

RUNNING HEAD: REMEMBERING REMOTELY

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Remembering remotely: Would video-mediation impair witnesses' memory reports?

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Witnesses often experience lengthy delays prior to being interviewed, during which their memories inevitably decay. Video-communication technology—favoured by intergovernmental organizations for playing larger roles in judicial processes—might circumvent some of the resourcing problems that can exacerbate such delays. However, whereas video-mediation might facilitate expeditious interviewing, it might also harm rapport-building, make witnesses uncomfortable, and thereby undermine the quality and detail of their reports. Participants viewed a crime film and were interviewed either 1 day later via video-link, 1 day later face-to-face, or 1-2 weeks later face-to-face. Video-mediation neither influenced the detail or accuracy of participants' reports, nor their ratings of the quality of the interviews. However, participants who underwent video-mediated interviews after a short delay gave more accurate, detailed reports than participants who waited longer to be interviewed face-to-face. This study provides initial empirical evidence that video-mediated communication could facilitate the expeditious conduct of high-quality investigative interviews.

Key words: Eyewitness Memory; Videoconferencing; Virtual Justice; Rapport-building; Interviewing

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Eyewitnesses are hugely important to the criminal justice system, often providing the most crucial evidence leading to prosecutions (Devlin, 1976; Kebbell & Milne, 1998). But eyewitnesses can only be key to securing justice if they remember what they witnessed. Although forgetting is an inevitable and important counterpart to remembering, when witnesses forget critical details of a crime or their memories become distorted, injustices are more likely (Wise, Dauphinais, & Safer, 2007). It is therefore important to ensure that witnesses can be interviewed adequately as soon as possible after a crime occurs. In this paper we test the potential utility of modern video-communication technology for facilitating expeditious yet effective investigative interviews with witnesses.

Decades of psychological research have played a substantial role in improving investigative interviewing (Fisher, 2010; Lassiter & Meissner, 2010). The Cognitive Interview technique is one approach borne from social and cognitive psychological principles, and has proven overwhelmingly effective for improving the detail and accuracy of witnesses' memory reports in laboratory studies and in real forensic contexts (Fisher & Geiselman, 1992; Memon, Meissner, & Fraser, 2010). However, despite being equipped with effective interviewing techniques, one serious problem for investigators is that several days or even weeks often pass before witnesses can be interviewed (Fisher, 2010; Gabbert, Hope, & Fisher, 2009). There are many reasons for these delays. Some are beyond the control of the legal system, such as when a witness only learns many days afterwards that a crime was

committed, but other delays are driven primarily by constraints on investigators' time and resources; for instance, there are often numerous witnesses to a single crime (Skagerberg & Wright, 2008), all of whom need to be interviewed professionally yet might not live locally.

As delays unfold, witnesses' memories will almost certainly fade, and may also be susceptible to distortions. Research since the seminal work of Ebbinghaus (1885) has documented the decline in memory completeness over time, demonstrating that forgetting occurs most rapidly in the period immediately following an event (e.g., Ebbesen & Rienick, 1998; Rubin & Wenzel, 1996). Of further concern is that whereas correct recall decreases as the retention interval increases, incorrect recall does not always decrease in a comparable manner, and in some cases even increases (Larsson, Granhag, & Spjut, 2003; Tuckey & Brewer, 2003). The net effect of these patterns is that longer retention intervals often lead to memory reports that are less accurate overall (Ebbesen & Rienick, 1998; Odinet & Wolters, 2006). Moreover, long delays also provide greater opportunity for memory to become contaminated by external sources such as co-witnesses (French, Garry, & Mori, 2011; Gabbert, Memon, & Allan, 2003; Hope, Ost, Gabbert, Healey, & Lenton, 2008). In sum, avoiding delays should improve both the amount and the credibility of the memory evidence gathered.

