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THE SUGGESTIBILITY OF MEMORY: INDIVIDUAL DIFFERENCES, ENVIRONMENTAL FACTORS AND PSYCHO-LEGAL IMPLICATIONS

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Abstract

This paper examines psychological parameters and legal issues associated with the suggestibility of memory. The "misinformation effect" is a phenomenon which refers to the acceptance of misleading information following exposure to an event, and findings from this and other related areas of research are reviewed. An initial study was performed to determine whether the misinformation effect could be replicated, and whether level of arousal and individual differences in dissociativity affected acceptance of misinformation. This study demonstrated strong misinformation effects, but neither the arousal condition nor differences in dissociativity had a significant effect. An unexpected result was revealed in a post-hoc analysis which indicated that females scored significantly higher in the acceptance of misinformation. A follow-up study was performed to determine if there would be a replication of these gender differences. The second study was also undertaken to clarify the issue of arousal, and a manipulation check was included for this condition. Additional measures of psychological characteristics were included to assess for any possible relationships between

these constructs and suggestibility; dissociativity was again assessed, in addition to hypnotizability, trait anxiety, and five general factors of personality. Results of the second study did not replicate the gender differences demonstrated in the first study. In addition, levels of arousal were found to be similar for both conditions, and none of the psychological constructs assessed were related to suggestibility as measured by performance on the dependent variable. These experiments are followed by a discussion of the legal issues relevant to research in suggestibility.

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CHAPTER I

THE SUGGESTIBILITY OF MEMORY: INDIVIDUAL DIFFERENCES, ENVIRONMENTAL FACTORS AND PSYCHO-LEGAL IMPLICATIONS

HISTORICAL BACKGROUND

What is suggestibility? As with many psychological constructs, the term has been defined inconsistently and differs according to the type of research being performed. In social psychology, it involves the degree to which one's attitudes or beliefs can be influenced by social persuasion. The term is also used in the context of hypnosis research, in which it generally refers to an individual's susceptibility to hypnotic suggestion. In cognitive psychology, suggestibility typically relates to memory processes and the extent to which they are subject to alteration from exposure to contradictory information. This review focuses on suggestibility from the standpoint of cognitive psychology. Because suggestibility in this sense is intrinsically related to the reliability of memory as a whole, a history of suggestibility research should first begin with the history of memory research itself.

The study of memory, like many current areas of research in psychology, has its origins in philosophical observation and theory. It did not become the object of

empirical study until 1885, when Hermann Ebbinghaus first used the experimental method in the assessment of memory (Ebbinghaus, 1885/1964). Prior to this, the analysis of memory was based upon introspective recollections of past experiences, with no external corroboration to determine the accuracy of that which was remembered. Ebbinghaus attempted to provide control over memory input, and therefore accuracy, by using "nonsense syllables" that were to be memorized and objectively tested (Schacter, 1995).

During the early part of the 20th century, many European researchers examined memory distortion in order to assess the reliability and suggestibility of eyewitness testimony. However, few were interested in the subject in the United States. This lack of interest was primarily due to differences between the legal systems of the two continents; because many European countries use an inquisitorial system in which there is often no jury, the judge is more likely to rely on expert testimony to determine witness competency (Ceci & Bruck, 1993). The United States justice system, which is adversarial in nature, relies upon opposing attorneys and the jury to determine witness credibility.

Although research on memory distortion was unpopular within the American legal and psychological communities during this time period, in 1908 a Harvard psychologist, Hugo Munsterberg, published <u>On the witness stand: Essays on</u>

psychology and crime. Based on his review of the European research in this area, Munsterberg argued that eyewitness memory is frequently unreliable. He recommended that the U.S. justice system rely on psychological methods in the assessment of eyewitness accuracy; however, this idea was largely rejected by the legal community. As a result, little research was performed on the reliability of eyewitness memory until the late 1970's.

Not all research involving the accuracy of memory has been undertaken specifically for the assessment of eyewitness memory. Sir Frederick Bartlett was a major contributor to research involving memory distortion during the first half of this century, and examined memory in a narrative context. In Remembering (1932), he described a procedure in which subjects were asked to repeatedly retell a story to which they had previously been exposed. Finding that his subjects' memories for the story were highly inaccurate, he theorized that memories for events are distorted by each individual's prior knowledge and experience, as well as by his or her social needs and attitudes. Bartlett focused on the constructive nature of memory, and was the first person to apply the concept of a cognitive "schema," an organized mental structure based on knowledge and experience, to memory.

Unlike Bartlett's naturalistic approach, most memory research during the middle part of this century was

behavioral in nature, and typically utilized the paradigm of paired-associate learning, in which learning a second pair of words impairs one's memory for the original pair (Schacter, 1995). These studies were based on the widely accepted theory of forgetting known as retroactive interference (R-I), which postulates that exposure to a new stimulus will make it more difficult to remember something which was previously learned (Keppel, 1968).

Studies within the field of memory research gradually expanded; by 1970, various references to different categories of memory had emerged. In response to the growing body of research in which these functions had become increasingly stratified, psychologists attempted to more clearly define the structure of memory through the creation of a unifying paradigm. Tulving and Donaldson's The organization of memory (1972) was an important publication in defining and explaining the various properties of memory that had been empirically demonstrated up to that point in time. This document was also important from a theoretical standpoint, in that Tulving postulated the existence of two broad categories of memory, which he described as being either "semantic" or "episodic" in nature.

As defined by Tulving, semantic memory refers to the knowledge base that is involved in the use of language, whereas episodic memory refers to the processing of information regarding temporally dated episodes or events.

Tulving theorized that much of traditional memory research, although designed to assess semantic memory through the learning of word lists, may have been assessing episodic memory instead. He also hypothesized that the two types probably differ in their susceptibility to alteration and the likelihood of storage failure, in which forgetting occurs more frequently in the episodic rather than in the semantic system. The idea of separate memory systems with distinct qualities and differential rates of forgetting was an important conceptualization in terms of understanding the diverse outcomes demonstrated within memory research.

The 1970's produced a great deal of research in the area of cognitive psychology, which led to a renewed interest in the constructive, and thus unreliable, nature of memory. Unlike Bartlett's approach, however, the newer methods used to assess memory relied more heavily on empiricism rather than anecdotal information, and were thus more convincing in their results. Early in the decade, Bransford and his colleagues performed a series of experiments that provided greater proof of the constructive nature of memory; in these experiments subjects were unable to distinguish sentences to which they had previously been exposed from sentences that had the same meaning, but had not seen (Bransford & Franks, 1971; Bransford, Barclay, & Franks, 1972). In other words, people remembered that which they understood, or the "gist" of the information, as

opposed to the actual experience, or word-for-word representation. The separation of "gist" versus "verbatim" memories was another important theoretical distinction in memory research that continues to influence cognitive psychology to this day. This will be discussed in greater detail as it applies to theories of suggestibility.

The 1970's were also a time of renewed interest in the accuracy of eyewitness memory. Although eyewitness research typically assesses only direct memory for a witnessed event, Elizabeth Loftus and her colleagues focused on the effects that suggestion has on memory for the event. By combining various theoretical and experimental traditions in memory research, Loftus, Miller and Burns (1978) attempted to demonstrate the effects of retroactive interference in relation to the suggestibility of eyewitness memory. Their results indicated that subjects' memories of an event were significantly altered by exposure to misleading (false) information following the event, which they termed the "misinformation effect." Their experiment established the research paradigm for future studies in the field. The following is a description of their methodology:

First, subjects were presented with a series of slides depicting some incident, such as a traffic accident. Next, subjects were given postevent information that was either consistent with the previous information, misleading, or irrelevant to the situation. This information was embedded

in the form of a question, and concerned some detail from the slides; for example, a misleading question would indicate the presence of a yield sign, whereas the slides had shown a stop sign. To assess the effects of the postevent information, subjects were given a forced-choice recognition test in which the alternatives were slides of either the correct or misleading information. The results demonstrated that subjects who were misled chose the wrong slide significantly more often than those who were not misled.

Numerous variations of the original study have taken place since that time. Some have differed in the type of stimulus to which subjects are exposed; for example, slides, videotapes, narratives, and live enactments have all been utilized as the means of presenting the original information. Presentation of the postevent information has also varied in format; for example, in some cases it is written, either given as direct information or embedded in the form of a question, sometimes it is verbally communicated during the process of an interrogation, and occasionally it is presented visually. There have also been differences in the length of time following exposure to the original stimuli. Despite these differences, however, each has used some variation of the original format. Overall, the research has consistently demonstrated that misinformation has a distorting effect on memory

THEORIES OF SUGGESTIBILITY

Storage vs. Retrieval Failure

The question then becomes, how does postevent information affect memory, and are other factors involved? In an argument based upon the concept of retroactive interference, Loftus and Loftus (1980) originally asserted that the misinfomation effect is due to a loss of the original memory when new information is stored in place of the old. In other words, the memory containing the original information is permanently altered when it is followed by exposure to suggested information. In their review of the various theories regarding misinformation effects, Ayers and Reder (1998) refer to this as the "overwrite/trace alteration account," because the memory trace is overwritten, or updated, by subsequent information. Thus, the forgetting that occurs following exposure to misinformation is the result of storage failure, in that original memories are replaced by more recent ones.

The idea of memory trace alteration did not go unchallenged; other researchers claimed that forgetting as a result of misinformation is due to problems with memory retrieval, as opposed to storage failure (Bekerian & Bowers, 1983; Christiaansen & Ochalek, 1983). This theory has also been referred to as the "blocking account," because it hypothesizes that exposure to false information results in impaired access to the original memory (Ayers & Reder,

1998). Proponents of this theory postulate that both original and postevent information coexist in memory, but that new information is more accessible for retrieval and is therefore more likely to be remembered. Although these researchers disagreed with Loftus and Loftus' (1980) original hypothesis in their explanation for the specific mechanisms underlying suggestibility, their results supported the general claim that memory processes are in some way impaired by misleading postevent information.

Response Bias and Demand Characteristics

Some researchers have argued that misinformation effects are in no way related to memory impairment, and demonstrated that these effects did not occur when the original experimental procedure was altered in order to account for response bias and demand characteristics (McCloskey & Zaragoza, 1985; Zaragoza, Jamis, & McCloskey, 1987). McCloskey and Zaragoza (1985) hypothesized that subjects may naturally forget the original information, regardless of whether it is followed by subsequent misinformation; the result of this would be a response bias towards the misleading information, because it is more likely to be recognized from the recent narrative. They also theorized that subjects may remember both original and misleading information, but decide to report the misleading information because they believe it to be the outcome desired by the experimenter. In sum, they argued that the

original procedure does not provide clear evidence that misinformation effects are due to interference from exposure to new information, but that response bias or social demands may produce guessing strategies that mimic these effects.

In order to account for the effects of response bias and demand characteristics, McCloskey and Zaragoza (1985) modified the original testing procedure. In the original procedure, subjects are given a choice between the correct item and the misleading item; in the modified procedure, subjects are given a choice between the correct item and a new item. They reasoned that the absence of the misleading item would eliminate the use of guessing strategies that bias subjects towards that item. In addition, by comparing the correct item to a new item, they believed that they could more directly assess impairment of the original memory. Because misinformation effects occurred only with the original procedure, they concluded that suggestibility in this context is not due to memory impairment but to response bias and social demands.

