Computer Audio Recorded Interviewing (CARI): Additional Feasibility Efforts of Monitoring Field Interview Performance

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1. Introduction

Computer Audio Recorded Interviewing (CARI) is a laptop computer software application, developed by RTI computer scientists, that allows the computer to act as a sophisticated tape recorder as the interviewer administers a CAPI (Computer Assisted Personal Interview) questionnaire. CARI unobtrusively digitally records the audio verbal exchange between the interviewer and respondent during production interviews. The system is completely under software control such that at any predetermined section in the instrument, the recording can be switched on or off, for all interviews or for randomly selected interviews. This function provides a capability which has previously been unavailable in a field environment; viz., the capacity to provide an audio record of the interviewer-respondent verbal interaction without disrupting the normal interview process. This capability is similar to that routinely used in centralized Computer Assisted Telephone Interviewing (CATI) telephone facilities for purposes of telephone interview call monitoring.

CARI potentially meets several critical needs specific to field interviewing and can potentially be used for a range of applications, including:

- detecting interview fabrication and interview errors,
- evaluating interviewer performance and providing feedback to interviewers,
- as a means for collecting audio-based information for use in identifying questionnaire problems and for coding the interviewer-respondent interaction, and
- for recording information in response to open-ended questions.

1.2 Purpose

RTI and the Census Bureau are collaborating on a study to determine the basic feasibility of CARI for production CAPI surveys. The purpose of this paper is to summarize previously reported aspects of CARI feasibility including:

- audio quality for the various CARI applications,
- reactions to CARI by field interviewers,
- CAPI system performance when running CARI, and general operational feasibility for production surveys, and
- costs in a production environment.

This paper also serves to document subsequent feasibility efforts including:

- reactions to CARI by survey respondents,
- performance monitoring procedures developed by RTI to evaluate field performance and provide feedback to field interviewers,
- potential for using CARI for monitoring decentralized telephone interviewing, and
- issues surrounding data security and encryption.

RTI implemented a CARI-based interviewer verification system in the National Survey of Child and Adolescent Well-being (NSCAW) and conducted a series of evaluations to assess system performance. The NSCAW is a panel survey conducted by RTI of 6,100 children who are subjects of abuse and neglect reports. The survey was fielded in September 1999 and will continue until March 2003. An overview of the CARI-based procedures that have been implemented in the NSCAW is provided in the next section.

2. Implementation of CARI for the National Survey of Child and Adolescent Well-being

2.1 Description of the NSCAW

The NSCAW is a national panel survey of children who have been investigated for allegations of child abuse and neglect during the sample recruitment period (October 1999 through December 2001). The sample design is a two-stage stratified sample where the primary sampling units (PSU's) are counties or groups of counties and where children are selected randomly within each PSU. A total of 6,100 children, who range in age from several months old to 14 years of age, were selected within the 94 PSUs in the study. To reduce the respondent burden, sampling was restricted to only one child per family.

Each family will be interviewed on three occasions: a baseline interview conducted face to face using CAPI, an interim followup interview conducted by Computer Assisted Telephone Interviewing (CATI), and a final followup interview conducted face to face using CAPI. Interviews are conducted with the child's current caregiver, the child (if 7 years of age or older), the caseworker for the child, and the child's teacher if the child is of school age. The teacher survey is conducted by mail. Interviews of caregivers and children are conducted in the children's homes while interviews of caseworkers are conducted in the Child Protective Services (CPS) offices located in the sample counties. The CARI system was implemented in the child, caregiver, and caseworker interviewers only.

2.2 Implementing CARI for the NSCAW

The primary purpose of implementing CARI for the NSCAW is for interview verification and to deter interviewer fabrication of interviews. However, CARI technology also provides a novel method for monitoring interview quality, interviewer performance, questionnaire performance, and the reactions of the respondent to survey questions. Although the initial implementation of CARI in the NSCAW is confined to the detection of falsified interviews, our plans are to extend the use of CARI to address other interview quality improvement objectives.

