Distinguishing Eyewitness Descriptions of Perceived Objects from Descriptions of Imagined Objects

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SUMMARY
This study identifies cues that differentiate perceptually based from suggested eyewitness memories and investigates whether misled witnesses deliberately invent false descriptions of suggested objects. Witnesses to a staged event either viewed a target object (Visible condition), did not see the object but had its presence suggested to them (Suggestion condition), or did not see the object but falsified a description (Deception condition). Compared to Suggestion witnesses, Visible witnesses who provided a description used more sensory details, used fewer verbal hedges and ‘I’ pronouns, rated their confidence higher, spoke more slowly, and maintained less eye contact with the interviewer. Obtained differences between Suggestion and Deception witnesses imply that misled witnesses do not intentionally fabricate descriptions.

In many criminal investigations, legal hearings, and courtroom trials, eyewitnesses are the main source of evidence. Unfortunately, witnesses can be misled. For example, Loftus has demonstrated that misinformation introduced after a target event can become incorporated into the witness’s report (e.g. Loftus, 1975; Loftus et al., 1978). It would be useful if researchers could identify cues in the content of the witness’s report, in the sound of his or her voice, or in his or her visual appearance while testifying that indicate whether a report is based on perception or suggestion. Then, perhaps observers (such as jurors) could improve their ability to evaluate testimony by learning to use these cues.

Several cues have already been found. Schooler et al. (1986) compared written transcripts of statements made by witnesses who actually saw a traffic sign to statements made by witnesses who did not see the sign but had its presence suggested to them. The authors reported that, compared to descriptions of suggested objects, descriptions of perceived objects tended to contain more sensory details and fewer words, verbal hedges (words that attenuate an assertion, such as ‘I think there was a stop sign’), references to the witness’s cognitive processes, and references to the function or purpose of the object. They also found that witnesses who saw the sign

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reported higher confidence than did misled ones, even though expressed confidence does not always predict witness accuracy (e.g. Bothwell et al., 1987; Deffenbacher, 1980; Leippe, 1980). The authors linked their results to Johnson and Raye’s (1981) reality-monitoring theory, which proposes that memories of events should contain information indicating whether the events were internally or externally generated. Memories of perceived events should typically include sensory details because these details are encoded when the senses are used to perceive an event. In contrast, memories of suggested events should include references to the cognitive processes that the individual uses in imagining the event.

Schooler and colleagues subsequently extended their findings using several new objects, such as a picture frame and a shovel, as stimuli (Schooler et al., 1988). As before, reports about perceived objects contained more sensory details and fewer verbal hedges than did reports about suggested objects. A new finding was that suggested memories were more likely than perceptual memories to include the pronoun ‘I’. Apparently this increase in self-reference was another consequence of the fact that suggested memories are internally generated. In contrast to their earlier results, Schooler et al. (1988) found no difference between the number of words used to describe perceptual versus suggested memories. They speculated that the complexity of the target object might determine whether a difference in word count is obtained. The stimuli in the later study have more features than do traffic signs and therefore could be described extensively by witnesses who actually saw them, whereas descriptions of perceived traffic signs would necessarily be shorter.

Leippe and colleagues (Leippe et al., 1991, 1992) have identified some additional cues. They videotaped witnesses describing encounters with two confederates. The researchers did not give the witnesses misleading information, but some of the questions concerning non-existent behaviours or objects were ‘acquiescence questions’, phrased so as to imply that the interviewer expected an affirmative answer. Using descriptions of the confederates and the actions that took place as well as photospread identifications, the authors calculated a composite accuracy score for each witness. They found that accurate witnesses used a more powerful speech style (Erickson et al., 1978) that included fewer verbal hedges than did inaccurate witnesses. In addition, accurate witnesses made fewer memory failure admissions (admitting that they did not remember a particular detail), and the number of words in the report was positively correlated with accuracy.