Not surprisingly, the above findings and conclusions produced a great deal of controversy, and were disputed on the basis of the methodology used. Other researchers found that when they used more sensitive measures for the modified test (Yes/No responses), significant misinformation effects were demonstrated (Belli, 1989; Chandler, 1989; Tversky & Tuchin, 1989). These results did not exclude the

possibility that response bias and demand characteristics may be involved in the processes underlying suggestibility; in fact, other studies have clearly demonstrated that social factors influence misinformation effects (Ceci, Ross, & Toglia, 1987; Smith & Ellsworth, 1987; Toglia, Ross, Ceci, & Hembrooke, 1992). However, the research to date shows that while other factors often contribute to misinformation effects, memory impairment cannot be summarily dismissed as an explanation for the phenomenon (Ayers & Reder, 1998). The question of response bias versus memory impairment continues to be a subject of debate within this field of study (Belli, Windshitl, McCarthy, & Winfrey, 1992).

Source Monitoring

More recently, another memory-based theory has been suggested to explain the phenomenon of suggestibility. Although this theory is based upon the assumption that misinformation effects are due to difficulties in memory retrieval, it differs from the notion that misleading information produces memory impairment because it is more recent, and therefore more accessible. Instead, it hypothesizes that retrieval difficulties are due to errors in "source monitoring," a term which refers to the cognitive processes involved in identifying the sources of specific memories (Lindsay, 1994).

According to this theory, subjects have access to memories of both original and suggested events, but become

confused and make errors when attempting to recollect the information due to difficulties in distinguishing the source of each memory (Lindsay & Johnson 1989a). It is theorized that these source misattributions typically result from decisions that are automatic and occur without conscious awareness, but they may also be the result of intentional deliberation (Lindsay, 1993).

Recent studies provide evidence that misled subjects genuinely believe themselves to have witnessed events which were only verbally suggested to them, indicating the presence of source monitoring confusion (Lindsay, 1990; Zaragoza & Lane, 1994). The role of source misattribution in suggestibility has been specifically demonstrated through a variation of the original methodology used to assess misinformation effects; in a reversal of the traditional procedure, misleading information was given before subjects witnessed the visual scene, and was nevertheless found to have a negative effect on memory (Lindsay & Johnson, 1989b; Rantzen & Markham, 1992). Thus, memory "updating," which serves as the basis for theories of both storage failure and retrieval inaccessibility, is an insufficient explanation for the processes involved in the effects of misinformation.

Source monitoring errors have been further demonstrated through another methodological variation, in which subjects were explicitly warned that information in the postevent narrative was false, and were asked to report only the

information contained in the originally witnessed event (Lindsay, 1990). Despite the warning, under certain conditions (in which original and misleading episodes were more difficult to discriminate) subjects confused suggested items for those that they saw. In a variation of this procedure, subjects were instructed to report only that which they read in the postevent narrative (as opposed to information from the original, visual event) (Weingardt, Loftus, & Lindsay, 1995). Similarly, results indicated source monitoring confusion.

In another experiment, subjects were warned of the possible occurrence of misleading suggestions within the postevent information, and were instructed to report separately the content of both the witnessed event and that which was mentioned in the postevent narrative (Belli, Lindsay, Gales, & McCarthy, 1994). Again, results demonstrated that misleading information negatively affected subjects' memory for events, and subjects sometimes confused the sources of their memories.

The research discussed above suggests that misinformation effects are the result of genuine memory impairment arising from difficulties in source monitoring. Although social demands, under certain circumstances, may play a role in mediating susceptibility to false information, the use of oppositional instructions (warning subjects of the presence of false information), and

explicitly asking them to report original and/or misleading information separately, effectively counteracts the problem of demand characteristics. These studies demonstrate that source monitoring confusion occurs despite conscious attempts to distinguish between original and suggested information.

How is it that both original and false information are so easily incorporated into memory, and are then so difficult to distinguish? Social psychology theory and cognitive research on comprehension and belief may lend some answers to this question. In drawing from the philosophy of Spinoza, as well as modern psychological research, Gilbert (1991) argued that in order to initially comprehend an idea, one must also accept it. According to this theory, acceptance occurs automatically, thus involuntarily, as a function of comprehension, and comprehension must first take place before an idea can be rejected. Consequently, we incorporate beliefs into our mental structure much more easily than we reject them, as rejection of an idea takes considerably more time and energy, as well as some degree of conscious effort.

Fuzzy-trace Theory

Hypotheses regarding the processes of reasoning and remembering have evolved into a complex set of principles that form the basis of what has been termed "fuzzy-trace theory." This theory, which was developed over the last

fifteen years, has broad implications for various types of memory research, and has been applied to the phenomenon of suggestibility (Reyna & Brainerd, 1995). Other cognitive theories, those based on specific storage and retrieval difficulties, account for some part of misinformation effects, yet no single theory has been able to encompass the multitude of findings. Fuzzy-trace theory offers an approach to this problem by providing an overall framework for the results of this area of research, without excluding any particular storage or retrieval-based explanations.

The application of fuzzy-trace theory to misinformation effects primarily concerns the following issues: 1) the nature of forgetting, 2) the qualities of "gist" (general) versus "verbatim" (specific) memories, 3) the independence of these types of memories, and 4) the differential rates of forgetting for each (Titcomb & Reyna, 1995). According to this model, forgetting is a gradual disintegration of the features of memory, with different thresholds for "storage failure" and "retrieval failure."

Fuzzy-trace theory also postulates that verbatim and gist memory representations are not integrated with one another. Because these memories are independent of each other and have distinct qualities, they differ in their rates of disintegration, with verbatim memory having a higher rate of forgetting. This hypothesis would correspond with the evidence demonstrated by Bransford and Franks

(1972), in which subjects could not discriminate between a sentence they had seen versus a sentence they had not seen that had the same meaning. Results of this study and similar ones that followed indicate that gist memory is more resilient than verbatim memory in terms of verbal learning tasks.

The above tenets of fuzzy-trace theory affect suggestibility in a variety of ways. According to Reyna and Brainerd (1995), most misleading suggestions involve specific details, as opposed to general events. If verbatim memory for the original event is strong, subjects are more likely to resist suggestions; however, if verbatim memory is weak and subjects access gist memory instead, they may not see the misinformation as contradictory and are more likely to accept it. The type of memory on which subjects rely is based on the extent of forgetting that has occurred; the more the verbatim memory trace disintegrates, the more subjects will rely on gist memory. In sum, susceptibility to misinformation depends upon accessibility to verbatim memories for original events. Therefore, factors that increase verbatim forgetting, such as a delay in presenting the misleading information, also increase suggestibility effects (Reyna & Brainerd, 1995).

Based on this model, the variable outcomes that have been demonstrated within suggestibility research are the result of interactions between the type of memory assessed

and the extent of trace disintegration. Interactions between these factors vary as a reflection of differences in methodology, such as timing, type of test used, or type of stimulus presentation. They may also be affected by individual differences that influence accessibility to gist or verbatim memories, such as age or prior knowledge (Reyna & Brainerd, 1995).

METHODOLOGICAL FACTORS AFFECTING SUGGESTIBILITY

Test Format and Mode of Stimulus Presentation

As noted previously, different results have been found using the original (Loftus et al, 1978) and modified (McCloskey & Zaragoza, 1985) recognition tests. The original test, in which subjects must choose between the suggested item and the correct item, produces much stronger effects than the modified test, in which subjects must choose between the correct item and a new item. As in any recognition test, if subjects only recognize one item (and in the case of the modified test, it would be the correct item), they are more likely to choose that item. Because the modified test produces a greater number of correct hits, misinformation effects often appear to be nonexistent, or at least much weaker, for this type of measure.

Variations in the mode of presentation for the original and misleading information may also affect suggestibility. Most studies have used original information that is visual in nature (i.e.; slides or videotapes), and misleading

postevent information that is verbal (i.e.; narratives or questionnaires). Zaragoza and Koshmider (1989) argue that the use of different modalities for original and postevent information should decrease suggestibility; they hypothesize that different types of information would be easier to distinguish than information from the same modality, which would correspond with source attribution theory. However, although few studies have examined the mode of presentation, the general trend is that misinformation effects are greater when different modalities are used, and less reliable when modalities are the same (Titcomb & Reyna, 1995). This may be due to the fact that in most cases, the mode of presentation of the misleading information is the same as that of the recognition test used to assess suggestibility; i.e., they are typically both verbal, where the original information is visual.

Although most recognition tests administered have used a verbal format, a few have been visual, and two experiments have attempted to compare the effects of each type of test on suggestibility (Pezdek & Greene, 1993; Yamashita, 1996). The studies that compared the two formats both indicated that visual recognition tests are more resistant to the influences of misinformation than verbal recognition tests if the original event is visual. From these results arises the hypothesis that when the modes of presentation are similar between the original information and the recognition

test, the original information is more likely to be recovered. To summarize, misinformation effects appear to be greatest when the original information is visual, the postevent information is verbal, and the recognition test is verbal.

Discrepancy Detection

Loftus (1992) hypothesized that an individual's memory for an event is more likely to be altered if he or she does not immediately detect discrepancies between original and postevent information; she termed this the "discrepancy detection principle." Discrepancy detection corresponds well with the concept of source monitoring, in that if memories are difficult to separate and distinguish, source monitoring confusion is more likely to occur, and therefore misinformation effects are more prominent. Several variables that affect susceptibility to misleading information provide support for this principle.

One variable that may increase discrepancy detection, and therefore lessen the effects of misleading information, is the presence of a warning. As previously noted, research in source monitoring has indicated that warning subjects of potentially false information does not extinguish misinformation effects (Lindsay, 1990; Lindsay, Gales, & McCarthy, 1994; Weingardt, Loftus, & Linsay, 1995). However, providing subjects with a warning has been found to reduce misinformation effects when the warning is given

before, but not after, exposure to the misleading information (Greene, Flynn, & Loftus, 1982). It is possible that warning subjects prior to exposure leads to greater vigilance when processing the information, which increases the likelihood that discrepancies will be detected.

The extent to which misleading information differs from the original information is another factor that may affect discrepancy detection. Blatantly false information is rarely accepted by subjects, and may cause them to be more resistant to other, more subtle, misleading information, by indirectly warning them of the possibility that they have been misled (Loftus, 1979b, 1991). Similarly, Lindsay (1990) found that the greater the difference between original and misleading information, the less likely misinformation effects were to occur.

Memory strength for the original event may also affect misinformation by increasing the likelihood that differences will be detected. Repeated exposure to the original information, which strengthens memory for the event, has been found to reduce subjects' susceptibility to misinformation (Shaughnessy & Mand, 1982; Mitchell & Zaragoza, 1996; Zaragoza & Mitchell, 1996). Another variable related to strength of the original memory is the delay between the original and misleading information. Generally, the longer the delay, the greater the misinformation effects; conversely, when delays are shorter,

effects are weaker. Loftus (1992) hypothesized that this reflects the fading of the original event in memory, which would decrease one's ability to detect discrepancies.

