

## Qualities of the Unreal

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Witnesses to complex events often recall nonexistent objects after being exposed to misleading postevent information. The present series of experiments investigated whether descriptions of these "unreal" memories differ from those of memories based on perception. In Experiment 1 subjects viewed a slide sequence depicting a traffic accident. In one condition, the sequence included a slide involving a yield sign. In a second condition, subjects did not see the sign but merely had its existence suggested. Many subjects in both groups later reported seeing the sign, and these subjects provided verbal descriptions. Descriptions that resulted from suggestion were longer and contained more hedges, more reference to cognitive operations, and fewer sensory details. Experiment 2 replicated these findings with a different object. Experiment 3 investigated judges' ability to discriminate the source of the descriptions based on perception and suggestion. Although judges often employed the appropriate criteria, their performance was only slightly above chance. Experiments 4 and 5 revealed that providing judges with clues regarding differences between perceived and suggested memories facilitated discrimination. The results of these experiments indicate that subtle differences exist between perceived and suggested memories, that people have a minimal ability to detect these differences, and that instructions can improve that ability.

Everyone, at one time or another, has listened to a witness's description of some fleeting event, patiently accommodated a child's extravagant tale, or tapped a foot while someone searched through memory for a tentative fact. In some of these situations one feels certain of the speaker's sincerity while still having a canny sense that the story is riddled with subjectivity. Equally, we have all had the unswerving belief that some statements are definitely factual. Is there something in these intuitions that is responding to actual differences between the way a person describes a real versus a not-so-real memory? If so, then a systematic comparison might reveal qualitative differences between the descriptions of real and distorted memories. Explicit knowledge of such differences could offer valuable insight into the representation of real and distorted memories as well as suggest ways to discern the veracity of memories.

One of the most common ways of experimentally inducing distortions in memory is through the use of postevent suggestions. In such studies, many subjects witness an event and then some receive misinformation about that event. Subsequently subjects are tested to see whether they recall the original information or the misinformation. Previous work has focused on the conditions that affect the likelihood that misinformation is retrieved. For

example, manipulations such as waiting for a duration before providing misinformation (Loftus, Miller, & Burns, 1978), describing misinformation within a parenthetical clause (Loftus, 1981), and using misinformation that refers to nonsalient items (Dristas & Hamilton, 1977) increase the likelihood that subjects' final recollection will reflect the suggested memory rather than the real memory. Conversely, manipulations such as warning subjects about the existence of misinformation (Christiaansen & Ochalek, 1983; Greene, Flynn, & Loftus, 1982), attributing misinformation to an unreliable source (Dodd & Bradshaw, 1980), using recognition tasks that present test items in an order corresponding to the sequence in which they were originally observed (Bekerian & Bowers, 1983), and not including the suggested item in the recognition test (McCloskey and Zaragoza, 1985) have all been observed to decrease the likelihood that the final recollection will reflect the suggested information.

Whereas previous comparisons of real and suggested memories have revealed many differences between the circumstances leading to their respective retrieval, presently little is known about differences between the memories themselves. The little evidence that has been collected regarding qualitative differences between real and suggested memories has generally led researchers to conclude that the two types of memories are not very different from one another. For example, a number of studies indicated that subjects' reported confidence for suggested memories can be as great as that reported for memories based on actual perceptions (Cole & Loftus, 1979; Greene et al., 1982; Loftus et al., 1978). Moreover, in some instances in which subjects have been asked for descriptions of suggested objects, their descriptions have been quite detailed. For example, in one instance, a nonexistent tape recorder was described as being "small, black, in a case, with no visible antenna" (Loftus, 1979, p. 62).

Descriptions of memories resulting from suggestions given under hypnosis can also be quite detailed and confident. Laurence and Perry (1983) provide accounts from subjects who, as a result

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of suggestions given under hypnosis, recalled having been awakened one evening by loud noises. One subject reported "I'm pretty certain I heard them. As a matter of fact, I'm pretty damned certain. I'm positive I heard these noises" (p. 524). These observations have impressed some researchers with the similarities between real and suggested memories.

On the contrary, in a paper entitled "Reality Monitoring," Johnson and Raye (1981) described a line of research that, although rooted in a different experimental paradigm, hints at the possibility of qualitative differences between real and suggested memories. Johnson and Raye provide a theory and supporting evidence to explain the processes that allow individuals to distinguish between perceived (externally generated) and imagined (internally generated) memories. In theory, differences between the representation of internally and externally generated memories reflect differences between the processes involved in the formation of each. For example, because externally generated memories result from perception, their representation is hypothesized to include more contextual (spatial and temporal) information as well as greater sensory detail. On the other hand, memories for internally generated events, having resulted from imaginal and thought processes, include information that is idiosyncratic to the subject. For example, statements pertaining to such memories may contain information about the individual's cognitive operations or his or her metamemorial processes.

Johnson and Raye have typically applied their model to memories of pallid stimuli such as word lists; however, reality monitoring principles have also been shown to apply to more complex episodic memories. For example, in a recent study, Johnson, Kahan, and Raye (1984), observed that reality monitoring principles may apply to differences between subjects' recollections of their own and their partners' dreams. It thus seems quite possible that reality monitoring principles might also correspond to differences between complex episodic memories based on suggestion and perception. If so, descriptions of memories based on perceived events would be predicted to contain more sensory information, whereas descriptions of memories based on suggestion would be predicted to contain greater reference to idiosyncratic cognitive processes.

This prediction is also suggested in part by the research of Undeutsch (1982), who uses a process termed "statement reality analysis" to differentiate between accurate and fabricated eyewitness testimony. This line of research is markedly different from the misinformation paradigm because it aims at evaluating the testimony of witnesses who may be unwilling rather than simply unable to tell the truth. Despite this different emphasis, Undeutsch's technique makes predictions somewhat similar to those of Johnson and Raye. Specifically, Undeutsch (1982) suggests that truthful statements should contain, among other things, "concreteness" and a "wealth of detailed description" (p. 46). Both of these qualities are reminiscent of Johnson and Raye's notion of greater sensory detail.