In summary, some cues that may signal that a report is perceptually-based are high self-reported confidence, many sensory details, and few verbal hedges, references to cognitive processes, memory failure admissions, and self-references. A greater number of words in the report may indicate a perceptual memory if witnesses must describe various aspects of a complex event lasting several minutes and including many different actions and two target persons (Leippe et al., 1992). In contrast, when the stimulus is a common object, such as a traffic sign, whose features show little variation across instances, witnesses reporting perceptions may use fewer words than the misled ones who fumble their way through a description of an imagined object (Schooler et al., 1986). Further, if the stimulus is an object with an intermediate level of complexity (such as a picture frame), then the word count might be the same for perceived and suggested memories (Schooler et al., 1988).

Except for the number of words used, the cues listed above involve the semantic content of the witness’s testimony. However, cues may also be available from the way
the witness sounds and from his or her appearance. For example, research on persuasion has shown that an increase in the number of hesitation words (such as ‘um’) decreases a speaker’s credibility (Erickson et al., 1978) and that speakers seem more credible when they speak rapidly rather than slowly and include few pauses in their speech (Miller et al., 1976). Furthermore, speakers who avoid eye contact with the listener lack credibility (Hemsley and Doob, 1978). Researchers have not demonstrated that these cues can actually be used to predict whether a report is based on perception, but it would be useful to examine their validity, as observers apparently assume that the cues are valid and use them to assess credibility.

In fact, there are some reasons to believe that these cues may be correlated with a report’s source (perception or suggestion), although not in the direction that observers expect. Witnesses who actually saw a critical object would describe their viewing of that object on a specific earlier occasion, but misled witnesses might describe their general knowledge of what typical examples of the object are like. Thus, witnesses remembering a perceived object must retrieve a particular episodic memory, whereas witnesses imagining an object would have to retrieve a semantic memory, or at least a blend of semantic and episodic memories. Tulving (1983) has argued that episodic retrieval is often slower and more effortful than semantic retrieval. If so, descriptions of a perceived object might be given more slowly and might contain more hesitation words and pauses than would descriptions of a non-existent, suggested object. In addition, witnesses reporting an actual memory might have less cognitive capacity available during recall than would witnesses describing an imagined memory. If focusing one’s gaze on another person’s eyes and maintaining that focus also requires some mental effort, then witnesses describing a perceptual memory might make less eye contact than would misled witnesses reporting a suggested memory.

Another way to look at the situation is that, for witnesses who perceived an object, there is only one ‘correct’ memory trace to retrieve (the memory of viewing the object on one earlier occasion). But for misled witnesses there are several possibilities, including retrieving general knowledge about the object or well-remembered memories of viewing similar objects previously. Misled witnesses might be able to describe suggested objects fairly quickly and easily because there are multiple retrieval paths that can be used to complete the task.

The primary purpose of this research was to identify cues that can distinguish reports based on perceptions from those based on suggestions. Visual and auditory cues as well as cues in the content of the witnesses’ testimony were examined, and the cues included not only ones that previous researchers have found to be diagnostic but also some that observers associate with credibility but whose validity has not been established. The cues were examined by exposing witnesses to a staged event and then providing some of them with misleading information to induce them to describe a non-existent object (a calculator). Their reports were compared with descriptions given by witnesses who actually saw the object. It was expected that previous results identifying valid cues would be replicated using the calculator, thus adding generality to those findings. One advantage to this procedure is that, as in the studies by Leippe and colleagues (Leippe et al., 1991, 1992), the witnesses observed a live, staged event rather than viewing a videotaped one. Furthermore, an attempt was made to put the participants in a situation that had legal relevance and was similar to what real eyewitnesses experience; therefore, the staged event involved an alleged theft rather than simply a display of objects. A calculator was chosen as the target object because
Calculators have many features that can be described (e.g. size and colour of the case; colour and number of function keys) and because these features vary considerably from one calculator to another.

A second purpose of the present study was to investigate whether the misled witnesses actually believed that they had seen the non-existent calculator or whether they provided a description that they knew to be invented. The question about belief has been a topic of debate for researchers interested in the effects of misinformation. It may be that misled witnesses deliberately invent details (or entire objects) that are consistent with the misinformation because they are ‘just going along with what they think the experimenter wants’ (Weingart et al., 1995, p. 72), perhaps in an attempt to portray themselves as attentive or good at remembering. Similarly, demand characteristics might emerge such that witnesses report details consistent with the misinformation, even though they know they never saw these details; they believe that the misinformation must be accurate since it was presented by the experimenter (McCloskey and Zaragoza, 1985; Zaragoza and Koshmider, 1989).

