

AUDIO-VISUAL COMPUTER ASSISTED SELF INTERVIEWING (AV-CASI) A PROGRESS REPORT

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At the Berlin Symposium MRI reported preliminary test results for its AV-CASI development project. This testing was conducted at a central location (shopping mall) and utilized non-portable, touch-screen computers. These results were equivocal because overall readership levels were substantially higher than previously experienced under both test and control conditions. Over the past two years, MRI has developed a prototype portable computer which may be carried by door-to-door interviewers. This paper reports on the development of this prototype and the results of a first national, controlled (paired-cluster) comparison of AV-CASI versus the standard MRI paper and pencil interview (PAPI).

Introduction and Background

During the past decade survey research has witnessed a surge of development in the area of Computer-Assisted Interviewing (CAI). This increased development and usage of CAI techniques has affected all three basic sectors of survey research: academic, commercial, and government. The first large-scale development in CAI occurred in the area of telephone interviewing. Computer-Assisted Telephone Interviewing (CATI) programs and systems first appeared in the early 1980s. By the middle 1990s CATI had become the dominant US telephone interviewing technique.

While the proportion (if not necessarily the absolute amount) of data collection conducted in the US via in-person, door-to-door interviewing has continued to decline through the 1990s, interest in the development and usage of CAI methods has intensified. In the 1980s much of the development in the area of in-person CAI was restricted to Computer-Assisted Data Entry (CADE). These systems provided a mechanism for "smart" data entry from PAPI questionnaires. Inconsistencies and problems discovered at the time of data entry were resolved by re-contacting either the interviewer or the respondent.

By the late 1980s some attempts had been made to use laptop computers as a replacement for a printed questionnaire, a clipboard and a pencil in door-to-door, personal interviewing. These early Computer-Assisted Personal Interviewing (CAPI) systems were typically modified versions of existing CATI systems which would run in non-network mode on a PC. Much of the early motivation for the use of CAPI systems was related to the substantial error rates experienced when in-person interviewers tried to follow complex skip patterns required for obtaining information about work history, financial assets and income sources. In the US, much of the early development of CAPI systems was funded by US Government internal data collection projects (US Census) and data collection contracts (US Department of Labor and US Department of Justice).

In US commercial research, there was some early usage of CAPI systems in mall interviewing facilities because of the potential of quick data turn-around.

Much of the early US development of Computer-Assisted Self Interviewing (CASI) systems was motivated by an attempt to increase the respondent's perception of anonymity in responding to questions about certain, sensitive behaviors such as drug use, alcohol use, and sexual practices. The use of a computer which could be "turned over" to a respondent was seen as a great improvement over either direct questioning or the use of self-report questionnaire sections, secret ballots, or "randomized response" questions.

In early CASI systems, the respondent was required to read questions that appeared in "TEXT MODE" on a black computer screen (DOS) and either press number keys or enter verbal responses using letter keys. As a result, it was felt these systems were appropriate only for the portion of the population with some degree of both traditional and computer literacy.

By the early 1990s several national US surveys had been conducted using a system known as CASI with Audio or Audio-Computer-Assisted Self-Interviewing (A-CASI). The first A-CASI systems used a tape player with earphones to deliver a series of questions to respondents. As questions were asked, the respondent was to enter responses into a personal computer. The tape cassette systems proved somewhat problematic and were replaced with systems using digital playback delivered via "sound cards" that were beginning to appear on laptop computers.

As with CASI, the development of early A-CASI systems was motivated by the need to collect potentially sensitive information during the course of a personal, face-to-face interview.

Early development of the MRI AV-CASI system

During the early 1990s there was increased recognition that interviewer-to-interviewer variation represents a substantial portion of the overall variation in "recent-reading" and "through-the book" print audience measurement surveys.

By 1993, the promise of near-term availability of high-speed laptop computers with extensive multimedia (video and sound) and storage capacity motivated the development, by MRI, of a fully-interactive, Audio-Visual Computer-Assisted-Self Interviewing (AV-CASI) system. The first prototype of this system made use of a full-sized desktop system and a non-portable, touch screen video monitor.