In making any predictions, it should be kept in mind that subjects who have accepted postevent information have, by virtue of being misled, been unsuccessful in their reality monitoring. Such subjects may be unsuccessful because their memory traces contain insufficient cues to indicate to them the source of their memory. In this case their memory descriptions should contain very few reality-monitoring cues of any sort. It is also possible

that misled subjects' memories are not lacking in reality-monitoring cues, but rather that the subjects are lacking in the degree to which they consider these cues. In this case, misled subjects might unknowingly mention various reality monitoring cues, such as cognitive operations, even though they do not use these cues. If such is the case, then judges who read descriptions of suggested memories might be able to use these cues to correctly identify their source.

The present series of studies investigated the application of reality-monitoring principles to potential differences between real and suggested memories. Experiment 1 examined whether qualities predicted by reality-monitoring theory would differentiate these two types of memories. Subjects actually saw a critical object, or they did not see it but merely had its existence suggested. Many subjects in both groups later reported that they had seen the critical object. These subjects then described their real or suggested memories. The two sets of descriptions were compared, and some interesting differences emerged that could be predicted by the reality-monitoring theory. Experiment 2 investigated whether these real versus suggested differences would generalize to a new item and whether the specific wording of the postevent information could affect the way an object is described. Experiments 3, 4, and 5 attempted to explore the implications of these differences by examining whether judges can identify reality-monitoring cues in order to discern the source of other people's memories. Experiment 3 investigated whether untrained subjects could differentiate between real and suggested memories and whether they would spontaneously use reality-monitoring principles in making their judgments. In Experiment 4, we examined whether providing subjects with a summary of the characteristic differences between suggested and real memories would facilitate their ability to discriminate between them. In Experiment 5 we investigated whether the same set of hints would be effective in improving the discrimination of a different set of descriptions.

### Experiment 1

Can reality-monitoring principles be used to distinguish between the descriptions of actual and suggested memories? To address this question, subjects participated in an experiment in which they viewed a slide sequence depicting an auto accident. In one condition, subjects viewed a sequence that included one slide portraying a car at an intersection by a yield sign. In a second condition, subjects viewed the identical slide sequence with the exception that the critical slide did not include a yield sign. After viewing the slides, subjects received a questionnaire. For the subjects who did not view the yield sign, the questionnaire included a suggestion about the existence of a yield sign at the intersection. Finally, subjects were given a second test in which they were asked if they had seen a yield sign, and if so, to describe it.

According to the reality monitoring model, the following predictions were made: (a) Descriptions generated by subjects who actually witnessed the yield sign should contain more sensory information about the sign. (b) Descriptions generated by subjects for whom the yield sign was suggested should be more likely to mention the cognitive processes involved in the formation of their memory.

## Method

**Subjects.** Subjects were 175 undergraduates from the University of Washington who received class credit for their participation. Experimental groups ranged in size from 1 to 8 people.

**Material.** The stimulus materials were 20 color slides that depicted various scenes of an auto-pedestrian accident. The slides were drawn from the set used by Loftus et al. (1978, Experiment 1). All slides were presented on a Kodak carousel projector and were projected onto a white wall.

**Procedure.** The procedure was similar to that used by Loftus et al. Subjects were told that they were to pay close attention to a slide sequence, the content of which was not described. The critical slide appeared in Position 13. For half of the subjects this slide depicted a red Datsun at an intersection by a yield sign. For the other half of the subjects this slide depicted the identical scene with the exception that the yield sign was not on the sign pole. The slide sequence was shown at a rate of approximately 8 s per slide.

After viewing the slides all subjects received a 15-min filler activity. Next subjects received a 17-item questionnaire pertaining to the slide sequence. For each question subjects were asked to respond either "yes" or "no." Subjects were also asked to indicate their confidence in their response by circling either 1 for guessing, 2 to indicate moderate confidence, or 3 to indicate that they were very confident. The questionnaire was a slightly amended version of that used by Loftus et al. Question 17 was the critical question. For those subjects who did not view the yield sign it read, "Did another car pass the red Datsun while it was stopped at the yield sign?" For those subjects who viewed the yield sign, Question 17 made no mention of a sign but instead referred to a slide that occurred later in the slide sequence.

Subjects were then given a 5-min filler task followed by a second questionnaire about the slide sequence. This questionnaire was the same for both conditions and asked whether subjects had seen six specific objects in the slide sequence. For each object listed, the subjects gave a "yes/no" response and confidence rating. All questions were in the form, "Did you see the . . . ?" The first five questions were filler questions that asked about objects other than the yield sign (e.g., a white building seen at the beginning of the slide series). The sixth question asked subjects if they had seen the yield sign. Upon completion of this questionnaire all subjects were asked to describe in detail those objects that they had just affirmed having seen. If subjects responded affirmatively to more than three items, the experimenters selected three items for them to describe, always including the yield sign if it was one of the items claimed to have been observed. No constraints were put on these descriptions and subjects were encouraged to take as much time as they needed.

## Results

Of the 90 subjects who witnessed the yield sign, 68 or 76% claimed to have seen it and provided a description of it. Of the 85 subjects for whom the yield sign was only suggested, 21 or 25% reported seeing it. Not surprisingly this difference was significant,  $z = 6.80$ ,  $p < .01$ .

Subjects who actually saw the sign were more confident about it than subjects who had not. The mean confidence rating for subjects who reported seeing the sign was 2.84 for subjects who actually saw the sign (real-memory condition) and 2.57 for subjects who did not see the sign (suggested-memory condition). (A higher rating indicates a greater degree of confidence.) This difference exceeded that expected by chance,  $t(87) = 2.33$ ,  $p < .05$ .

The mean number of words used by subjects to describe the yield sign was calculated. Subjects who saw the yield sign used

an average of 18.34 words to describe it. Subjects for whom the yield sign was suggested used an average of 25.14 words to describe it,  $t(87) = 2.32$ ,  $p < .05$ .

In order to ensure that the difference in word count was not due to a sampling bias (e.g., subjects who tend to accept misinformation may tend to write more), we examined the number of words used to describe an unrelated item. Virtually all subjects claimed to have seen the white building and provided a description of it. The mean number of words used to describe this unrelated item was 22.45 for subjects who described the yield sign in the real-memory condition and 24.76 for subjects who described the yield sign in the suggested-memory condition. This difference was not significant,  $t < 1$ .