Alternatively, misled witnesses may actually come to believe that they remember seeing suggested details or objects, either because the details replace or blend with the memory of the actual event, because the witness accepts them as true after failing to remember the actual event, or because of some other mechanism (see Loftus and Hoffman, 1989). Some studies have supported this hypothesis. For example, Weingart et al. (1995) explicitly instructed witnesses not to report information presented in the actual event. They found that misled witnesses often avoided reporting the misinformation, which suggests that they truly believed that it had been a part of the event. Additional studies that imply ‘true belief’ include ones by Toland (1990, cited in Weingart et al., 1994), in which witnesses were asked to bet money on the accuracy of their reports, and by Zaragoza and Lane (1994), in which witnesses had to specify the source of different pieces of information they received.

The issue about belief is important not only to research on the effects of misinformation but also to the search for cues that distinguish perceived from suggested memories. If witnesses do not truly believe that they saw a suggested object, then they should emit the same cues as do deceptive witnesses. This would mean that observers could distinguish perception-based from suggestion-based reports by using cues that researchers have linked to deception (most of which are non-verbal rather than verbal, according to Porter and Yuille, 1996). In contrast, if misled witnesses do believe that they saw the suggested object, then observers would have to use a set of cues other than those signalling deception, to tell which reports came from perceptions and which came from suggestions.

In this study, participants witnessed a staged event involving a target individual who was subsequently ‘accused’ of stealing a calculator (this scenario was inspired by Wells et al., 1979). In the ‘Visible’ condition, the witnesses could see the calculator. In the ‘Suggestion’ condition, the calculator was not visible but its presence was suggested to the witnesses. Finally, in the ‘Deception’ condition, witnesses were asked to invent a description of a calculator. Witnesses were videotaped as they were interviewed about what they had seen. Statements made by all witnesses who provided a description were compared in an effort to discover which visual, auditory, and content cues can differentiate perception-based from suggestion-based accounts. It is important to point out that no cues were examined that would require special equipment, slowing of the videotape, or extensive training on the part of the observers.
to detect, as the goal of this research was to identify cues that jurors or judges could perceive and use when listening to a witness in a courtroom.

The predicted results appear in Table 1. Most predictions for the Suggestion condition were based on the research of Leippe and colleagues (Leippe et al., 1991, 1992) and Schooler and colleagues (Schooler et al., 1986, 1988). The tentative prediction about witness-reported confidence was based on one significant result (Schooler et al., 1986) and one null result (Schooler et al., 1988). Predictions for the Suggestion condition involving auditory and visual cues were developed from Tulving’s (1983) arguments concerning the distinctions between episodic and semantic memories and the hypothesis that Suggestion but not Visible witnesses have several retrieval options.

Predictions for the Deception condition were based upon summaries of research on cues to deception (DePaulo, 1992; DePaulo et al., 1985) and Porter and Yuille’s (1996) study. In typical deception studies, participants are asked to lie about their emotional states or their feelings towards another person; they rarely lie about an event they experienced or an object they allegedly saw. Therefore, all the Deception predictions are actually rather tentative. There seems to be no empirical evidence that deceptive speakers use many verbal hedges, but given DePaulo’s (1992) conclusion that they may attempt to distance themselves from their false statements, one could hypothesize that verbal hedges should occur. No specific predictions were made regarding the remaining cues due to a lack of research on them.

### METHOD

#### Participants

The data reported in this article were generated by 54 female and 32 male students (Visible n = 35; Suggestion n = 25; Deception n = 26) enrolled in an introductory psychology course at a Midwestern university. All 86 students participated in partial

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Table 1. Predicted results for the Suggestion and Deception conditions relative to the Visible condition
fulfillment of a course requirement. The proportion of male and female participants did not differ significantly across conditions.

