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Dimensions of Failures in Reality Monitoring:

Finding Memory Creation Between the Lines of Verbal Report

Andrea Kenney

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ABSTRACT

Dimensions of Failures in Reality Monitoring: Finding Memory Creation Between the Lines of Verbal Report

Andrea Kenney

In an extended replication of a post eyewitness event memory creation paradigm by Schooler, Gerhard, and Loftus (1986), 226 subjects freely recalled in written form objects viewed or suggested in a slide sequence depicting a wallet snatching incident. Protocol analysis was guided by the Reality Monitoring model of Johnson and Raye (1981), in which sensory, spatial, and temporal details, and cognitive operations were tallied for veridical and suggested memory descriptions. Following Schooler et al., confidence, number of words, and verbal hedges were scored. Extended aspects of the study involved the examination of the roles of object "centrality", of preevent information (as a cue or as a suggestion), of individual differences, and of correct, incorrect, and attributional (i.e., subjective) details, in differentiating origin of memories. Discriminant analyses indicated that despite qualitative overlap, reliable differences exist between veridical and suggested memories in terms of total details and confidence, with less of each being associated with suggested relative to veridical memories. The data also suggest that veridical and suggested reports may be increasingly differentiated when a veridical item is central, and that time lapse between suggestion and final test may affect the nature of a suggested item's description. Additionally, it is proposed that confabulation on the critical item may set up a response bias which affects the quality of verbal descriptions of items unrelated to the

suggested material. Individual differences predicted a confabulation index derived from a recognition task, but did not predict qualities of free recall in a readily interpretable fashion. Results and proposed mechanisms of memory creation are interpreted in terms of a Reality Monitoring model of memory (Johnson and Raye, 1981), and methodological suggestions are proposed for future research in this area.

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Experimental research in the area of memory has documented enough seemingly contradictory evidence that predictability of its "accurate" expression in humans has proven to be an oftentimes elusive pursuit. At one moment memory may be a remarkably literal system guiding us effectively through mountains of detail related to our daily work activities, through every lyric of every "Beatles" song ever written, and through routine checking behavior which prevents fires in our homes and car accidents at every street corner. At the next moment we may find ourselves unable to explain why we believe we mailed a letter we obviously left on the counter, or denying that we said something earlier in a discussion while believing it was in fact said by the person with whom we are engaged in discussion, or vice versa. Despite the contradictions observable in our own and others behaviors, when we wear the "average person's" cap we continue to be astonished and skeptical that naturally observed and experimentally demonstrated failures of memory are truly an inherent feature of memory. Instead, we apparently maintain that the memory system makes a copy of reality akin to a videotape camera (Loftus and Loftus, 1980), and we remain unskeptical about the potential "ability" of the memory system to retrieve accurate information with the proper technique. When we switch into a "scientist's" cap, the problem lies less in disbelief in the phenomenon of "failures" of memory, but more in our inability to understand why and how these "failures" occur. Many advances have been gained in our understanding of factors which lead to increased failures of memory, but the search is far from finished and many areas lie neglected.

This thesis will attempt to carve out a small area in our understanding of

mechanisms which might underlie errors of memory. Our approach will rely upon the much investigated post (eyewitness) event misinformation paradigm developed in the 1970's by Elizabeth Loftus and colleagues (see Loftus, 1979a for a review), and its modification into a memory creation paradigm by Schooler et al. (1986). The present study represents an extended replication of the memory creation design, and effects will be interpreted in terms of the Reality Monitoring model of memory proposed by Johnson and Raye (1981).

Post Eyewitness Event Misinformation Paradigm

The misinformation paradigm in Loftus' studies typically involves subjects viewing an eyewitness-like event (such as a wallet snatching or an auto-pedestrian accident) presented in the form of a slide sequence. After observing the event, subjects are engaged in a filler activity for about 15 minutes. This activity prevents rehearsal, and allows partial consolidation of the observed event into long term memory. Subjects then answer a series of multiple choice questions about the observed event. For some subjects (misled), the questions include a leading question(s), introduced as a false presupposition (for instance, subjects might answer a question such as "Did another car pass the Datsun while it was stopped at the yield sign?", which presupposes the presence of a yield sign instead of the stop sign which was in fact present). For other subjects (control), these presuppositions are not introduced. Afterward, all subjects answer a series of "test" questions, including a critical question about the truth of the presupposition introduced in the postevent questionnaire. The test involves a two-alternative forced-

choice recognition between pairs of slides depicting either an originally presented slide or one which is identical except for a small change in detail. A *critical* slide pair includes an original, and one in which the presupposed misinformation is depicted- for example, one in which the Datsun is stopped at a stop sign (original) and the identical slide in which the stop sign is replaced by a yield sign (consistent with the presupposed misinformation). The typical result of such studies is that misled subjects are significantly more likely than control subjects to misremember the original event by choosing the slide depicting the misinformation as the one they actually saw. This misinformation effect has been replicated by Loftus herself, as well as by numerous other researchers (e.g. Bekerian & Bowers, 1983; Christiaansen, & Ochalek, 1983; Cole & Loftus, 1979; Dodd & Bradshaw, 1980; Greene, Flynn, & Loftus, 1982; Loftus, 1975; Loftus, Miller, & Burns, 1978; Loftus & Zanni, 1975; McCloskey & Zaragoza, 1985; Sheehan & Tilden, 1986; Tousignant, Hall, & Loftus, 1986; Weinberg, Wadsworth, & Baron, 1983; Zaragoza & Koshmider, 1989; Zaragoza, McCloskey, & Jamis, 1987).

The misleading information paradigm has been an important development in memory research for a number of reasons. First, the paradigm possesses a high degree of ecological validity; by simulating the type of setting in which memory naturally occurs, it represents a successful response to the type of paradigm so desperately appealed for by many memory researchers (Neisser, 1982). Second, results issuing from this paradigm have found a prominent place in real-life legal settings, demonstrating the applied usefulness of the study of specific manifestations of memory in natural contexts (though this "usefulness" in the legal process remains a contentious

point: see Loftus, 1979a, 1983; Loftus & Monahan, 1980). Third, and perhaps most important, the reliability of experimental results yielded by this paradigm have influenced theoretical conceptions of memory. The finding that postevent misinformation can reduce the reporting of an original event has been interpreted as evidence for impairment, or alteration of the original memory, thus supporting a reconstructive model of memory (e.g. Bartlett, 1932/1967; Loftus & Loftus, 1980).

This interpretation, however, has been attacked by the recent work of Zaragoza and her colleagues (McCloskey & Zaragoza, 1985; Zaragoza & Koshmider, 1989; Zaragoza, McCloskey, & Jamis, 1989). They claim that misled and control differences are an artifact of the "Loftus" recognition test, and would be expected to be observed even if misleading postevent information had no effect on the accessibility of the original memory. The work of these researchers has proven to be seminal to the notion of "process history", the realization that subjects may arrive at the same misled choice report via different routes. That is, three mechanisms may lead to the acceptance of misinformation over original information; subjects may have never seen the original stop sign but remembered reading about the presupposed yield sign and therefore choose this alternative, subjects remembered both items but trusted the presupposed yield sign account more than their original memory, or subjects remembered neither item and simply guessed incorrectly in favor of the yield sign. These researchers modified the recognition test to include a choice between an original item and a novel item (i.e. excluding the choice consistent with misinformation) in an incident involving an office theft of a calculator. In this incident a repairman-thief is

seen with a hammer, a wrench is subsequently presupposed to have been used, and a screwdriver is offered as the novel item choice (moreover, the tools are counterbalanced across subjects in the procedure). With this procedure they found equivalent reporting of the original hammer in control and misled conditions, thus providing evidence against a memory impairment hypothesis. That is, whether or not memory for the original item is retrievable or "impaired" depends on the way the question is asked.

In response to the movement by McCloskey and Zaragoza, a number of researchers have proposed their own *re*modified versions of the "Loftus" recognition test. Belli (1989) has proposed a "Yes"/"No" *retrieval* task to assess memory separately for the original and a novel item. In essence this format asks the questions, "Did you see the hammer, yes or no?", and "Did you see the screwdriver, yes or no?". This procedure prevents the pitting of one item against another, and various patterns of the *four* choices were hypothesized to reflect something new about subjects' underlying process histories. Tversky and Tuchin (1989) adopted the same "Yes"/"No" retrieval test strategy as Belli, but assessed subjects' memories for three items, the original, the misled item, and a novel item. The various patterns of findings from both studies indicated that various process histories can result from exposure to misinformation. Importantly, subjects can accept or reject more than one choice. For example, subjects can presumably assume that two or three tools were present, or that only the novel item was present. These investigators concluded that patterns of recall support interference and confusion effects in memory, and that observed patterns of errors cannot rule out the impairment of the original information in some cases.

The Eyewitness Memory Creation Paradigm and Reality Monitoring

In a review of the findings from these various studies, Loftus and Hoffman (1989) addressed data from all studies where the acceptance of the novel item was concerned and cited this phenomenon as consistent evidence for a process history of "misinformation acceptance" in a certain percentage of subjects. They suggest that a fruitful avenue for future research would involve the exclusion of the original item from the slide sequence for one group of subjects, who would subsequently have this item *suggested* in the form of presupposed postevent misinformation, thus eliminating the competition of the misinformation with an original memory. Loftus and Hoffman conclude that this paradigm would not address a memory *impairment* hypothesis regarding an underlying mechanism for the original misinformation effect, but would more clearly define some parameters of the misinformation *acceptance* effect, and allay skepticism about its reality.

The investigation of memory creation has had a long history as a clinical tool utilized in conjunction with hypnosis. More recently, experimental investigations of memory creation in hypnosis have demonstrated some of its parameters (see Laurence & Perry, 1988, for an historical and modern review of these areas). However, a non-hypnotic eyewitness *memory creation* paradigm has been investigated in only one published study to date (though see Donders, Schooler, & Loftus, 1987, cited in Loftus & Hoffman, 1989; Hashtroudi, Johnson, & Chrosniak, in press, and Johnson & Suengas, in press, both cited in Johnson, 1989) by Schooler, Gerhard, & Loftus (1986). In this study, control subjects viewed a red Datsun stopped at a stop sign in one slide in a sequence depicting an auto-pedestrian accident, while experimental

subjects viewed the same sequence with the stop sign missing but suggested after the event in a questionnaire. Verbal descriptions from subjects in both groups who reported they had seen the sign were analyzed and showed statistically significant differences along various qualitative dimensions.

This study is important for a number of reasons. First, the memory creation paradigm, in eliminating an original memory in favor of an essentially blank space to "compete" with postevent misinformation, more closely approximates a controlled variable situation, isolating one process history leading to errors of memory. Results can thus be more clearly interpreted than those from the original misinformation paradigm, where specific process histories and their mechanisms can become confounded, and thus be only equivocally interpreted. Second, now that research in this area has succeeded in controlling for a general category of error in memory, the closer investigation of the nature of memory creation via its manifestation in freely recalled verbal report may reflect something new about its underlying process, and is a logical extension toward an understanding of the lengthier eyewitness reports which occur in natural contexts. Finally, memory creation is a phenomenon which is readily and unambiguously interpretable in terms of a Reality Monitoring model of memory (Johnson & Raye, 1981), a model which accounts for processes involved in both discrimination and confusion between past acts of imagination and past acts of perception.

The Reality Monitoring model. Both perceptual processing of external stimuli and internal thought processes produce memories. These two processes sometimes occur separately, but oftentimes simultaneously. Reality monitoring represents the act of "re-representation" of an event in order to

trace its original process, and *source* (i.e. external or internal), during remembering. Johnson and Raye (1981) argue:

> There has been a tendency to overemphasize the hopeless entanglement of memories derived from perception and thought.... However, it is not logically necessary to prove that specific memory (i.e., memory faithful to perceptual events) does not exist in order to show that organized mental representations do exist... we run the danger of forgetting the dire functional implications of a memory system that is assumed to be so loosely tied to external events (although the problem is beginning to be recognized; Neisser, 1976)." (pp. 68-69).

With an emphasis on understanding the differences and similarities in the nature of internally and externally derived memories, (at the moment of the original experience) perceptions are assumed to contain more contextual, sensory, and semantic attributes, while thinking processes contain relatively less of these types of attributes and relatively more information about cognitive operations. During remembering, differences in average value along these qualitative dimensions can form the basis for deciding whether the origin of a memory was internal or external. Additionally, reality monitoring decisions may involve reasoning processes based on additional information from memory, such as previous knowledge, or metamemory assumptions about how our own memory, or memory in general, works. The model assumes that reality monitoring is affected by two factors: the nature of the traces (i.e., internally generated or externally derived) being evaluated, and the quality of the final decision process by the individual remembering. The Reality Monitoring model has been experimentally

substantiated by a number of studies (see Johnson, 1988; Johnson & Raye, 1981).

There are different ways for reality monitoring to break down. A target memory may be uncharacteristic of its class (e.g., an especially vivid imagination), or the person may fail to engage in reasoning on the basis of prior knowledge or may engage in faulty reasoning. This framework has important implications for previous interpretations of false recognition errors. That is, false recognition may, or may not, reflect altered representations of the original event in memory, but may reflect a failure to sample enough attributes of the original memory to accurately discriminate the source of its trace.

Verbal Reports in Other Eyewitness-like Paradigms

A number of studies have combined an eyewitness paradigm other than the original "Loftus" recognition test with the study of verbal report. For instance, Loftus and Palmer (1974) investigated the effect of "leading" postevent questions (i.e., questions which by their form or content suggest a desired response) on subjects' estimates of speed at which cars were travelling at the time they became involved in car accidents depicted in films. The question, "About how fast were the cars going when they smashed into each other?", elicited higher estimates of speed than questions which used the verbs *collided, bumped, contacted* or *hit* in place of *smashed*. In a second experiment aimed at investigating whether these results reflected a response bias rather than an alteration in the underlying memory representation, they asked if another plausible suggestion related to presupposed rates of speed would elicit differential rates of confabulation. On a retest one week later,

those subjects who had received the verb smashed were more likely to say "yes" to the question, "Did you see any broken glass?", even though there was no broken glass in the film. In a similar study, Loftus and Zanni (1975) found that relative to questions containing an indefinite article (e.g., "Did you see *a* broken headlight?"), questions which contained a definite article (e.g., "Did you see *the* broken headlight?") produced fewer uncertain (i.e., "I don't know") responses, and more "yes" responses to the event that never occurred. Additionally, Loftus (1975) found that misinformation could raise or lower subjects' estimates of the number of people involved in a classroom disruption (Experiment 2), and could increase the likelihood that nonexistent objects would be "recalled" (Experiments 3 and 4).

Thus it appears that subtle wording can connote meanings which may retrospectively override the facts of a perceived event, and become reported as distorted facts during recall. It is important to note that the verbal report in these cases may represent a *modification* (as opposed to a creation) of memory for the original event.

The notion that an interrogator's words can connote meaning which may be distorted or correspondent with reality has been investigated from the point of view of subjects' verbal reports. Insofar as wording can be assumed to connote meaning, it appears that subjects' free recall of events may reflect back distortions as well as accuracies of those aspects of an event which they initially encoded. In two experiments, Button et al. (1989) investigated hypermnesia (net recall) and reminiscence (cumulative or non-redundant recall) effects in repeated free recalls of a videotaped event of a simulated bank robbery. Central and peripheral details were analyzed in pre-hypnotic,

hypnotic, and post-hypnotic recall, as well as the effect of individual difference variables as they interact with these classes and stages of recall. Patterns of correct, incorrect, and attributional (i.e., neither correct nor incorrect) details contained in free recall were found to replicate across studies. Of particular interest was the effect which hypnosis had in triggering an increase in the production of errors and attributional details for both central and peripheral data, and the role of preferences in cognitive style (as measured by the "PICS", of Isaacs, 1982) in the use of attributional content in recall. Subjects who scored high on the PICS (i.e., typically low on verbal content, and effort in producing mental images, and high on imagery and absorption in imagery) produced more net attributional detail than subjects who scored low on the PICS (i.e., typically high on tendency to think in words, effortfully when thinking in picture images, and low on imagery and absorption). The low PICS subjects displayed a reversed verbal pattern, producing more net correct and incorrect detail. This complex interaction was found in both studies.

One description of the hypnotic procedure defines it as a cognitive process which leads to changes, even distortions, of perception, mood, and memory (Orne, 1980). The importance of the Button et al. (1989) study is that longer recalls allowed the observation of changes in qualities of verbal report as an accompaniment of changes in cognitive process. Additionally, differences in preference of cognitive style was apparently related to differences in verbal style independent of the hypnosis effect.

The present study was designed to replicate and extend the earlier mentioned memory creation experiment of Schooler, Gerhard, and Loftus

(1986), as well as a second study by Schooler, Clark, and Loftus (in press). In these studies, freely recalled veridical and suggested memories were compared in terms of qualitative dimensions of externally and internally generated memories predicted to differ according to a Reality Monitoring model of memory.

In Schooler et al.'s (1986) study a between subjects design was employed comparing percentages of subjects in each of veridical and suggested conditions who mentioned particular verbal qualities at least once. In the second study (Schooler et al., in press) a within subjects design compared mean frequencies of particular verbal qualities (of dissimilar comparison items) contained in veridical and suggested memories.

Schooler, Gerhard, and Loftus (1986). In Schooler et al (1986, Experiment 1), one group saw a yield sign while another did not see it but had its presence suggested in a postevent questionnaire. In Experiment 2, one group saw a stop sign while two other groups did not see it but had its presence suggested in a postevent questionnaire. The wording of the postevent misinformation was varied in these two suggestion groups in order to examine how wording might affect the content of the suggested descriptions. Thus one suggestion condition encouraged the mention of geographical properties of the stop sign as located at an intersection (i.e. "Did another car pass the red Datsun while it was at the intersection with the stop sign?"), while the other encouraged the reporting of sensory properties of the stop sign by asking, "Was the Datsun the same color red as the stop sign?". Percentages of subjects in each group who said they saw the critical item were reported , and subjects' written descriptions of suggested and veridical memories were compared in terms of

confidence, and number words used to describe both the critical object and an unrelated comparison object. Additionally, sensory details, geographical details, references to cognitive operations, mentions of the function of the sign, and verbal hedges were scored as either mentioned *at least once,* or not mentioned in the descriptions, and differences between groups were reported in terms of percentages of subjects whose descriptions mentioned these qualities (see Note 1).

Results were as follows: In both experiments subjects reported a veridical sign significantly more often than the similar item when it was suggested. In both experiments, suggested descriptions contained significantly more words, more references to cognitive operations, and more verbal hedges than veridical descriptions of the same item. And finally, in one or the other of the experiments, suggested memories were significantly less confident, contained significantly less sensory detail, and significantly more references to the function of the sign than veridical memories of the same item (see Appendix B).

Schooler, Clark, and Loftus (in press). In Schooler et al. (in press) two groups of subjects saw one of two versions of a slide presentation depicting a house robbery. Three critical items were seen in one version, while three different critical items were seen in the other version. After viewing the slides, subjects read a narrative of the presentation in which the three items which were viewed by the group they were *not in* were suggested. Subjects either viewed a robe, a picture frame, and a shovel, and read about a wool hat, an Ivory soap bottle, and a mailbox, or vice versa, then subsequently described verbally whichever veridical items they remembered having seen and whichever suggested items they had incorporated as veridical. "Accurate"

and "inaccurate" descriptions given by 53 subjects who described at least one item (veridical or suggested) were scored for mean frequency of verbal attributes similar to those examined in the previous study. Since not all subjects gave both an "accurate" and "inaccurate" description for within subject comparison, 13 groups of about 4 subjects (equalling 13 macrosubjects) were used for the within subjects analysis. Thus counterbalanced "accurate" descriptions were collapsed for comparison to counterbalanced collapsed "inaccurate" descriptions on a within macrosubject basis. Results of these analyses indicated significant differences in confidence and verbal hedges, with suggested ("inaccurate") memories being less confidently reported, and containing more verbal hedges than veridical ("accurate") memories (see Appendix C).

Unexplored Questions in Eyewitness Paradigms

First, the scoring of individual details (or "bits") contained in free recall descriptions of veridical and suggested origin has not been analyzed in a between subjects desig.

Second, "centrality" of critical objects has not been systematically analyzed in previous post (eyewitness) event misinformation studies as a possible confounding variable related to incidence of misinformation reporting. Button et al. (1989) found that while confidence for correct peripheral detail decreased post-hypnotically, highly confident errors were maintained; confidence on central details were not similarly affected by hypnosis, suggesting that central and peripheral details may be differentially processed.

Third, the reporting of *pre*event *mis*information in subsequent free

recall of an eyewitness event has yet to be investigated. More specifically, no study has attempted a preevent memory creation suggestion. However, previous research on forewarning effects suggest that "warning" information can influence subsequent verbal reports. Loftus (1979b) found that blatantly implausible misinformation presented before, but not after, other more plausible presupposed misinformation will cause a "spillover" warning effect which will make subjects more resistant to more subtle misinformation. Greene et al. (1982) tested this finding more directly by warning subjects explicitly that a postevent narrative contained misinformation. They found that warning prior to the *event* was ineffective in increasing subjects resistance to misinformation, but that warning was effective when given just prior to reading the postevent narrative. Christiaanser and Ochalek (1983) replicated the Greene et al. findings and additionally reported that the warning was only effective for items which subjects had correctly recognized in a postevent questionnaire given previous to the warning. In a similar study, Tousignant et al. (1986) determined from post-experimental inquiry that slower readers were more likely than fast readers to admit to having noticed discrepancies in a postevent narrative. In a follow up study, subjects who were explicitly instructed to read more slowly were more likely than subjects instructed to read quickly to detect discrepancies and subsequently resist misinformation. Finally, Fischhoff (1975, 1977) found that four groups of subjects who were each provided with different outcome information for the same story were unaware of how this prior information affected their retrospective predictions of how the story would have turned out had they not been told the ending; subjects consistently overestimated the outcome

(compared to an uninformed control) that they were told about when asked to rate the likelihood of each of the endings. Fischhoff's results suggest that subject's have difficulty unanchoring themselves from the perspective of hindsight. Even when a new set of subjects were explicitly told about the results of the 1975 study, Fischhoff (1977) found that these subjects, who underwent the same procedure, performed similarly. His explanation applies to all of the above studies; that is, subjects seem to be unable to disregard, or "deprocess" information already processed.

Finally, the relation of individual difference variables to type of detail contained in non-hypnotic free recall descriptions of similar veridical and suggested items has yet to be investigated in a misinformation paradigm. However, previous research suggests that individual differences may be related to verbal styles both in and out of hypnosis. As we have seen, individual differences such as preferred cognitive style (Isaacs, 1982) have been shown by Button et al. (1989) to be related to verbal styles in free recall of a veridical event, independent of a hypnosis effect. A study by Laurence and Perry (1983) (see also Laurence, Nadon, Nogrady, & Perry, 1986) was the first to present experimental evidence of the creation of memory via hypnotic suggestion in highly hypnotizable subjects. Labelle (1987) extended this finding to high-medium susceptible subjects, but found no evidence that low susceptible subjects were vulnerable to this manipulation. Further, Labelle linked memory creation to an interaction of hypnotizability with other individual differences such as imagery (as measured by the PICS; Isaacs, 1982) and absorption (as measured by the TAS; Tellegen & Atkinson, 1974).

The Present Study

The present study was an extended replication of Schooler et al.'s (1986) study. Four groups of subjects viewed a 23-slide presentation depicting a wallet snatching incident. For two groups, two critical items were presented. For two other groups, these two items were omitted, but suggested (either before the slide presentation, or after) to have been present.

Major questions. The investigation sought to address three major questions. First we asked, under which external conditions might veridical and suggested memories be incorporated? To this end, we tallied separately for each of four groups the frequency of "yes" responses to having seen several items as a function of (a) "see" and "don't see" condition, (b) as a function of the "centrality" of critical items, and (c) as a function of whether or not subjects were forewarned about these items' presence.

Accordingly, additional focus was given to certain aspects of the stimulus object presented. Schooler chose prototypical objects in his between subject design, road signs, which, although central to the meaning of the action depicted in the slide sequence (i.e. the traffic accident), were not visually central at the moment that this incident occurred. We presented and suggested to our subjects objects with more potential idiosyncratic aspects in addition to their prototypical aspects in a slide sequence depicting a wallet snatching. A scarf was chosen which appeared around the suspect's neck at the moment of the wallet snatching (in one slide), and a city garbage can which appeared next to the suspect (in one earlier slide) in which the viewer sees the suspect for the first time in the sequence. These two objects were chosen in order to test for the role of "centrality" on the incidence of reporting of veridical and suggested objects. The scarf was central in that it

was actually worn by the central character, and at the moment of the main event. The garbage can was peripheral in that it was not associated with the central character (in the way that a personal garment is), and was peripheral to the action of the main event. In terms of veridical items (seen in groups 1 and 3), we hypothesized that incidence of "yes" responses might be higher for central relative to peripheral items. In terms of suggested items (suggested in groups 2 and 4) it was hypothesized that "centrality" may be reflected in a pattern similar to veridical reports (Johnson & Raye, 1981), but to an attenuated degree.