This system was tested on respondents in a shopping mall environment. The results of this test, presented at the 1995 Worldwide Readership Research Symposium in Berlin, were equivocal. Magazine readership levels in both the test group (AV-CASI) and the control group (standard MRI PAPI questionnaire) were substantially higher than previously experienced. It was speculated that the respondent recruitment process (similar to focus group recruitment) may have resulted in sample selection bias.

Second generation development of the MRI AV-CASI system

By the end of 1995 the availability of Intel Pentium-Windows, multimedia laptops had reached the stage at which the development of a prototype system capable of door-to-door field testing was feasible. An extensive (and expensive) effort was undertaken to develop a system that could be used in door-to-door, general population interviews conducted (or, more properly, facilitated) by extant MRI interviewing personnel.

This paper does not fully describe all the steps in the development of this system, but several important decisions should be mentioned:

First, the lack of laptop, Pentium, touch-screen (finger or pen), audio-visual-capable systems, necessitated the design and manufacture of a system suitable for door-to-door interviewing. Fifteen (15) systems were produced¹.

Second, to assure respondents would be maximally-exposed to magazine title logos in the critical screening phase of the interview, it was decided that, in addition, the name of the magazine would be spoken by the computer (audio WAV file) as the magazine logo appeared on the screen (GIF file). Further, the AV-CASI system was programmed so a minimum of 2 seconds would elapse between the time the logo appeared and the time the computer accepted the screen touch of one of the three responses.

Finally, in order to obtain a non-confounded measure of readership level differences between the standard MRI "recent-reading" interview and the AV-CASI implementation of the interview, AV-CASI administration was restricted to the magazine readership portion of the interview. Specifically, the other portions of the interview were conducted using the standard MRI questionnaire with questions asked and answers recorded by the interviewer.

Test implementation

The test of AV-CASI under door-to-door, in-person interview conditions was conducted during February and August of 1997. The test was designed to compare interviews making use of AV-CASI for the magazine portion of the interview (**AV-CASI GROUP**) with current MRI interview (**CONTROL GROUP**)

The goal in implementing this test was to obtain matched samples of **CONTROL** and **AV-CASI** interviews conducted by the same interviewers in geographically-matched clusters. Matching on the bases of interviewer and sample cluster minimized the variation attributable to these potential sources of either main effects or interaction effects.

AV-CASI test interviews were conducted during the four-week period between waves of live MRI data collection. For each of the two waves of test interviewing a representative sample of interviewers was selected based on the geography of their interviewing areas and on their availability during the **AV-CASI** test months. Eighteen interviewers received 2-4 days of personal training by both MRI and LHK Partners staff. A nationally-representative sample comprising 36 clusters used in the course of standard MRI data collection (by the selected interviewers) in the immediately-preceding field period was selected to serve as the **CONTROL GROUP**. Geographically matched clusters were appended for these production clusters on the basis of geographic propinquity. Each interviewer was assigned matched clusters corresponding to the production clusters in which he or she had conducted the standard MRI interview in the immediately-preceding wave of interviewing.

The interviewers carried out the **AV-CASI** interviews using the same within-cluster and within-household sampling procedures that had been used in their paired production clusters.

In total, 251 **AV-CASI** interviews were collected by 14 interviewers. A total of 315 traditional interviews were available as the **CONTROL GROUP** in the corresponding matched clusters. The somewhat-lower number of **AV-CASI** interviews, relative to **CONTROL** interviews, was the result of a shorter field period for the **AV-CASI** data collection and of a slightly higher non-cooperation rate associated with the use of the **AV-CASI** system.

¹ The system entailed construction and assembly of an external touch-screen that was attached to the computer by a custom-designed, add-on circuit card. In addition, a housing was designed and produced which allowed the computer and the attached touch-screen system to be encased so the respondent saw only a touch-screen system without a keyboard.

Test results

The **AV-CASI** test system produced magazine readership levels 53% higher than standard MRI recent reading question. Screen-in rates were 73% higher than those observed using the standard MRI logo deck and sort board.

Table 1 shows the mean number of reads and screens for the **AV-CASI** group and the **CONTROL** group, as well as the ratios (INDICES) of these averages (**AV-CASI** divided by **CONTROL GROUP**) for the total sample and by gender.

The **AV-CASI** versus **CONTROL** group differences are somewhat greater for males than for females.