Materials

The calculator manipulation took place in a staging room containing several small desks that faced a large desk. Several items were arranged on the large desk to give the appearance that a student had been doing statistics homework there. Some of these items were a statistics textbook, a workbook, pencils, an open folder, a paper with statistics problems written on it, a sheet containing equations, a soft drink can, a yellow highlighting marker, and a book bag.

In the Visible condition, a Texas Instruments TI30Xa scientific calculator was in plain sight on the desk. This calculator comes with a black lid that, once removed, can be slid onto the back of it. Its case is grey, and different buttons are black, grey, and red. (Note that, although most college students are surely familiar with calculators in general, the features of individual calculators vary greatly. Therefore, if a witness who did not see the TI30Xa provided a description based on his or her general knowledge, the description would probably not match the actual calculator.) In the two other conditions (Suggestion and Deception) the calculator was not visible.

Procedure and design

The participant-witnesses were tested individually. The items in the staging room were arranged so that the scene would appear natural and witnesses would not scrutinize the room out of suspicion that their memories would be tested later. It seems that this goal was accomplished. Most witnesses expressed surprise when they were asked to remember what they saw in the room they had just left, and many remarked that it would be a difficult task.

Upon arriving at a waiting room, the witness was greeted by a research assistant and escorted to the staging room where a second assistant (an undergraduate) sat at the large desk, ostensibly studying while waiting for the witness. When the first assistant and the witness reached the doorway to the staging room, the first assistant said to the second ‘Studying hard?’ The second assistant replied ‘Yeah, I have a big statistics exam coming up’. The first assistant then said ‘Well, good luck’ before introducing the witness to the second assistant and explaining that the second assistant would take the witness through the next part of the experiment. The purpose of this conversation was to draw the witness’s attention to the items on the desk and to make the statistics schema salient.

After the first assistant left the staging room, the second assistant asked the witness to sit at a small desk approximately 4 feet from the large desk and directly facing it. The assistant sat at an adjacent desk and explained the consent form, which indicated that witnesses would be audiotaped and videotaped while answering some questions. The form did not reveal that witnesses would be asked to recall what they saw in the staging room. When the form had been signed, the assistant asked the witness to wait in the staging room for a moment and left the room, leaving the door ajar. The signing of the consent form took approximately 3 minutes.

Sixty seconds later, a confederate hesitantly entered the room and wandered over to the large desk. She did not touch anything on the desk, but examined the items on it
in full view of the witness. She then moved into an alcove behind the desk and unsuccessfully attempted to open a locked filing cabinet drawer. Thirty seconds after the confederate entered the room, the research assistant returned. Remaining in the doorway, where she could not see the confederate standing in the alcove, she asked the witness to follow her to another room.

After moving to the new room, the witness was introduced to a third researcher, who asked the witness to assume that the confederate had been accused of stealing a calculator from the staging room after the witness left. The researcher made it clear that no actual theft had been committed. The witness was told that he or she would be asked several questions about what happened in the staging room and that it was important to answer as accurately as possible.

Witnesses in the Visible and Suggestion conditions completed a written form containing eight questions about the items in the staging room. The critical question was: ‘Was the calculator closer to the textbooks or the book bag?’ For witnesses in the Visible condition, this question was legitimate, but for witnesses in the Suggestion condition it was misleading because it implied that a calculator had been on the desk when none had been. All witnesses readily answered the question. Deception witnesses were not given this form, so as to avoid suggesting to them that a calculator had been present.

At the end of the testing session, witnesses in each condition were interviewed. The researcher asked some general questions about various items that had been in the staging room. The witness was also asked to describe the confederate and to rate on a 10-point scale his or her confidence that the description given was accurate. The critical question came at the end of the interview and concerned the calculator. The researcher asked witnesses in the Visible and Suggestion conditions ‘Did you see the calculator that was on the desk?’ If a witness said ‘no’ the interview ended, and those witnesses’ data were discarded. Witnesses who said ‘yes’ were asked to describe the calculator and to use a 10-point scale to rate their confidence that the description given was accurate.