Schooler et al. (1986) examined differences between a control group who saw the critical items and a group of subjects who did not see the items but had their presence suggested *after* the slide sequence. The present study examined these group differences as well as differences between the control and group of subjects who had the critical items suggested *before* they ever viewed the event. As a comparison for the group who received preevent *suggestions* for the upcoming presence of a scarf and garbage can, another group, who actually perceived these items, was given the exact same preevent information. For this group then, preevent information came as a preevent *cue* for items which they subsequently saw. It was hypothesized that forewarning might increase the rate of reporting of *veridical* items, especially if these were peripheral.

If items are only suggested, however, no direction was specifically predicted for incidence of "yes" reports. This is because preevent information could potentially put subjects in veridical *and* suggested groups at an eyewitness advantage, or could put only subjects in the veridical condition at

an advantage. It was speculated that preevent information about the scarf and garbage can might make subjects who subsequently see these objects take special note of them when they do. Similarly, subjects who are warned about these objects but who never see them subsequently, may make special note that they were never seen. However, results of previous studies mentioned earlier (e.g., Fischhoff, 1975; 1977) suggest that subjects may incorporate the misinformation despite advanced warning, that is, may actually process this information without subsequently verifying its source during recall. In this case, misled subjects may be unable to deprocess the suggested information.

Second, we asked whether mental representations of suggested and veridical memories might be reflected in subjects' everyday vernacular, and if differences might be measurable quantitatively and qualitatively. That is, in what ways might these memories look different? To this end we scored subjects' free recall descriptions of the items in terms of confidence, number of sensory, geographical, and temporal details contained in the descriptions, "correctness" of information recalled, number of verbal hedges or qualifiers used in recalling information, number of references to cognitive operations, and number of words used to describe the items (see Appendix N for operational definitions of these qualities). We hypothesized, guided by the Reality Monitoring model of Johnson and Raye (1981) and by results of previous studies by Schooler et al. (1986; in press), that confidence, number of sensory details, verbal hedges, references to cognitive operations and words would vary with the source of the memory, that is, would vary between "see" and "don't see" conditions.

In addition to scoring those qualities of verbal description relevant to

reality monitoring, correct, incorrect, and attributional information were scored as per the Button et al. (1989) study. "Correctness" of information recalled represented an exploratory variable without any particular hypothesis attached.

Additionally, analysis of dependent measures reflected the adoption of the between groups aspect of Schooler et al.'s (1986) analyses, combined with the scoring of individual details contained in free recall descriptions from Schooler et al.'s (in press) study. Thus mean frequencies of verbal quality variables were compared between veridical and suggested conditions. The combining of these aspects in the present design, however, did not preclude the analysis of both incidence of mention, and total number of details of each quality contained in descriptions by both "within" and "between" procedures.

Third, we asked whether certain characteristics internal to the individual might be associated with (a) qualitative differences in vernacular, and with (b) a *general* tendency to report imagined mental representations as veridical in origin (i.e. with confabulation) . To this end we chose a number of individual difference measures to predict quality of vernacular and confabulation. For instance, hypnotizability, and various of its correlates (see Lynn & Rhue, 1986; Nadon, Laurence, & Perry, 1987) were examined, as well as other individual difference measures (see Method, and Results sections for further elaboration of rationale behind these) for their ability to predict memory creation. In terms of whether certain characteristics internal to the individual might be associated with quality or style of everyday vernacular in describing memories, we focused on predicting in a multiple regression framework criterion variables representing quality of vernacular, and asked if part of the

reason for their variability may have been due to the influence of individual differences, entered as independent variables. Next, in order to investigate the notion of confabulation we presumed that confusion between veridical and suggested memories would be reflected in inaccurate responses, and we wondered if individual differences would predict a tendency to answer "yes" to several questions which contained misinformation (and whose correct answer was "no"). Thus an individual difference variable may moderate an ability to resist the incorporation of misinformation, or an inability to do so.

METHOD

Subjects

Two hundred and twenty six subjects participated in the study. They ranged in age from 17 to 68 years, with a mean age of 25.4 years (SD = 8.98). Subjects were recruited through an advertisement placed weekly in one of Concordia University's student newspapers (*The Link*), through several sections of an undergraduate psychology research methods course, and by contact from previous participation in unrelated studies at the laboratory. Because of the "eyewitness" nature of the study, no demographic restrictions were placed on our subject pool. Most subjects were undergraduate students from various departments at Concordia University. The advertisement requested volunteers for participation in studies involving memory, imagery, and hypnosis.

Procedure

Each subject in the study attended two sessions, which are schematically represented in Figure 1. In each session subjects were tested in small groups varying in size from 1 to 15. The first session involved approximately 1 1/2 hours of subjects' time, while the second lasted just under an hour.

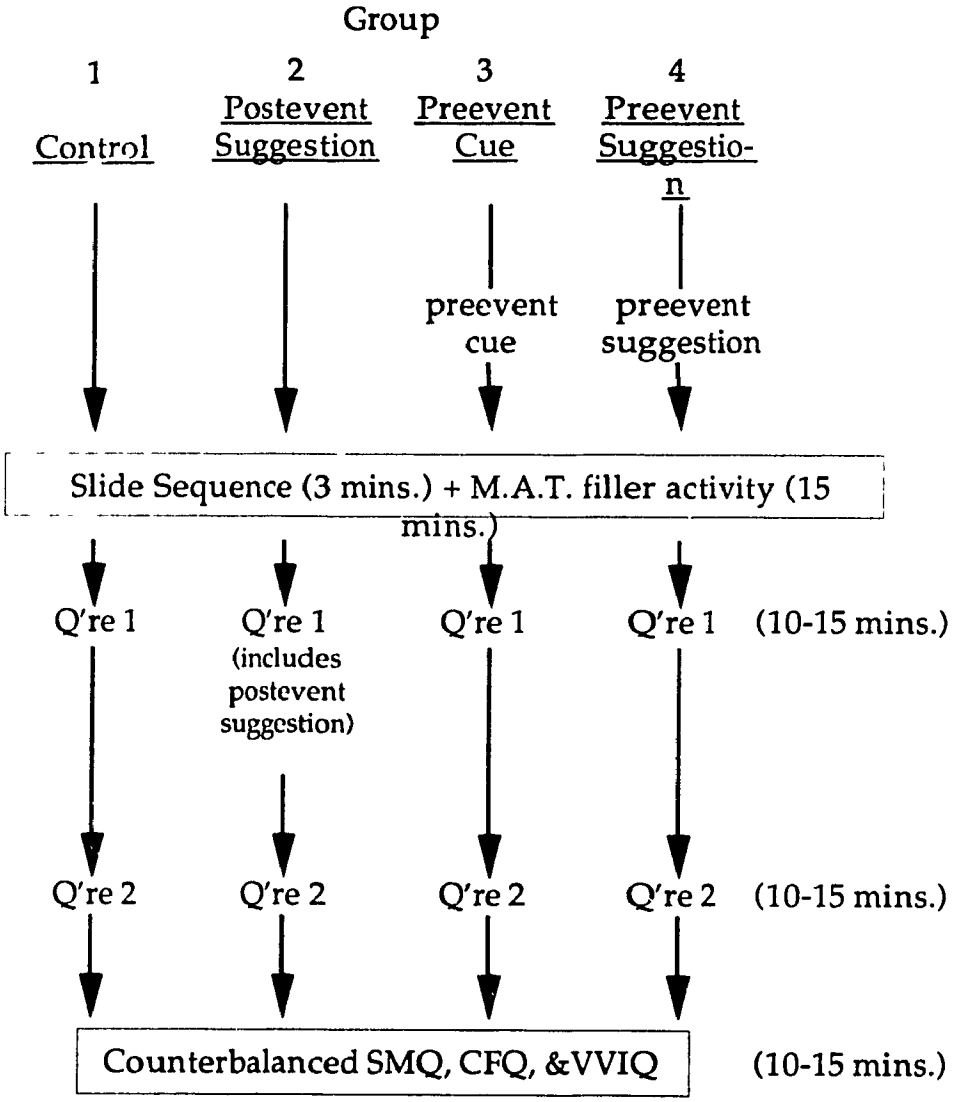
Insert Figure 1 about here

The first session involved the assessment of hypnotizability on the Harvard Group Scale of Hypnotic Susceptibility, Form A (Shor and Orne,

Figure 1
Schematic Representation of the Two Sessions

Session 1: HGSHS : A
PICS
TAS
PEQ

Session 2 :



1962), and filling out three individual difference questionnaires presented in counterbalanced order. These were the Tellegen Absorption Scale (TAS; Tellegen, 1974), the Preference for an Imagic Cognitive Style questionnaire (PICS; Isaacs, 1982), and the Paranormal Experiences Questionnaire (PEQ; Nadon et al., 1985), all described in more detail later in this section. Subjects were paid $6.00 for their participation.

Subject assignment to experimental conditions. Subjects were contacted by phone for the experimental session, randomly chosen from the pool of subjects who had attended the group hypnosis sessions. Subjects were asked if they would be interested in participating in an eyewitness recall study (which did not involve any hypnosis), in which they would view a slide sequence depicting a common street offense involving a suspect and a victim, and subsequently fill out questionnaires about what they saw. Subjects were randomly assigned to one of four experimental conditions. In control and preevent cue conditions subjects viewed a slide sequence in which two critical items were presented once, each in different slides. A "central" scarf appeared around the suspect's neck, and a "peripheral" garbage can appeared beside the suspect. In postevent and preevent suggestion conditions subjects viewed the exact same sequence but with the critical items missing. The presence of these items was suggested for these two groups, *after* viewing the slides for subjects in the postevent suggestion group, and *before* viewing the sequence for subjects in the preevent suggestion group.

Because Schooler et al. (1986) had reported a 25% rate of suggested item incorporation and a 75% rate of veridical item reporting amongst his subjects, twice as many subjects were assigned to suggestion than to no-suggestion

groups in order to finally obtain approximately the same numbers of subjects in all groups who reported seeing the veridical or suggested critical items. In total, 39 and 36 subjects formed the control and preevent cue groups respectively, while 75 and 76 subjects were assigned to the postevent and preevent suggestion groups.

The experimental session. The experimental session was introduced as an eyewitness recall study; the consent form for the experimental session informed subjects that they would be asked to view a slide presentation and fill out questionnaires, for which they would be paid $6.00.

The slide presentation depicted a woman (the eventual victim of a wallet snatching theft) walking along a street with shops. She is holding a shopping bag in her arms. As she stops to look into a window, a female friend arrives with a dog on a leash. The women chat, the "victim" leans over to pet the dog, then the two part, waving goodbye as they go. The "victim" reaches an intersection. On the opposite side is a man (the "suspect") standing (beside a city garbage can for subjects in "see" conditions, 1 and 3) and looking in her direction. She crosses the intersection. When she steps a few feet onto the sidewalk, the "suspect" "accidentally" collides with her and she drops the groceries in her bag onto the sidewalk. The two stoop to retrieve the items, during which time the victim leaves her purse unattended and the suspect snatches the wallet. He opens his coat and slips the wallet into his shirt pocket (behind his scarf for subjects in "see" conditions, 1 and 3). The two wave goodbye, and the unsuspecting victim walks toward her car. While she is looking for her car keys, she discovers that the wallet is missing. A passerby notices her distress, the victim points to the corner where she was robbed, and

they look together in that direction.

The 23-slide sequence was projected onto a white screen in a classroom with the use of a Kodak carousel projector at a distance of approximately 20 feet. Slides were presented at a rate of 8 seconds each, as per Schooler et al. (1986). The critical garbage can appeared in slide position 8 when the suspect first appears and is standing beside it, and the critical scarf appeared around the suspect's neck when he opens his coat to slip the stolen wallet into his shirt pocket, in slide position 16.

Just before the slide presentation subjects were given one of two versions of a set of instructions by the experimenter, one "short" or one "long". The following "short" instructions were given to subjects in the control and postevent suggestion conditions, those groups which directly replicated Schooler et al.'s (1986) design; "In a moment I'll be showing the slide presentation. It depicts a common street offense involving a suspect, a victim, and other passersby. Please watch carefully." Subjects in the postevent suggestion condition, who did not see the critical items during the slide sequence, received misinformation about the scarf and garbage can embedded within Questionnaire 1 (see Appendix D) which was handed out later in the session. The following "long" instructions were given to subjects in the preevent cue and preevent suggestion groups; "In a moment I'll be showing the slide presentation. It depicts a common street offense involving a suspect, a victim, and other passersby. Please watch carefully. Take special note of what the suspect is wearing - his hat, his scarf, his jacket, pants and shoes, and any other details of his appearance. Notice too the surrounding objects near where the incident takes place, like the intersection lights, the city

garbage can, the corner store, the phone booth, other pedestrians, and any other peripheral details." The information contained in this longer introduction served two purposes. First, for subjects in the pre-cue condition, this information served as a cue about the upcoming presence of items they would be seeing. Second, for subjects in the pre-suggestion group, these instructions contained misinformation which *suggested* the upcoming presence of two items which they did not subsequently see. Thus two groups saw the scarf and garbage can, and two groups did not. Of the two who saw the items, one simply viewed the slide presentation, while the other received a preevent cue. Of the two groups who did not see the scarf or garbage can, one received a postevent suggestion, the other a preevent suggestion.

After the slide presentation subjects were engaged in a filler activity to prevent recency and rehearsal effects in subsequent memory recall. Subjects were asked to complete part of the Miller Analogies Test (Sternberg, 1986) for a period of 15 minutes.

Afterwards, subjects received experimental Questionnaire 1, a 24-item questionnaire containing a series of specific questions about details of the slide sequence (see Appendix D) The answers were of a yes/no format, and subjects rated their confidence in their response on a scale from 1 to 4. For subjects in the postevent suggestion group, questions 23 and 24 on this questionnaire contained misinformation suggesting the presence of the scarf and garbage can. For subjects in all other groups these questions were replaced by questions of similar length and requiring a similar correct response of "yes", but inquired about another aspect of the sequence.

Once all subjects had completed Questionnaire 1, experimental

Questionnaire 2 was distributed (see Appendix E). Ten items asked subjects "Did you see the..." object in question, two of which were the scarf and garbage can, and 8 other objects. Subjects also provided confidence reports on their responses. The next page of the questionnaire asked subjects to describe in as much detail as possible on the lined paper provided the items they had just reported seeing. Instructions requested only 5 descriptions from the 10 objects inquired about, and positioning of the critical item questions assured that these would be described if subjects had answered "yes" to seeing them.

Next, subjects completed three individual difference questionnaires, the Cognitive Failure Questionnaire (CFQ; Broadbent et al., 1982), the Vividness of Visual Imagery Questionnaire (VVIQ; Marks, 1973), and the Self-monitoring Questionnaire (SMQ; Snyder, 1974) presented in counterbalanced order.

Finally, subjects completed a "Subject Information" sheet in which general information such as age, sex, study discipline, first language, and speech and writing fluency in english were inquired about. As well, subjects were asked if they had acquired any lay or professional knowledge regarding the findings of research on eyewitness recall.

Subjects were paid $6.00 and debriefed (for experimental scripts and debriefing see Appendix F).

Materials

Subjects were assessed on several self-reported individual difference measures, as well as on two experimental questionnaires.

Harvard Group Scale of Hypnotic Susceptibility: A (Shor and Orne, 1962). All subjects underwent a hypnosis session involving the administration of

this scale, a procedure designed for testing in a group context. Subjects listened to a tape recorded relaxation induction followed by a series of 11 suggestions ranging in response difficulty from motoric, to challenging, to cognitive. For instance, a suggestion requiring a motor response might involve experiencing a feeling of heaviness in an extended arm when given the suggestion that the extended arm will begin to feel too heavy to hold up. A challenge item would require a motor response to be challenged by the subject her/himself. For example, a subject might be asked to imagine that her/his arm is too stiff to bend then asked to "see how difficult it is to bend" by trying to bend it. Suggestions requiring a more cognitive response include imagining a fly in the room, or forgetting the events of the session post-hypnotically until given a cue to reverse the suggested amnesia. The session lasts approximately 45 minutes. After dehypnotization, subjects report on their subjective experience by answering one free recall question, and 11 forced choice questions, each corresponding to one of the suggestions. Each question requires a choice between two statements, one of which must correspond to the subject's own response to the suggestion. Each statement represents an objective criterion for response or non-response to a suggestion, and subjects are instructed to answer according to whether "an *onlooker* would have observed that you did or did not make certain definite responses by certain specific, predefined criteria.....we are thus interested in your estimates of your *outward* behavior and *not* in what your *inner, subjective experience* of it was like" (italics in original). For example, choices for response to the arm lowering suggestion ask if "A) My hand had lowered at least six inches", or "B) My hand had lowered less than six inches" ("before

the time you were told to let your hand down deliberately"). Subjects' scores are calculated by summing the number of "A" choices, those which objectively represent passing the item. Subjects score an additional point if they pass the amnesia suggestion which is assessed in free recall format prior to the forced choice questions. The HGSHS:A is traditionally scored out of 12, however we dropped one suggestion because it occurs out of hypnosis. Thus, subjects' scores may range from 0-11. Standardization of the test has been documented in Montreal as well as elsewhere (see Laurence & Perry, 1982).

Depth of hypnosis. Additionally, subjective estimates of depth of hypnosis were gathered. After completion of the HGSHS:A booklet, subjects were asked to rate the depth of their experience of each suggestion on a scale from 1 to 10, where 1 represents "not at all hypnotized", and where 10 represents "as deeply hypnotized as I could ever be". The notion of depth as a measure of hypnotic experience has been reviewed and discussed extensively in Laurence and Nadon (1986).

Preference for an Imagic Cognitive Style Questionnaire (PICS) (Isaacs, 1982) This scale is designed to tap "preference" for thinking with images, rather than for measurement of imagery "ability" (see Nadon 1983, 1985; Nadon, Laurence and Perry, 1987). Administration involves providing subjects with preliminary information on the distinction between thinking styles as verbal, or imagic, or as a mixture of both, and on the issue of discriminating mental images along a continuum of clarity or vividness. Imagery and verbal modes are presented to subjects as equally desirable, while clarity is presented as possibly dependent upon an individual's preferred thinking style. The entire set of instructions is designed to potentiate the subject's preferred thinking

style, thus minimizing response bias.

Once subjects finish reading this background information, the experimenter describes to subjects three scenarios in turn. After each scenario, they are instructed to close their eyes and "think about" (as opposed to "imagine") for a period of time the scenario described (2 minutes for the first and 1 minute each for the second and third). Subjects are asked to think first about a personal and private experience which had a positive emotional impact on them, and second about an early morning walk in a meadow alone. Finally, subjects are shown a projected slide of a sunny countryside viewed from the deck of a ship. Following each scenario, subjects answer four forced- choice questions regarding the content of their thinking, one on each of four subscales (Verbal, Imagery, Absorption, and Effort). Choices assess the clarity of their thinking on each subscale, ranging from "vague" to "fairly clear", "quite clear" to "so clear that it was almost real". The PICS score is calculated by subtracting Verbal and Effort scores from Imagery and Absorption scores, with results ranging from a possible -22 to +24. A copy of this questionnaire is included in Appendix G.

Tellegen Absorption Scale (TAS) (Tellegen and Atkinson, 1974). This scale was designed to measure openness to absorbing and self-altering experiences in daily life. It contains 34 true-false items that tap everyday experiences of appreciation and involvement in fantasy, new experiences, and other absorbing events. Examples of items include: "Sometimes I experience things as if they were doubly real", "Some of my most vivid memories are called up by scents and smells", or "The sound of a voice can be so fascinating to me that I can just go on listening to it." Subjects' scores are

calculated by adding "True" responses, with scores ranging between a possible 0 to 34 (see Appendix H). Isaacs (1982) reported an internal consistency alpha coefficient of 0.89 for the TAS inventory.

Vividness of Visual Imagery Questionnaire (VVIQ) (Marks, 1973). As the name suggests, this scale was designed to measure the vividness with which mental images are experienced. Subjects are instructed to complete in their minds each of 16 suggested images, and then to rate the vividness of that image on a scale from 1 to 5. Each rating is predefined; for example, number 1 on the scale is defined as "no image at all, you only 'know' that you are thinking of the object", while number 5 defines an image as "perfectly clear and as vivid as normal vision". Suggested images include visualizing the sun rising above the horizon into a hazy sky, or surrounded with blueness, or with a rainbow appearing. Subject ratings of the 16 items are summed such that scores range from a possible 16 to 80 (see Appendix I). Marks (1973) has reported a 0.85 split-half internal reliability coefficient for the VVIQ, while Dowling (1973; cited in White et al., 1977) reported an alpha coefficient of reliability of 0.94. Immediate test-retest reliability was found to be .74 by Marks (1973), and .67 by McKelvie and Gingras (1974; cited in White et al. 1977) for a three week interval.

The Self-Monitoring Questionnaire (SMQ) (Snyder, 1974). This scale was designed to measure individual differences in the tendency and ability to control and manage self-presentation, expressive behavior, and non-verbal displays of affect in social situations. The questionnaire lists a set of 25 true/false self-descriptive statements that describe (a) concern with social appropriateness of one's self-presentation (e.g., "At parties and social gatherings, I do not attempt to do or say things that others will like."); (b)

attention to social comparison information as cues to situationally appropriate expressive self-presentation (e.g., "When I am uncertain how to act in social situations, I look to the behavior of others for cues."); (c) the ability to control and modify one's self-presentation and expressive behavior (e.g., "I can look anyone in the eye and tell a lie, if for the right end."); (d) the use of this ability in particular situations (e.g., "I may deceive people by being friendly when I really dislike them."); and (e) the extent to which one's expressive behavior and self-presentation are tailored to fit particular social situations (e.g., "In different situations and with different people, I often act like very different persons."). The questionnaire asks subjects to rate on a 5-point scale from -2 to +2 the degree to which statements such as those above describe themselves (where -2 is "extremely uncharacteristic", 0 is "neutral", and +2 is "extremely characteristic"). Each item is scored in the direction of high self-monitoring; for half the items, this is so for an "extremely uncharacteristic" response, while for the other half, this is so for an "extremely characteristic" response. Scale reversed scores are summed, and range from a possible 0 to 100 (see Appendix J). The scale has demonstrated satisfactory construct and discriminant validity as discussed in Snyder (1979; 1987).

Cognitive Failures Questionnaire (CFQ) (Broadbent, Cooper, Fitzgerald, Parkes, 1982). The CFQ is a self-report inventory designed to measure stable individual differences in failures of perception, memory, and motor function. Subjects rate the frequency during the last six months of each of 25 items on a scale that ranges from 0 ("never") to 4 ("often"), with a midpoint response of 2 ("occasionally"). Examples of items include: "Do you fail to notice signposts

on the road?" (perception), "Do you find that you forget why you went from one part of the house to the other?" (memory), "Do you bump into people?" (motor). Scores are calculated by summing all circled answers for a total score of a minimum of 0 and a maximum of 100 (see Appendix K). Broadbent et al. (1982) reported a test-retest reliability of .82 over 21 weeks, .80 over 65 weeks, and .62 over a one to two year interval.

The Paranormal Experiences Questionnaire (Nadon, Register, and Kihlstrom, 1985). This is a 23-item self-report questionnaire designed to measure individual differences in paranormal experience, assuming a stable cognitive basis for anomalous experiences (see Nadon and Kihlstrom, 1987). Examples of questions include "Have you ever felt that you were in communication with someone who had died?, "Have you ever felt that you were able to directly influence others through your thoughts?", and "Have you ever felt that your body was emitting light or energy?". Subjects are asked to respond to each question in a yes/no format on two scales, "as an adult" and "as a child". The questionnaire is scored separately for each subscale by summing "Yes" responses (see Appendix L). The questionnaire has demonstrated an internal reliability alpha coefficient of .82 and .84 for adult and child scales respectively, and has accounted for variability in hypnotizability as measured by the HGSHS:A (Shor and Orne, 1962) over that accounted by the Tellegen Absorption Scale (Tellegen and Atkinson, 1974) in two samples involving more than 1,000 subjects (R. Nadon, personal communication, April 5, 1989).

Miller Analogies Test (in Sternberg, 1986). This test provided the task for a postevent filler activity. In each of 82 questions, two words were presented

together as presumably related along some dimension of similarity or correspondence. A third word is presented with a choice of four words, one of which must correspond to the third word along the same dimension as the relation between the first two words. Subjects' task was to choose a fourth word which would complete analogous comparisons between the two sets of words. For example, in the comparisons of PEN : INK : : PENCIL : (*a.* limestone, *b.* graphite, *c.* talc, *d.* gypsum), choice *b.*, graphite, completes the analogy between a writing utensil and the substance in it that makes it write. Subjects were given more analogies to work than could be completed in 15 minutes. This questionnaire was not scored.