In order to determine whether the difference between the number of words used by subjects in the real and suggested conditions could be attributed to differing levels of confidence, we calculated the partial correlation between number of words and condition, with confidence held constant. Even after controlling for confidence, we observed a significant relationship between the number of words used to describe the sign and whether subjects were in the real or suggested condition,  $r = .24$ ,  $p < .05$ . This finding argues against the possibility that differences between the description lengths of suggested and real memories were due to differences in confidence.

Two independent raters individually examined all of the descriptions for the following qualities: (a) The mention of any sensory attributes of the sign, including its color, size, shape, etc. (rater agreement = 91%). An example of a sign description that contained this quality is, "I saw the yield sign—it was red and white—looked like any old yield sign." (b) The mention of any geographic attributes of the sign, including its position in relationship to the curb, the trees, the sidewalk, etc. (rater agreement = 91%). An example of a sign description that contained geographic information is, "The yield sign was to the right of the corner of the Datsun. A special green bus was to its left." (c) The mention of any cognitive processes occurring either at or after the time that the sign was witnessed, including mention of what the subject was thinking or paying attention to while viewing the critical slide as well as thoughts that occurred to subjects while reading either the first or the second questionnaire (rater agreement = 91%). An example of a description that contained this quality is, "After seeing the question, the answer I gave was more of an 'immediate' impression of what I remembered. But I believe it was located on the corner just before the car turned." (d) The mention of the purpose of the yield sign (rater agreement = 94%). An example of a description including this quality is, "I believe there is a yield sign for the traffic going in the other direction." (e) The use of verbal hedges, such as "I think" or "I believe" used to modify statements about the sign. An example of a description that included this quality is, "I'm not sure but there was either a yield sign or a stop sign at the corner where the car turned right." Table 1 presents the proportion of descriptions that both raters agreed contained each of the above qualities.

As can be seen in Table 1, compared to real-memory descriptions, suggested descriptions less frequently mentioned the sensory properties of the sign but more often included the subjects' cognitive processes, the function of the sign, and verbal hedges. The two sets of descriptions did not differ with regard to their use of geographic information.

**Table 1**  
*Attributes of Memory Descriptions in Experiment 1:*  
*Percentage of Descriptions Containing Each Attribute*

Attribute	Description		z
	Real	Suggested	
Sensory	41	19	1.76*
Geographic	59	52	<1
Cognitive processes	3	29	2.88**
Function of sign	1	14	2.60**
Verbal hedges	12	38	2.71**

\*  $p < .05$ , one tailed. \*\*  $p < .01$ .

### Discussion

In Experiment 1 we observed a number of differences between memory descriptions based on perception and suggestion. Compared to descriptions of real memories, descriptions of suggested memories were reported with less confidence,<sup>1</sup> contained more words, were more likely to be qualified by verbal hedges, and were more likely to mention the function of the critical item. In addition, descriptions of real memories more commonly referred to the sensory attributes of the critical item, whereas descriptions of suggested memories more often mentioned the cognitive processes that the subject engaged in during or after viewing the initial event.

The observation that subjects in the real condition were more apt to describe the sensory properties of the sign is nicely accommodated by reality-monitoring principles. Specifically, in agreement with our results, reality-monitoring theory predicts that subjects who describe actual memories should recall the sensory properties associated with those memories, and should consequently be more apt to mention them.

Whereas reality-monitoring theory easily accommodates the qualities of the real-memory descriptions, it is a little more difficult to apply to unreal memories. Clearly subjects who described a suggested yield sign were unsuccessful in monitoring the reality of their memories. Nevertheless, their descriptions contain fewer sensory details and more mention of cognitive processes, two types of cues that might have facilitated accurate reality-monitoring processes. Thus the question remains, why did these subjects fail to adequately consider the reality-monitoring cues apparently present in their descriptions?

Analysis of the descriptions of suggested memories indicates that misled subjects may have engaged reality-monitoring processes to some insufficient degree. Specifically, the decreased confidence and increased number of words used by suggested-memory subjects hint at the possibility that these subjects may have used reality monitoring to assess the validity of their memories and consequently may have observed that their memories lacked sufficient sensory detail. In response, subjects may have used more words, including mention of their cognitive operations, to compensate for the sensory deficit identified by their reality-monitoring process. Three general observations support this interpretation. (a) Suggested-memory descriptions were significantly less likely than real-memory descriptions to mention the sensory qualities of the critical item. (b) Many of the qualities

typifying suggested memories (i.e., mentioning cognitive processes or the function of the sign) can be viewed as attempts to justify the memories. (c) Alternative explanations do not easily account for the increased number of words associated with suggested memory descriptions. The greater number of words used to describe suggested memories cannot be attributed to the possibility that suggestible subjects are simply more wordy because these subjects did not use more words to describe a neutral item. Moreover, the longer descriptions in the suggested-memory condition can not be exclusively attributed to a general lack of confidence in the response because, even when confidence was held constant, there was a significant relationship between description length and type of memory description.

Many factors could have induced subjects to expand upon their suggested memories. Given the evidence at hand, however, it seems quite plausible that the lack of sensory information may have at least contributed to this effect. In short, subjects may have felt compelled to compensate in longwindedness for what they lacked in vividness.

### Experiment 2

A question arises as to whether the results of Experiment 1 are peculiar to the particular item used, or put another way, whether such results would similarly be observed with a different

<sup>1</sup> The observation that suggested memories were associated with a lower degree of confidence is contrary to the findings of a number of other studies (Cole & Loftus, 1979; Greene, Flynn, & Loftus, 1982; Loftus, Miller, & Burns, 1978). In these studies reported confidence was as great or greater for suggested memories as compared to perceived memories. It is not completely clear why this study found lower confidence levels associated with suggested memories; however, there are a number of procedural differences between the present paradigm and previous designs that might be involved.