To witnesses in the Deception condition, the researcher said ‘You might expect to see a calculator on a statistics student’s desk, but there was not one on the desk you saw. What I’d like for you to do is tell me what a calculator might have looked like if there had been one on the desk. In other words, invent a description of a calculator.’

Interviews were audiotaped and videotaped. Witnesses did not identify themselves during their interviews and instead were assigned numbers for identification purposes. The researcher maintained eye contact with the witnesses while they gave their answers, but consulted notes while asking them questions.

RESULTS

Using multiple analyses of variance with alpha levels of 0.05, the witnesses’ reports were analysed with respect to cues in the content of their testimony, in the sound of their voices as they testified, and in their visual appearance. The Newman–Keuls test was used whenever a post hoc analysis was necessary. The two segments of the testimony that were studied were the description of the confederate (the control segment) and the description of the calculator (the critical segment). The reports were scored by two judges who were blind to experimental conditions. There were very few
disagreements between the judges, and all disagreements were resolved through discussion.

For the description of the confederate, there were no differences among conditions with respect to any of the content, auditory, or visual cues; therefore, only results concerning the description of the calculator are discussed below. Furthermore, there were no differences between reports made by male versus female witnesses.

Content cues

A transcript of each witness’s testimony was used to compare the reports of the witnesses in the three conditions with respect to six content cues: sensory details, references to cognitive processes, verbal hedges, memory failure admissions, the pronoun ‘I’, and confidence. Sensory details include any specific descriptive information that can be obtained through the senses. Due to the nature of the targets in this study (the confederate and the calculator), these details were visual. Examples of sensory details from reports about the calculator are mention of its type (e.g. a ‘scientific’ calculator), its brand name, its position on the desk, and the colours or sizes of specific component parts. The number of sensory details in witnesses’ descriptions of the calculator varied by condition, $F(2, 83) = 35.55, p < 0.001$ (see Table 2). The post hoc test revealed that witnesses in the Deception condition mentioned more sensory details than did witnesses in the Visible condition, who in turn mentioned more than did witnesses in the Suggestion condition.

References to cognitive processes include statements about what the witnesses attended to or thought about as they made their observations and statements about their memory processes. This variable differed across conditions, $F(2, 83) = 4.12, p = 0.02$. Deception witnesses referred to cognitive processes more often than did

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<th>Table 2. Responses by participants in each condition</th>
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<td>Eye contact</td>
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Note. Each mean value is frequency of occurrence, except for (a) confidence, which was rated on a 10-point scale; (b) speech rate, which is expressed as words per second; and (c) eye contact, which is expressed as the percentage of time eye contact was maintained. Means in the same row with different subscripts differ significantly at $p < 0.05$ according to the Newman–Keuls post hoc test.
witnesses in the Visible condition. The mean for witnesses in the Suggestion condition fell between the other means and did not differ from them.

Verbal hedges attenuate the witness’s assertions by expressing doubt; for example, a witness might say ‘I think the buttons were blue’. Other verbal hedges include ‘I believe that . . .’, ‘I’m pretty sure that . . .’, and ‘maybe . . .’. Verbal hedges varied across conditions, $F(2, 83) = 3.22, p = 0.045$. The mean of the Visible condition was lower than those of the other two conditions, which did not differ from each other.

Memory failure admissions occur when the witness admits that he or she cannot recall some part of the description. For example, in describing the calculator, a witness could say ‘I don’t know what the brand name was’. This variable changed significantly across conditions, $F(2, 83) = 4.93, p = 0.009$. Witnesses in the Suggestion condition admitted memory failures more often than did Deception witnesses. The mean for witnesses in the Visible condition was intermediate between the other means and did not differ from them.

Use of the pronoun ‘I’ varied significantly, $F(2, 83) = 6.09, p = 0.003$. Witnesses in the Suggestion condition used ‘I’ more often than did those in the other two conditions, which did not differ.

Visible and Suggestion witnesses used a 10-point rating scale to express their confidence in the accuracy of their reports. Confidence differed between conditions, $F(1, 58) = 9.28, p = 0.004$. Visible witnesses expressed more confidence than did Suggestion witnesses.