Recognizing the problems associated with lengthy delays, researchers have looked for ways to mitigate the effects that the passage of time has upon witnesses' memories. Notably, Gabbert et al. (2009) recently developed a Self-Administered Interview tool for witnesses to complete independently – soon after the crime

occurs – as a means for stabilizing their memories in preparation for a formal interview at a later date. These authors have shown that an early opportunity for eyewitnesses to rehearse and document their memories substantially improves performance in a later interview, and more recent studies provide further support for this finding (Hope, Gabbert, & Fisher, 2011; Roos af Hjelmsäter, Strömwall, & Granhag, 2012). Yet although the Self-Administered Interview undoubtedly offers great potential for investigative practice, different solutions to the delay problem could provide different benefits to investigators depending on the specific case characteristics. In some circumstances, stabilizing witnesses' memories in this way might be less preferable than actually conducting the formal interview sooner.

Videoconferencing with witnesses

In cases where resourcing issues underlie delays in interviewing, one novel and resourceful way of achieving shorter delays in some circumstances would be to interview witnesses remotely, rather than face-to-face. The justice system in general is already quite literate with video-mediated communication (VMC). Video-testimony by witnesses, victims and suspects is increasingly frequent in courtrooms in several countries (Johnson & Wiggins, 2006); in Australia for example, witnesses who live in remote rural areas are sometimes enabled to communicate with the court via video-link, thereby replacing the need to travel extremely long distances (Wallace, 2008). In various parts of the world, legal procedures including bail hearings and immigration appeals are also sometimes conducted in this way (Diamond, Bowman, Wong, & Patton, 2010; Haas, 2006). Indeed, major intergovernmental organizations such as the European Union have been eager to

promote 'virtual justice' via the more frequent use of VMC in legal proceedings (Council of the European Union, 2009). They and others argue that videoconferencing allows legal processes to occur more rapidly, although the primary motivation for many organizations' use of videoconferencing has been not the reduced delays, but the reduced costs that can be achieved in some circumstances.

Despite the justice system's growing familiarity with VMC, the notion of interviewing witnesses remotely during the investigative phases of a legal case – as opposed to the trial phases – has received scant discussion. This fact is perhaps unsurprising, because there are numerous reasons to expect that interviewing witnesses remotely would be counterproductive. For instance, we know that interviewers who take efforts to develop rapport with witnesses can elicit significantly more detailed and accurate memory reports from those witnesses (Collins, Lincoln, & Frank, 2002; Vallano & Schreiber Compo, 2011). However, social psychological research shows that face-to-face interaction is typically beneficial to rapport-building (Drolet & Morris, 2000); other research from the videoconferencing literature suggests that rapport-building is often less successful in VMC than in face-to-face interactions, with mutual liking harder to establish (Fullwood, 2007; Fullwood & Finn, 2010; Straus, Miles, & Levesque, 2001). Many legal professionals report similar concerns about the ability of defendants and attorneys to develop effective relationships remotely (Johnson & Wiggins, 2006; Poulin, 2004). Furthermore, video-mediated interactions are often perceived as uncomfortable and more difficult to understand than face-to-face interactions (Straus et al., 2001).

Arguments such as these would lead us to expect the benefits of video-mediation – in terms of its capacity to reduce certain delays – would be counteracted by the negative consequences of having an interviewer who is not co-present. If so, then we should understand whether this trade-off is worth making: whether any detriment of conducting interviews ‘virtually’ would outweigh the detriment caused by waiting longer to conduct a face-to-face interview. In fact, there are several reasons to instead predict no detriment – and perhaps even benefits – of video-mediation. For example, in other domains VMC has been found to be as effective as face-to-face communication for purposes as varied as conducting distance learning (e.g., Storck & Sproull, 1995) and delivering cognitive-behavioral therapy (e.g., Mitchell et al., 2008). In one study, negotiating dyads who believed they were physically distant from each other achieved better agreements than did dyads who believed they were physically close (Henderson, 2011). In another study, children questioned by a remote rather than physically-present adult reported equivalent amounts of correct information, but fewer incorrect details (Doherty-Sneddon & McAuley, 2000; see also Goodman et al., 1998). The authors suggested that video-mediation increased the children’s confidence and made them feel less intimidated. Finally, because a fundamental principle of Cognitive Interviewing is that interviews should be witness-led with minimal interruption from the investigator (Fisher & Geiselman, 1992), it is noteworthy that several studies have shown that VMC seems to encourage less frequent interruptions than in face-to-face interactions (O’Conaill, Whittaker, & Wilbur, 1993; Sellen, 1995).