First, all of the studies that have examined the confidence of suggested memories have used suggestions that represent an alteration rather than a supplementation of the critical item(s). In these studies, postevent suggestions modified existing objects rather than referring to nonexistent objects. For example, in Loftus et al.'s (1978) study, subjects viewed a yield sign that was subsequently referred to as a stop sign. In the present study, a yield sign was suggested to exist in a place where no sign had previously been viewed. It is possible that this type of supplemental misinformation may be more difficult to imagine than alterational misinformation and may therefore lead to subjects' reduced confidence.

A second difference between this study and other studies examining the relationship between suggestion and misinformation involves the exposure time of the slides. In this study each slide was shown for approximately 8 s as compared with the 3-s exposure typically used in other studies. We used a longer exposure time in an effort to maximize the likelihood that perceived descriptions would contain details absent in the suggested descriptions. The longer exposure produced more optimal witnessing conditions and this may have influenced confidence levels. In a review of 43 studies assessing the relationship between confidence and accuracy, Deffenbacher (1980) observed that positive correlations between confidence and accuracy occur primarily when events are viewed under optimal conditions. The observation that there may exist some threshold viewing optimality that affects the role of confidence could be applicable to the misinformation paradigm. Clearly, however, further research is necessary to fully understand the relationship between confidence and suggested memories.

item. To ascertain this, Experiment 2 was conducted. Experiment 2 was similar in most ways to Experiment 1 but involved a different critical item and a different subject population.

A second issue examined in Experiment 2 was whether the nature of the differences between real- and suggested-memory descriptions could be influenced by the wording of the postevent suggestion. In Experiment 1 we observed that, compared to real-memory descriptions, suggested-memory descriptions were less likely to mention the sensory properties of the critical item.

It is worth noting that the real and suggested descriptions differed with respect to the sensory attributes of the sign but not with respect to the sensory attributes of the general scene; that is, both types of descriptions were equally likely to describe the position of the sign in relation to the other objects in the slide. It is possible that the wording of the postevent question may have affected what aspects of the sign were described. Specifically, the yield sign was suggested by the postevent question, "Did another car pass the red Datsun while it was stopped at the yield sign?" Thus the yield sign was suggested in the context of a question that described the sign's position in relationship to the car. It seems possible that if the yield sign were mentioned in a postevent question that included a different context the pattern of results might differ. Suppose that the sign were to be suggested in the context of a question that referred to a specific sensory property; for instance, "Was the yield sign red and white?" Suggested memories might then be more likely to include sensory details of the sign. Such a result would reduce the likelihood that real and suggested descriptions would differ on this attribute. To address this issue, Experiment 2 included two different wordings of the postevent information: one referring to the position of the object (a geographic attribute) and the other to its color (a sensory attribute).

## Method

**Subjects.** Subjects were 177 high school students from a wide variety of geographic locales in the State of Nebraska. They came to Nebraska Wesleyan University in Lincoln, Nebraska, to participate in Psychology Fair on November 3, 1983. The fair demonstrated many different types of experiments, and the subjects who participated in this study perceived the study simply to be one of these many demonstrations.

**Design and procedure.** Groups of subjects, ranging in size from 4 to 8, were brought to a room to view 20 color slides depicting an automobile accident. The slides were presented at a rate of 3 s per slide. The critical slide appeared in Position 12. For 53 subjects this slide depicted a red Datsun at an intersection by a stop sign. For 124 subjects this slide depicted the identical scene with the exception that the stop sign was not on the sign pole.

Immediately afterward, each subject was handed a piece of paper and a pencil. They wrote their names at the top of the paper, and the Numbers 1 to 7 below. They were asked 7 questions about the slides. Question 4 was critical, and it defined three separate groups of subjects. For the 53 subjects who had actually seen the sign, Question 4 made no mention of a traffic sign but instead referred to a slide that occurred later in the slide sequence (real subjects). The 124 subjects who had not seen the sign were divided into two groups, containing 67 and 57 subjects, respectively, and were asked one of two questions that suggested a stop sign. One group was asked, "Did another car pass the Datsun while it was at the intersection with the stop sign?" (suggested/intersection subjects). The other group was asked "Was the Datsun the same color red as the stop sign?" (suggested/red subjects).

Question 7 asked all subjects if they had seen the stop sign. On completion of the questionnaire all subjects were asked to describe in detail those objects that they had just affirmed having seen. No constraints were put on these descriptions and subjects were encouraged to take as much time as they needed.

## Results

Of the 53 real subjects who saw the stop sign, 46 or 87% claimed to have seen it and provided a description of it. Of the 67 suggested/intersection subjects, 39 or 58% reported seeing the stop sign and described it. Of the 57 suggested/red subjects, 31 or 54% reported that they saw the sign and described it. Not surprisingly, the real subjects were significantly more likely to report seeing the stop sign than the other two groups,  $z = 3.49$ ,  $p < .01$  (for difference between the real and suggested/intersection subjects).

The mean number of words used by subjects to describe the stop sign was calculated. Real subjects who saw the sign used an average of 7.04 words to describe it. Subjects for whom the sign was suggested used an average of 12.69 words (suggested/intersection) and 11.23 words (suggested/red). An analysis of variance (ANOVA) confirmed that the differences were significant,  $F(2,113) = 12.85$ ,  $p < .001$ .

All descriptions were examined for the same qualities explored in Experiment 1. Table 2 presents the proportion of descriptions that contained each of the qualities.

All statistical comparisons of differences between real and suggested memories were collapsed across the two suggested conditions, with one exception (sensory properties). Over 80% of the real descriptions mentioned the sensory features of the sign in contrast to only 55% in the suggested conditions,  $z = 2.98$ ,  $p < .01$ . As predicted, the reference to the red sign in the suggested/red condition tended to increase the likelihood that red would be mentioned as a sensory attribute of the sign. Approximately 58% of the suggested subjects mentioned the color of the sign when it was referred to in the postevent suggestion, whereas only 38% mentioned the color when it was not referred to. This difference approached but did not quite reach significance,  $z = 1.63$ ,  $p < .06$  (one tailed). The wording of the question had a small, though not statistically significant, effect on the overall frequency of sensory details: 49% of the suggested/intersection subjects and 65% of the suggested/red subjects mentioned sensory details,  $z = 1.42$ ,  $p > .05$ .

