

A Comparison of Adult Witnesses' Suggestibility Across Various Types of Leading Questions

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Summary: The current study directly compared witnesses' susceptibility to suggestion across various structures of misleading interview questions. We examined four question structures that varied on numerous dimensions; whether they narrowed the response option to yes or no, whether they included highly specific detail about the witnessed event and whether they presumed the information being suggested to be true. Susceptibility to misinformation was measured by witnesses' responses to the initial interview questions and their responses to subsequent recognition questions. Interview questions that narrowed the response option and contained specific details and questions that encouraged broader responses but presumed certain information were found to be the most harmful. Participants were more likely to agree with the misleading suggestions contained in these question structures—and more likely to falsely report those suggested details at subsequent interview—than misleading suggestions contained in other question structures. The implications are discussed. Copyright © 2011 John Wiley & Sons, Ltd.

More than 30 years of research has revealed that misleading people about the details that they witnessed affects their memories and/or recollection of events (Loftus, Miller, & Burns, 1978; see Loftus, 2005, for a review). This *misinformation effect* is typically demonstrated using a three-stage procedure. First, people watch an event, such as a film of a car accident or crime. Second, they receive some post-event information that contains both misleading and non-leading (control) details about the event that they witnessed. Third, after a distractor task, people's memories for the original event are tested. Results consistently show that people's memories are less accurate for the details about which they received misleading information than the details about which they received control information (Loftus, 2005). Using this basic paradigm, variables, or groups of variables, have been measured and subsequently shown to affect witnesses' susceptibility to error when testifying about events. For example, age, retention interval (delay between the target event and memory test) and saliency of the event details have all been shown to markedly impact a person's susceptibility to suggestion.

One factor that is also known to impact suggestibility is the phrasing of the question containing the misinformation. Consider the following experiment in which participants watched a film of a car accident (Loftus & Zanni, 1975). Half the participants were asked whether they had seen *a* broken headlight; the other half was asked whether they had seen *the* broken headlight. Although there was no broken headlight in the film, participants were twice as likely to say that they had seen it when they were asked the question containing 'the' (15%) than the question containing 'a' (7%). This difference occurred because the word 'the' strongly implied that a broken headlight was present, and participants were merely asked to confirm its presence; the word 'a' did not make this presumption.

The current paper focused on how the structure of the question—in terms of a questions' adherence to several dimensions—influenced the likelihood of memory contamination. This issue has major relevance to the investigative interviewing arena, and yet very few studies have actually

compared the impact of various misleading questions within their designs. Of those few studies that have examined this issue, the effect of misleading information has been assessed at the memory test phase by examining how witnesses respond to questions that contain false information. Furthermore, this research has focused on child witnesses. Overall, the findings have shown that narrowing children's response options makes them more susceptible to errors. For example, in one such study, 9- to 10- and 11- to 13-year-old children visited a science centre; they were interviewed about their experience a week later (Gee, Gregory, & Pipe, 1999). They were interviewed using *closed questions*, which required yes/no answers or forced the children to choose between two options, and *cued-recall questions*, which did not require particular responses and allowed the children to describe their experiences in their own words. Half the questions were misleading and half were not. For instance, a closed misleading question forced children to choose between two incorrect alternatives (e.g. 'Was the entrance way white or blue?' when it had been red); a misleading cued-recall question asked for details about a fictitious item (e.g. 'What was in the tank with the turtle?' when there had been no turtle). Children made more errors about their experiences when asked the misleading closed questions than the misleading cued-recall questions (see also Powell & Roberts, 2002).

One reason that children made more errors in response to closed questions than cued-recall questions is response bias. They were more likely to guess the answer when asked closed questions (yes/no or forced choice alternatives) than open questions (Gee et al., 1999; see also Patterson & Pipe, 2009; Waterman, Blades, & Spencer, 2000). To answer the misleading forced choice questions, children had to reject both (incorrect) options. However, because they found this difficult, they chose one option and were misled. For the misleading open questions, children were more likely to say that they did not know the answer and were less likely to be misled. This result may have occurred for a number of reasons, including less reluctance to disagree with the interviewer and difficulty producing a coherent verbal report (Dent & Stephenson, 1979).