**Auditory cues**

The auditory cues that were examined were the number of words used in the report, speech rate, the number of pauses, and hesitation words. The results revealed significance in the total number of words used to describe the calculator, $F(2, 83) = 7.53, p = 0.001$. The mean of the Deception condition was higher than the means of the other two conditions, which did not differ from each other.

To calculate speech rate, a stopwatch was used to measure the duration (in seconds) of each witness’s audiotaped report, and then the number of words in the report was divided by time elapsed. Use of this rough method (and the methods of measuring pauses and eye contact, described below) could lead to measurement error, but it was employed instead of a more precise procedure requiring measurement equipment because it reflects what jurors would have to do when listening to a witness. Any error that occurred should be consistent across the three conditions. The results showed that speech rate varied by condition, $F(2, 83) = 7.85, p = 0.001$. Witnesses in the Suggestion condition spoke more rapidly in describing the calculator than did witnesses in either the Visible or the Deception condition.

It is possible that the speech rate of the Suggestion witnesses appeared to be faster not because they actually spoke more rapidly but because they used shorter words that can be pronounced in less time. Therefore, the transcripts were analyzed and words of three or more syllables were counted. It turned out that Suggestion witnesses did not use fewer long words than other witnesses. Instead, Deception reports contained the lowest percentage (4.89%) of these words, with the percentages in the Suggestion (8.41%) and Visible (8.92%) conditions being similar, $\chi^2(2, N = 2479) = 13.39, p < 0.005$. Additional analyses focused on specific words of three or more syllables.
(e.g. ‘calculator’, ‘scientific’, ‘probably’) to see whether they appeared less often in the Suggestion condition. They did not.

For the purposes of this study, a pause was defined as any obvious interruption in the flow of speech that the judges determined to have a duration of about one second. The number of pauses did not differ significantly, $F(2, 83) = 0.63$.

Hesitation words make no semantic contribution to the report but instead may be seen as sounds that interrupt the flow of the witness’s speech. Examples include ‘uh’ and ‘um’. The number of hesitation words varied among the three conditions, $F(2, 83) = 18.17$, $p < 0.001$. Deception witnesses used more hesitation words than did witnesses in the other two conditions.

**Visual cue**

The videotaped interviews were shot so that the seated witnesses would be visible from the waist up. To measure the amount of eye contact each witness maintained with the interviewer, a stopwatch was used to find the duration of each separate gaze that the witness directed toward the interviewer. The durations of the separate gazes were then summed, and eye contact was expressed as a percentage of total time elapsed while testifying. It was fairly easy to determine whether the witness appeared to be making eye contact. The interviewer was seated immediately to the left of the camera, and the camera shot was tight enough to allow the judges to see the witness’s eyes. The results revealed a significant difference, $F(2, 83) = 5.07$, $p = 0.008$. Witnesses in the Suggestion condition made more eye contact while describing the calculator than did those in either of the other conditions.

**Interviewer behaviour**

Because differences in the interviewer’s behaviour could potentially explain the observed effects, several analyses examined whether the interviewer treated Suggestion and Visible witnesses differently. (Deception witnesses were obviously questioned in a unique way, but Suggestion and Visible witnesses should have been treated similarly.) Examination of the audiotapes revealed that, after asking witnesses whether they had seen the calculator, the interviewer requested a description in one of two ways: either ‘Can you describe it?’ or ‘Can you tell me what it looked like?’ A chi-square test showed that the frequency of each question did not vary between conditions, $\chi^2(1, N = 56) = 0.20$, $p > 0.05$. Three witnesses (two Suggestion witnesses and one Visible witness) spontaneously described the calculator after being asked whether they saw it, without waiting for a description to be requested. Only one witness, in the Suggestion condition, was given any extra prompting. This witness said she had seen the calculator but answered ‘no’ when asked if she could describe it. The interviewer prompted her by asking ‘Can you remember anything about it?’ The witness then provided a description.