Social Demand Factors

Social demand factors may also influence the strength of misinformation effects. As a result of interest in the accuracy of children's testimony, most of the research in this area has focused on children, and has generally supported the notion that they are susceptible to demand characteristics (Ceci, Ross, & Toglia; Toglia, Ross, Ceci, & Hembrooke, 1992). The perceived authority of the experimenter may affect adults as well; in one study (Smith & Ellsworth, 1987), those who communicated the misleading information (in the form of questions) were presented as either knowledgeable or naive, and it was found that subjects were more likely to be influenced by the knowledgeable questioner.

If social demands are a strong enough factor, there may be conditions in which subjects report suggested information only because they believe it is expected of them by the experimenter, and not because their memory for the event is altered. However, it is also possible that social influence actually contributes to the modification of the memory, in that the authority of the presenter of the information increases the likelihood that the information will be accepted, and thereby incorporated, into memory.

INTERROGATIVE SUGGESTIBILITY

Even within the general category of memory-based suggestibility, however, a distinct subtype of the phenomenon has been defined which is unique in its theoretical framework and methodological procedure. Specifically, interrogative suggestibility has evolved from, and was designed to measure, susceptibility to misleading questions during a police interrogation (Gudjonsson, 1991).

Although some traditional misinformation studies are "interrogative" in nature, in that they embed misleading information in the form of verbal questions, they differ somewhat from those studies designed to specifically assess interrogative suggestibility. To clarify these differences, Schooler and Loftus (1986) defined two distinct, yet complementary, theoretical approaches to interrogative suggestibility; they termed these the "individual differences approach" and the "experimental approach."

The experimental approach refers to the traditional format of misinformation studies. False information, either oral or written, follows the presentation of an event, which is usually visual, and memory for the event is assessed (Loftus, Miller, & Burns, 1978; Schooler & Loftus, 1986). In this type of study the focus is on understanding the conditions in which suggestibility is most likely to occur, and methodological variations are commonly employed to assess the parameters of these conditions. "Interrogative"

suggestibility in the experimental context is therefore viewed in terms of general susceptibility to misleading information, and is not considered to be an independent construct.

The individual differences approach focuses on the personal characteristics that may predispose an individual to respond in a suggestible manner. Gudjonsson and Clark (1986) developed a specific theoretical model for this approach to suggestibility, based on situations involving police interrogation. Their model views suggestibility as a function of people's coping strategies in response to uncertainty and expectations, and they define interrogative suggestibility as "the extent to which, within a closed social interaction, people come to accept messages communicated during formal questioning, as the result of which their subsequent behavioural response is affected." Based on this definition, the term "interrogative suggestibility" more accurately describes the individual differences approach to suggestibility than it does the more general type assessed within the experimental approach. For clarification, this paper will specifically refer to the type of suggestibility outlined above as interrogative suggestibility.

Most experiments in the area of interrogative suggestibility have used the Gudjonsson Suggestibility Scales (Gudjonsson, 1984). In this scale, a narrative is

read aloud by the interviewer, and the examinee is then asked to report all that he or she can remember about the event, both immediately after and following a delay of about 50 minutes. Finally, the interviewer asks 20 specific questions, of which 15 are misleading, and again asks the questions after informing the examinee that he or she has made a number of errors. The test is scored on the basis of both the subject's responses to the misleading questions as well as any alterations that he or she makes in response to the second questioning.

Unlike the varied measures used within the experimental approach, the use of a standard test provides a unified format for examining personality and cognitive variables that affect suggestibility. For this reason, most research on individual differences in suggestibility has been performed in the specific area of interrogative suggestibility. The extent to which these studies can be generalized to suggestibility in an experimental context is unclear, as the two approaches appear to measure different aspects of an overlapping construct. However, because the procedure is similar to that used in the experimental approach, and because the theories are related, results of the studies on interrogative suggestibility may add to the understanding of suggestibility as a whole.

Although social factors are more likely to have greater emphasis in the context of interrogative suggestibility,

they do not appear to the exclusion of cognitive or memory-based factors. Conversely, while cognitive processes are the major focus of suggestibility in the experimental approach, this does not exclude the presence of social variables. It is difficult to separate and assess with precision the degree to which these factors contribute to the acceptance of false information, but it appears that both factors are involved to some degree in each type of suggestibility. Because the similarities between the two approaches are greater than the differences, data from both types of suggestibility research will be included in the review of individual differences and environmental factors that affect susceptibility to misinformation.

INDIVIDUAL DIFFERENCES: COGNITIVE FACTORS

Memory and Intelligence

Some researchers have examined whether there might be individual differences in cognitive functioning that predispose some people to respond more fully to suggestion. In terms of interrogative suggestibility, Gudjonsson (1987b) found a negative correlation with memory recall. He also found evidence that interrogative suggestibility is negatively correlated with intelligence in adults (e.g., Gudjonsson, 1983, 1988, 1990), of which memory capacity is an important factor. While intelligence is composed of a number of abilities, most activities that involve problem-solving or reasoning require that information first be

retained. In addition, memory capacity itself is considered to be a major facet of general intelligence, and is measured directly in most intelligence tests. For this reason, the relationship between memory and intelligence is very strong.

In a study of general eyewitness suggestibility, Powers, Andriks, and Loftus (1979) found no correlation between intelligence and suggestibility. They hypothesized that this was due to the small degree of variation in the cognitive abilities of their subjects, who were all university undergraduates. The studies of interrogative suggestibility that found a relationship between intelligence and suggestibility used a wider range of subjects, which may explain the differences between these results (Gudjonsson, 1992).

Developmental Differences

With the exception of the research noted above, most of the studies which have examined suggestibility in relation to cognitive variables have used children as subjects. These studies generally focus on age-related differences in cognitive development which may affect suggestibility. Differences in cognitive abilities among children are not individually assessed; rather, group differences, based on age, are interpreted as representing various levels of intellectual functioning, and these stages of development are examined in relation to each group's susceptibility to misinformation.

Many studies in the area of children's suggestibility demonstrate age differences in which younger children are significantly more susceptible to misinformation than older children or adults (Ceci, Ross, & Toglia, 1987; Cohen & Harnick, 1980; Goodman & Reed, 1986; King & Yuille, 1987; Laumann & Elliott, 1992; Ornstein, Gordon, & Larus, 1992). Although some studies contradict these findings, in an extensive review of the literature, Ceci and Bruck (1993) report that the majority of results have been indicative of developmental differences in children's suggestibility. Multiple causes, both cognitive and social, are likely to produce these developmental trends (Ceci & Huffman, 1997; Warren, Hulse-Trotter, & Tubbs, 1991). Although both cognitive and social variables have been clearly identified as factors affecting age differences in suggestiblity (Ceci et al, 1987), most studies have focused on the cognitive aspects of these differences.

Some researchers have argued that memory capacity, particularly as it relates to rates of learning and forgetting, is a major factor underlying age differences in suggestibility (Brainerd & Reyna, 1988; Ceci, Ross, & Toglia, 1988, Howe, 1991). Recent studies which have attempted to assess memory ability independently of other factors have demonstrated that it is a primary determinant of age effects in suggestibility (Ceci & Huffman, 1997; Portwood & Repucci, 1996). In addition, Loftus, Levidow, &

Duensing (1992) found that children, as well as elderly adults, were more suggestible than other age groups, and attributed this finding to differences in the subjects' memory abilities. They theorized that because these populations are generally considered to have poorer strength of memory, they are more highly suggestible. The notion of "strength of memory" was referred to within this study as a general measure of event recall that applies to both children and the elderly. Because memory research with children and the elderly encompasses a variety of methodologies and assesses different aspects of memory, it is difficult to be specific about age-related deficits. However, general trends indicate that the elderly and children perform more poorly on memory-based tasks. Whether this impairment involves storage failure or problems with retrieval continues to be a subject of debate, particularly concerning the elderly.

Some researchers have hypothesized that there are cognitive variables other than memory capacity which may account for age-related differences in suggestibility. These variables include the ability to reason about conflicting mental representations (Welch-Ross, Diecidue, & Miller, 1997), variations in source monitoring capabilities (Ackil & Zaragoza, 1995; Ceci, Loftus, Leichtman, & Bruck, 1994), and differences in information processing as outlined by fuzzy-trace theory (Cassel, & Bjorklund, 1995).

Findings that explain age differences in suggestibility on the basis of cognitive factors also have implications for adults, who vary in terms of their intellectual abilities. However, these differences are not as easily detected among a sample of adults as they are between groups of children of different ages or between groups of children and adults. Thus, while there is support for the theory that overall developmental differences in cognition (particularly in relation to memory capacity) affect susceptibility to misinformation, the extent to which individual differences in cognitive functioning predict suggestibility within the adult population is not well understood.

INDIVIDUAL DIFFERENCES: PERSONALITY TRAITS

Coping Style and Assertiveness

In addition to cognitive variables, it is also possible that some individuals may be more responsive to suggestion due to personality traits that affect their interactions with others. For example, some people may be more willing than others to accept the judgment of an authority figure, and thus may be more responsive to demand characteristics. In others, lack of self-confidence or anxiety may predispose them to doubt their own judgment.

Gudjonsson (1988) found that suggestible and non-suggestible individuals utilized different coping strategies; those who were more avoidant or less active were more highly suggestible. He also found a negative

correlation between assertiveness and interrogative suggestibility. Although it is difficult to examine directly, these two factors are possibly related; Gudjonsson and Clark (1986) hypothesized that unassertive individuals would not be able to implement effective coping strategies when faced with uncertainty and expectation in the context of an interrogation.

State vs. Trait Anxiety

State anxiety refers to transitory, or situational, anxiety. Measures for state anxiety assess feelings of apprehension, tension, and nervousness that occur at that specific moment in time. Gudjonsson (1988) found a positive correlation between state anxiety and interrogative suggestibility. However, researchers failed to replicate this finding in a later study, in which identical measurements were used (Smith & Gudjonsson, 1995). They hypothesized that these contradictory results may be due to differences between subjects in the two experiments, or may be a reflection of the complexity of the measurement which they used to assess anxiety (the Spielberger State Anxiety Inventory). If future studies reveal that state anxiety is a predictor of suggestibility, it is possible that anxiety-producing environmental conditions may increase the likelihood that individuals will respond in a suggestible manner.

Trait anxiety refers to the stable, enduring characteristic of chronic tension, nervousness, and unease. To date, no studies have assessed trait anxiety as it relates to suggestibility; thus, the effects of this variable are unknown. Because trait anxiety increases the likelihood that individuals will be anxious at any particular moment in time, a connection between trait anxiety and suggestibility may also indicate that state anxiety affects suggestibility as well.

Personality "Type"

It is important to note that all of the above studies were undertaken to examine personality characteristics within the specific context of interrogative suggestibility. In terms of personality characteristics that affect general (non-interrogative) suggestibility, results within the literature are few and inconsistent. Some researchers have attempted to assess the relationship between suggestibility and personality factors as determined by the Myers-Briggs Type indicator, but results were contradictory and inconclusive (Schooler & Loftus, 1993).