Although the research with children indicates that they are more susceptible to misleading information contained in closed than open questions it is difficult to generalise this

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finding to adults given the developmental differences in the misinformation effect (Sutherland & Hayne, 2001; Templeton & Wilcox, 2000; see Holliday, Reyna, & Hayes, 2002). Therefore, the aim of the current experiment was to determine the impact of question structure on adult witnesses' susceptibility to misleading information. Moreover, as we wanted to determine the impact of more than just closed versus open questions, we used four different question structures to deliver the misinformation (e.g. that a shotgun was present). Three question structures were closed and one was open. The first type of *closed question* simply required a yes or no answer (e.g. 'Did the robber hold up the bank with a shotgun?'). The second type of closed question, *closed presumptive questions*, required a yes or no answer and encouraged people to comply with the interviewer's presumed knowledge (e.g. 'The robber held up the bank with a shotgun, didn't he?').

The third type of closed question, *closed specific questions*, required a yes or no answer and should have encouraged people to think about the specific details of the misleading information (e.g. 'Did the robber hold up the bank with a *shotgun that had a black barrel and a dark brown stock*?'). Because the question describes the shotgun in detail, it may be difficult for people to avoid thinking about it in much the same way that it is difficult for them to avoid thinking about a white bear when instructed not to (e.g. Wegner, Schneider, Carter, & White, 1987). Research has demonstrated that exposing people to false information through a range of techniques that encourage them to spend time processing this information—such as imagining false events or explaining how they might have happened—makes them more confident that the false information was true (Bernstein, Whittlesea, & Loftus, 2002; Sharman, Garry, & Beuke, 2004; Sharman, Manning, & Garry, 2005). In the current experiment, it is possible that exposing people to the misleading information in closed specific question structures should also encourage them to spend time processing this information. They may imagine the suggested details, think about how they fit within the event or explain to the interviewer why those details were or were not present. This processing should occur at a level over and above the processing required to answer the closed and closed presumptive questions.

The fourth question structure, *open presumptive questions* (e.g. 'Tell me about the shotgun that the robber used to hold up the bank?'), has two components. First, it presumes knowledge—that a shotgun was present. Second, like the closed specific questions, it should encourage participants to spend time processing the suggested information. In particular, the open presumptive question structure should encourage participants to generate a narrative about the shotgun. Although the underlying mechanism may not be the same for both the closed specific and open presumptive questions, we expected that these question structures would encourage participants to process the suggested details in a different way to the suggested details contained in the closed and closed presumptive questions. As a result, we predicted that participants should be more susceptible to misleading information delivered through closed specific and open presumptive questions than the information delivered through closed and closed presumptive questions.

To examine the effects of these four question structures on adult witnesses' susceptibility to misleading information,

participants in the current experiment watched an event before being interviewed immediately or 1 week later. Delay was manipulated because research has shown that a delay between the event and the misleading information increases the misinformation effect (e.g. Higham, 1998; Paterson, Kemp, & Forgas, 2009; Paz-Alonso & Goodman, 2008). The misinformation effect is enhanced because people have forgotten many of the witnessed details and 'fill in the blanks' with the details about which they were misled. We investigated whether delay interacted with question type. During the initial interview, four structures were used as follows: closed, closed specific, closed presumptive and open presumptive. Half the questions contained misleading information; half contained control information. In a subsequent recognition test, participants' memories for the event details that they had actually witnessed were examined.

METHOD

Participants

One hundred and fifty-two participants (73% females) were recruited from Deakin University and the wider community. The participants ranged in age from 18 to 60 years ($M = 28.75$, $SD = 11.10$). The experiment used a 2 (interview: immediate, delayed) $\times$ 2 (information: control, misleading) $\times$ 4 (question structure: closed, closed specific, closed presumptive, open presumptive) mixed design. Information and question structure were within-participants; delay was between-participants.

Materials and Procedure

Participants took part in two sessions.

Session 1

Participants watched a 6 minutes 28 seconds DVD of 'Eric the electrician', an electrician who stole personal items while at a client's house (see Takarangi, Parker, & Garry, 2006, for more details). Half the participants watched version 1; the other half watched version 2. Each version was identical except for eight critical items. For example, in version 1, Eric arrives at the client's house in a van showing an 'AJ's electricians' logo; in version 2, the van shows an 'RJ's electricians' logo. After watching the DVD, participants completed a 12-minute distractor task.