It is, in sum, of timely importance to learn whether the efficacy of video-mediated interviews is any less than that of face-to-face interviews. Based on findings that indicate rapport-building can be more difficult in VMC than face-to-face, we predicted that it would indeed be less efficacious. If this prediction were supported, then an important applied question is whether the most detailed and accurate memory reports would be achieved by conducting a video-mediated interview sooner, or by conducting a face-to-face interview later. Although we predicted that people interviewed via VMC would exhibit poorer performance than would those interviewed face-to-face, we also expected that their performance would nonetheless be better than for people who are interviewed face-to-face after a substantive delay. The present study was designed as a first step to test these predictions. Mock witnesses watched a short crime film, and two subgroups were interviewed the following day either face-to-face or via VMC. A third subgroup was interviewed face-to-face 1-2 weeks later. We examined the objective quality and quantity of the information participants reported, and participants' subjective impressions of the interviews.

Method

Participants and Design

A total of 77 university students and staff members (65 females; Mean age = 20.71 years, $SD = 4.18$) participated in exchange for £6 or course credit. Participants were randomly allocated to either the Early-Virtual ($n = 26$), Early-Physical ($n = 26$), or Late-Physical ($n = 25$) condition.

Materials

Film. All participants watched a short film displayed on a computer screen. The film was 2 min in length, and depicted a nonviolent car theft. It was played to participants without sound.

Questionnaire. We prepared a short questionnaire for all participants to complete at the end of the study. The questionnaire contained nine questions, the first eight of which required participants to rate their subjective views about different aspects of the interview they had undertaken. Specifically, they used 7-point Likert scales to rate their agreement with the following statements – the scale anchors used for each question are indicated in parentheses: [1] the interviewer was (unfriendly/friendly); [2] the interviewer was (unprofessional/professional); [3] the interviewer's speech was (unclear/clear); [4] the interviewer was (inattentive/attentive); [5] I thought the interviewer and I had a (poor rapport/good rapport); [6] I found the interview (difficult/easy); [7] I found the interview (uncomfortable/comfortable); [8] the interviewer's questions and instructions were confusing (never/always). Participants were also asked to rate how comfortable they considered themselves to be with technology in general, again using a 7-point scale. Finally, a space was provided for participants to add open-ended comments.

Procedure

All participants individually attended two sessions on separate days. Prior to commencing the study, the third author – who interviewed all participants –

received 2 days of training in the Cognitive Interview technique from an experienced interviewer, and spent several weeks studying the Cognitive Interviewing literature.

Session 1

The first session was identical for all participants. After consenting to take part, participants were simply shown the film stimulus, and after this they arranged an appointment for Session 2 with the researcher.

Session 2

Participants returned either 1 day later (in the Early-Virtual and Early-Physical conditions) or 1-2 weeks later (in the Late-Physical condition; mean delay = 8.24 days; range = 7-13). They were met by the same researcher from Session 1 and escorted to a separate interview room. Here, the participant was informed that she or he would be interviewed by a different person; all participants consented to be recorded. The participant sat at a table, and the researcher telephoned the interviewer to confirm they were ready to begin. This prelude ensured that Early-Virtual participants did not meet the interviewer in person prior to their interview.

For participants in the Early-Physical and Late-Physical conditions, the interviewer next arrived at the interview room and sat facing the participant. For participants in the Early-Virtual condition, a video-streamed image of the interviewer instead appeared on a screen facing the participant (Figure 1). A video-camera beneath the screen streamed images of the participant back to the interviewer. These virtual interviews were conducted via a professional videoconferencing network that permitted high-resolution audiovisual

communication between the two locations (see Fielding & Fielding, 2012). Early-Virtual participants were unaware until the study ended that they and the interviewer were within the same building.