During NSCAW project training, the field interviewers were briefed on the purposes and uses of CARI and trained in CARI system procedures. The training includes informed consent procedures, description of how CARI works, and procedures for downloading CARI audio (or ".wav") files via Zip disks including connecting the Zip drive to the laptop computer, copying the CARI files to a Zip disk, and transmitting the CARI audio files to RTI by regular mail.

The NSCAW CARI procedures may be described as follows. Before starting the CAPI interview, the interviewer reads a short informed consent statement to the respondent to obtain consent for the recording of the interview. The interviewers are instructed to emphasize that these recordings are used strictly for quality control purposes. The respondent is asked to sign the consent form as evidence that consent was either granted or denied. Oral affirmation of the respondent's decision regarding CARI consent is also obtained at the start of the CAPI interview where the respondent's verbal response is keyed as a "yes" or "no" in the computer as well as audio recorded. When the interviewer records a "yes" response, CARI begins to record the interview at predetermined points. The system parameters may be set to record some sections of the interview for all interviews and other sections for randomly selected interviews only. Otherwise, the CARI function is disconnected and the interviewer informs the respondent that CARI has been turned off for the duration of the interview. Thus, written and oral consent of the respondent is required for the use of CARI during the interview. Only non-sensitive sections of the interview are candidates to be recorded.

Following the interview, the interviewers transfer the CARI audio files onto Zip disks and mail them to the RTI data quality monitors in Research Triangle Park, NC. Each disk can hold approximately 100 minutes of interviewing or all the audio files from about four NSCAW interviews. Thus, interviewers are instructed to copy their CARI files onto Zip disks once per week or after four interviews had been completed, whichever comes first. A custom-designed application in the case management system is used for copying the audio files to the Zip disks and archiving the files until they are no longer needed.

When the CARI audio files are received in RTI, they are transferred to the CARI server through a client-server system. This system records the receipt of the files, prepares deletion orders for the laptop copies, and loads the new data into the online CARI review system. Audio files are retained on the laptops until confirmation is received of successful file transfer, at which time the files are deleted from the laptops through the CARI application. The server copies of the files are then available to the quality control monitors. For the NSCAW, CARI monitors listen to 10% of each interviewer's recordings to verify that each interview is authentic. Suspicious interviews are transferred to the telephone center for follow-up by telephone using traditional respondent re-contact verification procedures. In addition, approximately 10% of the respondents who refuse to allow CARI to record their interviews are also followed up in the telephone center.

The NSCAW CARI system includes several hardware components. For field use, standard laptops with adequate disk space (i.e., at least 1 gigabyte) and built-in microphones are appropriate for CARI processes. If file transfer is by removable media, as on the NSCAW project, an external high-capacity drive is required; this project used 100 megabyte Iomega Zip drives. In addition, a 100-gigabyte file server at RTI is dedicated to CARI file management for the project. Processing of receipt information, transmission of deletion orders for laptop files and other CARI-related operations are executed on the Institute's distributed Windows NT network. These items comprise the CARI hardware system.

The CARI operation relies on several custom software applications, spanning laptops and the internal RTI network:

- Interviewing module for recording sound unobtrusively on the laptop,
- Interviewer-accessible laptop module for transferring audio files and processing deletion orders,
- Networked application for loading files onto RTI's CARI server, recording file receipt and issuing deletion orders,
- Networked application for reviewing, editing and deleting audio files,
- Networked database for recording file receipt and review events, quality comments and problem codes,
- Networked process for server space management, and
- Networked reporting processes.

Each of these components is essential for proper functioning of the whole system.

3. Summary Results from the Initial Feasibility Evaluations

3.1 CARI Audio Quality

The first step in evaluating the usefulness of CARI was to assess the sound quality of a sample of digital audio files from NSCAW interviews. In particular, any envisioned use of CARI technology is feasible only to the extent to which one can hear the vocal interchange occurring during the interview. To objectively rate the audio files, we developed a plan that included the development of a four scale point rating system, the random selection of audio files from the NSCAW study, and a rater reliability training to ensure high inter-rater reliability.