Five interviewers conducted the interviews verbally;¹ they received approximately 4 hours of training, which consisted

¹ There was an effect of interviewer on participants' overall recognition in the memory test [$F_{(4,147)} = 3.81$, $p = .006$, $\eta_p^2 = .094$]. Bonferroni-corrected post hoc tests revealed a significant difference between interviewers 2 and 4 ($p = .005$). Participants interviewed by interviewer 2 had higher overall recognition ($M = 72.2\%$, $SD = 18.8\%$) than those interviewed by interviewer 4 ($M = 49.6\%$, $SD = 32.6\%$). Closer inspection of the data also revealed significant differences in the ages of participants interviewed by these two interviewers. Interviewer 2's participants were significantly older—although still young adults ($M = 33.96$ years, $SD = 12.09$)—than interviewer 4's participants ($M = 25.68$ years, $SD = 5.22$ years). To determine whether age significantly covaried with participants' recognition, a repeated-measures analysis of variance (ANOVA) was conducted on participants' correct recognition for details about which they received control and misleading information. Age was not a significant covariate [$F_{(1,150)} = 2.04$, $p = .16$]; therefore, it was not included in the following analyses.

of going through the interview protocols step-by-step then conducting two practice interviews. The experimental interviews were not audio recorded as three-quarters of participants' answers consisted of 'yes' or 'no' responses. Instead, interviewers made notes of participants' answers. Participants in the immediate interview condition completed the initial interview. They were interviewed about the eight critical items from the film and an additional four filler items. For half of the critical items, participants received generic control information; for example, the logo on Eric's van was referred to as 'the logo'. For the other half of the critical items, participants received misleading information; for example, the participants who saw the 'AJ's electricians' logo were asked about the 'RJ's electricians' logo. Participants received the control information in each of four different question structures: closed, closed specific, closed presumptive and open presumptive. They also received misleading information using the four question structures. Each critical item was used equally often for each question type (see Table 1 for examples). Participants in the delayed interview condition completed a second filler task that took 5 minutes.

Session 2

One week later, participants returned for the second session. Those in the delayed interview condition completed the initial interview. Those in the immediate interview condition completed the 5-minute filler task. All participants then completed the subsequent recognition test. This test contained 20 items: 1 item about each of the eight critical details and 12 filler items. For each of the critical items, participants chose between the item that they had seen and the misleading item (e.g. The logo on Eric's van said *AJ's electricians* or *RJ's electricians*). Participants also rated their confidence about their answer from 1 (*not at all confident*) to 5 (*very confident*).

RESULTS

Initial interview

Before turning to the effects of question structure on later recognition, we first examined participants' responses to the interview questions. Overall, participants answered 60.5% of the questions correctly. Table 2 displays this accuracy by question structure and whether the question contained control or misleading information.

The left side of Table 2 shows that participants correctly agreed with most of the control questions, regardless of question structure. They gave the fewest incorrect responses for these questions when asked open presumptive questions.

Participants' 'don't know' responses indicated that instead of giving incorrect responses for open presumptive control questions, they were more likely to say that they did not know the answer compared with the other question types.

The right side of Table 2 shows that participants were most likely to correctly disagree with the misleading questions when a closed structure was used compared with the other three types. To test our prediction that participants should be most misled when asked closed specific and open presumptive questions, we compared the percentage of times participants incorrectly agreed with the misleading questions. They incorrectly agreed with more misleading suggestions when these suggestions were delivered in closed specific and open presumptive questions (37.8%) than closed and closed presumptive questions (24.2%) ($z = 2.72, p = .007$). To determine whether participants were not just agreeing with these suggestions but actually incorporating them into their memories, we next examined their recognition memory for items that they saw in the film.