[FIGURE 1 ABOUT HERE]

Interview Procedure. Next, the first researcher left the room, and the interviewer introduced herself. All interviews proceeded via a modified Cognitive Interview protocol. The 'modification' in this sense was that the protocol excluded two elements of the traditional Cognitive Interview protocol: participants were neither asked to recall the event in different temporal orders, nor to recall the event from different perspectives. Dando, Wilcock, Behnkle, and Milne (2011) demonstrated that this modification of the original protocol substantially shortens the duration of interviews, without sacrificing the detail or accuracy of witnesses' reports.

The interviews did not follow a verbatim script, but rather, the following general procedure was applied naturalistically with each participant. To begin, the interviewer spent several minutes building rapport with the participant by asking open-ended friendly questions. Next, she explained that the aim of the interview was to help the participant to recall as completely and accurately as possible the film they saw. The interviewer instigated a context reinstatement procedure, encouraging the participant to mentally take themselves back to the time and place they saw the film and to recreate in their mind's eye what they perceived (Fisher & Geiselman, 1992). Following this context reinstatement, the participant was invited to report everything they remembered, no matter how small but without guessing details.

They were asked to do so in their own time and at their own pace; the interviewer did not interrupt this free report. After their free report concluded, the interviewer asked several open questions about specific aspects of the participant's report (e.g., "can you remember any more about the appearance of the man who stole the car?"). The interviewer asked every participant about the same elements of the film unless they had not mentioned a particular element; for example, some participants failed to describe where the car ended up, and so were not asked about this setting. This procedure meant that the number of questions asked by the interviewer varied between participants. Finally, the interviewer offered the participant an opportunity to add any details they had omitted, and closed the interview by thanking the participant for their effort and informing them that the interview was complete.

At the end of the interviews, participants privately completed the short questionnaire described in the Materials section above, which probed several elements of their impressions of the interview and interviewer. To encourage honest responding and to avoid demand effects, participants were provided with an unmarked envelope inside which to seal their completed questionnaire. They were told (truthfully) that the interviewer would not see their responses.

Scoring and inspection of interviews

Interview recordings were transcribed verbatim, and any details that revealed a participant's experimental condition were redacted prior to scoring. The transcripts were scored by the first author blind to condition, by counting the number of correct and incorrect details reported by each participant as in Gabbert et al. (2009). For example, the movie began with a long-haired man. A report that described a man

with short hair would be scored with 1 correct detail (man), and 1 incorrect detail (short hair). Mirroring the scoring protocol in previous studies, comments alluding to uncertainty (e.g., “I think it might have been blue”) were treated as certain (“It was blue”), and subjective statements (e.g., “the man was quite good-looking”) were ignored.

A subset of 20% of the transcripts were also blind scored by a second rater. Inter-rater reliability was good for correct details ($r = .93, p < .001$) and incorrect details ($r = .97, p < .001$), therefore the analyses below are based on the first author’s scoring only.

We asked a research assistant who was blind to condition to examine the initial parts of each interview to verify that following criteria were met: (a) the participant was given an account of what the interview process would involve, (b) the participant was given clear ‘report everything’ instructions and an explanation of what these meant, (c) the participant was given active control of the interview. These criteria were judged to be met in all interviews. Furthermore, the same research assistant afterwards examined the recordings of all interviews and extracted duration data. As Table 1 shows, there were no significant differences across conditions in terms of the time spent on rapport-building, Kruskal-Wallis $\chi^2(2) = 1.17, p = .56$, or on the context reinstatement exercise, Kruskal-Wallis $\chi^2(2) = 0.99, p = .61$. Together these data support the claim that the interviewer behaved comparably across conditions.