Because the experimental approach to suggestibility has generally focused on environmental conditions rather than individual differences, little has been done in this area. In addition, interrogative suggestibility may be more influenced by social factors due to differences in methodological procedures (i.e., tests are administered

individually rather than in groups). For this reason, personality variables, rather than cognitive, may have more effect on this type of suggestibility, and are therefore more likely to be examined.

Hypnotizability

The term "suggestibility" has often been associated with hypnosis research. Although not always considered to be a direct correlate of hypnotic susceptibility, suggestibility in this context typically refers to the physical or physiological responses that occur within subjects in response to verbal suggestions, during both hypnotic and non-hypnotic states. Even within hypnosis research, however, there has been a great deal of debate regarding the definition and properties of this construct; it has been hypothesized that there are many types of suggestibility that differ in response to various types of suggestions, with little or no correlation between these different types (Eysenck, 1991).

The suggestibility of memory is essentially different from the type of suggestibility described above, because it focuses on the cognitive aspects of suggestion in relation to memory for events. Although the suggestibility of memory has not been linked to hypnotic suggestibility, it may be associated with the separate (but possibly related) construct of hypnotizability, also referred to as hypnotic susceptibility.

Some researchers have demonstrated that individuals who are highly hypnotizable are more susceptible to misinformation effects than low-hypnotizable individuals (Barnier & McConkey, 1992; McConkey, Labelle, Bibb, & Bryant, 1990). These differences occurred during both hypnotic and waking states but effects tended to be stronger if misinformation was given during hypnotic induction. Sheehan (1988) found mixed results among six independent studies which he conducted; the inconsistencies in his findings are likely to have resulted from the complexity of the numerous variables which were assessed. Eisen (1996) found that hypnotic susceptibility was not related to resistance to misleading information for events occurring either during or prior to hypnosis.

Among the studies supporting a positive correlation between hypnotizability and suggestibility, differences in misinformation effects were not significant in respect to hypnotic versus non-hypnotic conditions when assessed independently. Although earlier research indicated that hypnotized subjects were more susceptible to misleading information than non-hypnotized subjects (Putnam, 1979; Zelig & Beidleman, 1981), the above studies demonstrated that hypnotizability, rather than hypnosis per se, affected subjects' susceptibility to misleading information.

The only published study that has examined interrogative suggestibility and hypnotizability provided

evidence that they are unrelated factors. Register and Kihlstrom (1988) conducted a suggestive interrogation while subjects were hypnotized, and found no differences in interrogative suggestibility between those who were hypnotizable and those who were not. This would support Gudjonsson's claim (1987a) that interrogative suggestibility is independent of hypnotic suggestibility. However, subjects were only tested during hypnotic induction, and other methodological and statistical factors may have affected the results. Two unpublished studies attempted to replicate these findings, with some methodological variations (Gwynn & Spanos, 1996). These also indicated that interrogative suggestibility and hypnotizability are not related.

Some studies have indicated that individuals with good visual imagery abilities are more likely to be influenced by misinformation (Schooler & Loftus, 1993; Tomes & Katz, 1997). The ability to visualize verbal material may increase source confusion, and thus increase misinformation effects. However, additional research is needed to confirm these results. Although it is unclear whether visual imagery ability is connected with hypnotizability, it may certainly be a contributing factor. It may also be a factor involved in dissociativity, or in the creation of "pseudo-memories."

Dissociativity

Dissociativity may be another trait that is related to suggestibility. Janet (1907) is thought to be the originator of the concept of dissociation, which he defined as the process whereby mental functions operate independently from conscious awareness or recall. More recently, Ofshe (1992) documented the case of Paul Ingram, a man who was investigated as the prime suspect in a rape for which there was no evidence, and eventually was thought to be involved in a Satanic cult for which there was also no evidence. According to Ofshe, the subject would fall into a dissociative state that followed any interrogation or "suggestion" that implicated his guilt, and would then create pseudo-memories that corresponded with the suggestions that he received.

Ofshe surmised that the suspect's innate dissociative tendencies and firm trust in people of authority combined to produce the pseudo-memories that were the basis of this modern-day witch hunt. Obviously this is an extreme case of suggestibility, but dissociativity has been shown to exist on a continuum from severe pathological disturbances to occurrences in everyday life (Kihlstrom, Glisky, & Angiulo, 1994). For example, when driving a familiar route, people will sometimes realize that they have no recollection of driving over the past few miles. Another example would be "tuning someone out" when engaged in a conversation, in

which one has no recollection of what was said for a period of several seconds or several minutes. For this reason, there may be a relationship between dissociative tendencies in non-pathological individuals and susceptibility to suggestion.

Gudjonsson (1992, 1995) examined psychological aspects of numerous false confession cases, and found that interrogative suggestibility is extremely high among this population. Although he did not specifically explore the role of dissociativity among these cases, he reported that many suffer from a "memory distrust syndrome," in which false confessors begin to distrust their own memories, and rely on information provided by authority figures.

SEX DIFFERENCES

Data on sex differences in suggestibility are inconsistent. While Powers, Andriks, and Loftus (1979) found that female subjects were generally more suggestible than male subjects, they attributed this finding to differences in the accuracy of the types of information assessed. They observed that women were more accurate and resistant to suggestions about traditionally female oriented details (e.g., clothing), and that men were more accurate and resistant to suggestions about traditionally male oriented details (e.g., type of car).

A more recent study examined several demographic variables in relation to suggestibility, and found that

males, but not females, were significantly misinformed (Loftus et al, 1992). Gudjonsson (1984) reported that although females tend to score slightly higher on the Gudjonsson Suggestibility Scale in terms of overall interrogative suggestibility, the difference is not significant.

Although few studies have specifically examined sex differences in suggestibility, a significant amount of research has addressed the issue of sex differences in eyewitness memory. The evidence suggests that men and women have generally comparable eyewitness memory abilities, yet differ in the type of information they remember best (Loftus, Banaji, Schooler, & Foster, 1987).

ENVIRONMENTAL FACTORS: STRESS AND AROUSAL

As previously noted, Gudjonsson (1988) found that state anxiety may be predictive of suggestibility. This would imply that there is perhaps a relationship between anxiety at the time of recall that has an effect on interrogative suggestibility. However, it is unclear whether anxiety produces greater compliance with social demands, or has a direct effect on memory for the event.

No research to date has explored the effects of arousal on suggestibility, yet a tremendous body of research has been devoted to the relationship of stress, anxiety, and emotional arousal on memory. Because memory is an integral part of suggestibility, it is important to examine the

research in this area.

The first theory that attempted to provide a framework for the relationship between stress and memory is the Yerkes-Dodson law (1908). This theory states that the relationship between arousal and performance is an inverted-U function. In other words, performance is enhanced by arousal that is moderate, but becomes impaired beyond a certain point as arousal increases in intensity. Whipple (1915) applied this concept to eyewitness memory, and until recently it has been accepted as the paradigm for research in this area.

Easterbrook's cue utilization hypothesis (1959) attempted to explain this phenomenon. He theorized that as emotional arousal increases, there is a gradual restriction in the range of peripheral cues so as to better focus on the single dramatic event. This is helpful until the point at which arousal causes the relevant cues to be ignored as well; memory is correspondingly impaired thereafter.

Recently these traditional views have been questioned. Christianson (1992) reviewed the literature in this area and found that the relationship between memory and arousal entails more than a simple, unilinear curve. Evidence suggests instead that the relationship is very complex and involves several variables, including: type of event, type of detail information, time of test, and retrieval conditions. Unfortunately, the definitions and measurements

of arousal and stress have differed widely between studies. For example, some researchers have attempted to physically induce arousal in a laboratory setting while assessing memory for neutral information. Others have exposed subjects to emotionally arousing events, which may or may not produce physiological reactions. In his review, Christianson focused on memory for emotionally arousing events, rather than memory as it is affected by the subject's physiological state of arousal.

Studies have generally shown that exposure to emotionally arousing events does not impair memory as the traditional theories suggest, but may enhance memory for the central, critical event and its details. The opposite also seems to be true; memory is better for peripheral events and details in neutral situations than it is in emotionally arousing conditions. However, these results are inconsistent, and indicate that a complex set of variables interact in a variety of ways to affect memory.

EYEWITNESS MEMORY RESEARCH

Psychologists have conducted more research on eyewitness testimony than on any other forensically relevant topic, and within this category have focused almost exclusively on the eyewitness identification process (Lipton, 1996). The findings of eyewitness memory research are relevant to research on suggestibility because memory strength for an original event affects susceptibility to

false postevent information; thus, factors which affect eyewitness accuracy may also affect suggestibility. Identification research is particularly important because many studies on suggestibility intentionally incorporate questions involving the physical description of an individual.

Eyewitness identification issues are of central importance to many criminal law proceedings. The consequences of mistaken identification within this arena can be serious, which may explain the prolific amount of research involving the inaccuracy of eyewitness identification. Estimates for erroneous convictions range from only a few cases per year to 20% of all convictions (Huff, 1987). The overall rate of false identifications within a laboratory setting is difficult to assess, and Cutler and Penrod (1995) report that results have ranged from 0% to nearly 100%. The applicability of these findings to actual cases is questionable; however, the same researchers note that rates of 50% are often deliberately aimed for and easily attained, which is an indication of the general unreliability of eyewitness identification.

In an extensive review of the literature, Narby, Cutler & Penrod (1996) identified witness, target, and situational factors that affect eyewitness identification accuracy. These factors were classified further into three categories: reliable and strong factors, reliable and moderate factors,

and weak or noninfluential factors. The only strong witness factor is age, in that the performances of children and elderly adults are consistently poorer than those of adolescent and (non-elderly) adults. Weak witness factors include gender, intelligence, and personality characteristics (specifically, field dependency, self-monitoring behavior, and trait anxiety).

Target factors involve the characteristics of the person who is to be identified. Not surprisingly, target distinctiveness is a strong factor, although attractiveness in itself is a weak factor; in other words, people who are very attractive or very unattractive are more easily identified than people who are neutral in appearance. In addition, although the race of both witness and target, considered independently, are weak factors in identification accuracy, "own-race recognition bias" is a strong factor for Caucasians, African-Americans, and Mexican-Americans. This refers to the fact that individuals more accurately identify members of their own race than members of another race. Target gender is a weak factor, yet own-gender identification is a moderate factor.

One strong situational factor is the degree of "perceptual salience," or the extent to which the target can be distinguished from the background; for example, the more crowded a situation, the less the target can be isolated from others. The retention interval, or time between

exposure and testing, is another strong situational factor, in which the longer the interval, the less accurate the identification. This finding is consistent with suggestibility research, in that long delays between exposure to the original event and presentation of the misleading information increase misinformation effects, presumably because memory for the original event has faded.

A moderate situational factor in eyewitness accuracy is the level of stress, arousal, and/or violence that is present during the event. However, these constructs are not clearly defined in the research, and results are very inconsistent. As previously noted, similar inconsistencies have been demonstrated in the research on arousal and memory, which may help to explain the nature of these mixed results.