Experimental questionnaires. Two experimental questionnaires were completed by all subjects after viewing the slide presentation and completing the filler activity. These were designed by the experimenter for the purpose of the study, and were modelled after the postevent questionnaires originated by Loftus in her numerous studies using the misleading information paradigm (see Loftus, 1979a). Questionnaire 1 asked 24 yes/no format questions about objects, people, and actions viewed in the slide sequence (see Appendix D). Subjects also rated their confidence on their yes/no answers on a scale from 1 to 4, where a rating of 1 indicates guessing, while ratings of 2, 3, and 4 indicate low, moderate, or high confidence respectively. Examples of questions include: "At the moment when the victim first arrives at the crosswalk, was the pedestrian who appears on the far side of the street dropping a letter into the mailbox?"; "Was there a bus stop at the corner where the purse snatching incident took place?". Half of the questions required a "yes" answer to be correct, while for the other half a "no" answer represented a correct response.

The purpose of Questionnaire 1 was to provide a backdrop for the embedding of postevent misinformation in *one* condition, information suggesting the presence of the two missing critical objects (ie. the scarf, and the city garbage can). Subjects in all other conditions received the identical questionnaire minus misinformation regarding the critical objects. The suggestions were subtly fixed within the last two questions of the questionnaire, numbers 23 and 24, and were congruent with the style of previous questions. The questions read as follows: 23) "Is the victim crossing on a green light at the moment when the suspect first appears on the far side of the street **beside the city garbage can**?", and 24) "Is the victim still retrieving her fallen items at the moment when the suspect is hiding the victim's wallet in the shirt pocket **behind his scarf**?". For subjects in the other three conditions, questions in these positions read as follows: 23) "When the two women meet at the beginning of the sequence, is there a sign visible above the shop window in front of which they are standing?", and 24) "At the moment when the suspect bumps into the victim, was the passerby who was entering the store looking in their direction?". The latter neutral questions were modelled after the questions with suggested information in terms of length, and style, and all questions required a "yes" response to be correct.

Questionnaire 2 asked 10 yes/no format questions. Each question asked "Did you see the....." object in the slide sequence, a wording which presumes the presence of the object in question. Loftus et al. (1975) found this format to be associated with fewer "I don't know" responses, and more "recognition" of suggested events. Questions 5 and 7 pertained to the critical items, asking "Did you see the..." garbage can and scarf respectively, objects which are veridical for subjects in the control and preevent cue groups and suggested for

the postevent and preevent suggestion groups. Questions 2 and 9 asked if "the" ambulance and victim's skirt were seen, items which were not present for subjects in any condition. The six remaining questions asked about veridical objects in the slide sequence. Three of these were "central", the suspect's coat, and the victim's shopping bag and car. Three were "peripheral", the bicycle, the fire hydrant, and the dog. Subjects reported their confidence on the earlier mentioned 4-point scale for their responses on each of these 10 items.

The next page of Questionnaire 2 instructs subjects to describe in as much detail as possible on the lined paper provided the objects they just reported "yes" to having seen. Instructions requested only 5 descriptions from the 10 objects inquired about, and positioning of the critical item questions assured that these would be described if subjects had answered "yes" to seeing them (see Appendix E).

Examples of subjects' free recall descriptions of scarf and coat items from the four groups can be found in Appendix M. These were scored for detail content of several types. This involved the operational definition of individual "bits" of information into sensory, geographical, temporal, "other", attributional, correct, and incorrect details, as well as the definition of verbal hedges, and cognitive operations contained in the descriptions. Number of words was also scored by simple summation of each and every word contained in the descriptions of the objects. After scoring individual "bits", they were simply tallied for each detail type contained in each subject's descriptions to provide dependent measures. A detailed general guideline of scoring protocol, and item specific protocols for the scarf and coat are

contained in Appendix N. Interrater reliabilities on veridical and suggested scarves were .99, .89, 1.00, and .70 for sensory, geographical, temporal, and other details respectively; .98, .94, and .95 for correct, incorrect, and attributional details respectively; and .94 and .99 for number of verbal hedges and number of words respectively. Reliabilities on the suspect's coat were .98, .89, .86 for sensory, temporal, and other details respectively (N.B. no geographical details were contained in these descriptions); .98, .92, and .93 for correct, incorrect, and attributional details respectively; and .96, and .99 for number of verbal hedges, and number of words respectively. Finally, no references to cognitive operations were mentioned in subjects' descriptions of veridical or suggested scarves, or of the suspect's coat.

RESULTS

External Conditions Related to the Incorporation of Veridical and Suggested Information Into Memory

Centrality of Items and Timing of Preevent Information

Table 1 presents the percentage incidence of "yes" responses to questions on Questionnaire 2 which asked "Did you see the .....?" particular veridical or suggested object.

Insert Table 1 about here

Are veridical items reported more often than suggested items? Reports of the scarf and garbage can were compared for postevent and preevent conditions separately. Twenty-seven out of 39 subjects reported having seen the veridical scarf in group 1, while only 23 out of 75 subjects reported it when it was suggested (in group 2), rates of about 69% and 31% respectively, and significantly different [X^2 (1, n = 114) = 15.07, $p < .01$]. Two out of 39 subjects reported a veridical garbage can in group 1, while a larger proportion of 15 out of 75 subjects reported this item when it was suggested, significantly different rates of about 5% and 20% respectively [X^2 (1, n = 114) = 4.47, $p < .05$], and in the opposite direction of results for the scarf. However, preevent information changed the relation between incidence of reporting of a peripheral veridical item and the incidence of reporting of its suggested counterpart. Twelve out of 36 subjects reported a veridical garbage can when forewarned that they

Table 1
Percentage Incidence of "Yes" Responses to Critical Items Perceived or Suggested

	Group			
	1 Control	2 Post Sugg.	3 Pre Cue	4 Pre Sugg.
n	39	75	36	76
Scarf	69.2%	31.1%	83.3%	22.3%
Garbage Can	5.1%	20.0%	33.3%	22.3%
Coat	97.4%	97.3%	100%	98.7%

Note. 1 = control, 2 = postevent suggestion, 3 = preevent cue, 4 = preevent suggestion.

would be seeing it, while 17 out of 76 subjects reported this item when it had been suggested before the event, non-significantly different rates of about 33% and 22% respectively [X^2 (1, n = 112) = 1.53, p > .05]. The relation between veridical and suggested central scarf items did not change with the presence of preevent forewarning. The veridical scarf was still reported significantly more often than when it was suggested. Thirty out of 36 subjects reported the veridical scarf in group 3, and 17 out of 76 reported it when it was suggested before the event in group 4. The relation between veridical and suggested items remained significantly different [X^2 (1, n = 112) =37.28, p < .01].

We have just seen that the relative incidences of reporting of veridical and suggested memories may be dependent on whether or not the veridical item is central or peripheral. How does relative incidence of reporting of two veridical or two suggested items vary with the "centrality" of items? Data in columns 1 and 3 reflect the effect of "centrality" on incidence of "yes" reports for the veridical scarf and garbage can. For subjects in group 1, in which both items were seen once, a significant discrepancy in the percentages of reporting of the scarf and garbage can be observed [X^2 (1, n = 78) = 34.31, p < .01]. Twenty-seven out of 39 subjects reported having seen the scarf, while only 2 out of 39 reported the garbage can, rates of about 69% and 5% respectively. For subjects in group 3, in which subjects were cued about the upcoming presence of the items, 30 out of 36 subjects reported the scarf, while 12 out of 36 reported the garbage can, rates of about 83% and 33% respectively, a significant difference [X^2 (1, n = 72) = 18.51, p < .01]. Groups 2 and 4 reflect the effect of "centrality" on reports of suggested items. For subjects who did not see the scarf or garbage can but had its presence suggested after the event (group 2), 23

out of 75 subjects reported having seen the scarf, and 17 out of 75 reported they had seen the garbage can, rates of about 31% and 20% respectively, and non-significantly different [X^2 (1, n = 150) = 2.41, p > .05]. Seventeen out of 76 subjects in group 4 reported having seen a suggested scarf, and 17 out of 76 reported having seen the suggested garbage can, rates of about 22% and 22% respectively (X^2 (1, n = 152) , p = 1.00). Thus the "centrality" of an item is a non-relevant issue where the reporting of items generated in imagination are concerned.

Did the cue increase the rate of reporting of each item to a significant degree? Veridical and suggested items will be discussed in turn. The cue was associated with an increase in reports of the veridical scarf, from about 69% in group 1 to 83% in the preevent cue condition, but this was not significant [X^2 (1, n = 75) = 2.04, p > .05]. However, reports of the veridical garbage can in group 1 increased significantly in the presence of preevent information, from about 5% to 33% [X^2 (1, n = 75) = 9.81, p < .01]. Preevent information did not increase the rate of reporting of items whose presence was only suggested, regardless of whether they were central or peripheral. Twenty-three out of 75 subjects reported a suggested scarf when misinformation came after viewing the slide sequence, while 17 out of 76 subjects reported a suggested scarf when misinformation came before viewing the event, rates of about 31% and 22% respectively, and non-significantly different [X^2 (1, n = 151) = 1.46, p > .05]. Fifteen out of 75 subjects reported a garbage can when given misinformation about its existence after the event, while 17 out of 76 subjects reported seeing a suggested garbage can when misinformation was given before viewing the event, rates of about 20% and 22% respectively, and non-significantly

different [X^2 (1, n = 151) = .13, p > .05].

We have seen thus far that there is no significant difference in the rate of reporting of a suggested scarf or a suggested garbage can; that there is no evidence that their descriptive definition as "central" or "peripheral" is relevant; and that exposure to misinformed forewarning did not reduce or increase the incidence of suggested memory reports relative to reports based on misinformation received after an event. This rate is about 20% to 30%. However, exposure to more than one piece of misinformation may increase the overall incidence of suggested memory reports. All subjects in each suggestion group received misinformation (before or after viewing the event) about the presence of a scarf and a garbage can. In group 2, 23 out of 75 subjects reported the scarf (31.1%) and 15 out the 75 subjects in the group reported the garbage can (20.0%). Only 4 of these were the same subjects, which means that 36 out of 75, or 48% of subjects in group 2 reported the incorporation of misinformation as externally derived. In group 4, 17 out of 76 subjects reported the suggested scarf (22.3%), and 17 out of 75 subjects reported the suggested garbage can (22.3%). Only 7 of these were the same subjects, which means that 27 out of 76, or about 36% of subjects in group 4 reported the incorporation of at least one of the suggested items as perceptually derived These overall percentages of incorporation of suggested information for groups 2 and 4 did not significantly differ [X^2 (1, n = 151) = 2.42, p > .05]. It should be noted from Schooler's data in the column representing group 2, that an average rate of reporting of 45.8% across three suggested items falls within the overall range of "yes" reports from our data, 36% to 48% for groups 2 and 4.

How Might Verbalized Veridical and Suggested Memories Look Different?

Between Groups X^2 Analyses Comparing Postevent Suggestion Group to Control

Veridical control and postevent suggested memory descriptions were compared according to the scoring protocol of Schooler et al. (1986) (see Appendices A and B for Schooler et al.'s original data). That is, verbal quality variables were scored as either mentioned at least once, or not mentioned in the descriptions, and differences between groups were reported in terms of percentages of subjects whose descriptions mention these qualities.

In the interest of manageable reading, raw data and actual X^2 values of variables presented in Table 2 are presented in Appendix O. It might be noted that no significant differences were found between our two suggestion groups, 2 and 4, on verbal qualities (see Table 3).

Insert Tables 2 and 3 about here

Indices of veridical and suggested memory reports. As can be verified from data in Appendix C (and in Table 1), percentages of "yes" reports to postevent misinformation averaged a rate of 26.8% in the present study, while reports of non-misinformed, but similar, veridical memories averaged a rate of 69.2%.

In both veridical/suggested comparisons, confidence for suggested memories was lower than confidence for veridical memories. Confidence

Table 2
Chi-Square Significance Levels on Comparing Incidence of Mention of Verbal Quality Variables on the Scarf Between Control and Suggestion Groups

	Comparison	
Variable	C vs Postevent S	C vs Preevent S
% "Yes" Responses	**	**
Confidence	*[a]	n.s.[a]
# Words; critical item	n.s.[a]	n.s.[a]
# Words; unrelated item	n.s.[a]	n.s.[a]
Sensory Details	n.s.	n.s.
Geographical Details	**	n.s.
Cognitive Operations	--	--
Function of Sign	--	--
Verbal Hedges	n.s.	n.s.

Note. Note. See Appendix O for raw data.
C = control group.
a = Studentized t value was calculated rather than a X^2 value.
-- = unreported data.
n.s. = non-significant
*$p < .05$. **$p < .01$.

Table 3
Comparisons Between Suggestion Groups 2 & 4 on Verbal Qualities of Scarf

	Group 2	Group 4	Statistic
n	23	17	
Verbal Quality			
% "Yes" Responses	31.1	22.3	X^2 (1, n = 151) = 1.46
Confidence	3.22	3.35	t (38) = .48
# Words	16.52	10.41	t (38) = 1.82
% mention of sensory details	100	100	X^2 (1, n = 40) = 1.00
% mention geographical details	56.5	41.2	X^2 (1, n = 40) = .92
% mention verbal hedges	21.7	29.4	X^2 (1, n = 40) = .92

Note. Group 2 = postevent suggestion, group 4 = preevent suggestion.
*p < .05.

ratings of an unrelated object (the suspect's coat), described by subjects who also described a scarf, did not differ among groups (see Appendix P).

Data in the present study do not show a significant difference in number of words between suggested and veridical descriptions. Descriptions of an unrelated item (the suspect's coat), which all subjects saw, did not differ in length between the control and either of the two suggestion groups (see Appendix P).

Neither of our suggested and veridical comparisons yielded a significant difference in the mention of sensory detail (see Appendix O), and suggestion groups 2 and 4, postevent and preevent suggestion groups respectively, did not differ from one another [X^2 (1, n = 40) = 0.00, p = 1.00]. Additionally, these subjects' descriptions of an unrelated item (the suspect's coat) did not differ between groups in terms of sensory detail mentioned (see Appendix P).

Suggested descriptions in group 2 made significantly *more* mention of geographical detail than veridical descriptions (see Appendix O). The two suggestion groups, 2 and 4, did not differ from one another, however [X^2 (1, n = 40) = 0.92, p > .05]. Descriptions of the suspect's coat did not differ among groups in terms of mention of geographical detail (see Appendix P).

No subjects made reference to their cognitive operations in the present study (in describing either the critical or unrelated object). Similarly, subjects' descriptions of a scarf and a coat did not contain reference to the function of these in either suggested or veridical descriptions. These results were markedly different from Schooler et al.'s study, in which more mention of both of these qualities was associated with suggested relative to veridical descriptions.

Finally, no differences were found between veridical/suggestion

comparison groups in the use of verbal hedging (see Appendix O), nor between the two suggestion groups in the study [X^2 (1, n = 40) = 0.31, p > .05].

In summary, only one measure of verbal report across three experiments (in two studies) reflected a consistent pattern of difference between veridical and suggested memories. That is, when asked if an object was present, veridical objects which were central to the action tended to be reported more often than a similar object which was not present but whose presence was suggested by postevent misinformation. However, it was seen (presented earlier) from similar reports of objects *peripheral* to the action of an event, that this discrepancy, and direction of discrepancy, may be moderated by the "centrality" of the *veridical* item in question. That is, veridical items are reported more frequently than similar suggested items because they were central to the original action. Veridical items which were originally peripheral to the action may be reported *less* often (see groups 1 and 2 in Table 1), or as often (see groups 3 and 4 in Table 1), as similar items internally generated via suggestion.

All other aspects of verbal report showed a less consistent pattern.

Within Groups *t*-tests of Mean Frequencies of Verbal Qualities, Comparing Veridical to Suggested Descriptions in Postevent Suggestion Group 2

Veridical control and postevent suggested memories were compared according to the scoring protocol of Schooler et al. (in press) (see Appendix C for Schooler et al.'s original data). That is, mean "bits" of detail in veridical and suggested descriptions were compared on a *within* subject basis.

Twenty-three subjects in the postevent condition (group 2) provided a description of a suggested scarf as well as a veridical coat[2]. These were compared by dependent *t*-test analysis for mean differences on those verbal attributes previously discussed. Additionally, twenty-seven subjects described both a veridical scarf and veridical coat (in group 1), and these descriptions were analyzed for the same verbal attributes to serve as a control comparison group. No differences in terms of verbal attributes were expected to be found between these two veridical items. Table 4 contains the results of veridical/suggested and veridical/veridical items comparisons in the present study.

Insert Table 4 about here

Table 4 shows that the present study's results replicate Schooler's in terms of sensory details only, with veridical coat descriptions containing more sensory details than suggested scarf descriptions. Additional insight into the interpretation of this difference comes from the absence of difference between veridical coats and veridical scarves in group 1. Indeed it would appear as though veridical origin of a memory will lead to the reporting of more sensory detail relative to a memory of imaginal origin.

The remainder of Schooler's findings were not replicated. Where verbal hedging was concerned, no difference was found between veridical and suggested descriptions, whereas Schooler had. Neither was one veridical object compared to another more likely to be described with verbal hedge content, as can be seen in group 1 of Table 4. Schooler's data did not reveal a

Table 4

Dependent *t*-test Analyses of Mean Frequencies of Verbal Qualities Comparing Veridical/Suggested Descriptions from Group 2, and Veridical/Veridical Descriptions from Group 1

	Group 2			Group 1		
	V coat	S scarf	*t* *df* = 22	V coat	V scarf	*t* *df* = 26
Verbal Quality						
Confidence	3.91	3.22	4.06**	3.82	3.67	.89
# Words	21.78	16.52	2.20*	18.77	15.52	1.37
# of sensory details	6.17	3.22	6.26**	6.27	5.19	1.52
# geographical details	.00	.70	4.75**	.00	.19	2.44*
#verbal hedges	.70	.35	1.62	.62	.57	.15

Note. Group 2 = postevent suggestion group, group 1 = control.
V = veridical, S = suggested.
*p < .05. **p <.01.

difference in confidence or number of words between suggested and veridical memories, but the present study did. Veridical memories were more confident and lengthier than suggested memories (rather than shorter than suggested memories). Additionally, descriptions of two veridical items did not differ in confidence or length. Finally, suggested scarf descriptions were characterized by the use of more geographical detail than veridical coat descriptions, with this difference carrying over to a comparison of a veridical coat with a veridical scarf. Schooler did not report any data on geographical detail, and we did not report any on cognitive operations.

These two studies taken together suggest an overall inconsistent pattern regarding differences in verbal qualities as they are reflected in veridical and suggested memories. Bearing in mind the questionable ecological validity and of Schooler et al's macrosubject approach, and the logic of dissimilar item comparisons, one consistent pattern of finding emerged; origin of a memory will be reflected in a consistently sparser use of sensory detail in descriptions of an imagined object relative to a veridical object, and this may be independent of the object described, since this difference is not present when comparing two veridical objects.

Between Subjects Analyses of *Mean Frequencies* of Verbal Qualities Between Control and Postevent Suggestion Groups' Descriptions

Results will be presented for comparisons of verbal qualities between groups 1 and 2, those analogous to Schooler's.

Independent *t*-tests were used to compare verbal qualities previously discussed of descriptions of veridical and suggested scarves in groups 1 and 2,

control ("no cue") and postevent suggestion groups. Mean frequencies of these verbal qualities are presented in Table 5.

Insert Table 5 about here

Results indicate that subjects who reported seeing a scarf which was suggested after the event were significantly less confident about this report than subjects who reported seeing a scarf which they had actually seen. In subjects' subsequent descriptions of the reported scarves, suggested descriptions contained significantly less sensory detail and significantly more geographical detail than scarf descriptions given by subjects who had actually seen this item. Veridical and suggested descriptions did not differ in terms of number of words and verbal hedges contained.

It might be noted that no significant differences were found between groups 1 and 2 on descriptions of the suspect's coat given by the same subjects who described scarves, an object which all subjects saw (see Appendix Q).

Additional Analyses: Examining the Effect of Preevent Suggestion

The above analyses involved the comparison of veridical descriptions with suggested descriptions elicited by *post*event suggestion. If significant findings between these two categories of memory are to be attributed to the veridical or suggested nature of the memories freely recalled, then similar differences may be expected to be found between veridical and suggested

Table 5
Independent *t*-test Analyses Comparing Mean Frequencies of Verbal Qualities in Veridical and Suggested Scarf Descriptions in Groups 1 & 2

	Group 1	Group 2	t (df = 48)
n	27	23	
Verbal Quality			
Confidence	3.67	3.22	2.01*
# Words	15.52	16.52	.36
sensory details	5.19	3.22	2.43*
geographical details	.19	.70	3.22**
verbal hedges	.59	.35	.87

Note. Group 1 = control, group 2 = postevent suggestion.
*$p < .05$. **$p < .01$.

descriptions when suggested memories have been elicited by *pre*event information and/or suggestion.

The replication in the present study of analyses employed by Schooler et al. (1986; in press) will be presented next for comparisons between veridical and *pre*event suggested descriptions.

Between Groups X^2 Analyses Comparing Preevent Suggestion Group 4 to Control

In analyses comparing the preevent suggestion group to the control, it was found that descriptions elicited from preevent suggestion mirrored those found in descriptions elicited from postevent suggestion in terms of number of words, sensory details, and verbal hedges (all non-significantly different from the control, see Table 2). However, postevent descriptions were significantly less confident, and contained more geographical detail than the control, while preevent descriptions did not differ from the control on these qualities.

Within Groups *t*-tests of Mean Frequencies of Verbal Qualities Comparing Veridical to Suggested Descriptions in Preevent Suggestion Group 4

How might inclusion of group 4 affect the results of our analyses modelled after Schooler et al. (in press)? As can be seen from Table 6, postevent and preevent suggestion descriptions did not significantly differ in mean frequencies of verbal qualities contained.

Insert Table 6 about here

Table 6
Independent *t*-test Analyses Comparing Mean Frequencies of Verbal Qualities in Suggested Scarf Descriptions in Groups 2 & 4

	Group 2	Group 4	*t* (*df* = 38)
n	23	17	
Verbal Quality			
Confidence	3.22	3.35	.48
# Words	16.52	10.41	1.82
sensory details	3.28	2.41	1.29
geographical details	.70	.41	1.41
verbal hedges	.35	.53	.62

Note. Group 2 = postevent suggestion, group 4 = preevent suggestion.
*$p < .05$.

Given that this is the case, then pooling both suggestion groups for comparison to both veridical groups ought only to increase the power of effects previously found. Additionally, independent *t*-test analyses were done to assess the effect of preevent information on all verbal qualities in *veridical* descriptions of the scarf and coat from groups 1 (control, "no cue") and 3 (preevent cue). Results are presented in Table 7, and with the exception of confidence on the scarf, the cue did not have a significant effect on verbal qualities.

Insert Table 7 about here

Groups 2 and 4, and groups 1 and 3 were combined to repeat the earlier within subjects analysis on all verbal qualities which were non-significantly affected by preevent information. These results are presented in Table 8.

Insert Table 8 about here

When compared to results in group 2 of Table 4, collapsing of both suggestion groups does nothing to change the significant differences and directions of results previously found between veridical and suggested items. However, when compared to results in group 1 of Table 4, collapsing of both veridical groups renders significant a previously non-significant difference in number of sensory details between two *veridical* items. These results suggest that, at least where sensory details are concerned, a significant or non-significant difference may be moderated by more than origin of the memory being

Table 7

Independent *t*-test Analyses Comparing Mean Frequencies of Verbal Qualities in Veridical Scarf Descriptions from Groups 1 & 3, and Veridical Coat Descriptions from Groups 1 & 3

	Group 1	Group 3	*t* (*df* = 55)
n	27	30	
SCARF Verbal Qualities			
Confidence	3.67	3.97	2.17*
# Words	15.52	19.17	1.45
sensory details	5.19	5.67	.63
geographical details	.19	.37	1.41
verbal hedges	.56	.47	.40
n	26	29	t (df = 53)
COAT Verbal Qualities			
Confidence	3.82	3.93	1.18†
# Words	18.77	19.66	.25
sensory details	6.27	6.14	.13
geographical details	0.00	0.00	
verbal hedges	.62	.38	1.02

Note. Group 1 = control, group 3 = preevent cue.

† = (df = 55)

*$p < .05$.