The suggested- and real-memory descriptions did not differ substantially in terms of geographic information,  $z = .52$ ,  $p > .05$ , although the suggested/intersection group included this information somewhat more often. As in Experiment 1, suggested-memory descriptions were more likely to mention the cognitive processes that the subject engaged in either during or after viewing the slides. No real descriptions contained this type of information, whereas 11% of the suggested descriptions mentioned cognitive processes,  $z = 2.65$ ,  $p < .01$ . Although suggested descriptions were slightly more likely to mention the function of the sign (3% for suggested descriptions compared to 0% for real descriptions), this difference was not significant,  $z = 1.19$ ,  $p > .05$ .

As before, real and suggested descriptions differed with regard to the frequency with which they included qualifying hedges, with 2.2% of the real descriptions and about 13% of the sug-

Table 2  
*Attributes of Memory Descriptions in Experiment 2:  
 Percentage of Descriptions Containing Each Attribute*

Attribute	Description		
	Real	Suggested/ intersection	Suggested/ red
Sensory	82.5	48.7	64.5
Red	63.0	38.5	58.1
Geographic	39.1	46.2	41.9
Cognitive processes	0	13.0	11.4
Function of sign	0	0	6.4
Verbal hedges	2.2	10.2	16.1

gested descriptions including some form of verbal hedge,  $z = 1.98$ ,  $p < .05$ .

### Discussion

The results of Experiment 2 dovetail nicely with those of Experiment 1. As before, we observed that compared to descriptions of real memories, descriptions of suggested memories contained more words, were more likely to mention cognitive processes, and were more frequently qualified by verbal hedges. In addition, descriptions of real memories included more references to the sensory attributes of the critical item.

Some caution must be taken in generalizing these results to situations involving different forms of postevent suggestion or substantially different types of critical items. Although we observed similar differences for two different critical items in two separate experiments, it is important to note that these items were members of the same category, namely traffic signs. Consequently, the range of different types of items to which the observed differences apply remains an important area for further research.

The wording of the postevent suggestion may also have important implications for the nature of differences between real and suggested memories. One new aspect of this study is the observation that one can increase the likelihood that a particular sensory attribute is mentioned by suggested subjects simply by referring to that attribute when suggesting the nonexistent object. This finding indicates that the wording of the postevent suggestion can affect the magnitude of at least one of the differences between real- and suggested-memory descriptions.

### Experiment 3

The results of Experiments 1 and 2 showed differences between the descriptions of real and suggested memories. These studies constitute compelling evidence that the two kinds of memory descriptions can differ in systematic ways. One interpretation of the differences obtained in Experiments 1 and 2 is that some suggested descriptions included various reality-monitoring cues that the subjects simply failed to use sufficiently. If suggested memories do in fact contain neglected reality-monitoring cues, then judges may be able to use these cues to discriminate between real and suggested memories.

Experiment 3 examined whether suggested-memory descriptions contain a sufficient number of reality-monitoring cues to allow untrained judges to differentiate between the two types of descriptions. Johnson and Raye (1981) observed that subjects spontaneously use many of the reality-monitoring principles when evaluating their own memories. It thus seemed reasonable to assume that subject judges might also use these principles to determine the source of other people's memories. Experiment 3 addressed two related issues regarding untrained judges' ability to monitor the reality of other people's memories: (a) Can untrained judges distinguish between real and suggested memories?, and (b) Will untrained judges spontaneously consider any of the qualities shown important in Experiment 1 (e.g., presence of sensory attributes, number of words used, etc.)?

### Method

*Subjects.* The subject judges were 16 introductory psychology students from the University of Washington who participated for class credit.

*Materials.* All 21 of the descriptions of suggested memories and 21 randomly selected descriptions of real memories from Experiment 1 were typed and randomly presented in two counterbalanced lists. These lists were presented to judges in conjunction with a set of written instructions that included: (a) an explanation of the experiment in which the descriptions were generated and (b) directions instructing judges to try to classify each description as either real or suggested. These directions asked the judges to decide which of the 42 yield-sign descriptions generated in Experiment 1 were from subjects who had actually seen the sign and which were from subjects for whom the sign was merely suggested. Judges were told that there were an equal number of real and suggested descriptions. Judges were asked to record their responses by putting either an *s* for suggested or an *r* for real next to each description.

*Procedure.* Judges were given the written instructions describing the procedure of Experiment 1. After the judges had read the instructions to themselves, the instructions were read aloud by the experimenter. Judges were then given as much time as they needed to classify the 42 descriptions.

After judges had indicated the source of each of the 42 descriptions, they were given a second form. This form contained 42 numbered spaces within which they were asked to provide for each description a written explanation of the reasons why they classified that description as either real or suggested.

### Results

The mean percentage of correctly classified memory descriptions was 59% for suggested memories and 60% for real memories. This level of performance indicates that judges had a slight but consistent ability to discriminate the suggested- and real-memory descriptions above what would be expected by chance,  $t(15) = 3.16$ ,  $p < .01$ , and  $t(15) = 3.95$ ,  $p < .01$ , respectively.

For each description that was classified, judges provided the reason for the classification. For example, they may have said that they decided the description reflected a real memory because it seemed confident, because it mentioned the sensory properties of the sign, because it included explicit geographic information, or even because it contained information about the subject's thought processes. The frequency with which different reasons were cited by judges in making their classifications are presented in Table 3.

A number of reasons were associated with both real and suggested classifications. The apparent confidence of the description was one of the most common reasons cited for classifying a de-

Table 3  
Reasons for Real and Suggested Memory Classifications in  
Experiment 3: Percentage of Classifications Citing  
Each Reason

Reason for classification	Classification	
	Real	Suggested
Confidence	56	66
Sensory	46	12
Geographic	26	0
Cognitive processes	22	34
Function of sign	0	5
Rationalization	0	25

scription as real or suggested. For example, one judge classified a description as real for this reason: "Could describe it very clearly and was confident." Another judge said that a description was suggested for this reason: "He was not sure, if it was real he would have been more certain."

A second commonly given explanation for classifying a memory description was whether or not it mentioned the sensory property of the sign. For example, one judge said a description was real for this reason: "Strong description—remembers the color of the sign (new style—red) when subject thought of yield signs as yellow (old style)." One judge said that a description was suggested for this reason: "Described other aspects of the slide, not enough description of the sign itself."