Between 92% and 94% of the files that were coded were of the highest quality ("Excellent") and more than 95% are at least "Good." Monitors cited technical glitches, background noise, and voice quality as common reason for the few files with quality ratings other than "Excellent". The very high rate of audibility for CARI demonstrates that CARI is at least technologically feasible for all of the uses we envisioned for it.

3.2 Interviewer Reactions to CARI

In order to further assess the use of CARI in a production survey interviewing environment, it is also important to assess how project staff, and particularly interviewers, react to the use of this technological innovation. We asked the CARI monitors who listen to the CARI recordings for their reactions to the use of CARI and the CARI system for retrieving and playing the .wav files. All monitors were unanimous in their assessment that the information content obtained through CARI recording was excellent. They said that information regarding the quality of the interviews, problems with questions and survey procedures, and just the difficulty of completing the interview were quite apparent through listening to the CARI recordings. They also said they had not encountered any problems in determining whether an interview that was CARI recorded was conducted with a real respondent.

To obtain the reactions of the interviewers toward CARI, we developed an interviewer debriefing questionnaire which consisted of items about how respondents (caseworkers and caregivers) reacted to CARI. It also requested that the interviewers to provide information about their perceptions of CARI from a number of different perspectives. The interviewer debriefing questionnaire was sent to 65 current NSCAW interviewers who had significant experience in conducting NSCAW interviews and using CARI (i.e., who had conducted at least 10 NSCAW interviews). A total of 62 questionnaires were returned for a 95.4% response rate.

The responses from the interviewers were quite positive, in our opinion. Most interviewers (82.2%) felt positive or neutral about the overall use of CARI, while only 18% felt negative toward it. Approximately 89% felt positive or neutral toward the idea of using CARI as a way to evaluate and provide feedback to interviewers and 87.1% felt positive or neutral about using CARI as a falsification detection method. In addition, approximately 70% of the interviewers reported that respondents (caseworkers and caregivers) "never" or only "a few times" reacted negatively to the use of CARI.

Additional data analysis suggested an inverse relationship between interviewing experience and acceptance of CARI. The more experienced interviewers were more likely to be negative toward the use of CARI. In addition, a few interviewers commented on the questionnaire that the use of CARI demonstrates management's distrust of the interviewers. However, it also possible that with the continued use of CARI, all interviewers will become accustomed to being audio recorded unobtrusively in their interviews and will begin to perceive CARI as the standard use for the project. In addition, initial uses of CARI as an interviewer performance monitoring tool with frequent helpful feedback to the interviewers to help them improved their performances could also foster greater acceptance of the new technology.

3.3 General Operational Feasibility of CARI

Technically, the NSCAW CARI operations have been highly successful. No major difficulties have been encountered in obtaining, transferring or monitoring audio data. Our testing and field experience has found no evidence of CARI adversely affecting system performance or degradation of CAPI response times of any kind under normal operating conditions. However, several technical issues have arisen and have been resolved, as described below.

Depletion of Laptop Hard Drive Space. The laptop hard drive could become full if the interviewers neglect to download their audio files to the Zip disks for transmittal to RTI or if problems occur with transmission of

the deletion orders. This is because the audio files are retained on the laptop until RTI confirms their receipt and sends orders to the laptop for automatic file deletion. Of course, the simplest solution is to run the CARI copying utility, send the disks to RTI and receive the deletion orders in return. In a few situations, technical support staff at RTI headquarters intervened to relieve an immediate crisis via transmissions.

Depletion of Server Storage Space. Audio files tend to be large and may consume anywhere from a few kilobytes to 25 megabytes per file. With a large, active field staff, a large amount of disk space is required to store the CARI recordings. With 100 gigobytes reserved for NSCAW audio files, it was found that over time, the CARI audio file data completely consumed the 100 gigobytes of storage. We resolved this problem by deleting all audio files that were more than 12 weeks old. Alternatively, we could have chosen to keep some fraction of the files from every month of the survey - say, one out of every five audio files. This would provide a historical record and audio file archive for the study as well as conserve disk space.