Table 8

Dependent *t*-test Analyses of Mean Frequencies of Verbal Qualities, Comparing Veridical/Suggested Descriptions from Groups 2 & 4 Combined, and Veridical/Veridical Descriptions from Groups 1 & 3 Combined

	Groups 2 & 4			Groups 1 & 3		
	V coat	S scarf	*t* *df* = 39	V coat	V scarf	*t* *df* = 56
Verbal Quality						
# Words	20.56	13.93	3.78**	19.24	17.44	1.28
# of sensory details	5.59	2.88	7.44**	6.20	5.44	2.01*
# geographical details	.00	.58	5.78**	.00	.28	4.34**
#verbal hedges	.77	.43	1.84	.49	.51	.23

Note. Groups 2 & 4 = postevent and preevent suggestion, groups 1 & 3 = control and preevent cue.
V = veridical, S = suggested.
*p < .05. **p <.01.

recalled. If a preevent cue did not significantly increase the number of sensory details contained in either scarf or coat descriptions in groups 1 and 3, then one must consider the interpretation that the significant difference found was perhaps related to inherent differences between the objects themselves, or to the fact that the coat was seen many times while the scarf was seen only once.

Thus, our earlier replication of Schooler's finding that fewer sensory details may be associated with suggested memories relative to veridical memories is now called into question in light of having found a similar difference between two veridical items.

Between (4) Groups Comparisons of Mean Frequencies of Verbal Qualities in Veridical and Suggested Scarf Descriptions by Multiple Regression Analysis

We turn now to the inclusion of groups 3 and 4 (preevent "cue" and preevent suggestion groups respectively) in a between subjects design comparing mean "bits" of information recalled. The four groups were combined and examined within a multiple regression framework. "Group" was entered as a dummy coded independent variable (as per Cohen and Cohen, 1983; see pp. 183-198) predicting, in separate equations, each verbal quality as a criterion variable. Dummy coding a grouping variable allowed the examination of multiple preplanned comparisons between the control group (1) and all other groups. Moreover, multiple regression analysis yields values exactly the same as those which would have been obtained from an

ANOVA *F* value and post-hoc comparisons of significance between groups (Cohen and Cohen, 1983; pp. 196-198). Table 9 presents the amount of overall variance explained by group in separate analyses predicting each verbal quality.

Insert Table 9 about here

Group accounted for a significant 16% of the variance in confidence ($p < .001$). The postevent suggestion group was significantly less confident than the veridical control group, but the preevent suggestion was not significantly less so than the control. Additionally, the preevent cue group (group 3) did not differ from the control.

A significant 8.5% of variance in number of words used to describe the scarf was explained by group ($p < .05$). Dummy coding was arranged in the service of preplanned comparisons between each of the groups (2, 3, and 4) to the control (group 1). Neither of the suggestion groups, nor the preevent cue group, comparisons to the control was responsible for the significant effect.

Group accounted for a significant 21.4% of the variance in sensory details ($p < .001$). Both suggestion groups' descriptions of the scarf contained significantly less sensory detail than descriptions given by the control group's subjects who saw the scarf. The veridical preevent cue group did not differ from the control.

A significant 10.5% of variance was accounted for by geographical detail ($p < .01$). There was a significant difference between the postevent suggestion group and the control, but non-significant differences were found between

Table 9

Prediction of Verbal Quality Variables on Scarf by Grouping Variable in Separate Equations

Variable	R^2	F	df
Confidence	.160	5.92***	3, 93
Number of Words	.085	2.88*	3, 93
Sensory Details	.214	8.44***	3, 93
Geographical Details	.105	3.64**	3, 93
Verbal Hedges	.009	0.27	3, 93

	Group				
	1	2	3	4	
Variable					
	Means				
Confidence	3.67	3.22*	3.97	3.35	SE = .48
Number of Words	15.52	16.52	19.17	10.41†	
Sensory Details	5.19	3.22**	5.67	2.41***	SE = 6.48
Geographical Details	.19	.70***	.37	.41	SE = .30
Verbal Hedges	.56	.35	.47	.53	

Note. Mean comparisons were made between the control group 1 and each of groups 2, 3, and 4; asteriks beside means indicate that the means differed from the control; † = this mean is significantly different from group 3's mean (see Appendix O).

1 = control, 2 = postevent suggestion, 3 = preevent cue, 4 = preevent suggestion.

*$p < .05$. **$p < .01$. ***$p < .001$.

the preevent suggestion group and the control, and between the preevent cue group and the control. Thus the postevent, but not the preevent, suggestion group gave significantly more geographical detail than the control.

It should be noted that no differences were found between groups on any verbal quality contained in descriptions of the suspect's coat given by the same subjects who described a scarf (see Appendix R).

Total Number of Details

Sensory, geographical, temporal, and other details recalled were collapsed and reanalyzed with a multiple regression procedure as a new "sensory detail" variable . The source table for the prediction of total number of sensory details on the scarf predicted by group is presented in Table 10.

Insert Table 10 about here

Results indicate that group predicted a significant 18% of variance in scarf details recalled ($p < .001$]. The preevent suggestion group recalled significantly fewer sensory details than the control. The postevent suggestion group similarly recalled fewer sensory details than the control, but not significantly so. The veridical preevent cue group did not differ from the control.

It should be noted that no differences were found between groups for total coat details contained in descriptions given by same subjects who described scarves (see Appendix R).

Table 10
Prediction of "Total Details" Variable on Scarf by Grouping Variable

Variable	R^2	F	df
Total Details	.180	6.80***	3, 93

	Group				
	1	2	3	4	
Variable					
			Means		
Total Details	5.52	4.09	6.50	2.88**	SE = 8.34

Note. Mean comparisons were made between the control (Group 1) and each of groups 2, 3, and 4; asteriks beside means indicate that the means differed from the control.
1 = control, 2 = postevent suggestion, 3 = preevent cue, 4 = preevent suggestion.
**$p < .01$. ***$p < .001$.

The Roles of Correct, Incorrect, and Attributional Details, and the Interrelation of Verbal Quality Variables

Correct, incorrect, and attributional detail are verbal quality variables previously unexplored as reality monitoring cues available to subjects engaged in free recall. We wished to investigate the roles of these variables, along with the nature of the interrelation of all verbal quality variables amongst themselves. For example we might ask, "Does confidence predict sensory details, correct detail, or number of words?", and hypothesize that higher confidence may yield longer recalls containing more sensory detail and more correct detail about the remembered object than lower confidence. Hierarchical multiple regression is an approach to regression which allows the entry of variables in a predetermined order, based upon theoretical importance. Accordingly, each verbal quality variable served in turn as a criterion dependent variable, and then as a predictor variable for all other verbal quality variables, including correct, incorrect, and attributional detail. The predetermined order for variable entry is presented in Table 11.

Insert Table 11 about here

The underlying model determining entry order parallels the subject's experience of the experimental procedure; subjects were randomly assigned to an experimental group, reported confidence in their answer to the "Did you see....." the item in question on Questionnaire 2, then freely recalled their memory of the item (i.e., in words and details). Attributional, correct, and

Table 11

Predetermined Order of Verbal Quality Variable Entry to Test Interrelation of Dependent Measures

1. Group
2. Confidence
3. Group X Confidence
4. Number of Words
5. Group X Number of Words
6. Total Details
7. Group X Total Details
8. Attributional Details
9. Group X Attributional Details
10. Correct Details
11. Group X Correct Details
12. Incorrect Details
13. Group X Incorrect Details

Note. If a predictor variable is contained within the criterion variable (e.g., attributional details is a subset of total details) it is not entered in the equation. Also, if a predictor variable is contained within the previously entered predictor variable "total details", it is not entered unless total details was non-significant.

See Table 12 for predetermined order of verbal quality variable entry for individual verbal qualities.

incorrect details were entered last because these represented extended aspects of inquiry over the replication of Schooler et al. (1986; in press). Additionally, group, as a primary variable of interest in the replication, was tested for possible interactions with each verbal quality variable. Verbal quality variables which were inherently redundant, or overlapping, with the criterion variable were not entered. For example, number of words could not be entered as a predictor of sensory details (or any other detail for that matter), since sensory details are contained within total number of words. As another example, verbal hedges could be entered as a predictor of correct details but not of number words, since it is not contained within the former, but is a subset of the latter. Also, verbal quality variables which were inherently redundant, or overlapping, with a previously entered predictor variable were not entered unless the previously entered variable was found to be non-significant. Thus the predetermined list of variables for entry was shorter or longer depending on the criterion variable being predicted. The predetermined order of entry for individual criterion variables is presented in Table 12.

Insert Table 12 about here

The main questions were, "what do correct, incorrect, and attributional detail add to the prediction of verbal quality variables previously investigated, and how do all verbal quality variables relate to one another?". The above mentioned model was tested separately on two major subsets of the data; first, on predicting verbal qualities of veridical scarves and veridical coats described by same subjects from groups 1 and 3 combined, and second, on suggested

Table 12
Predetermined Order of Verbal Quality Variable Entry for Individual Verbal Qualities

Confidence:
- group
- # words
- group X # words
- total details
- group X total details†
- verbal hedges
- group X verbal hedges
- attributions
- group X attributions
- correct details
- group X correct details
- incorrect details
- group X incorrect details

words:
- group
- confidence
- group X confidence

Total details:
- group
- confidence
- group X confidence

Verbal Hedges:
- group
- confidence
- group X confidence
- attributions
- group X attributions
- correct details
- group X correct details
- incorrect details
- group X incorrect details

Attributions:
- group
- confidence
- group X confidence
- verbal hedges
- group X verbal hedges
- correct details
- group X correct details
- incorrect details
- group X incorrect details

Correct Details:
- group
- confidence
- group X confidence
- verbal hedges
- group X verbal hedges
- attributions
- group X attributions
- incorrect details
- group X incorrect details

Incorrect Details:
- group
- confidence
- group X confidence
- verbal hedges
- group X verbal hedges
- attributions
- group X attributions
- correct details
- group X correct details

Note. † = If "total details" is significant, predictor variables following it (i.e., predicting confidence) area not entered.

scarves and veridical coats described by same subjects from groups 2 and 4 combined. Because all information contained in suggested scarf descriptions is inherently incorrect, correct and incorrect details could not be entered as predictors of verbal qualities on scarf descriptions from all four groups combined, in which some descriptions were suggested and others veridical.

Descriptions of Veridical and Suggested Scarves

Groups 1 & 3. Subjects who described a veridical scarf were more confident about having seen it if they were in group 3, having received a preevent cue (see Table 7). Multiple regression analyses were done predicting other verbal quality variables, but group was the only predictor of confidence for these descriptions, accounting for a significant 7.9% of the variance in confidence (F (1, 55) = 4.70, $p < .05$). It should be noted that in previous analyses with 4 groups, group 3's confidence did not differ from the control. This may be because correct information predicts the same 7.9% ($p < .05$) of variance, and entered one after another, they negate each other's unique effect (see Table 13). Group did not predict any other verbal quality variable including correct, incorrect, and attributional detail, on veridical descriptions.

Insert Table 13 about here

Incorrect information predicted a significant 13.9% of variance in verbal hedges on the veridical scarf in groups 1 and 3 ($p < .01$). This variable also predicted a significant 9.0% of variance in attributional detail ($p < .05$). Not surprisingly, incorrect information was significantly predicted by attributional

Table 13
Prediction of Correct Details on Veridical Scarves in Groups 1 & 3

Variable	R	R^2	*F*	*df*
Confidence	.281	.079	4.70*	1, 55

	Group	
	1	3
Variable		
	Means	
Correct Details	.56	.47
Confidence	1.04	.83

Note. Mean comparisons were made between groups 1 and 3; an asterik(s) beside a mean indicates that the mean differs from the one before it.
1 = control, 3 = preevent cue.
*$p < .05$.

detail, and verbal hedges, each contributing unique variance at their respective steps in an equation accounting for 22.1% of variance overall ($p < .01$). All other verbal quality variables were entered for each of these equations, but only those predictor variables mentioned were significant. For clarity of exposition only the results of these analyses are presented in Tables 14, 15, and 16.

Insert Tables 14, 15, an 16 about here

Groups 2 & 4. Similar patterns were not observed for suggested scarf descriptions in groups 2 and 4. However, it might be recalled that correct and incorrect information could not be entered into an analyses of confabulated memories. Nevertheless, group, confidence, sensory details, attributional details, and words did not predict one another in any combination either.

Descriptions of Coats in Groups 1 and 3, and Groups 2 and 4

Group did not predict any verbal quality variable including correct, incorrect, and attributional detail, on veridical coat descriptions in either subset of descriptions.

Groups 1 and 3. Verbal hedges on the veridical coat were significantly predicted by attributions, incorrect detail, and the interaction of these two, each contributing significant unique variance at their respective steps to account for 62.5% of the variance in verbal hedges overall ($p < .001$). The

Table 14
Prediction of Verbal Hedges in Veridical Scarves in Groups 1 & 3

Variable	R	R^2	*F*	*df*
Incorrect Details	.372	.139	8.85**	1, 55

	Group	
	1	3
Variable	Means	
Verbal Hedges	.56	.47
Incorrect Details	1.04	.83

Note. Mean comparisons were made between groups 1 and 3; an asterik(s) beside a mean indicates that the mean differs from the one before it.
1 = control, 3 = preevent cue.
**$p < .01$.

Table 15
Prediction of Attributional Details in Veridical Scarves in Groups 1 & 3

Variable	R	R^2	*F*	*df*
Incorrect Details	.300	.090	5.43*	1, 55

	Group	
	1	3
Variable	Means	
Incorrect Details	1.04	.83
Attributional Details	1.07	1.07

Note. Mean comparisons were made between groups 1 and 3; an asterik(s) beside a mean indicates that the mean differs from the one before it.
1 = control, 3 = present cue.
*$p < .05$.

Table 16
Prediction of Incorrect Details in Veridical Scarves in Groups 1 & 3

Variable	Cum R	Cum R^2	I	F	df
Verbal Hedges	.372	.139	.139	8.85**	1, 55
Attributional Details	.300	.221	.082	5.69*	1, 54

	Group 1	Group 3
Variable	Means	
Verbal Hedges	.56	.47
Incorrect Details	1.04	.83
Attributional Details	1.07	1.07

Note. Mean comparisons were made between groups 1 and 3; an asterik(s) beside a mean indicates that the mean differs from the one before it.
1 = control, 3 = preevent cue.
I = increase in variance explained by individual predictor variable.
*$p < .05$. **$p < .01$.

slopes of the relation between verbal hedges and three representative values of attributions (at 1, 4, and 7) were .20, .29, and .60. The slopes of the relation between verbal hedges and three representative values of incorrect details (at 1, 4, and 7) were .21, .51, and .81. The interaction (calculated as per Cohen and Cohen, 1983, pp. 320-325) indicated that giving a high number of attributions and incorrect information makes a subject especially likely to use verbal hedges.

Not surprisingly, verbal hedges predicted a significant 42.9% of variance in attributional detail ($p < .001$). Incorrect information was redundant with verbal hedges in the prediction of attributional details. The above set of results are presented in tables 17 and 18.

Insert Tables 17 and 18 about here

Verbal hedges predicted incorrect information on the coat in groups 1 and 3. A significant 16.3% of variance was accounted for by this variable ($p < .01$). An additional significant 14.6% of variance overall was accounted for by the interaction of group by confidence ($p < .05$). The slopes of the relation between incorrect details and group (1 & 3) were .33, and -2.83. The slopes of the relation between incorrect details and three representative values of confidence (at 2, 3, and 4) were 5.73, 2.57, and -.59. The calculation of this interaction (as per Cohen and Cohen, 1983, pp. 320-325) suggests that increases in confidence are associated with either no change or decreases in incorrect information for groups 1 and 3 respectively. However, the presence of a cue decreases incorrect information only if confidence is reported at "4", very

Table 17
Prediction of Verbal Hedges in Coats in Groups 1 & 3

Variable	Cum R	Cum R^2	I	*F*	*df*
Attributional Details	.655	.429	.429	39.87***	1, 53
Incorrect Details	.690	.476	.047	4.68*	1, 52
Attributional X Incorrect	.790	.625	.149	20.19***	1, 51

	Group	
	1	3
Variable		
	Means	
Verbal Hedges	.62	.38
Incorrect Details	1.19	.86
Attributional Details	1.77	1.31

Note. Mean comparisons were made between groups 1 and 3; an asterik(s) beside a mean indicates that the mean differs from the one before it.
1 = control, 3 = preevent cue.
I = increase in variance explained by individual predictor variable.
*$p < .05$. ***$p < .001$.

Table 18
Prediction of Attributional Details in Coats in Groups 1 & 3

Variable	Cum R	Cum R^2	I	*F*	*df*
Verbal Hedges	.655	.429	.429	39.87***	1, 53
Incorrect Details	.656	.431	.020	.15	1, 52

	Group	
	1	3
Variable	Means	
Verbal Hedges	.62	.38
Incorrect Details	1.19	.86
Attributional Details	1.77	1.31

Note. Mean comparisons were made between groups 1 and 3; an asterik(s) beside a mean indicates that the mean differs from the one before it.
1 = control, 3 = preevent cue.
I = increase in variance explained by individual predictor variable.
***$p < .001$.

confident. If confidence is lower than this, then the presence of cue can increase the reporting of incorrect information. Together, group, confidence, their interaction, and verbal hedges accounted for an overall 29.1% of the variance in incorrect information in veridical coat descriptions in groups 1 and 3 ($p < .01$) (see Table 19).

Insert Table 19 about here

Coat descriptions (given by subjects who described veridical scarves) from groups 1 and 3 were combined for independent *t*-test comparison to coat descriptions (by subjects who described suggested scarves) from groups 2 and 4. These two larger groups did not differ significantly on any verbal quality variable (see Table 20).

Insert Table 20 about here

Groups 2 and 4. Despite a lack of difference between these two groups, a different pattern of interrelation amongst verbal quality variables emerged in groups 2 and 4. Verbal hedges were significantly predicted by attributional detail, *correct* detail, and the interaction of group by attributional detail, accounting for an overall 39.6% of the variance in verbal hedges ($p < .001$). The slopes of the relation between verbal hedges and group (2 & 4) were .24, and .35. The slopes of the relation between verbal hedges and three representative values of attributional details (at 1, 4, and 7) were .29, .60, and .92. The group by attributions interaction (calculated as per Cohen and

Table 19
Prediction of Incorrect Details in Coats in Groups 1 & 3

Variable	Cum R	Cum R^2	I	*F*	*df*
Group	.113	.013	.013	< 1	1, 53
Confidence	.157	.025	.012	< 1	1, 52
Group X Confidence	.382	.146	.121	7.25**	1, 51
Verbal Hedges	.540	.291	.145	10.25**	1, 50

	Group	
	1	3
Variable		
	Means	
Confidence	3.82	3.93
Verbal Hedges	.62	.38
Incorrect Details	1.19	.86

Note. Mean comparisons were made between groups 1 and 3; an asterik(s) beside a mean indicates that the mean differs from the one before it.
1 = control, 3 = preevent cue.
I = increase in variance explained by individual predictor variable.
**$p < .01$.

Table 20

Independent *t*-test Analyses Comparing Mean Frequencies of Verbal Qualities on Veridical Coats Between Groups 1 & 3 Combined, and Groups 2 & 4 Combined

	Groups 1 & 3	Groups 2 & 4	t (df = 92)
n	55	39	
Verbal Quality			
Confidence	3.88	3.80	.77†
# Words	19.24	20.56	.50
total details	6.24	5.72	.71
verbal hedges	.49	.77	1.54
attributional details	1.53	1.74	.70
correct details	3.67	3.23	.93
incorrect details	1.02	.74	.99

Note. Groups 1 & 3 = control and preevent cue; groups 2 & 4 = postevent and preevent suggestion.

† df = 95

*$p < .05$.

Cohen, 1983, pp. 320-325) suggests that increases in attributions are associated with increases in verbal hedges in both groups, but especially when subjects receive preevent information about the upcoming presence of the coat and gave increasing amounts of attributional detail (see Table 21).

Insert Table 21 about here

Increases in use of attributional detail on the coat was predicted by an interaction between group and correct information, accounting for 38.3% of variance overall ($p < .001$). Slopes of the relation between attributions and group (2 & 4) were .48, and 1.19. Slopes of the relation between attributions and three representative values of correct details (at 1, 4, and 7) were .92, -1.09, and -3.09. Calculation of this interaction suggests a positive relation between attributions and correct information without a cue present, and a negative relation between these two in the presence of a cue. The cue has a differential effect among subjects. Attributions will decrease in the presence of the cue only if subjects have recalled a moderate to large amount of correct detail. The fewer correct details contained in a description, the more likely attributions will increase (see Table 22).

Insert Table 22 about here

Finally, verbal hedges, attributions, and the interaction of group with attributions each contributed unique variance in the prediction of correct information on the coat, predicting an overall 51.5% of the variance ($p < .001$). Slopes of the relation between correct details and group (2 & 4) were .86, and -

Table 21
Prediction of Verbal Hedges in Coats in Groups 2 & 4

Variable	Cum R	Cum R^2	I	*F*	*df*
Group	.103	.010	.010	< 1	1, 37
Atributionl Details	.403	.163	.153	6.54**	1, 36
Correct Details	.494	.322	.159	8.22**	1, 35
Group X Attributions	.629	.396	.074	4.16*	1, 34

	Group	
	2	4
Variable		
	Means	
Attributional Details	2.00	1.38
Correct Details	3.48	2.88
Verbal Hedges	.62	.38

Note. Mean comparisons were made between groups 2 and 4; an asterik(s) beside a mean indicates that the mean differs from the one before it.
2 = postevent suggestion, 4 = preevent suggestion.
I = increase in variance explained by individual predictor variable.
**$p < .01$.

Table 22
Prediction of Attributional Details on Coats in Groups 2 & 4

Variable	Cum R	Cum R^2	I	F	*df*
Group	.234	.055	.055	< 1	1, 37
Correct Details	.435	.189	.134	5.95*	1, 36
Group X Correct Details	.619	.383	.194	11.04**	1, 35

	Group	
	2	4
Variable	Means	
Correct Details	3.48	2.88
Attributional Details	2.00	1.38

Note. Mean comparisons were made between groups 2 and 4; an asterik(s) beside a mean indicates that the mean differs from the one before it.
2 = postevent suggestion, 4 = preevent suggestion.
I = increased in variance explained by individual predictor variable.
*$p < .05$. **$p < .01$.

.60. Slopes of the relation between correct details and three representative values of attributions (at 1, 4, and 7) were .48, -3.90, and -8.28. Calculation of the group by attributions interaction confirms that the more attributions used in the presence of a cue, the less correct information is contained in the description. See Table 23 for source information on these equations.

Insert Table 23 about here

The Role of Individual Differences in the Prediction of Verbal Qualities, and the Tendency to Confabulate

Prediction of Verbal Qualities

The differing patterns of verbal quality predictors between two groups of subjects describing veridical coats suggests the possibility of the moderation of individual differences in the tendency for presence of preevent information to interact with the use of verbal quality variables. Accordingly, individual difference measures were entered as predictors of verbal qualities on the scarf and coat in both subgroups of descriptions (groups 1 and 3, and groups 2 and 4). Table 24 presents the predetermined order of these variables for entry.

Insert Table 24 about here

The model on which this order is based presupposes that subjects possess

Table 23
Prediction of Correct Details in Coats in Groups 2 & 4

Variable	Cum R	Cum R^2	I	*F*	*df*
Group	.158	.025	.025	< 1	1, 37
Verbal Hedges	.537	.288	.263	13.29***	1, 36
Attributional Details	.568	.322	.034	1.78	1, 35
Group X Attributions	.718	.515	.193	13.51***	1, 34

	Group	
	2	4
Variable		
	Means	
Correct Details	3.48	2.88
Attributional Details	2.00	1.38
Verbal Hedges	.62	.38

Note. Mean comparisons were made between groups 2 and 4; an asterik(s) beside a mean indicates that the mean differs from the one before it.
2 = postevent suggestion, 4 = preevent suggestion.
I = increased in variance explained by individual predictor variable.
***$p < .001$.

Table 24
Predetermined Order of Entry of Individual Difference Variables in the Prediction of Verbal Quality Variables

1. Sex
2. PICS (Preference for an Imagic Cognitive Style; Isaacs, 1982)
3. TAS (Tellegen Absorption Scale; Tellegen & Atkinson, 1974)
4. Self-monitoring Scale (Snyder, 1974)
5. All interactions of the above variable
6. HGSHS: A (Harvard Group Scale of Hypnotic Susceptibility. Form A (Shor & Orne, 1962)
7. Depth of Hypnosis (see Laurence & Nadon, 1986)
8. Amnesia (see scoring of HGSHS: A in Method section)
9. VVIQ (Vividness of Visual Imagery; Marks, 1973)
10. Paranormal (Adult) Scale (see Nadon, Register, & Kihlstrom, 1985)
11. Paranormat (Child) Scale (see Nadon, Register, & Kihlstrom, 1985)
12. Interactions of all significant variables.
13. Group
14. Group X individual difference(s) interactions

Note. See Appendix S for measures of central tendency of these variables across groups.

perceptual and cognitive skills which precede experimental manipulations. As such then, these variables were entered as though they were being entered first in the multiple regression equation. Sex was entered in first position in the equation. The order of entry of subsequent individual difference variables was based upon theoretical considerations. Based upon previous findings of Labelle (1987) in which preference for an imagic cognitive style (PICS) was found to be a significant predictor of memory creation, this variable was entered in second position. Although Labelle reported a significant contribution of the interaction of PICS with hypnotizability, it was decided to not enter HGSHS:A scores next. This is because when subjects are not hypnotized, as was the case in our study, and as was not the case in Labelle's (1987), hypnotizability may not be as important a factor as hypnotic-like waking experiences (see Button et al., 1989) in the prediction of waking suggested memory. Thus, the TAS was chosen since it has been found to represent the strongest reliable hypnotic-like experience correlate of hypnotizability reported in the literature to date (Kihlstrom, 1985). Next we entered self-monitoring, a variable previously found to be positively related to eyewitness accuracy (e.g. Hosch, Leippe, Marchioni, and Cooper, 1984; Hosch and Platz, 1984). These latter three variables were hypothesized to be of primary importance, and all interactions among them were tested. Other variables were then entered on a more exploratory basis. HGSHS:A, depth of hypnosis measures, and presence or absence of amnesia were entered in turn. It was hypothesized that the HGSHS:A variable, as a complex measure with multiple correlates, and with two of these correlates already statistically removed, may predict something above and beyond the PICS and the TAS.