A number of classifications were associated with the observation that they contained information about the subjects' cognitive processes. For example, one judge justified the classification of real noting that, "She saw it because she was 'interested' in whether the driver did yield to the sign." One judge said that a description was suggested for this reason: "Their concentration was focused on something else—it was easier to suggest the presence of the sign."

There were a few types of reasons that were used exclusively for either real or suggested classifications. Some judges concluded that a description referred to a true memory because it mentioned geographic information. For example, one judge said a description was real for this reason: "Described the location well and the foliage that was around it. Sounded very sure."

Some suggested-memory classifications were made on the basis that the descriptions seemed to offer a rationalization for the existence of the memory. For example, one judge said that a description was suggested for this reason: "This person seems to be making excuses for not seeing something that wasn't really there." Finally, a few judges indicated that their suggested-description classification was influenced by the observation that the subject mentioned the function of the sign. For example, one judge said that a description was suggested for this reason: "Sounded made up. He thought that there must have been a sign because the car moved slowly at the corner." It is of interest that no judge explicitly mentioned the length of the description as a reason for classifying it as suggested.

### Discussion

The results of Experiment 3 indicate that suggested-memory descriptions contain at least some cues that can serve to allow

judges to distinguish them from real-memory descriptions. This observation hints at the possibility that the reality-monitoring failure of suggested subjects may, at least in some cases, have been due to the insufficient consideration of the reality-monitoring cues present in their memories.

Examination of the justification used by judges indicated that they were relying on many of the cues found in Experiment 1 to actually distinguish real and suggested descriptions. Specifically, judges relied considerably on confidence, use of sensory details, and the mentioning of cognitive processes. Judges' reported reliance on confidence and in particular the mention of qualifying hedges is reminiscent of O'Barr & Conley's (1976) observation that jurors are more skeptical of testimony that includes hedges. Subjects' additional consideration of the sensory detail of the memory descriptions is also consistent with the findings of Wells and Leippe (1981). These authors presented subjects with videotapes of cross-examinations of witnesses and then analyzed the verbal protocols that subjects gave in evaluating the credibility of these witnesses. They concluded:

Reference to confidence, certainty, or composure was obviously of paramount import to our subjects, but we found equally consistent reference to the witnesses' memory for detail.  
(Wells & Leippe, 1981, p. 683)

The notion that people tend to evaluate the veracity of a memory by considering its degree of detail is also consistent with Neisser's (1981) discussion of John Dean's memory. Specifically Neisser notes: "When Dean first testified, his 'facility for recalling details' seemed so impressive that some writers called him 'the human tape recorder'" (p. 2). Apparently, the criteria that subjects use in assessing whether a memory is real or suggested are quite similar to those used to assess the veracity of a memory.

Although judges did show some ability to identify and use the cues that can distinguish real from suggested memories, their overall classification performance was not that impressive. It thus seems likely that judges, though aware of many of the important qualities that distinguish real and suggested memories, are not, or at least were not in this instance, particularly good at applying this knowledge. Experiment 4 addressed this issue.

### Experiment 4

In Experiment 3 it was observed that subject judges had a limited ability to distinguish real from suggested memories. It was unclear, however, whether this inability was due to an insufficient appreciation of the differences between the two types of memories. Specifically, judges often reported using the criteria that were observed in Experiment 1 to distinguish real from suggested memories. Thus, they may have used the appropriate criteria to the full extent possible; that is, their performance may have been as good as could be expected given what we know about the differences between real and suggested memories. On the other hand, it is also possible that judges did not adequately consider the distinguishing qualities, and therefore their performance might have been improved had they known what qualities to attend to before they began the classification task. Such a result is important theoretically because it would illuminate the effectiveness of people's ability to monitor the reality of other people's memory. It would also have important practical con-

sequences, for it would suggest the possibility that people could be trained to better distinguish real and suggested memories.

A second unresolved issue regarding judges' ability to evaluate the source of memory descriptions is, to what degree are judges sensitive to the accuracy of their classifications? This issue is of some importance because it indicates whether monitoring the source of other people's memories represents a skill for which people have some accurate metacognitive awareness.

Experiment 4 further explored the nature of people's ability to assess the source of memory descriptions by examining (a) whether providing explicit information about the qualities that tend to distinguish suggested from real memories would improve judges' ability to discriminate between them, and (b) whether judges have the ability to assess the accuracy of their classifications.

### Method

**Subjects.** Forty psychology students from the University of Washington served as subject judges for class credit.

**Materials and procedures.** All 21 of the suggested descriptions and all 68 of the real descriptions obtained in Experiment 1 were randomly ordered on two counterbalanced lists. Judges in the no-hint condition received instructions identical to those given to judges in Experiment 2 with two exceptions: (a) Judges were told that there were approximately three real descriptions for every one suggested description; (b) judges were asked to indicate for each description their confidence in their classification by circling a "1" to indicate certainty, a "2" to indicate a moderate level of certainty, or a "3" to indicate that they were guessing. Judges in the hint condition were also given a brief summary of the differences observed in Experiment 1 between suggested and real memories. Differences observed included: (a) Suggested memories tend to include more words than real memories, (b) suggested memories are more likely to describe the cognitive operations of the subjects, (c) suggested memories are more likely to contain verbal hedges, (d) suggested memories are slightly more likely to describe the purpose of the sign, (e) real memories are more likely to describe the sensory properties of the sign. Judges in the hint condition were also warned that there were many descriptions that did not contain these properties so they should be sure to use their own best judgment in addition to these clues.

The procedure was the same as that used in Experiment 3, with the exception that the instructions were not read aloud. Judges were given written instructions and asked to read them carefully. After reading the instructions, judges were asked if they had any questions. If they did, the experimenter pointed to the portion of the instructions that referred to the relevant issue. No judge asked a question that was not addressed in the instructions. Subject judges were reminded that there was an approximate ratio of one suggested memory for every three real memories and were then given the memory descriptions to classify.

### Results

Performance in classifying real and suggested memories in the hint and no-hint conditions is presented in Table 4.