Two judges were unable to detect any pauses or hesitations during the interviewer’s questions about the calculator. They agreed that there were only four instances in which the interviewer placed more stress or emphasis on a particular word than on other words in a question. In these four instances, four different words received greater emphasis. Two instances were in the Suggestion condition, and two were in the Visible condition.
The interviewer was not captured on videotape, so it was impossible to search for changes in facial expression. The interviewer attempted to maintain constant eye contact except when reading the script outline and held the script with both hands in order to prevent gesturing.

**DISCUSSION**

**Distinguishing descriptions of perceived objects from descriptions of imagined objects**

One purpose of this research was to attempt to replicate and extend previous findings regarding cues that may differentiate reports made by witnesses who actually saw an object from reports made by misled witnesses. The results related to this purpose were that, compared to witnesses who were led to believe that a calculator had been present, those who actually saw the calculator included more sensory details and fewer verbal hedges and instances of the pronoun ‘I’ in their reports, spoke more slowly, and maintained less eye contact. They also reported greater confidence in the accuracy of their descriptions. There were no significant differences in the number of words used, references to cognitive processes, memory failure admissions, pauses, or hesitation words.

The findings regarding four content cues (sensory details, verbal hedges, ‘I’, and confidence) are consistent with previous results, and findings involving the other two content cues (cognitive processes, memory failures) were insignificant in the predicted direction. Thus, the present results generally support the hypothesis that content cues based upon reality monitoring (Johnson and Raye, 1981) can help observers determine whether described objects were perceived or imagined. Furthermore, these cues work with objects that have many features and whose features vary considerably across instances.

Turning to auditory and visual cues, the present results fit with the suggestion that the complexity of the stimulus may influence the direction of the correlation between the number of words in the report and the likelihood that the report is perception-based. A positive relationship may occur if the stimulus is complex, involving multiple target objects (or persons) with many features. A negative relationship may occur if the stimulus (e.g. a traffic sign) is simple, with few features. Further, there may be no correlation if the stimulus has an intermediate level of complexity, as would be the case if it is a single object with several features that vary across instances.

The results concerning speech rate and eye contact are consistent with predictions based upon Tulving’s (1983) contention that, compared to episodic memories, semantic memories require less time and effort to access (the finding involving hesitation words was insignificant but in the expected direction). Misled witnesses maintained eye contact for a greater percentage of time and actually spoke more rapidly (as opposed to choosing shorter words) than did witnesses who really saw the calculator. Possibly because the semantic memory (or semantic–episodic blend) they were recalling could be retrieved relatively quickly and easily, misled witnesses could speed up their speech rate, and they had more cognitive capacity available to apply to the secondary task of maintaining eye contact.

The results are also consistent with the hypothesis that Suggestion witnesses had multiple retrieval options, whereas Visible witnesses did not. Visible witnesses needed to retrieve a particular memory of their experience of viewing the calculator.
once before. But Suggestion witnesses could have retrieved general information about typical features of calculators, knowledge which could have been quite accessible if it was linked in memory to several of the witnesses’ prior experiences. Suggestion witnesses also could have retrieved well-remembered memories of specific occasions when they viewed a calculator, although if this is what happened one might expect the reports to contain more sensory details than they did. In any case, Suggestion witnesses may have been able to give their reports relatively quickly and easily because there were more retrieval paths available to them than to Visible witnesses.

Comparing descriptions of imagined objects to descriptions given by deceptive witnesses

A second goal of the present study was to compare responses made by misled witnesses with responses made by witnesses who were instructed to fabricate a description. This comparison provided a way to investigate whether or not misled witnesses actually believed that they saw the suggested object. Of the ten cues examined, seven (sensory details, memory failures, number of words, instances of ‘I’, speech rate, hesitation words, and eye contact) showed significant differences between the Suggestion and the Deception conditions. These results, obtained using a different methodology than those used in previous studies, contribute additional support to the position taken by Weingart and colleagues (Weingart et al., 1994, 1995) and Zaragoza and Lane (1994) that misled witnesses do not supply descriptions that they know are false but instead come to believe that they saw the suggested details or objects.