Subsequent recognition test (1 week after the DVD event)

Recognition accuracy

Overall, participants showed the misinformation effect; that is, they correctly recognised more items about which they had received control information than items about which they had received misleading information. This misinformation effect was larger when participants were interviewed after a delay. A 2 (delay) $\times$ 2 (information) repeated-measures ANOVA revealed a significant interaction [$F_{(1,150)} = 4.64, p = .033, \eta_p^2 = .03$]. Follow-up *t*-tests revealed that participants correctly recognised more items from the film when they received control information immediately ($M = 78.0\%$, $SD = 20.8$) than after a delay ($M = 66.1\%$, $SD = 32.1$) [$t(150) = 2.70, p = .008, d = 0.44$]. Participants also correctly recognised more items from the film when they received misleading information immediately ($M = 62.8\%$, $SD = 27.2$) than after a delay ($M = 39.8\%$, $SD = 33.2$) [$t(150) = 4.67, p < .001, d = 0.76$]. There was also a main effect of misinformation [$F_{(1,150)} = 63.70, p < .001, \eta_p^2 = .30$]. Participants correctly recognised more items about which they received control information ($M = 72.0\%$, $SD = 27.6$) than misleading information ($M = 51.3\%$, $SD = 30.32$). Finally, there was a main effect for delay [$F_{(1,150)} = 20.26, p < .001, \eta_p^2 = .12$]. Participants correctly recognised more items when they received the information immediately ($M = 70.4\%$, $SD = 19.3$) than after a delay ($M = 53.0\%$, $SD = 27.7$). Because the effects of delay did not differ from this pattern across the four question structures, they will not be discussed below.

Table 1. Examples of the four question structures containing control and misleading information

Question structure	Control information	Misleading information
Closed	Did Eric have a company logo on his van?	Did Eric have an AJ's logo on his van?
Closed specific	Did Eric have a company logo in large black letters on his van?	Did Eric have an AJ's logo in large black letters on his van?
Closed presumptive	Eric had a company logo on his van, didn't he?	Eric had an AJ's logo on his van, didn't he?
Open presumptive	Tell me about the company logo on Eric's van?	Tell me about the AJ's logo on Eric's van?

Note: In this example, Eric's van had an RJ's logo in the film.

Table 2. Percentages of correct, incorrect and do not know responses to control and misleading questions during the initial interview

	Control			Misleading			Overall correct
	Correct	Incorrect	DK	Correct	Incorrect	DK	
Closed	68.0	23.7	8.2	61.7	21.3	17.0	65.1
Closed specific	73.4	20.2	6.4	46.9	37.8	15.3	59.9
Closed presumptive	71.4	18.4	10.2	47.6	27.4	25.0	60.4
Open presumptive	68.4	8.2	23.5	44.9	37.8	17.3	56.6

Note: DK, participants' 'don't know' responses.

Did question structure affect people's susceptibility to misinformation? In short, the answer is yes. Figure 1 shows participants' mean correct recognition for control and misleading information for each question structure. There are two important features to notice. First, collapsed across question structure, participants correctly recognised more items when they were given control information than misleading information. In other words, they demonstrated the misinformation effect. A 2 (information) $\times$ 4 (question structure) repeated-measures ANOVA revealed that this difference between control and misled items was significant [$F_{(1,150)} = 35.06$, $p < .001$, $\eta_p^2 = .19$]. The second important feature to notice is that the different question structures affected the size of the misinformation effect. That is, there was a significant interaction between information and question structure [$F_{(3,450)} = 10.20$, $p < .001$, $\eta_p^2 = .06$]. There was no main effect for question structure [$F_{(3,450)} = 1.37$, $p = .251$].

To further investigate the interaction, t -tests were conducted comparing correct recognition for misled and control items for each question structure. Closed questions revealed no misinformation effect: there was no significant difference in correct recognition between control and misled items [$t(150) = 0.11$, $p = .914$]. Closed specific, closed presumptive and open-ended presumptive questions all demonstrated significant misinformation effects [closed specific: $t(150) = 5.54$, $p < .001$, $d = 0.90$; closed presumptive: $t(150) = 2.17$, $p = .032$, $d = 0.35$; open-ended presumptive: $t(150) = 6.71$, $p < .001$, $d = 1.09$]. The effect sizes were largest for the closed specific and open presumptive questions, which suggest that these two question structures created the largest

differences in people's memories between control and misled items. Not only did they increase people's accurate recognition of items about which they received non-leading, control information but also they increased people's inaccurate recognition of items about which they received misleading information.