Hints improved performance as expected. Judges in the hint condition correctly classified significantly more suggested memories than did judges in the no-hint condition,  $t(38) = 3.02, p < .01$ . However, hints did not improve the classification of real memories,  $t < 1$ .

Judges' confidence in the accuracy of their real and suggested classifications was examined in the hint and no-hint conditions. For each judge a mean confidence value was determined for (a)

Table 4  
*Percentage of Descriptions Correctly Identified in Experiment 4*

Condition	Descriptions	
	Suggested	Real
Hint	60	63
No hint	50	63

all correct real classifications, (b) all incorrect real classifications, (c) all correct suggested classifications, and (d) all incorrect suggested classifications. The mean confidence for items classified as suggested and real is presented in Table 5.

A three-way ANOVA revealed that judges were significantly more confident in their correct classifications than in their incorrect classifications,  $F(1, 38) = 17.1, p < .001$ . Judges receiving hints were slightly more confident than those not receiving hints, though this difference only approached significance,  $F(1, 38) = 2.83, p < .10$ . There was no main effect on confidence of either hints,  $F < 1$ , or type of classification (real or suggested),  $F < 1$ . There was also no interaction between type of classification and hints,  $F < 1$ . There was a significant interaction between type of classification and accuracy,  $F(1, 38) = 4.81, p < .05$ . This interaction reflects the larger difference in confidence between accurate and inaccurate suggested memories (1.59% vs. 1.82%), as compared to that for accurate and inaccurate real memories (1.65% vs. 1.74%). There was no significant three-way interaction between type of classification, accuracy, and hints,  $F < 1$ .

### Discussion

From the results of Experiment 4, the following general observations can be made: (a) Providing judges with information regarding differences between suggested and real memories can significantly improve their ability to classify suggested memories, and (b) judges tend to be more confident in their accurate classifications.

Despite the possible ambiguities regarding precisely how hints affected performance, one conclusion is clear: Judges who received hints were better overall at discriminating suggested memories. This difference cannot simply be attributed to a change in judges' classification criterion. Specifically, if a change in criterion were responsible for this effect, then in addition to improving the correct classification rate for suggested items, hints should have also caused a decrease in the correct classification rate for real items, an effect that did not occur. Consequently, it appears that the effect of hints must be at least partially attributed to improved discrimination.

It might be argued that improving judges' ability to discriminate suggested from real memories simply indicates that judges can be trained to partition descriptions into two categories. Put another way, what does this experiment tell us about how judges monitor other people's memories? If judges knew and consistently applied all that we presently know about discriminating real from suggested memories, then providing hints would not affect their performance. Thus, the observation that hints facilitated discrimination indicates that judges did not always employ all



Table 5  
Subjects' Mean Confidence in Suggested and Real Classifications in Experiment 4

Classification	Condition		Overall
	Hint	No hint	
Suggested			
Correct	1.50	1.69	1.59
Incorrect	1.72	1.92	1.82
Real			
Correct	1.60	1.70	1.65
Incorrect	1.65	1.84	1.74
Overall	1.62	1.79	—

Note. A confidence rank of 1 = certain; 3 = guess.

of the information that is useful in evaluating the source of other people's memories. This observation is useful theoretically, in that it identifies the limitations of one person's ability to monitor the reality of another person's recollections. In other words, we are better than chance but not as good as we could be. From a practical perspective we note that very few researchers have successfully improved subject jurors' ability to evaluate the credibility of eyewitnesses (see Wells, Lindsay, & Tournant, 1980). The clues identified in this study may contribute to developing a training system that can improve jurors' ability to assess eyewitnesses.

Experiment 4 also provided information regarding judges' awareness of their ability to accurately identify the source of memory descriptions. Overall, judges were more confident in their classifications when they were accurate. Apparently judges had some ability to assess the accuracy of their judgments about the source of other people's memories.

### Experiment 5

Experiment 4 indicated that providing judges with hints can facilitate their ability to distinguish suggested from real memories. There is, however, a potential methodological question, namely that the very same protocols used in Experiment 1 to validate a set of factors (length, sensory, content, etc.) were used to test the hypothesis that hints about those attributes would help. This raises the question of whether the factors isolated in Experiment 1 could be used to help judges make successful discriminations on a different sample of protocols. In order to test the generalizability of the hints provided in Experiment 4, judges were given the set of protocols from Experiment 2 along with the same hints that were used in Experiment 4.

### Method

**Subjects.** Forty psychology students from the University of Washington served as subject judges for class credit.

**Materials and procedure.** The materials and procedure for Experiment 5 were exactly the same as those used in Experiment 4 with the exception that a different set of descriptions were used. All 46 of the real descriptions and all 39 descriptions from the intersection/suggestion condition of Experiment 2 were randomly ordered in two counterbalanced versions. Half of the judges were in the hint condition, and half in the no-hint condition. Judges in both conditions received instructions identical to those given

to judges in Experiment 4 with the exception that they were told that there were approximately an equal number of suggested and real memories, and they were not asked to indicate their confidence level.

### Results

Performance in classifying real and suggested memories in the hint and no-hint conditions is presented in Table 6.

Hints improved performance as expected. Judges in the hint condition correctly classified significantly more real memories than did judges in the no-hint condition,  $t(38) = 1.943, p < .05$  (one-tailed). Judges in the hint condition also correctly classified more suggested memories than did judges in the no-hint condition, although this difference only approached significance,  $t(38) = 1.60, p < .06$  (one-tailed).

### Discussion

The results of Experiment 5 nicely complement the previous finding that hints derived from Experiment 1 can improve judges' discrimination. Apparently, the benefits of hints observed in Experiment 4 are not simply due to the fact that the hints were based on the same set of descriptions for which they were used.

The observation that telling judges about differences between real and suggested memories improves their ability to discriminate the source of memory descriptions demonstrates the counterintuitive quality of the present findings. The fact that hints help suggests that we told judges information they did not already know and thus demonstrates the potential value of this research. Although clearly more research is necessary, the present findings suggest that it may be possible to develop a set of generic hints that can help people to more accurately determine the source of a memory. The practical value could be potentially quite substantial.