Depth and amnesia variables would necessarily follow. While the PICS was entered as a predictor of imagery preference, the VVIQ was entered as a predictor of vividness of imagery. Although correlated, these two measures might be differentially important in non-hypnotic incorporations of suggested material. The Paranormal adult and child scales were entered as a second measure of hypnotic-like experiences in daily life other than the TAS. Because these two questionnaires are correlated, and because they may or may not tap different aspects of absorption, this new questionnaire measure was entered as the lowest priority exploratory variable in the set, mainly for the purpose of collecting new data related to it. All significant measures were tested for interactions with each other. Significant individual difference predictors were subsequently combined with previously reported grouping and verbal quality predictors within one larger equation, and all interactions amongst these combinations were tested.

A two-way group by sex (4 X 2) ANOVA was performed on all individual difference variables. A main effect of sex on HGSHS: A was found [$F(1, 205) = 4.4$, $p < .05$], indicating that females had a higher mean HGSHS:A score than males in our sample. No main effects of group were found, indicating that random assignment of subjects to groups did not yield a disproportionate distribution of individual difference scores. No significant interaction effects were observed. Overall measures of central tendency are presented in Appendix S.

Results of multiple regression analyses indicate that with the exception of verbal hedges on the coat (in all groups), incorrect information on the scarf (in groups 1 and 3), and incorrect detail on the coat (in groups 2 and 4) all

verbal qualities of the coat and the scarf descriptions were significantly predicted by an individual difference. All significant individual difference variables contributed unique effects in equations combining these with verbal quality predictors. In general, no patterns were strong enough to interpret, however some general observations can be made.

The PEQ accounted for 9.0% [F (1, 52) = 5.12, $p < .05$], 23.8% [F (1, 52) = 16.22, $p < .001$], and 12% [F (1, 52) = 7.12, $p < .01$] of the variance in number of words, total details, and attributional details respectively of veridical scarves in groups 1 and 3. In all cases, the relation between paranormal experiences and verbal qualities was positive.

The SMQ accounted for 10.2% [F (1, 38) = 4.34, $p < .05$] and 17.4% [F (1, 37) = 7.79, $p < .01$] of the variance in number of words on the suggested scarf and same subjects' veridical coat descriptions respectively. Additionally, the SMQ accounted for 13% [F (1, 37) = 5.52, $p < .05$] and 13.8% [F (1, 37) = 5.9, $p < .05$] of the variance in total details and correct details respectively on the coat in groups 2 and 4 (i.e., same subjects who described suggested scarves), and 12.1% [F (1, 38) = 5.25, $p < .05$] of the variance of verbal hedges on suggested scarves. In all cases, the relation between the SMQ and verbal qualities was positive.

Sex accounted for 17.8% [F (1, 37) = 8.00, $p < .01$] and 27.3% [F (1, 37) = 13.87, $p < .001$] of the variance in total details and correct details respectively contained in coat descriptions in groups 2 and 4 (i.e., same subjects who described suggested scarves). In both cases, females as compared to males gave increasing amounts of these verbal qualities.

It is difficult to interpret the specific meaning of these results, however, the fact that certain individual differences are associated with major classes

such as confabulators (subjects in groups 2 and 4) and non-confabulators (subjects in groups 1 and 3) should encourage future pursuits of individual differences as predictors of verbal qualities of free recall.

Prediction of Tendency to Confabulate

In order to investigate the notion of confabulation it was presumed that confusion between veridical and suggested memories would be reflected in inaccurate responses, and wondered if individual differences would predict a tendency to answer "yes" to several questions which contained misinformation (and whose correct answer was "no"). The correct answer for each of questions 5, 8, 12, 17, 21, and 22 on Questionnaire 1 (see Appendix D), and questions 2 and 9 on Questionnaire 2 (see Appendix E) is "no". The confabulation index represents the sum of "yes" answers to these "memory creation" items, that is, questions containing misinformation suggesting the presence of objects which were not present.

Individual difference variables were entered in the order presented in Table 24. The Vividness of Visual Imagery Questionnaire (Marks, 1973) accounted for a significant 2.1% of the variance in the 8 item confabulation index ($p < .05$), and this relation was positive. That is, higher VVIQ scores were associated with "yes" answers on more memory creation items. Results are presented in Table 25.

Insert Table 25 about here

Table 25
Prediction of Confabulation Index Variable by Individual Difference Variables

Confabulation Index/8

Variable	R	R^2	*F*	*df*
VVIQ	.145	.021	4.66*	1, 217

Note. Confabulation Index/8 = memory creation items.
*$p < .05$.

Discriminant Prediction of Origin of Scarf Descriptions

Similar to Schooler et al. (1986), we asked the question, "Is there anything in subjects' verbal reports that would indicate to an objective observer whether a subject who has answered "yes" to seeing the scarf has indeed actually seen the scarf?". Schooler et al. employed informed judges to classify their subjects' descriptions. The present classification predictions were statistical. First, subjects who answered "yes" to having seen the scarf and who provided detailed descriptions of it were pooled from all groups. Thus some "yes" responses represented veridical memories while others "yes" responses represented suggested memories. Next a stepwise multiple regression analysis was performed to predict a criterion variable called "Yes" which was coded dichotomously as a veridical "yes" or a suggested "yes". Two variables predicted significant unique variance of the "Yes" criterion variable in a stepwise multiple regression equation (see Table 11 for order of variable entry). Not surprisingly, these were confidence and total number of sensory details. Table 26 presents the source table for this equation.

Insert Table 26 about here

The overall equation with both variables predicted a significant 22% of the variance in veridical and suggested "yes" responses ($p < .001$). Interpretation of the equation suggests that a veridical "yes" response will be predicted by aspects of verbal report characterized by greater confidence, and greater

Table 26
Prediction of Veridical vs. Suggested "Yes" Variable on Scarf By Verbal Quality Variables

Variable	Cum R	Cum R^2	I	*F*	*df*
Confidence	.365	.133	.133	14.59***	1, 95
Total Details	.469	.220	.087	10.49**	1, 94

Note. See Tables 11 and 12 for predetermined variable entry order.
I = increase in variance explained by individual predictor variable.
**p < .01. ***p < .001.

number of sensory details.

Next, an analogous stepwise discriminant procedure was performed to predict correct classification of veridical and suggested memories, using the significant predictors of the "Yes" criterion from the previous regression equation. Confidence was entered as a discriminant function of veridical/suggested group membership at step 1. The canonical correlation between group membership and the discriminant function (confidence) was equal to .365, indicating that the function accounted for a significant 13.3% of the variance in the grouping variable ($p < .001$). Further, confidence correctly classified 71.1% of the subjects in the sample overall ($z = -4.07$; binomial, $p < .001$).

Step 2 added sensory details to the discriminant function. This variable did not account for a significant change in the overall correct classification of subjects [$X^2(1, n = 194) = .02, p > .05$], even though the addition of this variable to the discriminant function increased the variance accounted for in the grouping variable to a significant 22% ($p < .001$). Table 27 presents a breakdown of percentages of subjects correctly classified into veridical and suggested categories.

Insert Table 27 about here

It can be seen from Table 27 that basing an origin judgment on high confidence alone will correctly classify a veridical memory in 87.7% of cases. However, deciding a memory is not veridical based on a lack of high confidence will only correctly classify 47.5% of suggested memories, a rate no

Table 27

Stepwise Discriminant Analyses of Veridical and Suggested "Yes" Responses Based on Significant Predictor Variables (see Table 26)

Step	Variable	Cum R	Cum R^2	F	df	% Correctly Classified Ver.	Sug.	Overall
1	Confidence	.365	.133	14.59***	1, 95	87.7	47.5	71.1
2	Total Details	.469	.220	13.27***	1, 94	73.7	72.5	73.2

Note. McNemar significance of change tests indicated no significant changes with the addition of the Step 2 variable (see text).
***$p < .001$.

better than chance. Perhaps many of these subjects appear falsely confident, and thus get misclassified. From step 2 it appears that deciding a memory is suggested based on lower confidence plus less sensory detail will improve the classification of that memory as suggested (though not significantly) [X^2 (1, n = 80) = 2.53, $p > .05$], while simultaneously reducing the correct classification of veridical information (though not significantly) [X^2 (1, n = 114) = 2.23, $p > .05$]. It appears here that higher confidence accompanied by less sensory detail would cause veridical memories to appear falsely suggested in nature. Thus, even though sensory details does not significantly improve *overall* correct classification, the directions of change in the classification of veridical and suggested memories indicate that it might be wiser in a practical or applied sense to trade off about 14% of correct veridical classifications in favor of a 25% increase in correct classification of suggested memories. Even though these improvements are not statistically significant, the direction of effect in an applied setting would seem to warrant the consideration of both variables.

DISCUSSION

The discriminant procedure demonstrated that there indeed exist reliable verbal quality differences between veridical and suggested memories, and in this sense, the results should encourage continued research in this area. However, the data which resulted from the examination of other questions regarding timing of misinformation, "centrality" of critical objects, and individual difference variables suggest that a number of factors may increase or decrease differences between freely recalled memories of veridical and suggested origin. These factors represent potentially manipulable variables which could serve to methodologically upgrade the existing memory creation paradigm in future studies pursuing this line of research.

The study sought to address three major questions: How might external variables such as the "centrality" of items, and the timing of the suggestion affect the reporting of veridical and suggested items viewed in a slide presentation?, How might veridical and suggested memories differ in the verbal qualities which define them?, and How might differences internal to the individual be related to the verbal report of veridical and suggested memories? Data addressing these questions and methodological considerations will be discussed in turn.

Timing of Suggestion and "Centrality" of Critical Objects

Timing of suggestion was found to be related to the quality of suggested

descriptions. Descriptions of scarves based on preevent suggestion contained significantly fewer total sensory details, and approached significance in terms of shorter length ($p < .069$) than the control group's veridical scarf descriptions. Postevent descriptions, however, did not differ from the control group's descriptions on these qualities but possessed significantly more geographical details than the control group's descriptions. It would seem then that these additional geographical details in postevent suggestion descriptions increased the total number of details contained in them, thereby increasing their length, and in turn reducing the differences observed between postevent and control group's descriptions. Interestingly, despite increased similarities between the postevent and control groups' descriptions in terms of total details, confidence was lower for postevent descriptions, while the preevent suggestion group's confidence did not differ from the control (even though these preevent descriptions contained less detail and fewer words). It should be noted, however, that preevent information also increased confidence for *veridical* scarf descriptions relative to control group descriptions (see Table 7).

There are a number of possible explanations for these observations. First, preevent information came verbally from the experimenter just before the slide presentation. In contrast, subjects in the control condition received no explicit information about the scarf, while subjects in the postevent suggestion condition received scarf information embedded subtly within a postevent questionnaire. The salience and reliability of the source of preevent scarf information may have increased subjects certainty about having seen it, whether or not they in fact did. Second, findings of Loftus,

Miller, and Burns (1978) suggest that misleading information had a greater effect on recall when introduced following a delay (2-20 minutes) than when introduced just after the initial event. These authors suggest that the longer the memory is stored, the more the memory trace is likely to fade, and the more vulnerable it is to the effect of subsequent misinformation. In a similar vein, Suengas and Johnson (1988, Experiment 3) found that some qualitative characteristics of memories are forgotten more quickly for imagined than for perceived events. They found that the passage of time lead to increased qualitative differences between these two classes of memory. If it is assumed that misinformation is incorporated at the moment of the suggestion (see Loftus, 1979b) then subjects in the preevent suggestion group may have stored suggested information almost 20-25 minutes longer than postevent suggestion subjects, who held the misinformation in memory for only 2-5 minutes. The present study confounds time and type of suggestion. Future studies might elucidate some of the changes which occur in verbal quality and confidence as a function of the manipulation of time intervals between suggestion and final test for each type of suggestion. Retention interval and type of suggestion may be separate factors leading to increases or decreases in discrimination between veridical and suggested descriptions, and/or for particular aspects of freely recalled descriptions.

"Centrality" of the veridical item is another factor which may serve to alter the magnitude of potential differences between veridical and suggested memories. Results of the present study indicated that postevent suggestion was more likely to elicit a "yes" report of a peripheral item than actually seeing it. With preevent information, however, a veridical peripheral item

may be reported as often as its suggested counterpart. Interestingly, *veridical* garbage can reports were too few for purposes of qualitative comparisons with suggested descriptions. It is clear that if a veridical item is too "peripheral", it may lack the type of detail (representationally as well as in verbal description) necessary to increase differences between veridical and suggested verbal descriptions. In contrast, the "centrality" of a *suggested*, as opposed to a veridical item, may be an irrelevant distinction, since the scarf and the garbage can were reported at similar rates (*and* regardless of the timing of the suggestion). These results suggest that imagination makes little if any distinction between objects in terms of spatial attributes, while perception does. This observation is consistent with the findings of Johnson and Raye (1982), in which subjects showed a greater availability of spatial (and temporal) information in retrieving memories of perceived pictures relative to imagined pictures. They concluded that spatial information is less available as a potential reality monitoring cue when retrieving memories derived from imagination rather than from perception. Even in the presence of a cue, veridical reports of the peripheral item increased to a rate of only 33%, a rate no higher than suggested reports. It is uncertain how useful peripheral item descriptions can be in delineating differences between veridical and suggested memories. Future research might consider this distinction more systematically.

If imagination relative to perception makes available less spatial detail in its representations on which "centrality" of objects could be discriminated, it is possible that temporal information, such as frequency of exposures of objects in the slide sequence, may also be an underepresented facet of

suggested memories. If this is so, then increasing the frequency of presentations of the veridical comparison item may increase the potential differences between veridical and suggested descriptions; Loftus, Nelson, and Kallman (1983) found that the acquisition of pictorial information progresses in stages, such that a first eye fixation of a picture will extract "holistic" information, while the purpose of subsequent fixations is to seek out specific informative features. In fact, the increased frequency of exposures to the suspect's coat may explain why its protocol analysis yielded a greater number of significant results than analyses of scarf descriptions. This finding suggests that increasing the frequency of exposures of a given veridical item provides a means of potentiating differences between veridical and suggested descriptions. Future studies might consider a controlled manipulation of number of exposures of veridical items, central and peripheral, in order to understand more clearly the effect of this factor on subsequent free recall descriptions.

In a similar vein, reinforcing the *suggested* presence of a critical item by mentioning it on more than one occasion may decrease differences between veridical and suggested descriptions. Such a manipulation could capitalize on the "Increased Frequency of External Events" (IFE) effect discussed by Johnson and Taylor (1977). That is, an item will tend to be judged to have been perceived with increased apparent frequency the more often it has been imagined. If subjects' confabulations are subsequently reinforced by further mention of the suggested item, this reinforcement may act to increase verbal output, thus decreasing certain differences between veridical and suggested descriptions.

It was seen that verbal reports of veridical and suggested memories of a

scarf bear a good deal of surface similarity, but that upon closer inspection qualitative differences can be found. Likewise, the comparison of two sets of veridical descriptions of the suspect's *coat* (by subjects in groups 1 and 3 combined, and in groups 2 and 4 combined) displayed no apparent surface differences (see Table 20), but concealed subtle shifts of information related to whether or not these subjects had described a confabulated or veridical scarf. It is noteworthy that observed differences between two groups of veridical memory descriptions came about as an unpremeditated consequence of an interaction between condition (i.e., suggestion/no suggestion) and the presence of a cue, and this interaction may be useful in future studies as an experimental manipulation which teases out differences between veridical descriptions of objects unrelated to misinformation in these two conditions. One post-hoc explanation of the effect of the cue is that it may have conveyed an implicit expectation, or invitation, for subjects to retrieve as much detail as possible. A more detailed interpretation of the interaction between these two variables will be discussed in the following section on verbal qualities.

Verbal Qualities of Veridical and Suggested Memories

As mentioned at the beginning of the discussion, the discriminant procedure demonstrated that there indeed exist reliable verbal quality differences between veridical and suggested memories. But error rates are presently too high, to justify the crossover of positive findings to an applied eyewitness setting. Perhaps a more appropriate appreciation of the results of

this analysis is their theoretical relevance to a fuller description of qualities of internally and externally derived memories.

For now, results of discriminant analyses are consistent with Johnson and Raye's Reality Monitoring model in the sense that externally derived veridical memories tend to be associated with relatively more total sensory details than internally derived confabulated memories. In addition to replicating the work of Johnson and Raye, the present study replicated Schooler's finding that externally derived memories tend to be more confidently reported. Discriminant analyses revealed that veridical memories of the scarf were given higher confidence ratings than suggested scarf confidence ratings.

There remains a problem of qualitative overlap between verbalized veridical and suggested memories. As Johnson (1989) has commented, requiring subjects to put memories into words may make memories more concrete than they really are, in consequence decreasing observable differences between them. However, this seems to be more problematic for oral descriptions (Johnson & Suengas, in press; cited in Johnson, 1989) than with written descriptions (Hashtroudi, Johnson, & Chrosniak, in press; cited in Johnson, 1989). In addition to mode of free recall, the present data suggest that a number of additional verbal qualities may be capable of differentiating between freely recalled memories of veridical and suggested origin.

The presence of increased geographical detail in postevent suggested descriptions as compared to veridical control descriptions (see Table 9) was examined. This result was contrary to the predictions of a Reality Monitoring model of memory which would associate relatively more geographical, or

spatial, detail with memories of *veridical* rather than suggested origin. "Geographical" details on the scarf referred to the recall of the location of the scarf around the suspect's neck, or under his coat. It is interesting that subjects who described a suggested scarf were more likely to mention these correct details than subjects who actually saw the scarf and who had a real opportunity to mention this detail. Recall of imagined events without awareness of imagined origin may be an occasional consequence of what Johnson (1983) refers to as generic memory processing, the activation of perceptually derived abstractions summated across similar episodes. Johnson (1983) has proposed that this type of processing is an essential feature of the "reflective system", the planning, comparing function of the mind which selectively activates information from various sources or "schemata". When engaged in active problem solving, generic processing can proceed in a searching fashion. On occasion, however, a stimulus input (such as a word) may activate an association in a relevant schema, producing a mental image which can be misattributed as a perceptual input. Free recall especially potentiates the occurrence of these random errors. The idea of generic memory is consistent with Ericsson and Simon's (1984) observation that subjects will occasionally *generate* responses about information which was never attended on the basis of information contained in the question or the context, and from semantic information in long term memory. In the present context, the recall of geographical detail on the scarf may reflect a random generation of prototypical features of scarves. Subjects who recalled a veridical scarf may have omitted this information in favor of the more idiosyncratic qualities of the scarf they actually saw.

The presence of prototypical detail may be another qualitative dimension worth scoring in future studies as a marker of internally generated memories. Baseline measures of prototypicality could be assessed by asking a group of subjects to consciously generate descriptions of a scarf as though they had actually seen it in the slide sequence. Additionally, inventories of details could be listed from all descriptions given by subjects in veridical and suggestion conditions; suggested and veridical descriptions may be predicted by the mention of prototypical details which they do and do not contain. This conceptualization would appropriately associate relatively more prototypical "geographical" details with internally generated suggested memories. In fact, prototypical detail may represent an *indirect*, or masked reference to cognitive operations, and may explain why we did not find any of the type described by Schooler et al. (1986; in press) or Johnson and Raye (1981) to score.

In the present study, the increased mention of the location of the scarf around the suspect's neck by the postevent suggestion group's subjects relative to the two groups of subjects who actually saw the scarf, was treated as an artifact of the object itself. As a solution to this problem, the operational definition of sensory detail was broadened to include geographical (or spatial), temporal, and "other" details, such that all subsets could be referred to as sensory aspects of the slide sequence. In light of the potential informativeness of prototypical details, such as the "geographical" details observed in the present study, in differentiating memories of different origin, such a solution may have its drawbacks. An alternative scoring scheme which preserves the above distinctions, but scores dimensions of idiosyncrasy and prototypicality of details may integrate all the data in a maximally

informative way.

The scoring of "correctness" of information allowed us to pursue further questions about the nature of verbal reports. Two patterns of verbal quality interrelation emerged from the data, and these were mentioned briefly in the earlier section in the discussion of the effect on verbal reports of an interaction between suggestion and the presence of a cue. Recent debates have centered around various "process histories" involved in the misinformation effect, but it seems evident that the incorporation of misinformation can lead to different process histories in the reconstruction of veridical events *unrelated* to the misinformation. In descriptions of veridical scarves *and* coats from subjects in groups 1 and 3, verbal hedges, attributional detail, and incorrect information were interrelated. Where descriptions of a veridical coat from subjects in groups 2 and 4 were concerned (i.e., those subjects who had received preevent cues), it was found that verbal hedges, attributional detail, and *correct* information predicted one another, while *no* verbal quality variable was associated with the prediction of qualities of the suggested scarf. In groups 1 and 3 none of the variables predicted correct information on the coat, whereas in groups 2 and 4, no variable predicted incorrect information on the coat.

What can be understood from a comparison of these data? When we consider the nature of verbal hedging, we can assume that it reflects a subjective uncertainty about details being recalled. It makes intuitive sense that we should find in groups 1 and 3 that incorrect information is verbally hedged in veridical descriptions of scarves (see Table 16) and coats (see Table 19). It also makes intuitive sense that subjects would tend to verbally hedge

attributional detail, as if they know that such detail may not be objectively verifiable (see Table 18). But this interpretation is put to the test when we find in groups 2 and 4 that *correct* information predicts verbal hedging (see Table 21).

We need not abandon the notion that verbal hedges and attributional detail reflect subjective uncertainty about details being recalled. Rather, we need only assume that subjects who confabulate on one item may become uncertain about their recall on other items, and this uncertainty may become reflected in subsequent free recall (i.e., subjects may come to verbally hedge correct information as well as incorrect and attributional details). This assumption is not without empirical support from recent results of post eyewitness event paradigms (see Zaragoza & McCloskey, 1989).

The notion of *response bias* due to previous exposure to misinformation has become a topic of recent debate in the interpretation of process histories leading to observed misled and control group differences (see Zaragoza & McCloskey, 1989). Belli (1989) found in both his experiments that when subjects were given a choice between an original and a novel item after viewing a slide sequence, that misled subjects were less likely than control subjects to respond "yes" to the novel item. Similarly, Zaragoza and McCloskey (1989), replicated this effect in two conditions, providing three choices (original, misled, and novel items); that is, subjects were less likely to accept a novel item if they had been exposed previously to misleading information. In these studies, the authors do not indicate if same or different subjects were responsible for some of these responses (i.e., subjects can respond "yes" to more than one item). If some of the misled subjects had

incorporated the misinformation, such a situation may have set up a reluctance to accept a second suggested item. In the present study, only 5% of subjects in group 2, and 9% of subjects in group 4 reported *both* suggested items, though the overall rate of acceptance for one or the other item was 36-48%.

A "discrepancy detection" effect or "spillover effect" (see Loftus, 1979b) may have been created by confabulation, influencing style of free recall on other items. The effect of the cue may help us understand more clearly how subjects who have confabulated may cope verbally with subjective uncertainty triggered by the presence of misinformation. It was seen in suggestion groups 2 and 4 that in descriptions of the coat in the presence of a cue, verbal hedges increased as attributions increased (see Table 21). It was also observed that attributions increased in the presence of a cue if these subjects had recalled a small amount of correct information on the coat (see Table 22). And finally, correct information increased in the presence of a cue as attributional detail decreased (see Table 23). It would certainly appear then that, at least in the presence of a cue, these subjects may have felt compelled to talk more freely, or provide "enough" detail in their descriptions to meet an implicit expectation set up by having been forewarned about the presence of the items. These observations may be especially true for an item such as the coat, which "can't be missed" as it were. These "confabulator" subjects, in describing the coat, may have become reluctant about the recall of concrete detail such as correct information (perhaps explaining why correct information predicted verbal hedges), and apparently "fattened up" their reports by recalling increasing amounts of "harmless" attributional detail,

verbally hedging it along the way, in response to the uncertainty set up by previous incorporation of misinformation.