The presence of a weapon is also a moderate situational factor in reducing identification accuracy; this phenomenon is referred to as "weapon focus." Loftus (1979a) originally hypothesized that the presence of a weapon during a crime attracts attention away from other surrounding details, such as the perpetrator's physical characteristics, because the witness tends to focus attention on the weapon. A meta-analysis of weapon focus effects (Steblay, 1992), reported a consistent and significant decrease in recognition accuracy for weapon-present conditions.

The type of procedure used to identify individuals,

also referred to as the identification test medium (ITM), is an important subject of study within eyewitness identification research. Live lineups, videotaped lineups, photo arrays, and line drawings are all commonly used ITMs. In legal settings, live lineups and videotapes tend to be preferred over photo arrays or line drawings, because they are presumed to produce more accurate identifications and more convincing evidence in court (Cutler, Berman, Penrod, & Fisher, 1994).

Shapiro & Penrod (1986) conducted a meta-analysis which provided some support for this presumption. Their results indicated that live or videotaped lineups produced slightly (yet significantly) more hits, or correct identifications, than did photo arrays or line drawings. The same analysis found that although live and videotaped lineups produced fewer false alarms than did photo arrays or line drawings, the difference was not significant. An updated meta-analysis, containing a larger sample size, indicated that live and videotaped lineups produced slightly, and only marginally significantly, more hits, and significantly fewer false alarms, than did photo arrays, slides, or line drawings (Cutler et al, 1994). However, they noted that all mean differences were small, whether statistically significant or not.

One finding which has even more direct application to research in suggestibility is that "instruction bias" has a

profound effect on false identification rates (Cutler & Penrod, 1995). An example of a biased lineup instruction would be to ask a witness to identify the person who committed the crime, without first telling the witness that the lineup might or might not contain the person who committed the crime. In addition to verbal cues delivered by the investigator, the presentation of the identification test can influence eyewitness accuracy. For example, sequentially presented lineups, rather than simultaneously presented lineups, reduce the rate of false identifications (Devenport, Penrod, & Cutler, 1997). In real-life situations, these factors are typically under the control of police investigators, and are often used to elicit a desired response from a witness.

SUMMARY

The focus of this review is an analysis of the factors associated with the phenomenon of "suggestibility." While the term may vary according to the area of study, in this context, suggestibility refers to the effect that exposure to false information has on memory. The research in this area has overwhelmingly indicated that memories for events are not only frequently inaccurate, but are particularly susceptible to intentional manipulation. It appears that a variety of cognitive and social factors contribute to the memory distortion that occurs following exposure to misleading information. Because of its relevance within

psychological and forensic settings, it is important to analyze the factors that are most likely to produce misinformation effects; conversely, it is important to learn which variables strengthen memory and increase resistance to alteration.

An overview of the research tells us that when an individual is exposed to misinformation, his or her ability to recall and recognize details from the original event is negatively affected. This may be due in part to storage failure, in which the original memory is replaced, or retrieval difficulties, in which the original memory is more difficult to access. However, "source-monitoring theory," which accounts for a greater number of the variable findings within this research, suggests that individuals may confuse the source of each memory and are therefore unable to distinguish the original event from the suggested information (Lindsay & Johnson, 1989a).

The same research that supports source monitoring theory also provides evidence for the "discrepancy detection principal" (Loftus, 1992). The basic tenet of this theory is that subjects are more likely to accept misleading information when it is not easily distinguishable from the original information. As the discrepancy between the original and misleading information increases, resistance to suggestion also increases. Factors that enhance discrepancy detection, such as shorter delays, blatantly false

information, and warnings, tend to diminish misinformation effects.

Findings from suggestibility research also provide evidence for "fuzzy-trace theory," which asserts that acceptance of misleading information is partly mediated by the type of memory that is accessed (Reyna & Brainerd, 1995). Because gist memories appear to have a slower rate of forgetting than verbatim memories, the greater the delay following exposure to words or events, the more likely gist memories are to be accessed. Delays are frequent in suggestibility studies, producing a greater tendency for subjects to rely on gist memories. When this occurs, subjects are less likely to view misinformation as contradictory, and are therefore more likely to accept it. Variables that enhance verbatim memory, such as repeated exposure to original information or shorter delays between exposure and testing, tend to reduce susceptibility to misinformation.

Research also indicates that social demands influence acceptance of misleading information. Both children and adults may endorse misleading items due to the experimenter's perceived authority and a desire to perform in the manner that is expected. This tendency may be even more pronounced in studies examining interrogative suggestibility, since subjects are interviewed individually in a situation that is designed to mimic a police

interrogation. Although some people may intentionally select information that was merely suggested to them, it is also possible that social pressure leads to an actual alteration in the memories of certain individuals.

In terms of test format, misinformation effects are strongest when subjects must choose between a suggested item and the correct item, rather than the correct item and a new item. The mode of stimulus presentation is also a variable in the acceptance of misinformation, which tends to be greatest when the original information is visual and the postevent information and recognition test are verbal.

Relatively few studies have examined individual differences in relation to suggestibility. For the most part, this research has specifically focused on correlates of interrogative suggestibility. In terms of cognitive differences, some evidence suggests that memory recall and intelligence are negatively correlated with interrogative suggestibility (e.g., Gudjonsson, 1987b, 1990). However, no relationship has been established between those characteristics and general suggestibility as assessed in the experimental approach.

Among studies focusing on children's suggestibility, the general trend is that younger children are significantly more suggestible than are older children or adults (Ceci & Bruck, 1993). Although both social and cognitive factors underlie this trend, there is some indication that memory

capacity, particularly as it relates to learning and forgetting, is the primary determinant of age differences in suggestibility (e.g., Howe, 1991). One study has indicated that the elderly may also be more susceptible to suggestion than non-elderly adults (Loftus et al, 1992), but this issue needs further substantiation before conclusions can be drawn.

In terms of personality characteristics, one study that examined coping style and assertiveness in relation to interrogative suggestibility found that those who were less active in coping and less assertive were more highly suggestible (Gudjonsson, 1988). The relationship between state anxiety and suggestibility is unclear, and the relationship between trait anxiety and suggestibility has not been examined to date. Although some research indicates that hypnotizability may be related to general suggestibility, the few studies that have examined this issue have been inconsistent. The only published study that has examined hypnotizability in relation to interrogative suggestibility found that they were unrelated factors (Register & Kihlstrom, 1988).

At present, no studies have explored suggestibility in relation to dissociativity. However, Gudjonsson (1992, 1995) found that interrogative suggestibility is extremely high among false confession cases, and reported that many confessors suffer from a "memory distrust syndrome." Ofshe

(1992) documented a highly publicized false confession case in which the subject would fall into a dissociative state following interrogation, and would then create pseudo-memories that corresponded with the suggestions. Based on these cases, it is possible that dissociative tendencies may be related to suggestibility, although research is needed to directly explore this issue.

The data on gender differences in suggestibility are inconsistent, with no overall trends. An early study found that female subjects were more suggestible than males (Powers, et al, 1979), while a more recent study found that male subjects were significantly misinformed, while females were not (Loftus, et al, 1992). Although females tend to score higher on the Gudjonsson Suggestibility Scale for overall interrogative suggestibility, the difference is not significant. Research on gender differences in eyewitness memory indicates that men and women have generally comparable eyewitness memory abilities, yet differ in the type of information they remember best (Loftus, et al, 1987). In other words, both males and females tend to have better memories for traditionally sex-typed details, and may therefore be more resistant to suggestion regarding these details when presented with misleading information.

The relationship between stress or arousal and eyewitness memory is extremely complex. A review of the literature in this area (Christianson, 1992) found that

several variables mediate the impact of arousal on memory. These include methodological differences based on variable definitions of arousal (i.e., viewing emotionally arousing events vs. laboratory-induced physiological arousal), the type of event witnessed, the type of information assessed, the time of test, and retrieval conditions. Overall, it appears that exposure to emotionally arousing events may enhance memory for the central critical event and its details; however, memory for peripheral events and details tends to be less accurate for emotionally arousing conditions than it is for neutral situations. To date, no studies have explored the effects of these variables on suggestibility.

An extensive review of eyewitness identification research isolated several witness, target, and situational factors that affect eyewitness identification accuracy (Narby, et al, 1996). One strong witness factor is age, in which the performances of children and elderly adults are consistently poorer than those of adolescent and non-elderly adults. Target distinctiveness leads to greater identification accuracy, as does "own-race" recognition bias. The extent to which a target can be distinguished from the background, and shorter retention intervals between exposure and testing, also increase accuracy. The presence of a weapon may actually reduce identification accuracy due to "weapon focus." Finally, live and videotaped lineups

produce more correct hits than photos or line drawings.

Because memory accuracy for an original event affects the likelihood that one will accept false postevent information, the factors that affect eyewitness accuracy may also affect suggestibility. The results of some suggestibility studies correspond with the research on eyewitness accuracy, such as the preliminary data indicating that elderly adults and young children are more highly suggestible than other age groups. Suggestibility research has also routinely shown that longer delays before testing produce greater misinformation effects, which is consistent with eyewitness identification research as well. Clearly, further research should be undertaken to determine whether other factors that affect eyewitness identification accuracy also affect susceptibility to misleading information.

An overview of this research indicates that several issues remain unresolved, particularly those involving individual differences in suggestibility. Very few studies have examined personality variables that may predispose individuals to accept misleading information. Because of these gaps in the research, it is important to attempt to identify individual characteristics that are correlated with suggestibility. Some of the constructs that would benefit from further exploration in this area include trait anxiety, hypnotizability, and dissociativity.

Another area that should be examined concerns the situational or environmental variables that may affect susceptibility to suggestion. In particular, the effect of witnessing emotionally arousing events should be assessed in relation to acceptance of false information. While the issue of arousal has received attention in memory research, it has not yet been addressed in the context of suggestibility.

CHAPTER II

EXPERIMENT I

PURPOSE

An initial study was undertaken to more accurately identify the variables associated with suggestibility. The first goal of the study was to establish the presence of misinformation effects using a questionnaire devised by the experimenter which contained embedded postevent information. Another goal of the study was to explore the impact of emotionally-arousing events on misinformation acceptance, and to determine any interactions between arousal and misinformation. Finally, the relationship between dissociativity and suggestibility was examined.

A videotape of a shooting was used as the stimulus for this study. To determine the effects of misleading postevent information, half of the subjects were presented with false information and half with correct information following the video. The information was embedded in the form of questions regarding incidents that took place in the video. For the arousal condition, half of the subjects viewed a videotape edited for violence, while the other half viewed the unedited version. Memory for the videotape was assessed with a forced-choice recognition questionnaire devised by the experimenter. A measure for dissociativity

was given following exposure to the postevent information and prior to administration of the forced-choice recognition questionnaire.

The present study employed a 2 x 2 factorial design in which subject grouping (misleading vs. correct information) was crossed with arousal condition (violent vs. non-violent stimulus). Thus, four groups resulted:

1. Misled subjects in a high-arousal condition.
2. Correctly informed subjects in a high-arousal condition.
3. Misled subjects in a low-arousal condition.
4. Correctly informed subjects in a low-arousal condition.