Results

Overall, participants reported a substantial amount of correct information, along with fewer incorrect details: as Table 1 shows, 81% of the information reported was correct. To examine differences in correct and incorrect reporting between the conditions, we conducted a MANOVA¹; however, before doing so we first log-transformed the data to correct for substantial skewness in some cells. The MANOVA on the transformed data revealed a significant multivariate effect of condition, Pillai's $V = 0.16$, $F(4, 148) = 3.31$, $p = .01$, $\eta^2_p = .08$. Examining the univariate effects with separate ANOVAs (Bonferroni-corrected $\alpha = .025$) showed that there were differences across conditions with regard to the number of correct details reported, $F(2, 74) = 5.06$, $p < .01$, $\eta^2_p = .12$, but not with regard to the number of incorrect details reported, $F(2, 74) = 1.47$, $p = .24$, $\eta^2_p = .04$. Because cell-sizes differed slightly yet Levene's tests revealed no significant homogeneity of variance ($p > .33$ for both variables), we chose Gabriel's post-hoc test to follow up the significant effect on correct recall. This test showed that participants in the Late-Physical group reported significantly fewer correct details than did participants in the Early-Virtual and Early-Physical conditions ($p = .03$, $d = 0.67$, and $p = .01$, $d = 0.79$ respectively), and that the two Early- conditions did not differ ($p = .98$, $d = 0.10$).

We next calculated the proportion of the details reported that were correct (i.e., accuracy). These accuracy scores were again transformed, this time using a reflected log transformation to correct for negative skewness; variances of these

¹ Note that accuracy could not be included as a variable in the MANOVA because it is statistically dependent upon correct and incorrect recall.

transformed scores were suitably homogeneous, Levene's test $p = .45$. An ANOVA showed that accuracy differed significantly between conditions, $F(2, 74) = 3.81$, $p = .03$, $\eta^2_p = .09$. Post-hoc Gabriel comparisons showed that Early-Virtual participants' reports were more accurate than those of Late-Physical participants ($p = .02$, $d = 0.76$). The accuracy of Early-Physical participants did not differ significantly from that of either Late-Physical participants ($p = .20$, $d = 0.53$) or Early-Virtual participants ($p = .75$; $d = 0.24$).

As the bottom row of Table 1 shows, there were no significant differences across conditions in terms of the total duration of the interviews. However, there were slight but nonsignificant differences between participants in terms of the number of questions asked (see fourth row of data in Table 1). For this reason, we repeated all of the above analyses with the number of questions included as a covariate. The pattern and significance of all results was replicated in these analyses.

[TABLE 1 ABOUT HERE]

Subjective ratings

Finally, we examined participants' ratings of the quality of the interviews, summarized in Figure 2. Overall, the interviews were judged positively on our various 7-point scales, in terms of the extent to which participants believed they developed rapport with the interviewer ($M = 6.27$, $SD = 0.82$), and of the interviewer's friendliness ($M = 6.83$, $SD = 0.38$), professionalism ($M = 6.47$, $SD = 0.97$), speech clarity ($M = 6.57$, $SD = 1.04$), and attentiveness ($M = 6.47$, $SD = 1.21$). Participants found the interviews quite easy ($M = 5.39$, $SD = 1.30$) and comfortable

($M = 5.86$, $SD = 1.30$), and did not find the questions or instructions confusing ($M = 1.44$, $SD = 0.88$). Importantly, none of these positive characteristics differed significantly across conditions (smallest $p = .12$, largest $\eta^2_p = .06$ for “the interviewer’s speech was clear”). Participants considered themselves comfortable with using technology in general ($M = 5.70$, $SD = 1.13$; these ratings did not differ systematically across conditions, $p = .16$).

[FIGURE 2 ABOUT HERE]

Discussion

Reducing delays in investigative interviewing is of utmost importance due to the decay in memory completeness and accuracy over time and the desire for timely apprehension of the perpetrator. Our data indicate for the first time that physical co-presence may not be a necessary component of effective interviewing. Contrary to our initial prediction, participants who were interviewed via VMC reported just as much correct detail as those interviewed via a traditional face-to-face approach, with no additional incorrect detail, and indeed without incurring any peripheral cost in terms of interview duration.

Considering the information that was lost by waiting 1-2 weeks to interview participants in person, these data provide initial evidence in support of our second prediction, that an early video-mediated interview is a preferable alternative insofar as the detail and accuracy of interviewees’ reports is concerned. As such we propose that when circumstances make it difficult to conduct timely interviews with witnesses, videoconferencing might offer a valuable addition to the investigator’s

'toolkit' alongside other effective innovations such as the Self-Administered Interview (Gabbert et al., 2009). Each of these innovations could be more or less beneficial to a case depending on specific case characteristics.