Subjects in groups 1 and 3 also responded to the cue, apparently by providing "enough" detail to meet the expectation set up by preevent information, but they responded differently from subjects in suggestion groups 2 and 4. The lack of exposure to misinformation may have led these subjects to be relatively less careful in their recall in the presence of the cue. The observed group by confidence interaction suggests that these subjects added incorrect detail in the presence of a cue even when their confidence was less than "very" confident; if confidence was at "4" however, then subjects actually decreased their output of incorrect information (see Table 19). Thus in groups 1 and 3, the cue had the effect of making subjects better eyewitnesses if their confidence was high, but made them progressively more error prone eyewitnesses when their confidence was less than maximum.

Future studies may elucidate the nature of the effects of the cue, of suggestion, and of their interaction by observing whether confabulator and non-confabulator subjects become more or less certain about their recall in the presence of preevent information. Confidence ratings on individual "buttressing" details recalled may reveal, for example, that attributional details are more or less confidently reported than incorrect details. A methodology involving concurrent confidence ratings of individual details during recall was successfully employed by Button et al. (1989), and allowed the analysis of high and low confidently rated details of different quality to be more closely examined.

Individual Differences

Another interpretation of discrepant patterns of interrelation of verbal qualities between the two groups is possible. The data may suggest that subjects who have committed themselves to a description of a confabulated memory do not "become" more uncertain in subsequent recall, but rather may be *dispositionally* more prone to confabulation, and in turn this individual difference may be related to a particular style of speech regardless of the origin of the memory they are recalling. For example, subjects who prefer an imagic cognitive style may be especially adept at discriminating among their mental images. As Button et al. (1989) have concluded, in the absence of clear images during recall, these subjects' "impressionistic" images may become expressed in an "impressionistic" style characterized by increased usage of attributional detail.

Results of Button et al.'s (1989) hypermnesia study show that repeated recalls of a series of events (as opposed to single items described once) yield a systematic relation to individual differences in preferred cognitive style (on PICS, Isaac, 1982), absorption (on TAS, Tellegen & Atkinson, 1974), and hypnotizability as measured by the Stanford Hypnotic Susceptibility Scale, Form C (Weitzenhoffer & Hilgard, 1962). Accordingly, individual difference measures in the present study were entered as predictors of verbal qualities on the scarf and coat in both subgroups of descriptions (groups 1 and 3, and groups 2 and 4). Qualities of free recall revealed an association of particular individual differences with the "confabulators" of groups 2 and 4, and with the "non-confabulators" of groups 1 and 3. These results, though apparently patterned, are not readily interpretable, given the operation of uncontrolled

factors discussed above (e.g., the interaction of suggestion with cue). However, Button et al.'s (1989) results suggest that the pursuit of a systematic relation of free recall to individual differences might be more fruitful with longer recalls. For the present memory creation paradigm, suggested *actions* of characters may require longer explanations of details of an event, providing more recalled material for protocol analysis. This manipulation might be considered in future studies.

The Vividness of Visual Imagery Questionnaire (Marks, 1973) was found to be positively related to an eight item memory creation index. That is, the higher subjects' vividness of imagery was, the more likely it was that subjects answered "Yes" to items which were designed to confuse them. This result was consistent with findings from a study by Johnson, Raye, Wang, and Taylor (1979) in which good imagers demonstrated more confusion than poor imagers between perceptions and imaginings in a reality monitoring task. In this study, subjects made frequency judgments of number of presentations of pictures, and numbers of times they generated those pictures internally. Good imagers were more likely than poor imagers to overestimate the number of times they saw pictures which they had also regenerated in imagination. Johnson et al. (1979) suggest that differential performance of good and poor imagers may be due to good imagers' ability to generate more "accurate" images than poor imagers. "Accurate" regenerations may be more similar to the original perceived event, thus these two may be more likely to become confounded in subsequent judgments of external event frequency. If "accuracy" and "vividness" refer to similar aspects of imaginal representation, then good imagers in the present study may have generated

details of the "suggested" information contained in "memory creation" items which were vivid enough to misattribute to reality, at least by a "yes" response. It would be interesting to see if subjects could describe in more detail those aspects of the slide sequence to which they answered "yes" on this recognition task. Previous discussion on the issue of possible response bias set up by incorporation of misinformation suggests that free recall may involve a more complex reflection of confusion in free recall verbal reports (e.g., buttressing of reports with attributional detail). For the present, such findings suggest the importance of individual differences in moderating certain task performances, as well as the importance of continued research in this area.

Mechanisms of Memory Creation

The memory creation paradigm of this study may shed some light on the mechanism which leads to the reporting of misinformation as though it had been originally perceived. Previous efforts which have succeeded in "altering" an original memory by the presentation of postevent misinformation have suggested that the fading of the original memory over time may make it vulnerable to the presentation of misinformation by a process of retroactive interference (e.g. Loftus & Loftus, 1980; Loftus, Miller, & Burns, 1978). However, recent debates regarding the different process histories leading to similar verbal reports (e.g., Zaragoza & Koshmider, 1989), suggest that different *response biases* could lead to the reporting of misinformation instead of the original memory, even if two representations

coexist in memory. These biases include guessing, and social variables such as demand characteristics. The memory creation paradigm eliminates speculation about which response bias will win the retrieval competition between original information and postevent misinformation in memory; an original memory is simply not presented. In this manner, a postevent suggestion can be supplied to fill the gap as it were. Our data suggest that, at least in the case of a memory creation, suggested information may be semantically processed, creating an incidental image which is encoded; during recall subjects may mistake this self-generated pictorial information for externally presented pictorial information (Johnson & Raye, 1981).

This hypothesized mechanism is especially compelling in the case of suggestion given *before* an actually perceived event, in which subjects may form a spontaneous image which is capable of overriding subsequent reality. This view is consistent with the research of Fischhoff (1975, 1977) which indicates that subjects are biased in recall toward the information which they have processed previously. He suggests that stored representations can *pro*actively inhibit subsequent perceptions which cannot be "deprocessed" retrospectively. In this sense then, reality monitoring may not refer solely to confusions of internal and external memory during retrieval, but may also be explained as a phenomenon of "automatic" creation of information at the time of encoding. Failures of reality monitoring may sometimes be more akin to failures of reality testing (from which the term "reality monitoring" was adapted; Johnson & Raye, 1981).

We have a long way to go before we can typify the characteristics and mechanisms of internally and externally derived memories. But the exploration of conditions of memory creation, of novel attributes of

memories from these different sources, and individual difference variables influencing these attributes can add new dimensions to Johnson and Raye's Reality Monitoring model in particular, and to many lines of memory research more generally.

FOOTNOTES

1. It should be noted that Schooler originally reported z values for these differences. We will report X^2 values for our data because the Chi-Square was particularly well-suited to the experimental design. Subjects either mention or do not mention the critical object when they have seen it, or they mention or do not mention it when they have not seen it. In each condition separately, proportion of one response reflects a necessary proportion for the other response, and this is not the case when comparing proportions *between* conditions. "When the data of research consists of frequencies in discrete categories, the X^2 test may be used to determine the significance of differences between two independent groups" (Siegel, 1956; p. 104).

We recalculated Schooler's data with a X^2 procedure, and results indicated similar significant differences between veridical and suggested descriptions (see Appendix B; see Appendix A for Schooler et al.'s original calculations). Recalculation did not change Schooler et al.'s reported results. However, Schooler et al. used a one-tailed test for significance of sensory details mentioned in Experiment 1. When this is reported for the equivalent of a two-tailed test in the chi-square analysis, the effect does not reach significance.

In both experiments subjects reported a veridical sign significantly more often than the similar item when it was suggested. In both experiments, suggested descriptions contained significantly more words, more references to cognitive operations, and more verbal hedges than veridical descriptions of the same item. In one or the other of the experiments, suggested memories

were significantly less confident, contained significantly less sensory detail, and significantly more references to the function of the sign than veridical memories of the same item.

2. Macrosubjects were not compared in the present study's analogous analysis. In terms of the eyewitness nature of the recall involved, macrosubjects obviously lack ecological validity. In fact, Schooler et al. (in press) did not employ this analysis by choice, but because not enough subjects described both a veridical and a suggested object for group means derived from individuals to be compared. The replication of the procedure seemed unwarranted given that enough individual subjects provided both a veridical and a suggested description.

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APPENDIX A
Original Data of Schooler, Gerhard, & Loftus (1986)

z-tests on Schooler et al's (1986) Original Data Comparing Incidence of "Yes" Reports to Critical Items Between Control and Postevent Suggestion Groups

	Experiment 1: Yield Sign	Experiment 2: Stop Signs		
	C vs S	C vs "inter-section" S	C vs "red" S	C vs S's (combined)
Variable				
% "Yes" Responses	75.6 24.7	86.8 58.2	86.8 54.4	86.8 56.5
n	90 85	53 67	57 57	--
z	6.80** (n = 175)	3.49** (n = 120)	--	--

Note. C = control group, S = postevent suggestion group.
-- = unreported.
**p < .01.

z-tests on Schooler et al's (1986) Original Data Comparing Incidence of Mention of Verbal Quality Variables Between Control and Postevent Suggestion Groups

	Experiment 1: Yield Sign	Experiment 2: Stop Signs		
	C vs S	C vs "inter-section" S	C vs "red" S	C vs S's (combined)
Variable				
n	90 85	53 67	53 57	53 124
Sensory Details	41.0 19.0	82.5 48.7	82.5 64.5	82.5 55.0
z	1.76**	-- †	--	2.98**
	(*n* = 175)			(*n* = 177)
Geographical Details	59.0 52.0	39.1 46.2	39.1 41.9	39.1 44.3
z	< 1	--	--	.52
	(*n* = 89)			(*n* = 177)
Cognitive Operations	3.0 29.0	0.0 13.0	0.0 11.4	0.0 12.9
z	2.88**	--	--	2.65**
	(*n* = 89)			(*n* = 177)
Function of Sign	1.0 14.0	0.0 0.0	0.0 6.4	0.0 3.2
z	2.60**	--	--	1.19
	(*n* = 89)			(*n* = 177)
Verbal Hedges	12.0 38.0	2.2 10.2	2.2 16.1	2.2 12.9
z	2.71**	--	--	1.98*
	(*n* = 89)			(*n* = 177)

Note. C = control group, S = postevent suggestion group.
† = comparison of % of suggested reports in this group to % of suggested reports in "red" suggestion group was $z = 1.42$, $p > .05$. *$p < .05$. **$p < .01$.

Mean Confidence and Number of Words on "Yes" Responses to Critical Items in Control and Postevent Suggestion Conditions

	Experiment 1: Yield Sign		Experiment 2: Stop Signs	
	C vs S		C vs "inter-section" S	C vs "red" S
n	68	21	46 39	46 31
Confidence	2.84	2.57	--	--
t	(87) = 2.33*			
# Words; critical item	18.3	25.1	7.0 12.7	7.0 11.2
t	(87) = 2.32*		†	†
# Words; unrelated item	22.5	24.8	--	--
t	< 1			

Note. C = control group, S = postevent suggestion group.
† = F (2, 113) = 12.85, $p < .001$.
*$p < .05$.

APPENDIX B
Schooler, Gerhard, & Loftus (1986) Data Reanalyzed by Kenney (1989)

Between Group Chi-Squares on Schooler et al's (1986) Data (Reanalyzed by Kenney, 1989) Comparing Incidence of "Yes" Reports to Critical Items Between Control and Postevent Suggestion Groups

	Experiment 1: Yield Sign	Experiment 2: Stop Signs		
	C vs S	C vs "inter-section" S	C vs "red" S	C vs S's (combined)
Variable				
% "Yes" Responses	75.6 24.7	86.8 58.2	86.8 54.4	86.8 56.5
n	90 85	53 67	53 57	53 124
X^2	45.23** (1, *n* = 175)	11.70** (1, *n* = 120)	13.73** (1, *n* = 110)	15.14** (1, *N* = 177)

Note. C = control group, S = postevent suggestion group.
**p < .01.

Between Group Chi-Squares on Schooler et al's (1986) Data (Reanalyzed by Kenney, 1989) Comparing Incidence of Mention of Verbal Quality Variables Between Control and Postevent Suggestion Groups

	Experiment 1: Yield Sign	Experiment 2: Stop Signs		
	C vs S	C vs "inter-section" S	C vs "red" S	C vs S's (combined)
n	68 21	53 67	53 57	53 124
Sensory Details	41.0 19.0	82.5 48.7	82.5 64.5	82.5 50.0
X^2	3.41	14.67**	4.63*	11.42**
	(1, *n* = 89)	(1, *n* = 120)	(1, *n* = 110)	(1, *n* = 177)
Geographical Details	59.0 52.0	39.1 46.2	39.1 41.9	39.1 44.3
X^2	3.84	.56	.07	.34
	(1, *n* = 89)	(1, *n* = 120)	(1, *n* = 110)	(1, *n* = 177)
Cognitive Operations	3.0 29.0	0.0 13.0	0.0 11.4	0.0 12.9
X^2	6.63*	7.69*	6.94*	7.52*
	(1, *n* = 89)	(1, *n* = 120)	(1, *n* = 110)	(1, *n* = 177)
Function of Sign	12.0 38.0	2.2 10.2	2.2 16.1	2.2 12.9
X^2	6.63*	3.48	6.43*	5.19*
	(1, *n* = 89)	(1, *n* = 120)	(1, *n* = 110)	(1, *n* = 177)
Verbal Hedges	1.0 14.0	0.0 0.0	0.0 6.4	0.0 3.2
X^2	6.18*	1.00	3.28	1.75
	(1, *n* = 89)	(1, *n* = 120)	(1, *n* = 110)	(1, *n* = 177)

Note. C = control group, S = postevent suggestion group.
See Appendix A for original data. "Confidence" and "number of words" on "yes" reports of critical items did not require recalculation.
*$p < .05$. **$p < .01$.

APPENDIX C
Schooler, Clarke, and Loftus (in press) Data

Dependent *t*-test Analyses of Mean Frequencies of Verbal Qualities of Veridical and Suggested Memory Descriptions from Schooler et al. (in press)

	Memory Description		
	Veridical	Suggested	*t* (*df* = 12)
Verbal Quality			
Confidence	--	--	.75
# Words	22.12	23.74	2.96*
# of sensory details	2.45	1.52	1.39
# cogntive operations	.18	.42	1.39
# verbal hedges	.59	1.30	3.09**

Note. N = 13 macrosubjects (12 X 4 subjects + 1 X 5 subjects = 53 descriptions).
-- = unreported
*p < .05. **p <.01.

APPENDIX D
Experimental Questionnaire(s) 1

QUESTIONNAIRE 1

NAME:_____

Please answer the following questions by circling **Yes** or **No**. Indicate your level of confidence on a scale from 1 to 4, where 1=guessing, 2=low confidence, 3=moderate confidence, and 4=high confidence. Please read each question carefully.

	CONFIDENCE guessing low moderate high 1--------2---------3---------4
1. Did the victim look into the shop window before running into her friend with the dog?	Yes No 1 2 3 4
2. Did the victim put her shopping bag down to pet her friend's dog?	Yes No 1 2 3 4
3. When the victim was looking for her car keys, did she put her shopping bag on the ground?	Yes No 1 2 3 4
4. Did the victim remove her purse from her shoulder while retrieving her fallen items?	Yes No 1 2 3 4
5. At the moment when the victim starts to walk away from the pickpocket, was a city bus stopping at the corner where the incident took place?	Yes No 1 2 3 4
6. Was there clothing in the shop window in front of which the victim stopped at the beginning of the sequence?	Yes No 1 2 3 4
7. Was the dogowner carrying a purse?	Yes No 1 2 3 4
8. At the moment when the victim first arrives at the crosswalk, was the pedestrian who appears on the far side of the street dropping a letter into the mailbox?	Yes No 1 2 3 4
9. Was the victim's purse already open for the suspect to reach into it?	Yes No 1 2 3 4
10. Did the suspect help the victim retrieve her fallen items?	Yes No 1 2 3 4

	CONFIDENCE	
	guessing low moderate high	
	1--------2--------3--------4	
11. Was the dog held on a leash?	Yes No	1 2 3 4
12. Could a gettaway car be seen waiting for the pickpocket to aid in his escape after the theft?	Yes No	1 2 3 4
13. Was the victim waving hello to a friend when the suspect bumped into her?	Yes No	1 2 3 4
14. Was there a toboggan leaning up against the fire hydrant on the corner where the incident took place?	Yes No	1 2 3 4
15. Was there a bus stop at the corner where the pursesnatching incident took place?	Yes No	1 2 3 4
16. Is the pedestrian to whom the victim reveals the theft wearing glasses?	Yes No	1 2 3 4
17. At the moment when the suspect bumps into the victim, was there anyone in the phone booth which is visible in the background?	Yes No	1 2 3 4
18. Was the suspect wearing gloves?	Yes No	1 2 3 4
19. Did the dog sit while being petted by the victim?	Yes No	1 2 3 4
20. Did the suspect have a beard?	Yes No	1 2 3 4
21. Was the suspect wearing an earring?	Yes No	1 2 3 4
22. At the moment when the suspect was taking the victim's wallet, did a pedestrian appear who may have witnessed the theft?	Yes No	1 2 3 4
23. Is the victim crossing on a green light at the moment when the suspect first appears on the far side of the street beside the city garbage can?	**Yes No**	**1 2 3 4**

24. Is the victim still retrieving her fallen items at the moment when the suspect is hiding the victim's wallet in the shirt pocket behind his scarf? **Yes No** **1 2 3 4**

CONFIDENCE

guessing low moderate high
1--------2--------3--------4

11. Was the dog held on a leash?	Yes No	1 2 3 4
12. Could a gettaway car be seen waiting for the pickpocket to aid in his escape after the theft?	Yes No	1 2 3 4
13. Was the victim waving hello to a friend when the suspect bumped into her?	Yes No	1 2 3 4
14. Was there a toboggan leaning up against the fire hydrant on the corner where the incident took place?	Yes No	1 2 3 4
15. Was there a bus stop at the corner where the pursesnatching incident took place?	Yes No	1 2 3 4
16. Is the pedestrian to whom the victim reveals the theft wearing glasses?	Yes No	1 2 3 4
17. At the moment when the suspect bumps into the victim, was there anyone in the phone booth which is visible in the background?	Yes No	1 2 3 4
18. Was the suspect wearing gloves?	Yes No	1 2 3 4
19. Did the dog sit while being petted by the victim?	Yes No	1 2 3 4
20. Did the suspect have a beard?	Yes No	1 2 3 4
21. Was the suspect wearing an earring?	Yes No	1 2 3 4
22. At the moment when the suspect was taking the victim's wallet, did a pedestrian appear who may have witnesse d the theft?	Yes No	1 2 3 4
23. When the two women meet at the beginning of the sequence, is there a sign visible above the shop window in front of which they are standing?	**Yes No**	**1 2 3 4**
24. At the moment when the suspect bumps into the		

victim, was the passerby who was entering the store looking in their direction? **Yes No** **1 2 3 4**

APPENDIX E
Experimental Questionnaire 2

QUESTIONNAIRE 2

NAME:_____

Please answer the following questions by circling **Yes** or **No**. Indicate your level of confidence on a scale from 1 to 4, where 1=guessing, 2=low confidence, 3=moderate confidence, and 4=high confidence.

CONFIDENCE

guessing low moderate high
1----------2---------3----------4

1. Did you see the suspect's coat?	Yes No	1 2 3 4
2. Did you see the ambulance?	Yes No	1 2 3 4
3. Did you see the bicycle?	Yes No	1 2 3 4
4. Did you see the shopping bag?	Yes No	1 2 3 4
5. Did you see the city garbage can?	Yes No	1 2 3 4
6. Did you see the victim's car?	Yes No	1 2 3 4
7. Did you see the suspect's scarf?	Yes No	1 2 3 4
8. Did you see the fire hydrant?	Yes No	1 2 3 4
9. Did you see the victim's skirt?	Yes No	1 2 3 4
10. Did you see the dog?	Yes No	1 2 3 4

INSTRUCTIONS FOR DETAILED DESCRIPTIONS

Please return to the last questionnaire you completed, "Questionnaire 2". We would like you to describe in detail 5 of the items from questions you answered "Yes" to. describe first the items from odd numbered questions (i.e., 1, 3,...,9), then, if necessary, return to answer your even numbered "Yes" answers beginning with #2, through to #10. Continue selecting "Yes" answers in the above order until you have given descriptions of 5 items. If you answered "Yes" to fewer than 5 questions, describe these.

To summarize, please describe in detail the items you saw from "Questionnaire 2". Be as detailed as possible. Take as much time as you need to provide your descriptions; there is no time limit. Don't forget to describe odd numbered "Yes" answers first then, if you don't have 5 descriptions, return to the even numbered questions beginning with #2 until you have 5 items to describe in detail. We suggest that you list your 5 items before you begin, then proceed to your detailed descriptions.

APPENDIX F
Experimental Script(s) and Debriefing

EXPERIMENTAL SESSION SCRIPT(S)

Hi, for those of you who don't know me, my name is Andrea Kenney. I'm working with Dr.'s Laurence and Nadon. Thanks for coming today.

As you know, we're conducting a study on eyewitness recall. The first thing I'm going to do is show you a slide presentation, and then afterwards you'll be filling out questionnaires. Right now, I'll pass around these consent forms.

(HAND OUT CONSENT FORMS)

"SHORT" instructions (for control and postevent suggestion groups, 1 & 2)

Ok, I'll show the slide presentation in a moment. It depicts a common street offense involving a suspect, a victim, and other passersby. Please watch carefully.....

"LONG" instructions (for preevent cue and preevent suggestion groups, 3 & 4)

Ok, I'll show the slide presentation in a moment. It depicts a common street offense involving a suspect, a victim, and other passersby. Please watch carefully. Take special note of what the suspect is wearing- his hat, his scarf, his jacket, pants and shoes, and any other details of his appearance. Notice too the surrounding objects near where the incident takes place, like the intersection lights, the city garbage can, the corner store, the phone booth , other pedestrians, and any other peripheral details.....

Ok, I'm going to hand out a questionnaire on analogies now, and I'll read some instructions to you before you start.

(HAND OUT M.A.T. then read instructions)

Following is a questionnaire on analogies, the comparison of two or more things along some dimension of similarity of correspondence. You'll find some of the questions easy, some harder. If you don't know an answer, we'd like you to guess by going with your first hunch. Sometimes we can have intuitive hunches which are really based in knowledge we've picked up

somewhere, but which may become implicit as time goes by. You may not be able to complete the whole questionnaire- just do as may as you can without lingering too long over any one question- you'll have 15 minutes.

(COLLECT M.A.T.)

Ok, here's the next questionnaire- I'll read the instructions with you.....any questions?

(HAND OUT Q're 1)

Ok, I'm going to hand out a package of questionnaires now. Please work through it at your own speed, and in the order given. The questionnaire begins with instructions which are self-explanatory, but if you have any questions just raise your hand. Don't forget to write your name on the front of the package.

DEBRIEFING

As you know, this is study on Eyewitness Recall. What we're most interested in looking at are the types of errors which are made in recalling an event, why they're made, and what degree of confidence is attached to these.

There are many types of errors- for instance False Positive errors- when we answer "yes" to "no" answer, and False Negative errors- when we answer "no" to a "yes" answer, the frequencies of each type of error and how they relate to correct answers, and the confidence attached to correct and incorrect answers.

We have also varied the content of the story for different groups- we want to see how this might affect the incidence of False Positives and False Negatives.

We're also interested in looking at differences in more detailed descriptions to see how these freely recalled descriptions might relate to incidence of correct and incorrect answers on the forced-choice questionnaires.

We're also interested in how certain types of error correlate with other variables such as hypnotizability, imagery, absorption, and cognitive style. All these variables were measured by the various questionnaires you filled out.

In summary, we are interested in how changes in the stimulus properties of an event may affect the incidence of False Positives and False Negatives in proportion to overall amount of correct and incorrect information, how these changes affect the confidence attached to correct an incorrect responses, and how these response styles relate to other variables such as hypnotizability, absorption, and cognitive style.

APPENDIX G
Preference for an Imagic Cognitive Style Questionnaire (PICS)
(Isaacs, 1982)

PICS Release 2.6
Instructions to Subjects

The purpose of this questionnaire is to help determine your style of thinking and imagining. People differ greatly in the kind and amount of fantasy and imagery which engage them. We also differ in the role that these forms of imagination play in our lives. Most of us take our own thinking style for granted and only occasionally are made aware of it when we encounter a friend who seems to think quite differently. By working through this questionnaire you may become more attuned to the different ways in which people think and to your own style.