		INDEX		INDEX	
		AVERAGE	CASI TO	AVERAGE	CASI TO
		SCREENS	CONTROL	READS	CONTROL
AV-CASI	TOTAL	25.86	172.6%	9.86	152.8%
	MALE	27.60	177.0%	10.60	169.4%
	FEMALE	23.58	165.3%	8.87	132.8%
CONTROL	TOTAL	14.98		6.45	
	MALE	15.60		6.26	
	FEMALE	14.26		6.68	

Tables 2 through 4 show the mean number of reads and screens for the **AV-CASI GROUP** and the **CONTROL GROUP**, as well as the ratios (INDICES) of these averages by education, age group, and household income.

TABLE 2 - INDEX OF AV-CASITO CONTROL SCREENS AND READS BY EDUCATION

		INDEX		INDEX
	AVERAGE	CASITO	AVERAGE	CASITO
	SCREENS	CONTROL	READS	CONTROL
AV-CASI				
TOTAL	25.86	172.57%	9.86	152.74%
COLL+	27.30	147.46%	8.60	114.87%
ATT COL	28.83	201.12%	12.14	203.24%
NO COL	21.59	173.73%	8.33	140.00%
CONTROL				
TOTAL	14.98		6.45	
COLL+	18.51		7.49	
ATT COL	14.33		5.97	
NO COL	12.43		5.95	

AV-CASI produces higher screens and reads for all of these demographic categorizations than does the current MRI methodology (CONTROL GROUP). Tables 2-4 generally show AV-CASI vs. CONTROL differentials that are larger for respondents with lower household income and less education. A notable exception to this generalization is shown for respondents who began college but did not obtain a 4-year degree. This non-4 year degree group shows higher differentials than do persons with no college. Older respondents (over 45) also tend to show slightly higher ratios.

TABLE 3 - INDEX OF AV-CASITO CONTROL SCREENS AND READS BY AGE

		INDEX		INDEX
	AVERAGE	CASITO	AVERAGE	CASITO
	SCREENS	CONTROL	READS	CONTROL
AV-CASI				
TOTAL	25.86	172.57%	9.86	152.74%
< 45	31.83	194.52%	11.83	157.28%
>= 45	18.47	138.80%	7.41	143.81%
CONTROL				
TOTAL	14.98		6.45	
< 45	16.37		7.52	
>= 45	13.31		5.15	

TABLE 4 - INDEX OF AV-CASI TO CONTROL SCREENS AND READS BY INCOME (HH)

	INDEX		INDEX	
	AVERAGE SCREENS	CASI TO CONTROL	AVERAGE READS	CASI TO CONTROL
AV-CASI				
TOTAL	25.86	172.57%	9.86	152.74%
\$60+	30.28	161.21%	11.84	141.46%
<\$60	22.64	189.38%	8.41	170.85%
CONTROL				
TOTAL	14.98		6.45	
\$60+	18.78		8.37	
<\$60	11.95		4.92	

In addition to the within-demographic-group differentials shown in Tables 1-4 there is some evidence that a differential cooperation rate may be associated with computer familiarity. Sixty-seven (67) percent of **AV-CASI** respondents reported using a personal computer while 53 percent of the **CONTROL GROUP** respondents reported personal computer usage.²

Overall, the cooperation rate was approximately 10% lower for the **AV-CASI** test group. This may be a function of either differential cooperation associated with computer literacy or of the truncated field period, which obviated through callback attempts. This potential decline in response rate might prove an imposing obstacle for implementing **AV-CASI**. At the very least, it suggests the need for alternative implementation procedures when respondents are unwilling to use the computer.

Conclusions and next steps

The magnitude of the **AV-CASI** versus **CONTROL** group differentials are higher than anticipated. Possible explanations for the differentials observed in this experiment range from the well-documented "Hawthorne Effect" on the part of interviewers or respondents to lack of familiarity with computer-based systems to real differences in measurement.

The addition of the audio prompts and timing delays in the presentation of magazine logos may have contributed to the higher screen-in rates and higher readership levels. The computer enclosure manufactured for the test may have proved too imposing to respondents. Lack of interviewer experience with the **AV-CASI** system may have resulted in a differential in the respondent-interviewer interaction and expectation context set.

Further experimentation will address these issues as well as others.

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² In the most recent MRI study, the average number of magazines read by persons who use a computer (at home or work) was 8.0. This average was 5.6 for those who do not use a computer at home or work.