Confidence

Overall, participants were confident about their answers on the recognition test; they rated their confidence at about 3 on the seven-point scale ($M = 3.09$, $SD = 0.80$). Consistent with previous research, participants were more confident about their memories of items about which they received misleading information ($M = 3.23$, $SD = 0.90$) than control information ($M = 2.94$, $SD = 0.87$) (see, for example, Assefi & Garry, 2003; Loftus, Donders, Hoffman, & Schooler, 1989). Indeed, a 2 (delay) $\times$ 2 (information) repeated-measures ANOVA revealed a significant main effect for information [$F_{(1,150)} = 22.43$, $p < .001$, $\eta_p^2 = .13$]. There was also a main effect for delay [$F_{(1,150)} = 28.60$, $p < .001$, $\eta_p^2 = .16$]. Participants were more confident about their memories when they received the information immediately ($M = 3.40$, $SD = 0.65$) than after a delay ($M = 2.77$, $SD = 0.81$). The interaction between information and delay was not significant [$F_{(1,150)} = 0.57$, $p = .45$].

Figure 2 shows participants' mean confidence for misled and control items displayed by question structure. Participants were more confident about their answers for misled than control items for closed and closed presumptive questions. Indeed, a 2 (information) $\times$ 4 (question structure) repeated-measures ANOVA on mean confidence ratings revealed a significant interaction [$F_{(3,450)} = 3.22$, $p = .023$, $\eta_p^2 = .02$]. There was also a significant main effect for misinformation: participants were more confident about their answers for misled than control items [$F_{(1,150)} = 6.86$, $p = .01$, $\eta_p^2 = .04$]. There was no main effect for question structure [$F_{(3,450)} = 1.66$, $p = .17$].

To further examine the interaction, t -tests were conducted comparing confidence on misled and control items for each question structure. For closed and closed presumptive questions, participants were more confident about their answers on misled than control items [$t(150) = 7.34$, $p = .007$, $d = 0.44$ and $t(150) = 3.47$, $p = .001$, $d = 0.56$, respectively]. For closed specific and open-ended presumptive questions, there was no difference between participants' confidence for their answers on misled than control items [$t(150) = 1.21$, $p = .228$ and $t(150) = 0.15$, $p = .883$, respectively]. These results suggest that question structure also affected people's confidence ratings: they were more confident about their answers to

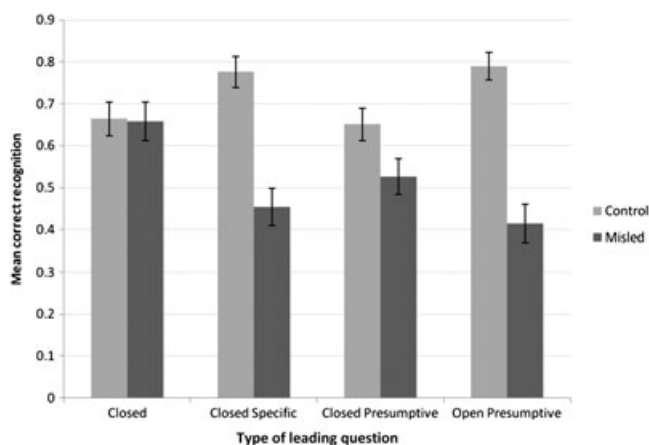


Figure 1. Mean correct recognition for control and misled items by question structure

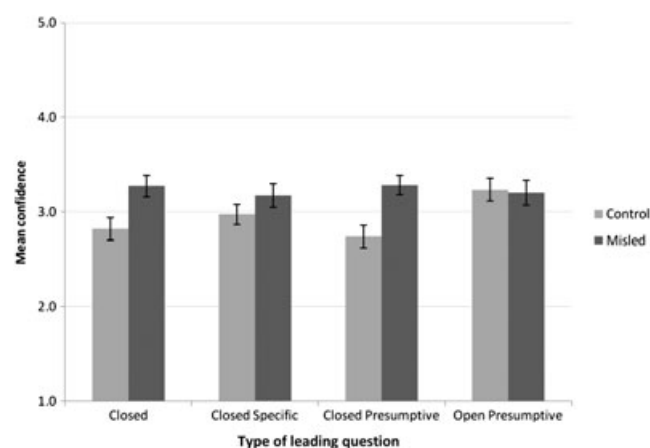


Figure 2. Mean confidence for control and misled items by question structure

misled items than control items but only when they had been asked closed and closed presumptive questions.

