	0.662
Having (more) children:								
- preference (0-10 scale)	34.8	37.1	2.3	0.534	23.3	22.9	-0.4	0.904
- expectation (0-10 scale)	39.4	43.3	3.9	0.311	19.3	17.4	-1.9	0.546

Notes: a. Difference between the means of the CAPI and PAPI samples (CAPI minus PAPI). *, **, *** indicated statistical significance of the difference from zero at the 10, 5 and 1 per cent levels, respectively.

b. p-value is the significance level of the difference from zero.

c. Ratio of the CAPI standard deviation to the PAPI standard deviation. *, **, *** indicate the ratio of the standard deviations is significantly different from one at the 10, 5 and 1 per cent levels, respectively, based on Levene's (1960) statistic.

d. p-value is the significance level of the difference of the ratio of the standard deviations from one.

Responses to four questions in the PQ on reading and maths skills are compared in Table 17. Respondents were asked to assess skills relative to their daily needs at work and at home, and to assess their skills relative to the average Australian adult. The overall impression is that CAPI does not significantly affect reported self-assessments of reading and maths ability. All differences in means are not significant at the 10 per cent level and, while standard deviations of self-assessed reading and maths skills were all lower under the CAPI mode, only for reading skills relative to need was this significant at the 10 per cent level. Propensities to select extreme values were also not significantly different between the two survey modes, with the exception that the proportion selecting the maximum score of 10 for reading skills relative to others was 5.8 percentage lower under CAPI.

Table 17: Distributions of reading and maths skills variables

	Mean						Standard deviation			
	PAPI	CAPI	Diff[a]	p-value[b]	Adj diff[a]	p-value[b]	PAPI	CAPI	Ratio[c]	p-value[d]
Reading skills…										
…relative to need (1-4 scale)	1.6	1.6	0.0	0.583	0.0	0.774	0.8	0.8	0.94*	0.056
…relative to others (0-10 scale)	7.8	7.7	-0.1	0.436	-0.1	0.216	2.1	1.9	0.90	0.101
Maths skills…										
…relative to need (1-4 scale)	2.1	2.1	0.0	0.613	0.0	0.435	0.9	0.9	0.97	0.496
…relative to others (0-10 scale)	6.9	6.9	0.0	0.677	0.1	0.580	2.1	2.0	0.95	0.497

	Percentage choosing lower extreme				Percentage choosing upper extreme			
	PAPI	CAPI	Diff[a]	p-value[b]	PAPI	CAPI	Diff[a]	p-value[b]
Reading skills…								
…relative to need (1-4 scale)	56.8	55.4	-1.4	0.607	3.8	3.3	-0.5	0.654
…relative to others (0-10 scale)	0.9	0.3	-0.6	0.190	25.2	19.4	-5.8**	0.014
Maths skills…								
…relative to need (1-4 scale)	28.3	29.0	0.7	0.791	6.9	5.2	-1.7	0.188
…relative to others (0-10 scale)	8.5	8.2	-0.3	0.863	8.5	8.2	-0.3	0.863

Notes: a. Difference between the means of the CAPI and PAPI samples (CAPI minus PAPI). *, **, *** indicated statistical significance of the difference from zero at the 10, 5 and 1 per cent levels, respectively.

b. p-value is the significance level of the difference from zero.

c. Ratio of the CAPI standard deviation to the PAPI standard deviation. *, **, *** indicate the ratio of the standard deviations is significantly different from one at the 10, 5 and 1 per cent levels, respectively, based on Levene's (1960) statistic.

d. p-value is the significance level of the difference of the ratio of the standard deviations from one.

6. Conclusion

The findings from our Wave 7 CAPI test confirm many of those identified in earlier studies despite the changes in perceptions and use of computers and in attitudes to privacy that have taken place since the mid- to late-1990's. In the areas where the previous studies have offered a consensus view, our study largely confirms those results. That is, we find no effect of CAPI on response rates, most of the respondents were ambivalent about the change, interviewers readily adapted to the new technology and there was a lower rate of missingness due to interviewer error. We note, however, that nearly one-third of our respondents commented that the move the CAPI was an improvement, whereas in the earlier studies the vast majority of the respondents were ambivalent about the change. This perhaps reflects the growth in the use of computers in society, resulting in paper-based systems being increasingly viewed as antiquated.