Occasional File Corruption. All storage media suffer some rate of failure, and Zip disks are no exception. An extremely low incidence of unusable files was encountered during the study time period. Zip failures could be categorized as physical (jammed or damaged), file structure (damaged file directories or disk identification table) or data storage (unreadable files). Of these, only file structure problems could be repaired. The combined rate of these types of failures amounted to less than a few per thousand disk usage cycles.

Maintenance of External Drive Hardware and Removable Disks. Many interviewers are not accustomed to working with computer equipment. Zip drives, like other devices, must be treated appropriately or they may suffer damage. Normal wear-and-tear is to be expected.

3.4 Costs of Implementing CARI in a Production Survey

We examined the costs of using CARI within a production survey environment for the limited purpose of interview falsification detection, and compared these costs to that of two traditional methods of verification. For the traditional approaches, we assumed that the basic mode of recontact to verify that the interview was conducted is the telephone. For households in the verification sample that are telephone nonrespondents or that cannot be reached by phone (non-telephone households), two alternative contact modes were considered: one using a mail post-card verification approach and another using a face to face contact verification approach. The former method is cost effective but will usually result in a very low rate of return (20 percent or less). The latter has a higher contact rate but is much more expensive.

Comparison costs were based upon RTI's actual experience from the NSCAW as well as several other recent CAPI studies that have implemented the telephone-based verification schemes. In each case, we ignored system development costs; i.e., we assumed that a fully functional CARI-based or telephone-based verification scheme exists in the organization which requires little or no modification to accommodate our hypothetical survey.

Our analysis showed that the CARI-based verification approach was less expensive than either of the traditional approaches. Compared with a telephone/postcard scheme, the ratio of CARI costs per sample case to telephone costs was 0.68. That is, the cost of the CARI-based system was 32 percent less than the telephone-based approach with postcard follow-up. Compared with the telephone/face to face approach, this ratio was 0.77; i.e., CARI cost 23 percent less than the telephone with a face-to-face follow-up approach. The finding that CARI saves money in survey project work suggests a further advantage of this system as currently configured.

It should be noted that none of the start-up costs either for CARI or for telephone verification were included in the cost comparisons. Implementing CARI in a CAPI study requires a higher-priced laptop due to the need for a laptop microphone, and file transfer through removable media adds additional cost for the storage device

and disks. Each interviewer requires 6-10 Zip disks on hand at any time, and some will be in transit or awaiting processing at any given time. The disks are highly reusable, being returned to the field with regularity on the NSCAW project. Central data storage requirements add to the cost but depend on the disk space allocation and charging policies of the institution. At RTI, a file server has been dedicated to CARI audio file storage, and so a one-time cost was incurred in purchasing the computer.

4. Results from Subsequent Feasibility Evaluations

4.1 Respondent Reactions to CARI

The next step in determining the feasibility of CARI was to assess respondent reactions to it. In particular, we want to determine the extent to which respondents comply with the request to audio record their interviews using CARI as well as their feelings toward the use of this technology during the CAPI interview.

Based on an analysis of completed NSCAW interviews, it was found that 80% of caseworkers that completed an interview agreed to the use of CARI, 80% of the caregivers agreed, and 74% of the child interviews were recorded using CARI. These cooperation rates are comparable to the cooperation rates for the use of tape recorded field interviews reported in other studies. In addition, as mentioned previously, the NSCAW collects extremely sensitive information on child abuse and neglect and, therefore, represents somewhat of a worst case scenario for assessing respondent compliance with CARI. For surveys of highly sensitive topics, CARI can be viewed by a few respondents as a risk to disclosure of potentially harmful information. Therefore, we believe that cooperation rates around 80%, while quite acceptable for the envisioned purposes of CARI, are likely to be lower than what one would observe for a survey involving less threatening subject matter.