Further strengthening these conclusions, our participants found video-mediated interviews to be as agreeable as face-to-face interviews. Notably, participants' questionnaire responses showed that the degree of comfort and interviewer-interviewee rapport – both important factors for securing strong witness reports – were found to be equivalent across both interview formats. This finding is in contrast with those of prior studies that suggest rapport-building would be difficult in video-mediated interviews (e.g., Fullwood, 2007; Straus et al., 2001). Together, these subjective ratings add ecological validity to our data insofar as they suggest that real witnesses would be at ease when participating in such interviews. Of course, there are substantive limitations to these kinds of subjective-rating data, not least because different people will no doubt have very different interpretations of complex concepts such as 'rapport' (Vanderhallen, Vervaeke, & Holmberg, 2011), and because they might not all have believed that these ratings would be anonymous. Nonetheless, participants' open-ended comments also add to the overall picture in this regard. For instance, in line with Doherty-Sneddon and McAuley's (2000) findings, several Early-Virtual participants commented that remote presence might minimize the pressure they felt, for example: "I actually think I found it less daunting and intimidating than being in a room with someone" (see also similar reports in Kuivaniemi-Smith, Nash, Brodie, Mahoney, & Rynn, in press). Some studies show that witnesses who are comfortable or less anxious report more

correct information, and are less susceptible to misinformation (e.g., Almerigogna, Ost, Bull, & Akehurst, 2007; Vallano & Schreiber Compo, 2011), and so plausible advantages such as these call for further inquiry.

Several questions relating to the generalizability and external validity of our findings remain to be addressed, and clearly this study represents the starting point for, rather than the conclusion of, an important research agenda. In the present study we tested the efficacy of video-mediated interviews using only one relatively innocuous, unemotive stimulus event. Moreover, we used rather optimal video-mediated interviewing conditions: our VMC technology and thus the video-images and audio were high-quality, and transmission delays in communication were rare. It is plausible that even minimal visual or auditory degradation could compromise the detail reported by witnesses. Moreover, our witnesses themselves were somewhat 'optimal' – they were both cooperative and comfortable with using technology, and primarily drawn from a student population. Future studies should investigate the efficacy of video-mediated interviews among older witnesses for instance, who might feel less comfortable in such interactions, and among child witnesses, who might find the remote setup strange or even scary (Murray, 1995). Indeed, it seems unlikely that video-mediation would be appropriate in practice for all interviews or all witnesses. For example, offering adequate reassurance to a worried person might be rather difficult without physical co-presence; face-to-face interviewing might therefore seem more suitable in cases involving vulnerable witnesses, or cases that involve divulging very personal or emotional/traumatic information. Evidently there are many questions to address with regards to the

circumstances under which videoconferencing with witnesses would be appropriate and beneficial.

Although caution must be taken in interpreting the findings of this study for the reasons we have outlined, our findings support a promising technique that might be extremely valuable to investigators. Here we have focused primarily on the potential for videoconferencing to help reduce delays. However, there are several other plausible motivations for using videoconferencing to facilitate investigative interviewing. For example, as mentioned above, videoconferencing is increasingly seen as beneficial to judicial proceedings conducted across international borders, where conducting physical interviews inevitably involves considerable costs as well as time (Council of the European Union, 2009). Videoconferencing might also facilitate better standards of interviewing in some cases; for example, it might permit the remote 'presence' of a highly trained expert interviewer when no such expert is locally available (see Kuivaniemi-Smith et al., in press). As judicial systems around the world become increasingly reliant upon new technologies for conducting legal processes, it is vital that empirical research is conducted to facilitate clearer understanding of the implications of these developments. In this vein, our findings warrant optimism about the prospects for new faces of virtual justice.

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Table 1. Performance measures and interview content indicators across conditions. Standard deviations of means are in parentheses, where appropriate.