Main effects were predicted for the information condition, in which misled subjects would perform significantly poorer on the recognition test than subjects who received correct information. It was likewise predicted that the presence of violence would negatively impact overall performance on the recognition questionnaire. Interactions between information and arousal conditions were predicted to enhance these effects, such that misled subjects who viewed the high-arousal (unedited) videotape would be the least accurate on the recognition test.

In terms of differences in the type of detail remembered, it was hypothesized that compared to the low-arousal condition, subjects in the high-arousal condition

would have poorer memory for the peripheral details and greater memory for the central details of the event. Finally, based on information from case studies as well as research involving interrogative suggestibility, it was hypothesized that dissociativity would positively correlate with suggestibility as measured by scores on the forced-choice recognition test.

METHOD

Subjects

Subjects were 122 University of Tennessee students who volunteered in order to receive class credit for their participation. Fifty-eight of these subjects were female and 64 were male. All were randomly assigned to one of four groups which were divided by two independent variables, an arousal condition and an information condition. Subjects were tested in groups of approximately 15-20 and were informed of their right to terminate their participation in the experiment at any point and still receive class credit. Each group was debriefed following the procedure.

Materials

Stimulus Display

Subjects were assigned to one of two arousal conditions. Each condition used a different videotape as the primary stimulus. This video was approximately two minutes long and contained news footage of a shooting that occurred in an airport. The footage was originally shot by a news

team from a television station in Texas, who were taping the return of a captured crime suspect. The suspect had been accused of molesting a child, and was being extradited back to Houston when he was ambushed by the child's father in an airport.

The sequence begins with several scenes of airplanes landing, taking off, and unloading passengers outside. This is followed by a shot of people entering the airport terminal, and another of people standing by a window in a waiting area. The next scene shows the handcuffed suspect being escorted down a hallway by a plain-clothes police officer, both of whom pass directly in front of the television camera. As they pass the camera, the assailant steps from a telephone booth on the opposite side of the walkway, raises a pistol and shoots the suspect in the head at point-blank range. The victim falls to the floor as the man with the gun turns back to the phone booth. The escort and another man rush the assailant with their guns drawn, and apprehend and disarm him. The escort then returns to the victim who is now laying on the floor, and audibly says, "Son of a bitch." Finally, the camera pans back to the assailant who briefly turns to the side and then faces the camera. In this last scene he is shown clearly from the waist up.

The viewing time for this entire videotape is two minutes, 13 seconds. The crime segment, from the first

sighting of the suspect to the tape's end, is 20 seconds. For the purposes of this study, the scenes prior to the shooting and arrest are considered to be the peripheral details, while the scenes that involve the crime are considered to be the central details. The videotapes in both arousal conditions contained the same material with the exception of one crucial difference; the tape assigned to the high-arousal group was unedited, whereas the tape assigned to the low-arousal group was edited to remove the few seconds that contained the actual shooting.

Misleading Questionnaire

Following exposure to the stimulus, subjects were assigned to one of two information conditions; one group received false information and one received correct information regarding the videotape. Information was conveyed via a forced-choice recognition questionnaire which was devised specifically for the above video by the experimenter. Either false (see Appendix C) or correct information (see Appendix D) was embedded within ten of the 22 questions. This instrument was not scored, but was only used as a subtle means of presenting the postevent information.

This questionnaire was developed specifically for the tape that was shown, and followed the model on which other studies for suggestibility have been based. Questions were generally of a descriptive nature, of the sort frequently

used in memory studies for suggestibility and eyewitness identification. Half of the ten misleading questions involved the peripheral details of the video, while the other half involved the central details. This experiment was the first in which the questionnaire was administered; it functioned as a pilot study to assess the scale's efficacy in measuring the effects of misinformation.

Dissociative Experiences Scale

Subjects were also given the Dissociative Experiences Scale (DES), in order to assess dissociativity. The DES has been widely used in research for dissociation and related constructs, and has been well validated through extensive studies in recent years (Carlson & Putnam, 1993). This self-report scale assesses the frequency of dissociative experiences in the daily lives of subjects, and is conceptualized as a trait, rather than a state, measure.

While the DES was originally designed to screen for dissociativity in a clinical population, it has also been used in research using non-clinical samples from the general population (Ross, Joshi, & Currie, 1990), as well as college students (Ross, Ryan, Voight, & Eide, 1991; Sanders, McRoberts, & Tollefson, 1989), and adolescents (Ross, Ryan, Anderson, Ross, & Hardy, 1989; Sanders & Giolas, 1991).

Forced-Choice Recognition Questionnaire

Finally, subjects were given a second forced-choice recognition questionnaire that assessed the subjects' memory

for the event and served as the dependent variable (see Appendix E). This questionnaire was also devised by the experimenter, and contained ten items about the stimulus that were based on the information (either correct or misleading) given in the first questionnaire. Each question required a positive response to one of two alternatives, one of which was correct and the other incorrect. Five of the ten questions assessed memory for the peripheral details, and five assessed memory of the central details. Questions for the central event were generally of a descriptive nature, and were based upon models used in previous research on eyewitness memory and suggestibility. As with the questionnaires that contained the embedded information, this was the first experiment in which the scale was used.

Design and Procedure

Subjects were given the opportunity to volunteer for this research project through sign-up sheets posted in the psychology building and by solicitation in undergraduate psychology classrooms. Subjects were randomly assigned to both information and arousal conditions.

The procedure was explained per the informed consent form in Appendix A, and forms were collected. Subjects were shown the video in groups of no more than 20 individuals at a time, and all had equal visual access to the stimulus. Following the viewing of the tape, subjects were given the above questionnaires in the following order: 1) the

questionnaire containing the embedded postevent information, 2) the DES, and 3) the forced-choice recognition questionnaire. They were asked to fill them out one at a time in the order given, and were specifically instructed to not refer back to any of the questionnaires once they had completed each one. The entire procedure, on average, lasted approximately 20 minutes. All subjects were debriefed following the experiment, and the experimenter remained as long as necessary to answer any questions.

RESULTS

Data showed a replication of previous studies on suggestibility; the hypothesis that memory performance would be negatively affected by misleading postevent information was confirmed. A one-way ANOVA revealed that subjects in the group that were exposed to misleading information scored significantly lower on overall memory as measured by the recognition test ($F(1,120) = 99.85$, $p < .0001$; power = 1.0). A factorial ANOVA was performed and results showed a significant main effect for the information condition ($F(1,121) = 98.64$, $p < .0001$; power = 1.0)(TABLE 1).

The hypothesis that arousal would negatively affect overall memory was not confirmed. Neither did arousal affect the type of detail remembered, in which it was predicted that memory for peripheral details would be negatively affected in the high arousal condition and memory

Table 1

Experiment I

Recognition Scores for Overall Memory as a Function of Information and Arousal Conditions

Group	n	M	SD
Misinformation / High-Arousal	31	5.23	1.67
Misinformation / Low-Arousal	26	5.12	1.45
Correct Information / High-Arousal	32	8.25	2.05
Correct Information / Low-Arousal	33	8.03	1.24

for central details positively affected, as compared to the low-arousal condition. One-way ANOVAs revealed that there were no significant differences between high and low-arousal groups for overall memory ($F(1,120) = .007$, $p = .94$)(TABLE 2), central memory ($F(1,120) = .009$, $p = .93$), or peripheral memory ($F(1,120) = .02$, $p = .88$). In addition, a factorial ANOVA revealed that there were no interactions between arousal and information variables that affected either overall ($F(1,121) = .37$, $p = .54$), central ($F(1,120) = .38$, $p = .54$), or peripheral memory ($F(1,120) = .28$, $p = .60$).

Although only the information condition had an effect on memory, and neither condition differentially affected peripheral and central memory, it was found that when subjects from all groups were combined there were significant differences in the ability to remember peripheral versus central details. Overall, subjects had better memory for peripheral details than central details ($F(1,240) = < .008$)(TABLE 3).

The final hypothesis, that dissociativity and suggestibility would be positively correlated, was not confirmed. A correlational analysis revealed that there was no relationship between dissociativity and suggestibility as determined by overall memory for the event ($r = .004$, $p = .97$).

This study also produced some unexpected results; an unusual post-hoc finding revealed that males and females

Table 2

Experiment I

Analysis of Variance for Overall Memory

Source	df	F
Between groups		
Information (I)	1	98.64***
Arousal (A)	1	.37
I x A	1	.02
Error	118	(2.67)

Note. Values enclosed in parentheses represent mean square errors.

***p .0001

Table 3

Experiment I

Analysis of Variance for Peripheral vs. Central Memory Among All Subjects

Source	df	F
Between Groups	1	7.21**
Error	240	(1.67)

Note. Values enclosed in parentheses represent mean square errors.

**p .01

exposed to misleading information responded differently on the measure for overall memory. Of these subjects, females (M = 4.7, SD = 1.35) performed more poorly on the memory task than males (M = 5.6, SD = 1.6). This difference was significant ($F(1,50) = 4.6$, $p < .05$; power = 0.55) (TABLES 4 & 5).

Table 4

Experiment I

Mean Gender Differences in Overall Memory Scores for Misled Subjects

Group	n	M	SD
Females	21	4.67	1.35
Males	31	5.58	1.61

Table 5

Experiment I

Analysis of Variance for Gender Differences among Misled Subjects

Source	df	F
Between Groups	1	4.59*
Error	50	(2.28)

Note. Values enclosed in parentheses represent mean square errors.

*p .05

CHAPTER III

EXPERIMENT II

PURPOSE

A second study was undertaken as a follow-up to the first. In the second experiment all subjects were given misleading postevent information in order to increase the subject pool and better isolate the variables associated with suggestibility. The two arousal conditions were again used, but included a manipulation check to determine any differences between the two conditions. A major goal of this experiment was to determine whether there would be a replication of the sex differences found in the first study. It was hypothesized that sex differences would again occur at a level of significance.

The second study also served to assess individual differences that may be associated with suggestibility. The DES was again included to determine whether an increase in sample size would result in a positive correlation with the dependent variable. In terms of other traits, it was predicted that hypnotizability would correlate positively with suggestibility. While state anxiety was predicted to correlate with suggestibility (as a measure of arousal), trait anxiety was not. Finally, a general measure of personality was administered to assess whether any of the

following characteristics may be associated with suggestibility: neuroticism, extroversion, openness, agreeableness, and conscientiousness

METHOD

Subjects

Subjects consisted of 148 University of Tennessee undergraduates who participated in the experiment in order to receive class credit. Fifty-seven males and 91 females took part in the study. In this procedure, all subjects were given misleading information. The group was again divided into separate arousal conditions, with 76 in the high arousal and 72 in the low arousal group. Subjects were tested in groups of approximately 20-50 and were informed of their right to terminate their participation in the experiment at any point and still receive class credit. Each group was debriefed following the procedure.

Materials

Stimulus Display and Misleading Questionnaire

Both edited and unedited videotapes as described in the first study were used again in this procedure. Because Experiment I found such strong effects for the misleading condition, all subjects in Experiment II received the false information questionnaire in order to better isolate the mechanisms involved in suggestibility.