In addition to computing cooperation rates for CARI, other more direct measures of respondent reactions to CARI were measured. Three key research questions were explored:

1. How do respondents feel about being audio recorded?
2. Do respondents think about the audio recording during the interview?
3. Does the audio recording of the interviews have any influence on the respondents' answers?

To obtain answers to these issues, we developed a respondent debriefing questionnaire that was administered to NSCAW respondents. This seven item questionnaire asked how the respondents felt about audio recording their interview. Every NSCAW interviewer (approximately 130 at the time of data collection) was instructed to administer the debriefing questionnaire to one or two caseworker respondents and one or two current caregiver respondents who agreed to the use of CARI. This brief paper and pencil questionnaire was completed by the respondent after the NSCAW interview was completed. The interviewers were successful in completing a total of 283 respondent debriefing questionnaires: 130 from caseworker respondents and 149 current caregiver respondents.

The first question asked the respondent their feelings about the initial request to audio record the interview. Overall, more than 70% of the respondents reported they had no reaction one way or the other, 15% reported liking the idea, while 13% disliked the idea. The percentages are similar for both caseworker and caregiver respondents.

Respondents were then asked how much they thought about the fact that the interview was being audio recorded during the interview. More than 77% of the respondents reported that they did not think about the recording at all, nearly 11% reported "A little," and 12% reported thinking about the recording "Somewhat" or "A lot." Again, these results were similar when looking separately at the caseworker and caregiver respondents. The respondents who answered "A lot," "Somewhat," or "A little" continued to our next

research questions while the interview was terminated for those respondents who answered "Not at all" (which was the majority).

Question 3 consisted of two parts. The first part asked how the fact that the interview was being recorded influenced the respondent's answers. Nearly 69% of the overall respondents reported not being influenced at all by the audio recording, 16.4% reported that their answers were influenced "A little," and nearly 15% reported that their answers were influence "Somewhat" or "A lot." These data did differ by type of respondent as more caregivers reported that their answers were influenced by the audio recording than caseworkers.

The respondents who answered "A lot," "Somewhat," or "A little" received the follow-up item while the interview was terminated for those respondents who answered "Not at all" (which was the majority). The follow-up item asked how they thought their answers were influenced. Over 47% of the respondents reported that their awareness of the recording probably influenced them to provide more accurate responses, 36.8% reported that the recording had no effect, while only 15.8% reported that it influenced them to provide less accurate responses.

We regard the results of our respondent debriefing study as quite positive. Our results suggest that CARI has little influence on respondent answers. To the extent it does, it is more likely to improve data accuracy, from the perspective of the respondent, than to lessen data accuracy.

4.2 Providing Feedback on Interviewer Performance from CARI Monitoring

Design Objectives. Another objective of this research was to explore the issue of whether the information contained in the CARI audio files could be used to monitor and assess interviewer performance. If CARI could be used to provide performance level data; problems with question administration, general interviewing techniques, payment of incentives, and adherence to study protocols could be identified and corrected which could ultimately result in better quality data. Positive as well as critical feedback could also be provided to field representative which could also result in a higher morale as result of supervisors giving more attention to their interviewers and giving them instructions on how to become better at what they do. This might also have a positive effect on interviewer retention rates, although the effect would be difficult to measure.

Our investigation into these issues was necessarily preliminary due to the original scope of the research. The objectives of our investigation are threefold:

- to design a system for CARI interviewer performance monitoring with feedback, subject to the constraints imposed by the NSCAW resources for this activity,
- to assess the feasibility of CARI interviewer performance monitoring, and
- to evaluate the effect on interviewer performance through supervisor debriefings.

The CARI team developed forms and a protocol for the monitoring of the NSCAW study interviews, which were then discussed with both the NSCAW field supervisors and the NSCAW project staff. The NSCAW staff and supervisors were very excited about this unique opportunity to receive more frequent feedback on the performance of their representatives than they had been receiving through the CARI falsification monitoring system.