	Condition			
	Early-Virtual	Early-Physical	Late-Physical	Total
Correct details (mean)	45.50 ^a (10.28)	46.19 ^a (8.84)	38.72 ^b (11.16)	43.53 (10.54)
Incorrect details (mean)	9.15 ^a (5.14)	11.19 ^a (9.41)	12.00 ^a (7.79)	10.77 (7.65)
% accuracy (mean)	83.51 ^a (7.47)	81.63 ^{ab} (8.84)	76.80 ^b (10.74)	80.70 (9.40)
Number of questions asked (mean)	6.19 (1.10) ^a	5.92 (0.94) ^a	5.88 (1.13) ^a	6.00 (1.05)
Duration of rapport- building (median)	51 sec ^a	49 sec ^a	43 sec ^a	49sec
Duration of context reinstatement (median)	2 min 3 sec ^a	2 min 4 sec ^a	2 min 6 sec ^a	2 min 6 sec
Duration of entire interview (median)	11 min 52 sec ^a	13 min 23 sec ^a	13 min 44 sec ^a	13 min 16 sec

Note: Within each row, means/medians with different superscripts differ at $p < .05$.

Figure Captions

Figure 1. Interview room layout in the Virtual (top) and Physical (bottom) conditions.

Figure 2. Participants' mean subjective ratings of the interview and interviewer. Error bars are standard errors.



Figure 1

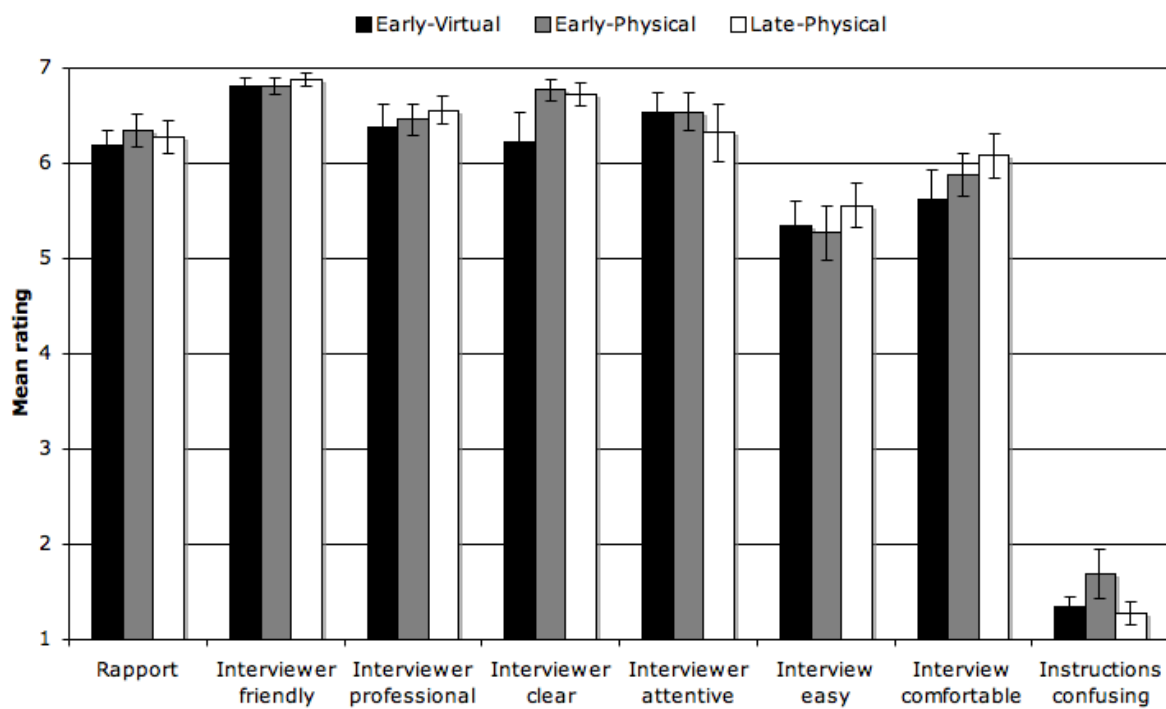


Figure 2