DISCUSSION

Our findings indicated that people were more misled when previously exposed to misleading information in closed specific and open presumptive questions than when exposed to this information in closed and closed presumptive interview questions. Not only did the closed specific and open presumptive questions encourage people to agree with the misleading questions during the initial interview but also these questions decreased the accuracy of participants' memories during the later recognition test. The denial of information in the initial interview provided no indication of whether participants would report the information on the subsequent recognition test. These findings fit with earlier research demonstrating that the way in which interview questions are worded affects witnesses' memories (e.g. Loftus & Palmer, 1974; Loftus & Zanni, 1975).

It is interesting to note that closed questions did not demonstrate a misinformation effect in the subsequent recognition test; that is, there was no significant difference between participants' correct recognition of control and misleading information. However, this lack of a misinformation effect may have occurred because closed questions did not encourage participants to spend much time thinking about the answer; they could simply reply 'yes' or 'no'. The other questions encouraged participants to spend time thinking about the items that they were asked about, albeit in different ways. For closed presumptive questions, participants might have merely accepted the information that the interviewer presumed (see Belli, 1989, for a discussion of misinformation acceptance). For the open presumptive questions, participants might have accepted the presumed information and then processed that information in such a way—through visualising the details or providing a narrative answer—that increased their susceptibility to the misleading information. For the closed specific questions, participants might have also engaged in additional processing, which increased their susceptibility to the misleading information. It is possible that the open presumptive and closed specific encouraged

participants to process the suggested details at a level over and above the processing needed for closed and closed presumptive questions. As a result, participants were more misled by suggestions introduced through open presumptive and closed specific questions. Future research might determine the exact mechanism through which this increased suggestibility occurs.

The results of the current experiment were partially consistent with those found in investigations of question structure and misleading information in children. For example, at least two experiments have demonstrated that children were more misled when they were asked closed questions than open questions (Gee et al., 1999; Powell & Roberts, 2002). Children were thought to be more misled by closed than open questions because they were more likely to guess one of the alternative answers when asked closed questions than they were to generate an answer to open questions. Research has shown that children were more likely to answer closed questions that did not make sense—because they could guess one of the alternatives—than the same questions asked using open structures (Waterman et al., 2000). In the current experiment, it is possible that adults did not guess more for closed than open questions because they were able to generate answers for the open questions. Indeed, adults have been shown to be less likely to guess answers to closed questions than children (Waterman, Blades, & Spencer, 2001). This difference in guessing may have contributed to the current results that suggested that adults were equally misled by certain types of closed and open questions. Future research might directly compare adults' and children's agreement with misleading information delivered via open and closed questions to determine whether different questions encourage different response sets based on age.

There were a few limitations to the current experiment. First, there was only one question of each structure used. It is possible that using two versions of closed presumptive questions, for example ('The robber used a shotgun to hold up the bank didn't he?' and 'Didn't the robber use a shotgun to hold up the bank?'), might have increased the power of the experiment. Second, the sample consisted of mainly middle-class, female, white participants, which may limit the generalisability of the results. However, on a more positive note, the sample was not limited to university students and also included many members of the wider community.

The current findings have important practical implications for all professionals who conduct or evaluate investigative interviews. To heighten the reliability of the witness's statement and to ensure that the statement is admissible in court, interviewers need to avoid questions that lead on an issue or suggest or presume contentious details. In our experience and that of legal experts (H. Selby, personal communication, The Australian National University, Canberra, 22 June 2009), misleading *open-ended* questions (one type of question shown to be most damaging in the current study) are often overlooked by professionals as being innocuous, particularly when they lack specific detail like the misleading open-ended questions used in this study. Furthermore, although leading questions constitute a relatively low proportion of all questions, they are used by a large proportion of interviewers. In one study, over

three-quarters of interviewers used at least one option-posing question containing a specific detail or activity that the witness had not previously disclosed, and with regard to presumptive cued-recall questions, the rate is approximately 50% (Hughes-Scholes & Powell, 2008). Although this research was conducted with children, comparisons across studies show that interviewers predominantly use closed question structures irrespective of the age of the witnesses (e.g. Davies, Westscott, & Horan, 2000; Memon, Holley, Milne, Koehnken, & Bull, 1994).

The current findings therefore highlight the importance of investing in further research regarding ways to enhance professionals' ability to identify and avoid misleading questions. The findings also highlight the importance of electronic recording of all witness interviews, where possible, to increase professionals' ability to scrutinise the questioning process.

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