In terms of aspects of data quality for which the findings of earlier studies are more mixed, if not conflicting, we contribute the following four findings. First, we identified a higher rate of 'don't know' responses in the CAPI data for some sections (health and tracking) and for certain items, such as benefit income. When we combine this with the reduction due to interviewer error, the overall rate of missingness is unchanged. Second, the number of responses reported at multi-response questions are generally similar between the two modes. Third, the length of open-ended text is longer for occupation and industry text in CAPI but not for 'other-specify' text, and this is most likely a result of the size of the boxes provided for the interviewers to write in.

Fourth, few significant effects on the distributions of key variables are evident as a consequence of the shift from the PAPI to CAPI mode. Effects were limited to relatively few

variables and were usually in the desirable direction—for example there were indications of less social desirability bias in reported vegetable consumption and smoking history under CAPI. This finding is broadly consistent with findings by Martin et al. (1993), Baker et al. (1995) of small but generally positive effects of CAPI on reliability of responses. One effect of CAPI that may not be regarded as desirable was a slightly lower tendency to choose the extreme lower value of 0 for reported satisfaction with various aspects of life. Interestingly, this is at odds with the finding by Lynn (1998) of an increased tendency to use the extremes of attitudinal scales under CAPI. A further potentially undesirable effect of CAPI found for the HILDA Survey trial was that mean annual government benefit income reported by recipients of government benefits (but *not* the percentage reporting receiving benefits) was significantly lower. However, this is likely to be due to the particular way in which the question on annual government benefit income was administered in the trial, rather than an effect of CAPI per se. Specifically, the apparent lack of an option to report income on a fortnightly basis under CAPI—with the option only made available when the respondent provided a 'don't know' to income over the year as a whole—is likely to be responsible for the lower mean value.

With the exception of the increased use of 'don't know' responses in some sections of the questionnaire and the reduced length of other specify text, and the possible exception of some of the differences found for distributions of variables, the differences identified in the CAPI data compared to the PAPI data indicate that CAPI offers improvements to the overall quality of the data collected. Changes to the size of the write-in boxes provided and discouraging use of 'don't know' or 'refused' options, for example by 'hiding' them on the console screen, may eliminate these differences.[13]

The key area of concern arising from this study is the impact that CAPI has on the overall interview length, with the interview duration for those individuals interviewed previously being 24 per cent longer with CAPI than via PAPI and the household component taking 35 per cent longer. This is a sizeable increase compared to other studies that found that CAPI interviews were longer – in the order of 12 to 17 per cent longer (Martin el al., 1993; Fuchs et al. 2000). We expect this increase is a result of the mouse-dependent nature of Confirmit in a laptop environment, as well as our use of experienced HILDA interviewers, who have become proficient in minimising the time taken to administer the PAPI instrument. One of the two previously mentioned studies that found a reduction in the interview length with CAPI (in the order of 16 to 20 per cent shorter), was in a longitudinal setting and made use of more than 60 data items from the previous interview that were incorporated into the CAPI script or provided on a factsheet for the PAPI interviewers (Baker et al., 1995). By comparison, we incorporated only five dependent data items. Reductions in the interview length could be obtained by making greater use of the dependent data.

Finally, we recognise that the results of our CAPI trial are somewhat sensitive to the particular way we implement both the CAPI system and the PAPI system. This extends to the choice of a laptop over a tablet, the amount of dependent data used, and the number of internal consistency checks incorporated. Our aim was to set up a system that would mimic as closely as possible the system we would have if we implemented it in the main study. However time constraints limited the scope of what we could do—for example, the Household Form was retained on paper, the amount of dependent data was limited, and the range of edits was less extensive than would have been the case in main study

[13] Unfortunately, we are not aware of a way to hide the 'don't' know' and 'refused' options in the Confirmit software, but we are aware that other CAPI software programs (such as Blaise) contain this functionality.

implementation. Apart from the interviewer learning effects that are evident in the interview lengths, there were also learning effects at the programming and management level which would lead to improvements in CAPI implementation and fieldwork monitoring. Nevertheless, the findings of this CAPI trial provides some solid contemporary information for implementation of a full-scale CAPI system—and indeed it did provide valuable guidance for the CAPI system implemented in Wave 9 of the HILDA Survey.

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