### General Discussion

Collectively, the results of this research indicate that although suggested memories can differ from memories based on perceptions, these differences are not fully appreciated by either the witnesses who generate them or by judges who are asked to distinguish them. In Experiments 1 and 2 it was observed that although suggested subjects failed to adequately monitor the source of their memories, their suggested-memory descriptions contained some qualities that were different from real-memory descriptions. Experiment 3 demonstrated that these qualities could serve as reality-monitoring cues to give judges a limited ability to correctly identify the source of these memory descriptions. Experiments 4 and 5 showed that providing judges with information regarding differences between real and suggested mem-

Table 6  
Percentage of Descriptions Correctly Identified in Experiment 5

Condition	Descriptions	
	Suggested	Real
Hint	52	57
No hint	46	48

ories can facilitate discrimination, indicating that judges may also be overlooking effective reality-monitoring cues.

Clearly, the present study only scratches the surface of the possible issues that might be addressed by comparing descriptions based on suggestion and perception. Determining what differences between these two types of memories generalize over different situations will require considerable systematic study. As noted earlier, such issues as confidence and the context of the presentation of the suggested item need to be further explored. In addition, the type of misinformation may have a major effect on differences between real and suggested memories. For example, the present study used very stereotypical items—a yield sign and a stop sign—thereby providing little opportunity for subjects who actually witnessed the item to recall any idiosyncratic features. There are many other kinds of objects whose physical and functional properties are more variable than a sign, such as a nonexistent workman who could be old or young, black or white, with his back or face to the camera, repairing a house, etc. Moreover, the relationship of the implied object to the main theme of the event could be varied. A sign is an important part of a traffic accident, but an election poster is not. Varying the nature of the suggested object can affect the probability of inducing the memory in the first place and thus could affect the content of the suggested memory as well.

It remains to be seen what characteristics of unreal memories are due to explicit experimental suggestion and what characteristics are representative of a false memory that is created without explicit suggestion. The present research did not examine descriptions of memories of objects that were neither observed nor explicitly suggested. Memories based on such objects might have their own unique qualities. Additionally, it remains to be seen whether the characteristics of unreal memories are similar to those of subjects who deliberately imagine that an object has been seen. Memories induced through deliberate imagery would necessarily maintain the self-generated qualities of the unreal memories observed in this study without possessing any qualities associated with misattributing the source of a memory. In short, a comparison of different types of unreal memories may help us learn more about the processes involved in generating them.

The present work could also be expanded to explore the reality-monitoring processes of those subjects in the suggested condition who effectively resisted the misinformation. People who successfully resisted misinformation may have used one or more reality-monitoring principles in accomplishing this resistance, yet by virtue of this accomplishment these individuals effectively removed themselves from the set of individuals who provided analyzable descriptions. Future research might use protocol analysis of all subjects to illuminate the reality-monitoring processes used by subjects who resisted the misinformation.

This study also suggests future research regarding the manner in which subjects monitor the reality of other people's memories. For example, our judges had no nonverbal information, which in and of itself might have been useful for distinguishing real and unreal memories. As mentioned earlier, Wells and Leippe (1981) provided their subjects with actual videotapes of witnesses being cross-examined, thereby allowing their subjects to consider a variety of nonverbal cues. If our judges had viewed videotapes instead of written descriptions, they might have performed much better, for then a host of new and possibly useful characteristics,

such as speech rate and body movements, could have been considered.

Further study of the manner in which subjects monitor the reality of other people's memories has additional theoretical value. Subjects' ability to monitor other people's memories depends heavily on their beliefs and knowledge concerning differences between accurate and inaccurate memories. The term *metamemory* has been used to describe the knowledge, beliefs, and assumptions that people have about the characteristics of their own memory function (e.g., Flavell & Wellman, 1977). It seems likely that people apply their metacognitive knowledge about their own memories to infer the characteristics of other people's memories (Schacter, 1986). Consequently, observing the types of cues that subjects use to determine the source of other people's memories may provide useful insights into their metacognitive beliefs and assumptions about their own memories.

The potentially close correspondence between the metacognitive processes that people use to assess the source of their own and other people's memories may have implications for the use of providing clues about memory discriminations. Specifically, because hints help subjects identify the source of other people's memories, it seems possible that hints could also help the witnesses themselves. Accordingly, providing information regarding differences between real and suggested memories might facilitate witnesses' reality-monitoring processes, thereby increasing their ability to determine the source of their own memories.

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**Articles Published in the Most Recent Issue of  
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**Vol. 12, No. 1**

- 3 Illusory Words: The Roles of Attention and of Top-Down Constraints in Conjoining Letters to Form Words  
*Anne Treisman and Janet Souther*
- 18 Perceptual Interactions in Two-Word Displays: Familiarity and Similarity Effects  
*James L. McClelland and Michael C. Mozer*
- 36 Binocular Vision and Spatial Perception in 4- and 5-Month-Old Infants  
*Carl E. Granrud*
- 50 Illusory Concomitant Motion in Ambiguous Stereograms: Evidence for Nonstimulus Contributions to Perceptual Organization  
*Mary A. Peterson*
- 61 Dual Loudness Scales in Individual Subjects  
*Richard Popper, Scott Parker, and Eugene Galanter*
- 70 Attention Within Auditory Word Perception: Insights From the Phonemic Restoration Illusion  
*Arthur G. Samuel and William H. Ressler*
- 80 "Fair" Allocations of Salaries and Taxes  
*Barbara A. Mellers*
- 92 Integration of Noxious Stimulation Across Separate Somatosensory Communications Systems: A Functional Theory of Pain  
*Daniel Algom, Nehama Raphaeli, and Lior Cohen-Raz*
- 103 Multidimensional Scaling Reveals Two Dimensions of Thermal Pain  
*W. Crawford Clark, J. Douglas Carroll, Joseph C. Yang, and Malvin N. Janal*
- 108 Model Testing Is Not Simple: Comments on Lane, Anderson, and Kellam  
*Colleen F. Surber*
- 110 Functional Relations Are Not Models: A Note on Covariation Detection  
*Craig A. Anderson, David M. Lane, and Kathryn L. Kellam*
-