It appears that descriptions reported by misled witnesses and those reported by deceptive witnesses are generated by different processes. Among misled witnesses, the misinformation might replace or blend with the witnesses’ memory of the actual event, or it might be inserted where no memory trace of the actual event exists (Loftus and Hoffman, 1989). Unlike misled witnesses, deceptive witnesses are probably more concerned with realism and the appearance of truthfulness, and these issues may influence their decisions about what to report and how to report it. Deceptive witnesses must take care to provide enough detail and maintain eye contact. Although they could try to imagine what calculators generally look like, the high number of sensory details in their reports suggests that they instead are more likely to retrieve an easily accessible episodic memory of a specific calculator they have seen in the past, possibly because they believe the latter description will seem more believable. An important implication of all this is that, apparently, misled witnesses do not deliberately fabricate descriptions. Therefore, observers should not attempt to use deception cues identified by previous researchers to distinguish reports based on perceptions from ones based on suggestions, as those cues will not be diagnostic.

Another implication concerns the search for ways to determine whether a witness is lying. One existing approach is ‘statement validity assessment’ (SVA), which includes an analysis of both verbal and non-verbal cues to deception. A component of SVA is ‘criteriabased content analysis’ (CBCA), ‘a method of content analysis guided by a specific set of “credibility criteria”’ which ‘have been gathered over time by legal scholars’ (Sporer, 1997, p. 374). CBCA focuses on the content of a witness’s report rather than on nonverbal cues. Some studies suggest that CBCA might be a useful
tool (e.g. Porter and Yuille, 1996), but ‘others indicate this usefulness is minimal at best and nonexistent at worst’ (Ruby and Brigham, 1997, p. 716).

Hernandez-Fernaud and Alonso-Quecuty (1997) noted that some, but not all, CBCA criteria are much like reality monitoring criteria. But they argued that, because reality monitoring is completely focused on memory processes and because memory plays a crucial role in the elaboration of deceptive statements, reality monitoring criteria should surpass CBCA at facilitating the detection of deception. Similarly, the cues used in the present study are based on either reality monitoring or other hypotheses about memory. Because many of these cues differed significantly between Deception and Suggestion reports and between Deception and Visible reports, perhaps additional research should examine whether these cues and others related to memory processes can help identify deception.

Conclusion

These results add to previous researchers’ attempts to identify cues that indicate whether a described object was perceived or imagined. It is clear that cues can be found not only in the content of the report but also in the sound of the witness’s speech and in his or her appearance. The possibility must be noted that these cues could have emerged because of subtle differences in the interviewer’s behaviour toward Suggestion and Visible witnesses, although no such differences were found. It is also possible that the nature of the target object (the calculator) to some extent determined which cues appeared or how strong they were.

These findings could be used to improve the evaluation of eyewitness reports. An interesting question is whether fact finders (such as jurors or judges) spontaneously use any of these cues in evaluating witnesses’ testimony. Furthermore, if they do not, could they be trained to use them? The ideal practical application of the present line of research would be to develop an instructional programme that would teach fact finders to distinguish perception-based from suggested reports using diagnostic cues. Such a programme would represent an important advance not only because researchers have repeatedly shown that witnesses are quite susceptible to suggestion but also because reports resulting from suggestions can seem very plausible and authentic.

Some additional recommendations for future study should be mentioned. One is that researchers should continue to search for more cues that may exist. It would not be surprising to discover that there are others besides the ones that have been reported so far. The more cues that are available, the easier it may be to determine whether a report is perceptually based. A second recommendation is to explore further the possibility that some cues (e.g. number of words) may indicate either a perceived or an imagined object, depending on the situation. It is, of course, necessary to know how to use each cue. A third recommendation concerns the fact that the witnesses in the present research were Midwestern university students. It would be useful to examine cues among adults (and children) from other cultural backgrounds, as these individuals may use different communication styles and as a result may emit different cues. Finally, it would be valuable to attempt to replicate the present results using target objects other than those used in the present and previous research. It may be that the cues emitted by witnesses depend on the target’s unusualness, familiarity, or some other attribute.
AUTHOR NOTES

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