Harvard Group Scale of Hypnotic Susceptibility, Form A

Subjects were first given the Harvard Group Scale of

Hypnotic Susceptibility (HGSHS:A). This is a 12 item scale (Shor & Orne, 1962) that is the standard used for measuring hypnotic susceptibility in groups (McConkey, Sheehan, & Law, 1980). The HGSHS:A has been widely used and validated through extensive research, and is well correlated with other group and individually administered scales of hypnotic susceptibility (Hilgard, 1965; Register & Kihlstrom, 1986).

Speilberger State/Trait Anxiety Inventory

The State/Trait Anxiety Inventory (STAI) is a standard measure of anxiety that has been used and validated through many years of research, and was most recently revised in 1977 (Spielberger, 1977). The state anxiety half of the inventory has also been used as a self-report measure of physiological arousal in studies examining the effects of arousal on memory (Bothwell, Brigham, & Pigott, 1987; Kramer, Buckhout, Fox, Widman, & Tusche, 1991). These studies also demonstrated a correlation between the STAI and objective measures of physiological arousal.

For the purposes of this study, the STAI served dual functions. First, the state anxiety scale was used to determine whether the two arousal conditions were successful in inducing significant differences in subjects' physiological reactions to the edited and non-edited versions of the videotape. Second, the trait anxiety scale was used to determine if this relatively enduring characteristic is associated with suggestibility.

NEO Personality Inventory Revised

The NEO-PIR is a well-validated inventory that measures personality variables based on a five-factor model (Costa & McCrae, 1992). These factors are: neuroticism, extroversion, openness to experience, agreeableness, and conscientiousness. In addition to the five factors, each domain is further divided into subscales for a total of 30 facet scores, which allows for a greater analysis of overall personality.

Design and Procedure

Subjects were given the opportunity to volunteer for this research project through sign-up sheets posted in the psychology building and by solicitation in undergraduate psychology classrooms. Subjects were randomly assigned to arousal conditions.

The procedure was explained per the informed consent form in Appendix B, and forms were collected. Subjects were first administered the Harvard Group Scale in groups that ranged between approximately 20-50 subjects. Subjects were then given packets that contained several questionnaires in the following order: 1) the State/Trait Anxiety Inventory (STAI), 2) the forced-choice recognition test containing the false information as described in Experiment I, 3) the Dissociative Experiences Scale (DES), 4) the forced-choice recognition questionnaire, and 5) the NEO-PIR.

Subjects were given the above packets face-down, and were told not to open them until after the video was shown. They were then shown either the edited or the unedited video, and all had equal visual access. Immediately following the viewing of the video, subjects were told to complete the questionnaires one at a time, in the order in which they were given, and were not to refer back to any of the questionnaires once they had been completed.

The Harvard Group Scale took approximately 50 minutes to administer, and was administered by the experimenter each time. The videotape and the other questionnaires were also administered by the experimenter, and took approximately one hour to one and one-half hours to complete. The Harvard Group Scale and the other scales were matched by asking subjects to place the last four digits of their social security number in the top corner of each page.

RESULTS

The sex differences demonstrated in the first study were not replicated in the present study. No significant differences were found between male (M = 4.16, SD = 1.51) and female (M = 4.10, SD = 1.38) subjects ($F < 1.0$)(TABLE 6). The findings from the first study that indicated non-significance for the arousal variable were repeated in the present study, in that there were no significant differences found between high-arousal (M = 4.20, SD = 1.39) and low-arousal (M = 4.0, SD = 1.48) conditions ($F < 1.0$)(TABLE 7).

Table 6

Experiment II

Mean Gender Differences in Overall Memory Scores

Group	n	M	SD
Females	91	4.10	1.38
Males	57	4.16	1.51
All	148	4.12	1.43

Table 7

Experiment II

Mean Recognition Scores for Overall Memory as a Function of Arousal Condition

Group	n	M	SD
High-Arousal	76	4.20	1.39
Low-Arousal	72	4.04	1.48
All	148	4.12	1.43

Differences in level of arousal between the two groups, as measured by the state-anxiety half of the STAI, were not confirmed. A T-test indicated that there were no significant differences in state anxiety between the high-arousal group ($\underline{M}$ = 39.34, SD = 11.81), which viewed the unedited videotape, and the low-arousal group ($\underline{M}$ = 38.78, SD = 12.96), which viewed the edited version ($F < 1.0$)(TABLE 8).

A logistic regression analysis was used to assess whether memory for the event, as measured by the forced-choice recognition test, was affected by any of the following variables: sex, arousal group, hypnotizability, dissociativity, and state/trait anxiety. No significant effects were demonstrated with any of the above independent variables. A separate analysis was performed for the five domains on the NEO-PIR, and again no significant effects were found.

Table 8

Experiment II

Mean State Anxiety Scores as a Function of Arousal Condition

Group	n	M	SD
High-Arousal	76	39.34	11.81
Low-Arousal	72	38.78	12.96

CHAPTER IV

DISCUSSION

EXPERIMENT I

The fact that misinformation effects were demonstrated in this study is not surprising considering the overwhelming data supporting this phenomenon. In terms of the strength of the information condition, it is possible that the robustness of the misinformation effects may be due, in part, to the mode of stimulus presentation. Because a videotape is perhaps less salient to subjects than a live event, it may not be processed or encoded in the same way. If memory for the event is less accessible as a result of this factor, subjects may rely upon postevent information to a greater extent. Although misinformation effects have been demonstrated using a variety of stimuli, it is not clear as to whether live enactments, videotapes, or slides differ in relation to subjects' acceptance of false information.

Level of arousal had no effect on memory in this study. The most obvious reason for this may have been an insufficient difference between the high and low arousal stimuli that were used. Unfortunately, there was no data collected to determine the effectiveness of the putative manipulation of arousal, so this hypothesis is speculation only. In addition, the research findings on arousal from

other studies are not nearly as consistent as the data supporting the misinformation effect.

Despite the lack of differences between the arousal groups, however, it may be possible that the overall difference found in memory for peripheral and central events, in which peripheral memory was better across all groups, is a reflection of the shorter duration of the central events compared to the peripheral scenes of the video. In other words, there may have been more retention of the original peripheral events due to longer exposure. In addition, research indicates that in general, central details of emotionally arousing events are relatively well retained, while peripheral details are less accurately retained, compared to neutral conditions (Christianson, 1992). Because this study resulted in greater memory for peripheral details, it may be that the events in the video were not emotionally arousing in either condition, and the stimulus was perceived as neutral. It is possible that students have become relatively desensitized to violence in this medium, and did not experience a strong emotional response to the violence in the videotape.

The finding that dissociativity was not related to suggestibility may in part reflect the limited variability of responses on both the DES and the forced-choice recognition questionnaire. Because the information condition had such a powerful effect, the range of scores on

the dependent variable did not vary to a great extent within either group. Consequently, it would be difficult to determine the presence of a correlation between the recognition test and any other measure. In addition, scores on the DES for non-clinical populations tend to fall within a fairly narrow range on the low end of the scale (Carlson & Putnam, 1993). Finally, it may be that susceptibility to misinformation as elicited by this type of study is not associated with the type of cognitive processes that underlie dissociative tendencies.

While this experiment replicated results of similar studies that have demonstrated misinformation effects, the question remains as to the underlying mechanisms involved in suggestibility. Traditional debates on this subject have primarily focused on cognitive processes, rather than social demands, yet this is an issue that remains unresolved. In the first place, to what extent do social factors play a role in suggestibility? If they are found to be a significant determinant in the acceptance of misinformation, is this because subjects are consciously reacting to the demands of the situation, or because they actually alter memory for the event?

Suggestibility research has demonstrated that subjects are often very sure of their answers when misled. In the context of social demands, this may indicate that either social demand characteristics are not very powerful in these

particular studies, or that if they are present, they had the effect of shaping the subjects' memories without their awareness. In the present study, social demands may have been a more powerful influence than in previous research due to the short duration of the videotape, which may have resulted in subsequent deficiencies in the original memory. In other words, subjects may have been more likely to accept the experimenter's information if their memories of the original stimulus were unclear.

A major indication of the influence of social demands for this study is the unexpected finding that, of the groups who were misled, women performed more poorly than men on the recognition test. Past studies on misinformation effects have not reported any findings that indicated the presence of sex differences. However, related areas of research in social psychology, those of influenceability and persuasability, have demonstrated, albeit inconsistently, that females were more likely to be influenced by external pressure to alter their preexisting viewpoints (Eagly, 1987; Eagly and Chaiken, 1993; Maccoby & Jacklin, 1974). It may be possible that the present experiment elicited this phenomenon as a result of its demand characteristics.

Further, it is unlikely that the sex differences found were due to differences in cognitive ability (ie; memory capacity or intelligence), as there were no sex differences found for the recognition task in the groups that were not

exposed to misleading information. The higher rate of susceptibility to suggestion among women may also be a reflection of this particular subject pool; further research should be undertaken in order to assess the consistency of the sex differences found in this study.

In conclusion, misinformation had a very strong effect on memory, whereas arousal and dissociativity apparently had none. Sex differences were found, in which misled females performed significantly worse on the recognition test. While misinformation effects have been well-established empirically, further clarification is needed to better determine the environmental factors and individual differences that may be associated with suggestibility.

EXPERIMENT II

The absence of sex differences in Experiment II is more readily explained than the presence of sex differences seen in Experiment I. It is likely that the original differences found were a reflection of that particular subject pool, which was smaller in size than the group who participated in the second experiment; in this sense, the significance difference between female and male responding in Experiment I may be seen as an anomaly. However, the proportion of women to men was much greater in Experiment II, which may have resulted in less statistical accuracy in detecting differences. It is also important to note the inconsistencies in the research regarding this issue. Some

have found females to be more suggestible than males (Powers et al, 1979), while others have found the opposite to be true (Loftus et al, 1992).

Experiment II replicated the results from Experiment I in terms of the arousal condition, in that the this manipulation did not produce a significant difference in memory scores between the two groups. The failure of the tapes to elicit differential responses on the dependent variable may be due, in part, to an insufficient degree of distinction between the two stimuli. It appears that the impact of the edited versus non-edited version of the tape was not powerful enough to produce differences in subjects' physiological levels of arousal; when arousal was assessed by the state anxiety half of the STAI, no differences were found. Because the groups did not differ by self-perceived physiological arousal, the question regarding the effect of arousal on suggestibility remains unanswered. While it is possible that both tapes induced some degree of physiological arousal, the impact of this variable on the recognition test remains unclear without a comparison group.

As previously noted, many studies exploring the role of arousal on memory have not focused on the physiological aspects of arousal, but on the content of the witnessed event itself (Christianson, 1992). In other words, it may be the presence of a "negative emotional event," rather than actual physiological arousal, that affects memory. In the

present study, the contents of both videotapes were likely to be perceived as negative emotional events; each tape contained a man in handcuffs being taken through an airport, followed by some commotion in which the shooter was aggressively apprehended (even in the edited version). In this sense, there was not likely to be a sufficient difference in emotional valence that may could have affected either memory or suggestibility.