The Design of the CARI Performance Monitoring and Feedback System. Design parameters were discussed to ensure that the system was designed to meet the needs for information on interviewer performance and was well-integrated into the CARI falsification monitoring system currently being used for the study. The following design parameters were agreed upon.

- Due to the budget constraints, only new interviewers would be eligible for CARI performance monitoring. These are defined as interviewers who have just completed training.

- All interviewers would be monitored at least once sometime during each two-week period.
- Monitors were allowed to spend up to 75 minutes listening to the CARI files for each interviewer. The files monitored should be a random sample from all the interviews conducted by the interviewer; however, certain "difficult" sections of the NSCAW interview should be monitored for all interviewers in the study.
- Finally, the monitoring should focus on question delivery, probing technique, interviewer's courtesy, knowledge of the NSCAW, and ability to handle difficult respondents. A special *Interview Performance Coding Form* was developed for this purpose.

System Performance. The CARI performance monitoring procedures took about 1.5 hours per interviewer on average, including the time organizing and opening the CARI files, listening to the interviews, completing the *Interview Performance Coding Form*, and sending the results to the Field Supervisor using a special form developed for that purpose referred to as the *Interview Feedback Form*. However, the actual amount of time depended on the number of interviews completed by the interviewer and the number of CARI files that were available to be monitored.

The *Interview Performance Coding Form* was designed in Microsoft Excel to record whether each question monitored is read as worded, the appropriateness of the feedback given to the respondent, the thoroughness and appropriateness of interviewer probing for clarification, and the interviewers ability to respond to questions from the respondent. Further, when any undesirable behaviors were observed, the monitor noted this along with the question for which it occurred and a detailed explanation of the behavior.

The *Interviewer Feedback Form* was created in an email friendly format and consists of a summary section followed by a comment section. The summary section was used to record the percentage of appropriate behaviors observed on the *Interview Performance Coding Form*. For example, if an interviewer always probed appropriately and when needed, he or she would receive a 100% for "probing". The bottom section contained a list of interviewing style qualities to rate. Aspects of professionalism, voice quality and question asking were assigned an E(xcellent), S(atisfactory), or N(eeds Improvement) by the monitor. The *Interviewer Feedback Form* also contained a comment section where the positive and negative comments were recorded.

Results of the Supervisor Debriefings. Following this one month test, a debriefing questionnaire was distributed to the 10 field supervisors who had some of their field interviewers monitored. The main purpose of the questionnaire was to judge the effectiveness of the interviewer feedback process. The debriefing questionnaires revealed that the field supervisors all felt positive toward the CARI interviewer feedback process and thought it was helpful in evaluating their interviewers' performance. All the supervisors said that the feedback forms were helpful in evaluating their interviewers' performance.

4.3 Telephone Uses of CARI

A few of RTI's field studies (including the NSCAW) include a telephone survey component where the field interview conducts a survey over the telephone from his/her own home. Unlike telephone surveys that are conducted at a centralized facility, these phone surveys are similar to face-to-face field studies where observation and monitoring are difficult and expensive. Therefore, we wanted to determine the technological feasibility of using CARI to monitor telephone interviews in the field.

In conducting this assessment, two telephone adapter devices were purchased and tested. Although no formal testing was done with these devices, we did test them with mock NSCAW interviews conducted over the telephone.

The first device is a telephone recording suction cup device. This device is a simple small suction cup that attaches to any telephone hand receiver including cordless phones. It picks up the conversation from the

phone handset and plugs directly into any recording device - in this case the CARI laptop microphone input jack. The device was inexpensive ($8.00) but worked fairly well. The audio quality of the files was excellent as both the interviewer (caller) and respondent (receiver) were intelligible.