The first distinction to make is whether pictures or words trigger thought. A person who thinks with pictures generates mental images in solving problems, reading, and many other situations involving thought. People who do not think in pictures often describe their thought as more like hearing than seeing. They may experience their thoughts as a internal commentary. Thinking in these people seems more tied to language than to vision and their thoughts may be experienced as a kind of internal commentary. Some people do not experience either pictures or words and describe their thought as "just knowing".

People who do not think in pictures may still have pictures accompany their verbal thinking. That is, the pictures are there in addition to thinking. For people who think in pictures however, the thoughts are the pictures.

It is important to note that differences in thinking style are unrelated to general intelligence. Successful artists tend to think in pictures, while lawyers tend to think in words. There is evidence that Einstein thought in pictures. Sherlock Holmes is an example of a word thinker. In many fields it is possible to be successful using either style of thinking and of course many people have a mixture of styles.

The difference in thinking style is also unrelated to your verbal ability. No matter what your thinking style, the output of that thinking can be expressed equally well by both types in speaking or writing. Performance does not depend on thinking style, but rather on how efficiently you use your preferred style. Poets and descriptive writers tend to think in pictures while other writers tend to think in words.

The next distinction to make concerns the clarity or vividness of mental images. In the rating scales you will be asked to use, we describe images as ranging from "vague" to "fairly clear", "quite clear" up to "so clear that it was almost real". In deciding how to rate your image, consider such things as your awareness of the relative positions of parts in your image; the detail present--for example the detail of a person's facial expression or clothing or postures. Many people have images which are very vague in detail and are mainly composed of outlines or "cloudy" shapes that are positioned in space relative to each other. Other people are aware of much more detail and their images are more three-dimensional.

We have separate rating scales for the verbal and image parts of your thinking. But we also consider separately the degree to which you become involved or absorbed in your thinking. Some people may at times have had the experience of being so involved in a daydream as to be unaware of someone entering the room or even calling your name. Absorption refers to the amount of "shutting out" of other thoughts or perceptions while being involved in something.

Experimenter's Instructions for PICS

Okay, you are now going to have several minutes during which I would like you to recall some experience from your own life which has had great personal significance for you. This experience may be entirely personal and private. You will not be asked about its content. I would like you to choose an experience which had a strong positive emotional impact on you. Just take a few moments now to close your eyes and think privately about this experience.

(WAIT 2 MINUTES)

Now please turn to the next page of your response form and answer the questions about your thinking style base on the recall you have just done.

Notice that the first question is followed by a blank line. I would like you to enter here your estimate of how much time has passed from when you closed your eyes.

(Wait for Completion)

Next, I would like you to think about a situation as I describe it to you.

You are walking alone in a meadow. It is early morning, about 6 o'clock or 6:30. Think about your experience there and what might happen.

(PAUSE)

Close your eyes now and just let this situation develop in your mind.

(WAIT 1 MINUTE)

Now please turn to the next page and fill out the section on the MEADOW.

(Wait for Completion)

I am now going to show you a slide on the wall. In a moment, I am going to ask you to look at the slide for a short time. You will then have some time to relax and experience what it brings to mind.

(SHOW PICTURE FOR 15 SECONDS)

Okay,.....now close your eyes and relax.

(WAIT 1 MINUTE)

Now please fill out the section on the PICTURE.

STYLE OF THINKING QUESTIONNAIRE

Recall of Emotional Experience:

1. _____

2. While recollecting this experience, how did you feel?

   A. Positive, happy
   B. Neutral
   C. Negative, sad

3. How intense was your original experience?

   Neutral 1 2 3 4 5 6 7 Very Intense

4. How intense was your feeling while recollecting?

   Neutral 1 2 3 4 5 6 7 Very Intense

5. Which part of your recollection held most of the feelings for you?

   A. The images that came to mind while recalling.
   B. The things I heard or said to myself while recalling.
   C. Both equally carried the feelings.

PLEASE GO ON TO THE NEXT PAGE

6. Which description best characterizes the verbal part of your recollection?

   A. No words or language was involved.
   B. Vaguely aware of some words or inner speech.
   C. Fairly clear inner speech.
   D. Quite clear inner speech.
   E. Inner speech was so clear that it was almost like hearing it.

7. which description best characterizes the imagery part of your recollection?

   A. No image.
   B. Vague image.
   C. Fairly clear.
   D. Quite clear.
   E. So clear that it was almost real.

8. Which description best matches your degree of absorption in your recollection?

   A. High absorption. Always involved with no extraneous thoughts.
   B. Mostly involved with my recollection; few other thoughts.
   C. Fairly involved; but also found my mind wandering.
   D. Only occasionally absorbed in my recollection.
   E. Many distractions. I lost contact with my recollection much of the time.

9. Which description best matches your thinking?

   A. It just popped into mind. No effort was needed to choose it.
   B. I had to think a little at first before knowing what to recall.
   C. It took quite a bit of searching around before I decided on what to recall.
   D. It took quite a bit or searching around and I was still somewhat unsure.
   E. I considered may possibilities and had difficulty deciding on one.

WAIT HERE FOR FURTHER INSTRUCTIONS

MEADOW

1. Which description best characterizes the verbal part of your recollection?

   A. No words or language was involved.
   B. Vaguely aware of some words or inner speech.
   C. Fairly clear inner speech.
   D. Quite clear inner speech.
   E. Inner speech was so clear that it was almost like hearing it.

2. which description best characterizes the imagery part of your recollection?

   A. No image.
   B. Vague image.
   C. Fairly clear.
   D. Quite clear.
   E. So clear that it was almost real.

3. Which description best characterizes your level of absorption?

   A. High absorption. Always involved with no extraneous thoughts.
   B. Mostly involved with my recollection; few other thoughts.
   C. Fairly involved; but also found my mind wandering.
   D. Only occasionally absorbed in my recollection.
   E. Many distractions. I lost contact with my experience of the meadow much of the time.

4. Which best describes the flow of your thoughts after you close your eyes?

   A. My thoughts flowed easily without any conscious decision about where to make them go.
   B. I had to make a few initial decisions and then my thoughts flowed from there.
   C. I had to make several decisions at various points about how to proceed.
   D. I made decisions for each step of my thoughts, sort of carefully planning the situation and considering alternatives.

WAIT HERE FOR FURTHER INSTRUCTIONS

PICTURE

These questions apply to your thinking after the picture was removed.

1. Which description best characterizes the verbal part of your recollection?

   A. No words or language was involved.
   B. Vaguely aware of some words or inner speech.
   C. Fairly clear inner speech.
   D. Quite clear inner speech.
   E. Inner speech was so clear that it was almost like hearing it.

2. Which description best characterizes the imagery part of your recollection?

   A. No image.
   B. Vague image.
   C. Fairly clear.
   D. Quite clear.
   E. So clear that it was almost real.

3. Which description best characterizes your level of absorption?

   A. High absorption. Always involved with no extraneous thoughts.
   B. Mostly involved with my recollection; few other thoughts.
   C. Fairly involved; but also found my mind wandering.
   D. Only occasionally absorbed in my recollection.
   E. Many distractions. I lost contact with my experience of the meadow much of the time.

4. Which best describes the flow of your thoughts after you close your eyes?

   A. My thoughts flowed easily without any conscious decision about where to make them go.
   B. I had to make a few initial decisions and then my thoughts flowed from there.
   C. I had to make several decisions at various points about how to proceed.
   D. I made decisions for each step of my thoughts, sort of carefully planning the situation and considering alternatives.

Scoring of PICS

Scoring was done of the final 3 pages of the booklet. The first, second, and fourth questions on each page were scored as follows:

A = 1 B = 2 C = 3 D = 4 E = 5

Because of the wording of the third question, it was scored as follows:

A = 5 B = 4 C = 3 D = 2 E = 1

The first question on each page rated verbal thinking (V); the second, imagery (I); the third, absorption (A); and the fourth, effort (E). To obtain the final score, verbal and effort were subtracted from imagery and absorption by the following equation:

(I + A) - (V + E) = PICS score

APPENDIX H
Tellegen's Differential Personality Questionnaire
Scale Ab (TAS)
(Tellegen and Atkinson, 1974)

Auke Tellegen, Ph.D.
University of Minnesota, 1978.

DIFFERENTIAL PERSONALITY QUESTIONNAIRE: Scale Ab

In this booklet you will find a series of statements a person might use to describe his or her characteristics. Each statement is followed by two choices, True or False. Read the statement and decide which choice better describes you, then circle your answer on the answer sheet.

Please answer every statement, even if you are not completely sure of the answer. Read each statement carefully, but don't spend too much time deciding on the answer.

In marking your answers on the answer sheet, please be sure that the number of the statement in the booklet is the same as the number on the answer sheet.

1. Sometimes I feel and experience things as I did when I was a child.

2. I can be greatly moved by eloquent or poetic language.

3. While watching a movie, a television show, or a play, I may become so involved that I forget about myself and my surroundings and experience the story as if it were real and as if I were taking part in it.

4. If I stare at a picture and then look away from it, I can sometimes "see" an image of the picture, almost as if I were still looking at it.

5. Sometimes I feel as if my mind could envelop the whole world.

6. I like to watch cloud shapes change in the sky.

7. If I wish, I can imagine (or daydream) some things so vividly that they hold my attention as a good movie or story does.

8. I think I really know what some people mean when they talk about mystical experiences.

9. I sometimes "step outside" my usual self and experience an entirely different state of being.

10. Textures - such as wool, sand, wood- sometimes remind me of colors or music.

11. Sometimes I experience things as if they were doubly real.

12. When I listen to music, I can get so caught up in it that I don't notice anything else.

13. If I wish, I can imagine that my body is so heavy that I could not move it if I wanted to.

14. I can often somehow sense the presence of another person before I can actually see or hear him or her.

15. The crackle and flames of a wood fire stimulate my imagination.

16. It is sometimes possible for me to be completely immersed in nature or in art and to feel as if my whole state of consciousness has somehow been temporarily altered.

17. Different colors have distinctive and special meanings for me.

18. I am able to wander off into my own thoughts while doing a routine task and actually forget that I am doing the task, and then find a few minutes later I have completed it.

19. I can sometimes recollect certain past experiences in my life with such clarity and vividness that it is like living them again or almost so.

20. Things that might seem meaningless to others often make sense to me.

21. While acting in a play, I think I could really feel the emotions of the character and "become" him or her for the time being, forgetting both myself and the audience.

22. My thoughts often don't occur as words but as visual images.

23. I often take delight in small things (like the five-pointed star shape that appears when you cut an apple across the core or the colors in soap bubbles).

24. When listening to organ music or other powerful music, I sometimes feel as if I am being lifted into the air.

25. Sometimes I can change noise into music by the way I listen to it.

26. Some of my most vivid memories are called up by scents and smells.

27. Certain pieces of music remind me of pictures or moving patterns of color.

28. I often know what someone is going to say before he or she says it.

29. I often have "physical memories"; for example, after I've been swimming I may still feel as if I'm in the water.

30. The sound of a voice can be so fascinating to me that I can just go on listening to it.

31. At times I somehow feel the presence of someone who is not physically there.

32. Sometimes thoughts and images come to me without the slightest effort on my part.

33. I find that different odors have different colors.

34. I can be deeply moved by a sunset.

SCORING OF TAS

Where an answer of "True"=1, sum all "True" answers, for a minimum of 1 and a maximum of 34.

APPENDIX I
Marks Vividness of Visual Imagery Questionnaire
(Marks, 1973)

Subject's Name: _____

Marks Imagery Questionnaire

A set of 16 images is suggested below. In each case, your are then asked to rate the vividness of the image. Write the number corresponding to your experience nest to each item. Use the following scale in determining which number to write.

1 = No image at all, you only "know" that you are thinking of the object.
2 = Vague and dim.
3 = Moderately clear and vivid.
4 = Clear and reasonably vivid.
5 = Perfectly clear and as vivid as normal vision.

For items 1-4, think of some relative or friend whom you frequently see (but who is not with you at present) and consider carefully the picture that comes before your mind's eye.

1. The exact contour of face, head, shoulders and body.
2. Characteristic poses of head, attitudes of body, etc.
3. The precise carriage, length of step, etc. in walking.
4. The different colors worn in some familiar clothes.

Visualize a rising sun. consider carefully the picture that comes before your mind's eye.

5. The sun is rising above the horizon into a hazy sky.
6. The sky clears and surrounds the sun with blueness.
7. Clouds. A storm blows up, with flashes of lightning.
8. A rainbow appears.

Think of the front of a shop which you often go to. Consider the picture that comes before your mind's eye.

9. The overall appearance of the shop form the opposite side of the road.
10. A window display including colors, shapes and details of individual items for sale.
11. You are near the entrance. The color, shape and details of the door.

12. You enter the shop and go to the counter. The counter assistant serves you. Money changes hands.

Finally, think of a country scene which involves trees, mountains and a lake. Consider the picture that comes before your mind's eye.

13. The contours of the landscape.
14. The color and shape of the trees.
15. The color and shape of the lake.
16. A strong wind blows on the trees and on the lake causing waves.

SCORING OF Marks VVIQ

All ratings are summed, for a minimum score of 16 and a maximum of 80.

APPENDIX J
Self-Monitoring Questionnaire
(Snyder, 1974)

PERSONAL REACTION INVENTORY

Name: _____

The statements on the following pages concern your personal reactions to a number of different situations. No two statements are exactly alike, so consider each statement carefully before answering. Your are asked to rate each item on a 5-point scale which relates to how characteristic the statement is of you. A rating of -2 indicates that the statement is extremely uncharacteristic of you, a rating of +2 indicates that the statement is extremely characteristic of you, a rating of 0 indicates that the statement is neither characteristic nor uncharacteristic of you.

It is important that you answer as frankly and as honestly as you can. Your answers will be kept in the strictest confidence.

	-2 Extremely Uncharacteristic	-1	0	+1	+2 Extremely Characteristic
1.	I find it hard to imitate the behavior of other people.	-2	-1	0	+1 +2
2.	My behavior is usually an expression of my true inner feelings, attitudes, and beliefs.	-2	-1	0	+1 +2
3.	At parties and social gatherings, I do not attempt to do or say things that others will like.	-2	-1	0	+1 +2
4.	I can only argue for ideas which I already believe.	-2	-1	0	+1 +2
5.	I can make impromptu speeches even on topics about which I have almost no information.	-2	-1	0	+1 +2
6.	I guess I put on a show to impress or entertain people.	-2	-1	0	+1 +2
7.	When I am uncertain how to act in a social situation, I look to the behavior of others for cues.	-2	-1	0	+1 +2
8.	I would probably make a good actor.	-2	-1	0	+1 +2
9.	I rarely need the advice of my friends to choose movies, books, or music.	-2	-1	0	+1 +2
10.	I sometimes appear to others to be experiencing deeper				

emotions than I actually am. -2 -1 0 +1 +2

11. I laugh more when I watch a comedy with others than when alone. -2 -1 0 +1 +2

12. In a group of people I am rarely the center of attention. -2 -1 0 +1 +2

13. In different situations and with different people, I often act like very different persons. -2 -1 0 +1 +2

14. I am not particularly good at making other people like me. -2 -1 0 +1 +2

15. Even if I am not enjoying myself, I often pretend to to be having a good time. -2 -1 0 +1 +2

16. I'm not always the person I appear to be. -2 -1 0 +1 +2

17. I would not change my opinions (or the way I do things) in order to please someone else or win their favor. -2 -1 0 +1 +2

18. I have considered being an entertainer. -2 -1 0 +1 +2

19. In order to get along and be liked, I tend to be what people expect of me rather than anything else. -2 -1 0 +1 +2

20. I have never been good at games like charades or improvisational acting. -2 -1 0 +1 +2

21. I have trouble changing my behavior to suit different people and different situations. -2 -1 0 +1 +2

22. At a party I let others keep the jokes and stories going. -2 -1 0 +1 +2

23. I feel a bit awkward in company and do not show up as well as I should. -2 -1 0 +1 +2

24. I can look anyone in the eye and tell a lie with a straight face (if for a right end). -2 -1 0 +1 +2

25. I may deceive people by being friendly when I really dislike them. -2 -1 0 +1 +2

SELF-MONITORING QUESTIONNAIRE SCORING KEY

Questions 1, 2, 3, 4, 9, 12, 14, 17, 20, 21, 22, and 23 are scored as follows:

-2 = 4
-1 = 3
0 = 2
+1 = 1
+2 = 0

Questions 5, 6, 7, 8, 10, 11, 13, 15, 16, 18, 19, 24, and 25 are scored as follows:

-2 = 0
-1 = 1
0 = 2
+1 = 3
+2 = 4

Scores range from a minimum of 0 for low self-monitors, and a maximum of 100 for high self-monitors.

APPENDIX K
Cognitive Failures Questionnaire
(Broadbent, Cooper, Fitzgerald, and Parkes, 1982)

NAME : _____

BROADBENT ET AL. SCALE

The following questions are about minor mistakes which everyone makes from time to time, but some of which happen more often than others. We want to know how often these things have happened to you in the last 6 months. Please circle the appropriate number.

	Very Often	Quite Often	Occa-sionally	Very Rarely	Never
1. Do you read something and find that you haven't been thinking about it and must read it again?	4	3	2	1	0
2. Do you find you forget why you went from one part of the house to the other?	4	3	2	1	0
3, do you fail to notice signposts on the road?	4	3	2	1	0
4. Do you find you confuse right and left when giving directions?	4	3	2	1	0
5. Do you bump into people?	4	3	2	1	0
6. Do you find you forget whether you've turned off a light or a fire or locked the door?	4	3	2	1	0
7. Do you fail to listen to people's names when you are meeting them?	4	3	2	1	0
8. Do you say something and realize afterwards that it might be taken as insulting?	4	3	2	1	0

	Very Often	Quite Often	Occa-sionally	Very Rarely	Never
9. Do you fail to hear people speaking to you when you are doing something else?	4	3	2	1	0
10. Do you lose your temper and regret it?	4	3	2	1	0
11. Do you leave important letters un-answered for days?	4	3	2	1	0
12. Do you find you forget which way to turn on a road you know well but rarely use?	4	3	2	1	0
13. Do you fail to see what you want in a supermarket (although it's there)?	4	3	2	1	0
14. Do you find yourself suddenly wondering whether you've used a word correctly?	4	3	2	1	0
15. Do you have trouble making up your mind?	4	3	2	1	0
16. Do you find you forget appointments?	4	3	2	1	0
17. Do you forget where you put something like a newspaper or a book?	4	3	2	1	0
18. Do you find you accidentally throw away the thing you want and keep what you meant to throw away- as in the example of throwing away the matchbox and putting the used match in your pocket?	4	3	2	1	0
19. Do you daydream when you ought to be listening to something?	4	3	2	1	0
20. Do you find you forget people's names?	4	3	2	1	0

	Very Often	Quite Often	Occa-sionally	Very Rarely	Never
21. Do you start doing one thing at home and get distracted into doing something else (unintentionally)?	4	3	2	1	0
22. Do you find you can't quite remember something although it's "on the tip of your tongue"?	4	3	2	1	0
23. Do you find you forget what you came to the shops to buy?	4	3	2	1	0
24. Do you drop things?	4	3	2	1	0
25. Do you find you can't think of anything to say?	4	3	2	1	0

SCORING OF COGNITIVE FAILURES QUESTIONNAIRE

Sum all circled answers for a total score of a minimum of 0 and a maximum of 100.

APPENDIX L
Paranormal Experiences Questionnaire
(Nadon, Register, and Kihlstrom, 1985)

PARANORMAL EXPERIENCES QUESTIONNAIRE

The following questions are about various experiences you may have had as a child and/or as an adult. Please circle your answer for both parts of each question.

---

1. Have you ever had, while awake, a strong feeling, impression, or "vision" that a previously unexpected event had happened, was happening, or was going to happen?
   as a child: Yes No
   as an adult: Yes No

2. Have you ever felt that a dream, "vision", or definite feeling, provided you with information about an event or another person which you could not have gotten in any "normal" or conventional way?
   as a child: Yes No
   as an adult: Yes No

3. Have you ever seen or thought you saw an object move with no "natural" or physical means of motion that you could discover?
   as a child: Yes No
   as an adult: Yes No

4. Have you ever had an experience in which you felt that "you" were located "outside of" or "away from" your physical body, i.e., the feeling that your consciousness, mind, or center of awareness was at a different place than your physical body?
   as a child: Yes No
   as an adult: Yes No

5. Have you ever had, while awake, a vivid impression of seeing, hearing, or being touched by another being, whose impression, as far as you could discover, was not due to any external physical or "natural" cause (exclude religious experiences)?
   as a child: Yes No
   as an adult: Yes No

6. Have you ever felt that you were in communication with someone who had died?
   as a child: Yes No
   as an adult: Yes No

7. Have you ever felt that you were being controlled or were possessed by a spirit?
   as a child: Yes No
   as an adult: Yes No

8. Have you ever lived in a house that you felt was haunted?	as a child: Yes No as an adult: Yes No
9. Have you ever had what felt to be a memory of a previous life?	as a child: Yes No as an adult: Yes No
10. Have you ever had the strong feeling or impression that you had been someplace or in the same situation before, even though you had never actually been there before or were experiencing the event for the first time in "real life"?	as a child: Yes No as an adult: Yes No
11. Have you ever seen light or lights around or about a person's head, shoulders, hands, or body which, as far as you could tell, were not due to "normal" or "natural" causes?	as a child: Yes No as an adult: Yes No
12. Have you ever felt that you were able to receive thoughts through telepathy?	as a child: Yes No as an adult: Yes No
13. Have you ever felt that you were able to transmit thoughts through telepathy?	as a child: Yes No as an adult: Yes No
14. Have you ever felt that were able to receive information through a "sixth sense"?	as a child: Yes No as an adult: Yes No
15. Have you ever felt that your body was emitting light or energy?	as a child: Yes No as an adult: Yes No
16. Have you ever felt that some inanimate objects have consciousness?	as a child: Yes No as an adult: Yes No
17. Have you ever experienced God was profound or mystical way?	as a child: Yes No as an adult: Yes No
18. Have you ever felt that God was communicating with you directly?	as a child: Yes No as an adult: Yes No
19. Have you ever felt that a particular occurrence or feeling was a sign or an omen of the future?	as a child: Yes No as an adult: Yes No

20. Have you ever felt that all events are interdependent and that nothing that happens, has happened, or will happen is purely accidental?
    as a child: Yes No
    as an adult: Yes No

21. Have you ever felt that you were able to directly influence others through your thoughts?
    as a child: Yes No
    as an adult: Yes No

22. Have you ever felt that you were being influenced directly by someone else's thoughts?
    as a child: Yes No
    as an adult: Yes No

23. Have you ever felt that you were able to make something happen solely because you willed it?
    as a child: Yes No
    as an adult: Yes No

SCORING OF Paranormal Experiences Questionnaire

All "Yes" answers are summed to yield scores from a minimum of 0 to a maximum of 23 on "child" and "adult" subscales.

APPENDIX M
Examples of Scarf and Coat Descriptions
from Groups 1 (Control) and 2 (Postevent Suggestion)

Scarf and Coat Descriptions

Control Group 1

Ss 2: Red with black checkers, cotton or similar fabric, not wool. Long, below torso but above waist, had "stringy" extensions on ends.
Long coat, approximately knee length. dark blue in color. Made of simple thick cloth, probably cotton. Coat had a silk-like lining of either a light blue or grey color. Probably had pockets on outside, low, about at height of thighs, also are inside on his left.

Ss 3: Yes, when he opened is coat to put the wallet into his shirt, I saw a white and somewhat blue checkered scarf.
It was black (3/4 long). I mean that the coat covered half of his thigh.
It was a little open in V at the neck area (front).

Ss 6: Red scarf.
Black, 3/4 length.

Ss 7: The suspect's scarf was red in color and looked like wool.
The suspect's coat was blue in color, it's coat reached just under his bum.

Ss 8: I think I saw the suspect's scarf around his neck. The scarf was loose, it was not wrapped around the suspect's neck.
The suspect was wearing a navy blue or black cloth coat, that was 3/4 length and it was open in front.

Ss 10: Suspect's scarf was a very bright plaid, red, blue and white (tartan).
Suspect's coat was navy blue or black, double breasted, a "pea" coat (navy style) probably wool. Length was to top of thigh.

Ss 12: The suspect's scarf was of two different colors, light colors, beige and yellow or orange with threads in both ends.
The suspect coat was of a dark color, black or navy blue, it was long to his knees and he had it open. It was one coat with buttons in both sides.

Ss 13: It seems to me there was one, but I can't describe it.
Marine coat, opened, not long.

Ss 14: Plaid red, white and black. Hanging.
Just to the knee. Dark navy blue or black.

Ss 15: The suspect's scarf was red and dark blue plaid.
The suspect's coat was a dark navy blue, Pee coat.

Ss 16: Soft wool, purple grey, square pattern.
Red cloth, short, open.