The second device is a bit more advanced. This device serves as an intermediary between the phone base and the handset. The handset plugs into the device, the device plugs into the phone base, and another cord connects the device into a recording device - again in this case the CARI laptop microphone input jack. This device does not work with cordless phones and it was more expensive than the suction cup device, priced around $25. The audio quality of the files was excellent and both the interviewer (caller) and respondent (receiver) were intelligible.

We also assessed the feasibility of using the suction cup recording device with a telephone headset. Field interviewers who conduct telephone surveys from their homes may especially use these headsets as it allows them to talk on the phone while using their hands to enter the data into the laptop. The telephone headset that we tested plugs directly into the handset of a cordless phone. Since the second device described above does not work with cordless phones, we were only able to test the suction cup device with the telephone headset. Unfortunately, the suction cup device was not able to record the conversations using this particular telephone headset. The CARI files that were produced consisted of blank static noise. We feel that further investigations with other types of headsets need to be conducted to properly assess the feasibility of using this technology.

We have determined that it is feasible to use CARI to record telephone surveys conducted by field interviewers with their laptops. In a direct comparison of audio quality, we found that the audio quality was slightly better with the second device than with the suction cup. However, the difference was minor and the second device was more expensive and did not work with cordless phones. Both devices did not work with a telephone headset and we recommend further investigations with other devices.

4. Summary of CARI Feasibility

The objective of this research was to determine the feasibility of CARI for a wide range of survey quality improvement purposes, including the detection/deterrence of interview fabrication, interviewer performance monitoring, and collection of verbatim survey responses. Our results indicate that CARI is feasible for all of the above uses. It provides an unobtrusive means of recording the interactions between the respondent and the interviewer. CARI audio quality is comparable to analog recordings using tape recorders, but without the logistical problems that accompany the use of external audio recording devices in large-scale field operations.

CARI audio quality is on par with that of tape recorders or better. However, we experienced very few lost files with CARI which can be a problem using tape recorders as a result of malfunctioning equipment, battery failures, microphone too far from respondent or not plugged in, out of tape, lost tapes, etc.

Interviewers seem generally favorable or neutral toward the use of CARI to monitor their work. However, 10-15% of interviewers was mildly negative to very negative toward the use of CARI and viewed it as an intrusion on their privacy or a sign that management "doesn't trust us." More experience interviewers seem more resistant to CARI.

The results of the cost analysis were quite positive. A CARI-based verification system can save 20 to 30% of the cost of traditional reinterview approaches to interview verification. However, this cost does not include the costs of using CARI for interviewer performance monitoring and feedback, which we believe should be part of the CARI quality control system. We believe that the costs of field interview monitoring should be a standard part of the total interviewing costs and that survey budgets routinely including CARI monitoring costs as a necessary part of interview quality control, just as is currently being done for centralized telephone surveys.

Although approximately 74%-80% of NSCAW respondents consented to the use of CARI, we expect consent rates to be somewhat higher in surveys with less sensitive content. Results from the respondent debriefings suggest that CARI has little influence on respondent answers. To the extent it does, it is more likely to improve data accuracy, from the perspective of the respondent, than to lessen data accuracy.

Supervisors are particularly interested in obtaining information on how their interviewers perform during the interview. CARI can provide information on interviewer performance that is not available through any other means. However, since the transfer of audio files relies on the postal system, interviewer performance feedback is not as timely as telephone interview feedback which is the model for our feedback system. Still, CARI allows more frequent and less obtrusive observations of the interviewer and respondent interactions were possible before. In that regard, the system developed for this study was quite successful and providing high quality information to supervisors for evaluating the performance of interviewers.

We also determined that CARI can work quite well with telephone interviews provided that the traditional hand-held receiver is used. For recording using headsets, more expensive devices are available that are connected in series between the telephone and the headset. Although we have not tested these devices, we believe they offer a solution to the use of CARI when interviewing is done via a telephone headset.

All the research we have conducted to date on CARI using the NSCAW has shown unequivocally that CARI monitoring for falsification prevention and interviewer performance monitoring is not only feasible but is preferred to traditional methods used in CAPI surveys.