Ss 18: The suspect wore a long, white and blue scarf with frilled ends. The pattern was dark blue crosshatch or tartan against a white background.
The suspect's coat was dark blue or black, heavy fabric, and was open. It had wide lapels, large buttons, and was a long overcoat-type.

Ss 19: The suspect's scarf was red, it has black lines on it.

Ss 20: Checkered white, red and black or navy. Fairly long for a scarf (3 1/2 feet).
Black trench coat hanging just below the buttocks. It was open.

Ss 21: The suspect's scarf was checkered; red and .....on a white background with small dark lines (black or navy blue).
The suspect's coat was black. It's length was mid-leg (mi-cuisse).

Ss 25: The scarf was wool blend, hanging around his neck with one side longer than the other. The colors were red, mainly white, and blue.
The suspect was wearing along, blue coat.

Ss 26: The suspect's scarf was a dark blue made most probably of wool. It had two fringes and was mostly tucked in the coat.
The suspect's coat was made of a grey wool Its length was just past the waist and its grey color seemed to be mixed with a little black. Its collar was conventional, with flaps (triangular in shape). Black buttons finished it off.

Ss 27: The scarf was red. It wasn't tied.

I think it was white and long.

Ss 29: The suspect's scarf was red and white. It had some kind of squared motif. It was not fold throughout the neck.
The suspect's coat was long, open in the front. It was dark.

Ss 30: It was long/red and I think plaid.
His coat was long and baggy. I think it was dark.

Ss 32: The suspect's scarf was white with plaid sections of red, white, black.
The coat was tan in color, made of material, probably polyester.

Ss 33: The scarf was red.
Blue, waist length, with a plaid pattern on the inside.

Ss 34: It was a white and red tartan wool scarf. Short, not very wide.
It was black wool, knee length.

Ss 35: I think was white in background red squares (carrote rouge et bleu je pense). Seemed long enough cause it went about as far as hem of coat. Il me semble qu'il y avait une frange dessus.
Navy-blue (solid color). Medium length (mid-thigh). Button (not zippered). Collar pulled up. No hood. Two pockets (at least).

Ss 37: The suspect's scarf was red and white in a plaid pattern. It was rather nice!
Suspect's coat was black/P coat. It had a high collar with about 4 or 5 buttons. It was about crotch length. It fit him well.

Ss 38: Suspect's scarf was long, shaggy, with frilled ends. Thin, not bulky. Wrapped once around neck and crossed in front. Best visible after suspect opened coat to place wallet in shirt pocket. Scarf was dark colored.
Suspect's coat was dark blue, full length, buttoned up in front. Navy style trench coat. Scarf visible around neck.

Ss 39: Le foulard du suspect est blanc a carreaux rouge. Le foulard est assez long.
Le manteau du suspect est un manteau trois-quart (mi cuisses) bleu

fonce. C'est probablement un manteau de laine avec environ de couleur fonce. Lors de l'incident, le suspect avait son manteau ouvert. Aussi, le col du manteau etait releve.

Postevent Suggestion Group 2

Ss 41: Je me souviens tres bien d'avoir vu le foulard du suspect cependant j'ai beaucoup de difficulte a me souvenir de la couleur. Il etait cependant de chaque cote du cou du suspect. Il etait soit bleu ou rouge car la tuque etait rouge.
Le manteau etait de type marin ou quelque fois appele canadienne. it etait bleu marin et avait plusiers boutons. It etait de longueur 3/4.

Ss 42: Yes, it was red.
Yes, the coat was a 3/4 coat, black and with wide collar.

Ss 45: The suspect's scarf was the same color as his coat. It was not hanging on the outside of his coat but rather wrapped around his neck on the inside of his coat.
The suspect's coat was navy blue or black and appeared to be made from wool. It had a wide collar and buttons down the front. It fell to just above the suspect's knees.

Ss 47: Blue scarf.
Dark grey thick wool coat. Collar up. Side pockets, black buttons.

Ss 52: Red, long wrapped around his neck draped down the front of his body.
Brown, full-length, belt around the waist. Buttons down the middle.

Ss 53: His scarf was black, hanging on both sides- not wrapped around his neck. Over his coat when he was hiding the wallet. Some fringe at the ends.
His coat was black and short (slightly above his thighs). Kind of coat that looks like the ones "Marines" wear- there are many buttons- double breasted. He did not have it buttoned up.

Ss 56: The suspect was wearing a red scarf around his neck. It was visible when he was stealing the wallet.
The suspect's coat was a blue navy style one. The length of the coat

reached the suspect's waist.

Ss 66: The suspect was wearing a woolen scarf of average length that was red. It came down below the chest area.
The suspect's coat was a dark navy blue heavy wool coat. The length of it was approximately to the knee with about 5 or 6 buttons that were open. The coat's blue collar was turned up.

Ss 69: Suspect's scarf was darker than his coat, it was wrapped around his neck loosely, somehow there was a possibility of seeing his shirt.
Suspect's coat was a short gray winter jacket and had two side pockets which suspect had his hands in when he was waiting for the victim to cross the street.

Ss 76: Red, six inches wide.
Black, waistcoat, wide open "V-neck".

Ss 87: The suspect's scarf was red.
The suspect's coat was 3/4 long dark navy blue or black jacket.

Ss 88: The suspect's scarf was a short knitted one. I think it was blue.
The suspect's coat was a long, full one. it was dark in color and was open at the front.

Ss 90: The suspect's scarf was red.
The suspect's coat was black, made out of material like wool. The coat had long sleeves and black buttons. The length of the coat was about medium reaching to the upper thigh area.

Ss 92: The scarf was a long red one worn outside his coat.
The coat was a long red one.

Ss 95: Black or dark blue scarf around the neck, inside the coat but not tied at all. Short scarf.
Short, navy blue, wool, lapels, sailor type coat.

Ss 97: The suspect's scarf was black.
The suspect's coat was black and unbuttoned and came down to his thighs.

Ss 98: He had the scarf around his neck and it wasn't tied.
The coat was a large trenchcoat and it was opened

Ss 100: Red, hanging down neck ie. not wrapped.
Black, falling to hip level, unbuttoned mostly.

Ss 102: The suspect's scarf was red in color (just like the victim's friend- the man with a dog), and seemed wooly in texture.
The suspect was wearing a dark navy blue coat. it was really a 3/4 length coat (or you may say jacket)- the jacket was not buttoned up.

Ss 105: The suspect's scarf was a bright red woolen scarf with fringes, not knitted wool but woven wool. It was quite long and was not wound around his neck but hung loose.
The suspect was wearing a dark navy blue woolen coat - double breasted and short in length. It was not a bomber style jacket but longer and straigh almost 3/4 length. The lapels were quite large. There were two pockets on the front. It was not belled.

Ss 108: The suspect was wearing a white (maybe off white) scarf wrapped around his neck. It looked to be made of a fine material, perhaps silk, with the ends of the scarf dangling.
The suspect's coat was a dark blue navy-style winter coat, about waist-length. No tears or dirty patches were visible on the jacket.

Ss 111: It was a bright color scarf but was not tied around his neck (possibly)- loose on his neck.
Yes, he had a navy blue, short winter coat, the collar was bit up but not covering the chin- it was sort of navy style coat- perhaps a wool kind- was not closed, so he had the chance to slip the wallet into his pocket underneath his coat.

Ss 112: It was around the pickpocket's neck. It was grey with some white.
This was a navy blue coat. it reached down to a little below his waist. I believe it had approximately 4 large buttons down one side, to button it up. It had a collar on it.

APPENDIX N
Scoring Protocol for Scarf and Coat Descriptions

GENERAL SCORING GUIDELINE

As a general guideline the rules of grammar and inherent meaningfulness should be assumed and applied when scoring free recall. Thus bits of information are linked to other words in a sentence on at least two relevant levels- meaningfully and grammatically.

This general guideline can become readily "out of focus" when scoring the poor sentence structure so characteristic of subjects' free recall. However, attention to meaningfulness and grammar will in large part assure the consistent application of scoring protocol across idiosyncratic styles of verbal expression.

For example, when a subject says "The scarf was red, long, and I think tied.", we can assume that the details "long" and "red" refer exclusively to the scarf, whereas "tied" refers to both the scarf and the phrase "I think". If the subject says, "I think the scarf was red, long, and tied.", we can assume that the uncertainty denoted by "I think", in the absence of clear linkage to the detail "red" only, refers to the entire subsequent description "red", "long", and "tied". A subject may say, in poor sentence structure, "The scarf was red, long, and tied I think." In this case, we can not be certain that there is a unique grammatical or meaningful link of "I think" to the word "tied", and thus it should be retrospectively linked to "red" and "long" as well. By the rules of grammar, additional qualifying words would be required to make a unique link to the word "tied" evident.

This is a very simplified example of sentence structure. In reality, subjects' free recall can become complex with digression, and tangential thought. The point is to find a balance when scoring, between not overlooking connected information which represents one thought, and simplistically and superficially scoring every single word as separate information. The former represents the scorer's risk of subjectively interpreting the subject, while the latter represents the risk of loss of objectivity. These two issues should be reviewed anew before and during the scoring of each subject's data.

DETAILED SCORING PROTOCOL

1. All descriptions are broken down into their component details, i.e. into "bits" of distinct information. Number of details is the main dependent measure of the study. All information in a description is scored even though some details may "seem" to the scorer to be inherently redundant or synonymous in meaning. However, if the subject uses the exact same words twice, this information is not scored twice.

"Bits" can be single words or phrases. The point is that each bit represents one piece of information. For example, in answering the request to describe a bicycle a subject may say "the bicycle was located beside a store". This would be broken down into "The...../beside/ /a store/"- 2 bits of information about the location of the bicycle. A subject may say "The bicycle was located beside the store the woman stopped in front of to talk to her friend". This would be broken down into "The ...../beside/ /the store/ /the woman stopped in front of to talk to her friend/." The last bit "../the woman stopped in front of to talk to her friend/" is a long phrase which represents one more piece of information about the location of the bicycle. If the original question had asked the subject to describe the actions of the woman, this same phrase would be broken down into "/the store the woman stopped in front of/ /to talk to her friend/." Thus the break down of "bits" will very much depend on the question you have asked, since the question you have asked determines the detail you are looking for. In this study we asked subjects to describe in as much detail as possible a list of 5 items which they had seen in a slide sequence. Number 2 below lists the type of detail we were looking for.

2. Each bit is hierarchically classified along 3 separate dimensions:
   a) Type: Sensory (S), geographical (G), temporal (T), or other (O).
   b) "Correctness": Correct (Corr), incorrect (Inc), or attributional (Att).
   c) Quality of Verbal Reference: Direct (Dir), verbal hedge (VH), or reference to cognitive operations (Cog Op).

N.B. A detail cannot be classified more than once within any one dimension.

3. TYPE OF DETAIL: All bits are either sensory, geographical, temporal, or other in type. *Geographical* details indicate "where" an item was seen, and *temporal* details indicate "when". *Sensory* details describe aspects of an item which have been perceived visually, and which are not geographical, or

temporal in nature. Most details are sensorial in nature. Occasionally, details will not satisfactorily fit into any of the above categories. For example, the functional aspect of an item might be alluded to. Such details are noted as falling into an "other" category.

4. "CORRECTNESS" OF DETAIL: All bits are either correct, incorrect, or attributional. In order to determine "correctness", refer to the guideline description of the item, a comprehensive summary of *correct* details of the item.

Incorrect classification is determined in relation to the set of predetermined objective criteria listed in the guideline description of each item. For example, the detail "red" in "the suspect's coat was red" is scored as incorrect since the guideline notes its correct color as black. For a detail to be classified as incorrect it must also be objectively verifiable. Thus, "red" has some objective meaning to most people whereas "scarlet red" has less so. This phrase should be scored as 2 details; "red" is incorrect whereas "scarlet" is an attributional detail. *Attributional* details are those which do not obviously classify as correct or incorrect. This type of detail is further exemplified in descriptions such as "the scarf was nice", or "the coat was long". The details "nice" and "long" are neither correct or incorrect. Rather, these descriptions are subjective in nature, having no specific meaning which would allow them to meet an objective criterion for classifying them as correct or incorrect.

5. QUALITY OF VERBAL REFERENCE: All information is "referenced" either directly, with verbal hedging, or with reference to cognitive operations. *Direct* referencing represents the phrasing of descriptions in a factual tone, without qualification. For example, "the scarf was blue", "the bike was green", or "the coat was long". Note that the "correctness" of the detail is independent of the manner in which it is referenced. Correct, incorrect, and attributional details can all be stated by subjects as though representative of factual information. A large proportion of detail recalled is directly referenced.

A *verbal hedge* implies a hedging of directness. It is an added word or phrase before or after a detail which qualifies commitment to what would otherwise appear as a direct reference. Hedging conveys uncertainty, relative to direct referencing, about the content of the information recalled. Examples of hedging words and phrases are "sort of", "possibly", "maybe", "kind of", "I think", "Not sure but.." etc.:

eg. "The scarf was sort of a blue color."

Here "blue" is the detail which is hedged by "sort of".

eg. "The scarf was blue, sort of."

Although the detail "blue" appears at first to have been directly referenced, the phrase "sort of" which follows is grammatically linked to "blue" and therefore retroactively qualifies the detail as hedged.

It should be noted that verbal hedges can become rather elaborate. For example, "I'm not sure but I think the scarf was sort of blue". This would be scored as one detail verbally hedged once. Additionally, if a subject says "The scarf was brown or black", the "or" is considered to be a verbal hedge. This phrase looks as though it is directly referenced but the "or" implicitly conveys uncertainty about committing to one or the other details of that aspect of the item being recalled.

References to cognitive operations do not provide additional detail about the object of the subject's original perception which would aid an objective observer in the identification of the object being described. Rather this information provides elaborative detail on the internal cognitions of the subject at the time of their external perception (or what they believe to have been an external perception). Examples of cognitive operations include "I remember at the time that I saw the garbage can that I was told beforehand that I would be seeing it"; here the subject provides only information regarding her thought process at the time that she saw the garbage can. In the example "I remember seeing the scarf and thinking that it couldn't be keeping him warm if it wasn't tied" the subject has provided two types of information; information about what she was thinking at the time of the perception, and information about the perception itself (ie. the scarf "wasn't tied). As such then, cognitive operations may be linked with a detail, or may not be linked to detail.

SUMMARY OF SCORING PROTOCOL

1. Review the General Guideline, Detailed Scoring Protocol, and guideline Description of Items and return to them for refocus when making a difficult judgment.

2. Color code "bits" in yellow.

3. Decide on type and "correctness" of detail, and mark abbreviated classification above yellowed detail.

4. Underline verbal hedging in purple, and references to cognitive operations in blue.

5. Transfer information to scoring sheet.

6. Note exceptional cases for later discussion and rule elaboration or modification; particular items may require particular rules.

SCARF DESCRIPTION

N.B. /..... ..... / = score as 1 detail; /... / /... / = score as separate details.

SENSORY:

-plaid or tartan
-red, white, black or /navy blue/ or /dark blue/; with grey, and pink or /pale red/ or /light shade of red/.
-squares are white, red, and pink or /pale red/ or /light shade of red/.
-red squares are surrounded by black or /navy blue/ or /dark blue/ border or lines.
-pink or /pale red/ or /light red/ squares are surrounded by grey border or lines.
-white squares surrounded by fine royal blue border or lines, then by thicker black or /navy blue/ or /dark blue/ and/or grey borders.
- black or /navy blue/ or /dark blue/ and white lines thread throughout non-white squares, horizontally and vertically.
- red squares lie across horizontal width of scarf; pink squares lie the vertical length of scarf.
-white squares appear as background color.
-3 rows of red-white horizontal stripes are visible; a 4th is half visible at collarbone level.
-scarf is hanging; visible on suspect's left side only.
-fringes at end; are red, white, and black or /navy blue/ or /dark blue/; hang at hip level or 6-12 inches below belt.

GEOGRAPHICAL:

-around neck.
-under coat
-under shirt collar.

TEMPORAL:

-visible when coat is open.
-not visible when coat is closed.
-visible in one slide only.
-visible when putting wallet in shirt pocket (under scarf)

Additional A-priori Scarf Scoring Protocol:

If a subject reports that the scarf is red only, code this as incorrect information. This is because a solid color red scarf was worn by a passerby in the slide sequence, and was reported often enough around the suspect's neck to raise the suspicion that a red- only description might represent an error of displacement in recall. If the scarf is reported as red and another color, score "red" as correct and the other color as a separately scored detail.

If a subject reports that the lines on the scarf are "navy blue or black", both details are acceptable, and should be scored as 2 correct details. Since both details are acceptable in this particular instance, do not score the "or" as a verbal hedge. This rule is adopted because a large proportion of subjects happened to have reported these two details concurrently, and to score "or" as a verbal hedge would inappropriately elevate the tally of verbal hedging for these particular items, thus potentially distorting the comparison of quality of descriptions to a comparable item.

If subjects say the scarf "has stripes up and down", score the "stripes" as incorrect. However, if they mention "plaid" concurrently with stripes in their description we know what kind of "stripes" they mean, and we should not score this as incorrect. Stripes would be scored as correct information in this case.

Estimates of length and width of scarf, and size of squares on it are scored as attributional information, except where indicated in the summary description.

COAT DESCRIPTION

N.B. /..... ..... / = score as 1 detail; /... / /... /= score as separate details.

SENSORY:

-black or /navy blue/ or /dark blue/.
-"Navy" or "Sailor" or "Pea" style.
-cloth material
-straight fit; not fitted.
-lapels; with "V" shaped indentation.
-collar; worn up.
-"V" shape of lapelled collar begins mid-chest.
-length is mid-thigh.
-double breasted; 3 buttons either side.
-buttons are 1- 1 1/2 inches in diameter; black or /navy blue/ or /dark blue/.
-2 pockets; on front of coat; vertically positioned; inferred because suspect has hands in them in 3 slides.
-inside lining is same color as coat; black or /navy blue/ or /dark blue/.
-worn unbuttoned, or open.

GEOGRAPHICAL:

TEMPORAL:

-suspect has hands in pockets before bumping into victim.
-suspect opens coat when stealing wallet; lining and shirt visible at this time.

Additional A-priori Coat Scoring Protocol:

If a subject reports that the suspect's coat was "navy blue or black", both details are acceptable and should be scored as 2 correct details. Since both details are acceptable in this particular instance, do not score the "or" as a verbal hedge. This rule is adopted because a large proportion of subjects happened to have reported these two details concurrently, and to score "or" as a verbal hedge would inappropriately elevate the tally of verbal hedging for this particular item, thus potentially distorting the comparison of quality of descriptions to a comparable item.

APPENDIX O

Between Groups X^2 and *t*-test Comparisons on Present Study's Data of Verbal Quality Variables on the Scarf Between Veridical and Suggestion Groups

Between Groups X^2 and *t*-test Comparisons on Present Study's Data of Verbal Quality Variables on the Scarf Between Veridical and Suggestion Groups

	C vs Postevent S (1 vs 2)		C vs Preevent S (1 vs 4)		Preevent Cue vs Preevent S (3 vs 4)	
n	39	74	39	76	36	76
% "Yes" Responses	69.2	31.1	69.2	22.4	83.3	22.4
X^2	15.07**		23.96**		37.28**	
	(1, *n* = 113)		(1, *n* = 115)		(1, *n* = 112)	
n	26	23	27	17	30	17
Confidence	3.67	3.22	3.67	3.35	3.97	3.35
t	(48) = 2.01*		(42) = 1.24		(45) = 3.52***	
# Words	15.5	16.5	15.5	10.4	19.21	10.4
t	(48) = .36		(42) = 1.87		(45) = 2.87**	
n	27	23	27	17	30	17
% Mention Sensory Details	96.3	100	96.3	100	100	100
X^2	.87		.64		1.00	
	(1, *n* = 40)		(1, *n* = 44)		(1, *n* = 47)	
% Mention Geographical Details	18.5	56.5	18.5	41.2	33.3	41.2
X^2	7.79**		2.70		.29	
	(1, *n* = 40)		(1, *n* = 44)		(1, *n* = 47)	
% Mention Verbal Hedges	40.7	21.7	40.7	29.4	30.0	29.4
X^2	2.06		.58		.00	
	(1, *n* = 40)		(1, *n* = 44)		(1, *n* = 47)	

Note. C = control group. S = suggestion group.
*p < .05. **p < .01. ***p < .001.

APPENDIX P

Between Groups X2 and *t*-test Comparisons on Present Study's Data of Verbal Quality Variables on the Coat Between Veridical and Suggestion Groups

Between Groups X^2 and *t*-test Comparisons on Present Study's Data of Verbal Quality Variables on the Coat Between Veridical and Suggestion Groups

	C vs Postevent S (1 vs 2)		C vs Preevent S (1 vs 4)		Preevent Cue vs Preevent S (3 vs 4)	
n	39	75	39	76	36	76
% "Yes" Responses	97.4	97.3	97.4	98.7	100	98.7
X^2		.00		.24		.48
	(1, n = 114)		(1, n = 115)		(1, n = 112)	
n	27	23	27	17	30	17
Confidence	3.82	3.91	3.82	3.66	3.93	3.65
t	(48) = .76		(42) = .88		(45) = 1.85	
n	26	23	26	16	30	17
# Words	18.8	21.8	18.8	18.8	19.7	18.8
t	(47) = .80		(40) = .01		(43) = .21	
% Mention Sensory Details	100	100	100	100	100	100
X^2		1.00		1.00		1.00
	(1, n = 49)		(1, n = 42)		(1, n = 47)	
% Mention Verbal Hedges	38.5	47.8	38.5	56.3	34.5	56.3
X^2		.44		1.27		2.00
	(1, n = 49)		(1, n = 42)		(1, n = 47)	

Note. C = control group. S = suggestion group.

APPENDIX Q

Independent *t*-test Analyses Comparing Mean Frequencies of Verbal Qualities in Veridical and Suggested Coat Descriptions in Groups 1 & 2

Independent *t*-test Analyses Comparing Mean Frequencies of Verbal Qualities in Veridical and Suggested Coat Descriptions in Groups 1 & 2

	Group 1	Group 2	t (*df* = 47)
n	26	23	
Verbal Quality			
Confidence	3.82	3.91	< 1†
# Words	18.77	21.78	< 1
sensory details	6.27	6.17	< 1
geographical details	.00	.00	
verbal hedges	.62	.70	< 1

Note. Group 1 = control, group 2 = postevent suggestion.
† = *df* = 48

APPENDIX R
Multiple Regression Prediction of Verbal Quality Variables on Coat by Grouping Variable

Prediction of Verbal Quality Variables on Coat by Grouping Variable

Variable	R^2	*F*	*df*
Confidence	.045	1.48	3,93
Number of Words	.008	< 1	3,89
Sensory Details	.026	< 1	3,90
Total Details	.023	< 1	3,90
Geographical Details	(no variance)		
Verbal Hedges	.040	1.26	3,90

	Group			
	1	2	3	4
Variable				
			Means	
Confidence	3.82	3.91	3.93	3.65
Number of Words	18.77	21.78	19.66	18.81
Sensory Details	6.57	6.66	5.74	6.31
Total Details	6.31	6.30	6.17	4.88
Geographical Details	.00	.00	.00	.00
Verbal Hedges	.78	.71	.31	.71

Note. Mean comparisons were made between the control (Group 1) and each of groups 2, 3, and 4; asteriks beside means indicate that the means differed from the control.

1 = control, 2 = postevent suggestion, 3 = preevent cue, 4 = preevent suggestion.

APPENDIX S
Measures of Central Tendency for Individual Difference Variables Across Groups

Measures of Central Tendency for
Individual Difference Variables
Across Groups

Variable	Group			
(N = 226)	1 (n = 39)	2 (n = 75)	3 (n = 36)	4 (n = 76)
Sex	1.59	1.56	1.50	1.62
	(.50)	(.50)	(.51)	(.49)
PICS	9.00	8.81	7.69	8.37
	(5.05)	(5.91)	(5.20)	(5.64)
TAS	22.05	22.25	21.03	21.73
	(4.98)	(5.85)	(5.69)	(6.17)
Self-Monitoring	47.72	46.61	49.39	46.15
	(10.63)	(12.13)	(9.90)	(12.39)
HGSHS: A	4.70	5.57	5.06	5.24
	(2.67)	(2.51)	(2.39)	(2.49)
Depth of hypnosis	4.68	5.23	4.67	4.75
	(2.25)	(2.53)	(2.21)	(2.18)
Amnesia	.08	.14	.14	.14
	(.28)	(.35)	(.36)	(.35)
VVIQ	60.61	61.92	58.39	58.80
	(12.25)	(11.43)	(11.21)	(11.49)
Paranormal (adult)	9.24	9.52	9.22	8.25
	(4.24)	(4.16)	(5.35)	(5.20)
Paranormal (child)	7.59	7.14	7.03	5.94
	(4.34)	(4.59)	(4.77)	(4.49)

Note. Group means appear first, standard deviations below, in parentheses.