Although the videotapes did not induce differing levels of arousal, and were similarly "negative" in content, the key difference between them was the presence of the gun and subsequent shooting. The phenomenon of "weapon focus," in which a weapon captures the witness' attention, has been shown to have an effect on memory for events (Cutler, Penrod, & Martens, 1987; Kramer, Buckhout, & Eugenio, 1990; Loftus, Loftus, & Messo, 1987). When a weapon is present, people tend to visually fixate on the critical stressful object; the result of this is that memory for the weapon is enhanced, but at the expense of other details in the scene. However, in the videotape used for this study, the weapon may not have been present for a sufficient amount of time to have affected the subjects in this manner.

Two other factors that may have affected the lack of significant effects in the second experiment are differences in group size and subject population. The groups were tested in larger numbers in the second experiment, in which

case the noise level may have been greater during the testing situation. This difference may have had an effect on subjects' responsiveness to the videotape. In addition, subjects in Experiment I were recruited from introductory psychology classes, whereas subjects in Experiment II were recruited from more advanced undergraduate psychology classes and were mainly psychology majors.

As predicted, trait anxiety did not correlate with suggestibility, yet no other variables were associated with the scores on the recognition test either. The hypotheses that hypnotizability and dissociativity are related to suggestibility were not confirmed, and no personality variables were identified that correlate with the dependent variable. The lack of significance of these findings leads to one of two conclusions; 1) these traits are independent and totally unrelated constructs, or 2) a relationship exists, but is difficult to detect based on the measure used to assess suggestibility in this study.

While studies in interrogative suggestibility typically use a standard scale (the Gudjonsson Suggestibility Scale) that elicits suggestibility in response to social demands, there has been no such device developed for suggestibility in the general experimental context. Most of the studies in this area have measured suggestibility through the use of recognition or recall tests which assess memory for witnessed events. The items that are preceded by misleading

postevent information are scored to determine the extent to which subjects accept the false information. Unfortunately, these studies have used a variety of stimuli and postevent tests to assess memory, so that a systematic measurement for suggestibility has not yet been developed.

One difficulty in the development of any suggestibility scale would be in drawing a distinction between memory for the original event versus memory as influenced by the postevent information. When an individual selects the misleading information, it is important to try and separate out the varying degrees to which that answer was affected by poor original memory as opposed to being affected by the false information. A related question that should be further addressed is the effect of social influence on misinformation effects; that is, to what extent are individuals intentionally selecting the misleading information rather responding to a literal alteration of memory.

The development of a standardized scale for suggestibility could help sort out the above issues and better determine the social and cognitive mechanisms involved in suggestibility. In addition, a standard scale would provide a systematic means of determining constructs that may be related to this phenomenon, as well as environmental factors that may increase the likelihood that individuals will respond to misleading suggestion.

CHAPTER V

LEGAL ISSUES ASSOCIATED WITH SUGGESTIBILITY

THE FALSE MEMORY DEBATE

Perhaps the most publicized aspect of suggestibility involves the issue of "repressed memories." In 1980, Lorey Newlander, who was twenty-one years old at the time, filed a suit in a California court claiming that she had been sexual assaulted as a teenager, but had only recently begun remembering the incidents. In doing so, she became the first of many litigants who claimed that a repressed memory had prevented her from filing her suit in a timely manner (Hall, 1996).

Although the Newlander case was settled out of court, the major obstacle hindering similar lawsuits that followed was that the statute of limitations had expired in many of the cases. However, in situations involving malpractice actions, some courts have used date of discovery rules to sidestep the issue of expired statutes of limitations (Zoltek-Jick, 1997). For example, if a plaintiff finds that a doctor left a sponge in his body years after the statute of limitations has run out, the cause of action begins at the point of discovery, rather than at the time of the initial injury.

The first sexual abuse case to argue the delayed

discovery rule in relation to repressed memory was Tyson v. Tyson, 1986 (Spiegel & Scheflin, 1994). In this case, a woman alleged that her father had sexually abused her during childhood, but she had suppressed the acts from memory until she entered therapy during adulthood. She brought the suit at the age of twenty-six, several years after the statute of limitations had expired, but argued that the memories emerged within the time frame allowed by the delayed discovery doctrine.

The Washington Supreme Court rejected her argument, and held that the discovery rule did not apply to a cause of action for childhood sexual abuse in which the incident was blocked from conscious memory during the period of the statute of limitations. The court was concerned that there was no objective evidence, and that psychology and psychiatry were "imprecise" disciplines which could result in a "distortion of the truth."

Despite this ruling, however, advocates for adult survivors of sexual abuse pressured lawmakers to adopt regulations which would permit adults to file suit for damages stemming from sexual assault that occurred during childhood. During the late 1980's and early 1990's over thirty state legislatures enacted special statutes of limitations for civil actions based on childhood sexual abuse. In most of these, the basis for the extension was some form of delayed discovery accrual (Williams, 1996).

In 1988, another ruling was made which directly affected the issue of delayed discovery in lawsuits of adults claiming to have been abused as children. In Johnson v. Johnson, the plaintiff suddenly remembered at the age of thirty-two being abused by her father over a ten-year period during childhood, and filed a civil suit against him. In response to her request to apply the delayed discovery doctrine, the federal district court divided incest/sexual abuse cases into two categories by standardizing the distinction between "Type 1" plaintiffs and "Type 2" plaintiffs. "Type 1" plaintiffs are those who remember the sexual assaults before the age of majority, but are unaware that other physical and psychological problems they suffer were caused by the abuse until after the limitations period has expired; this awareness usually occurs through some type of intervention such as therapy. "Type 2" plaintiffs are those who claim that, because of the trauma of the sexual abuse, they had no recollection of the event until shortly before filing suit. The court in Johnson found the plaintiff to fall under the "Type 2" category, and held that the delayed discovery doctrine applied to this type of plaintiff. They did not state, however, that the discovery rule would never apply to "Type 1" plaintiffs (Spiegel & Scheflin, 1994).

The legal response to this issue was, in part, due to the widespread use of "recovered memory therapy" during the

1980's and early 1990's, which led to numerous lawsuits involving adults claiming to have discovered memories of abuse from childhood. "Recovered memory therapy" is a generic term used by Lindsay and Read (1984) that refers to the multitude of techniques and orientations used by clinical practitioners who focus on the alleviation of symptoms through the release of "repressed" memories of traumatic events. These practitioners believe that there is a specific mental mechanism that prevents patients from retrieving information about a past trauma, and that certain techniques, such as hypnosis, can remove barriers which prevent the memory from entering consciousness.

The memories that individuals claim to have uncovered through repressed memory therapy may be relatively mild, or extremely bizarre. Some of the repressed-memory scenarios popularized by the media and "cult" literature involve themes of satanic ritual abuse, past life experiences, and alien abductions. In the psychological literature, these "pseudomemories" have been explained in the context of cognitive, socio-historical, and social constructionist theories (i.e., Mulhern, 1994; Spanos, Burgess, & Burgess, 1994).

It has been estimated that thousands of childhood sexual abuse actions have been filed by adults across the country since the mid-1980's (Williams, 1996). Repressed memories have also served as the basis for a conviction of

murder. In 1991, George Thomas Franklin was sentenced to life in prison after his daughter testified she had recently remembered his raping and killing one of her playmates twenty-two years before (People v. Franklin).

The legal trend supporting the repressed memory phenomenon led to an organized backlash against such suits in the form of the False Memory Syndrome Foundation (FMSF). This organization was founded in 1992, and dedicated itself to helping people who had been falsely accused of sexual abuse by their adult children. In addition, in 1993, the American Psychological Association established a taskforce entitled, "The Working Group on the Investigations of Memories of Childhood Abuse." Members of this group were charged with examining the research on memory and suggestibility in adults who claim they were abused as children (APA Monitor, November 1993).

Because psychologists as well as the public had become very divided on the issue of repressed memories, and the divisions often seemed to fall along the lines of clinician versus researcher, the taskforce sought to incorporate data from both sets of literature. They reached a consensus that "both ends of the continuum are possible." In other words, under certain cue conditions, early memories may be retrievable. At the other extreme, it is also possible that under certain conditions memories may be implanted or embedded.

The misinformation effect has often been cited as evidence that information can be incorporated into memory through suggestion. Yet critics have claimed that while it might be possible to create false memories regarding a stop sign versus a yield sign, it would be impossible to create a false autobiographical memory of a complex traumatic event (Pope, 1996). In response to this argument, Loftus (1993) developed a more realistic experimental analogue to demonstrate the implantation of false autobiographical memories for a traumatic event. In the "lost in the mall" experiment, a fourteen-year-old boy was told by his older brother that he had been lost in a mall when he was five years old. The subject in the study thereafter began to "remember" details of this mildly traumatic event. Several studies with a greater number of subjects followed which were based on this research paradigm, and similar results emerged (Loftus & Pickrell, 1995; Pope, 1996). In these experiments, approximately 15-20% of subjects developed pseudomemories of mildly traumatic events in response to suggestions from older family members.

Research findings in this area, in addition to increased public awareness that pseudomemories can be created through a therapist's suggestions, have led to a number of suits filed by third parties against therapists. The first and most publicized of these was the Ramona trial which took place in 1994 (Gary Ramona v. March Isabella et

al.). In this case a father was allowed to sue his adult daughter's therapists for emotional distress and loss of income, which he alleged was caused by their treatment of her. This was the first legal challenge to therapists who practice "recovered memory therapy" that was initiated by a non-patient, and accepted by the courts (Gross, 1994).

The daughter in this case had entered therapy to deal with bulimia, and had begun recovering memories of sexual abuse. She had confronted her father about it in a meeting she had asked him to attend at her therapist's office. He denied the abuse, and she filed suit against him for childhood sexual abuse. He then filed his own suit, claiming that her therapists had caused her to believe in false memories of sexual abuse. The jury found that the therapists had "implanted or reinforced false memories of abuse" and had acted affirmatively to cause the father to be confronted with the allegations. In this sense they incurred a duty towards him with respect to their treatment of his daughter (Williams, 1996).

This verdict led to a series of "third party" lawsuits against therapists based on false memory claims. The original trial set legal precedent, since the suit was filed by a non-patient (who presumably had no relationship to the therapists, and therefore no duty could be inferred) and the actual patient had no complaint against them. The foundation for the pretrial ruling allowing Ramona's claim

was a prior California decision holding that under certain circumstances medical professionals could have a legal duty, and thus liability, towards non-patient third parties who suffer emotional distress as a result of the professional's negligence toward the patient (Molien v. Kaiser Foundation Hospitals). In Molien, a woman's physician and hospital were held liable to her husband for negligence in having misdiagnosed her as suffering from syphilis. Although the husband was not the patient, they had instructed the wife to inform him of the diagnosis. However, one major difference between this suit and the Ramona suit is that in Molien, the wife, who was the patient, was also co-plaintiff, whereas the daughter in Ramona was not (Williams, 1996).

In 1993, first suit took place in which a former patient won a settlement from her therapists after suing them for negligence and fraud related to the implantation of false memories (Jaroff, 1993). Since then, several suits have also been filed and won by former patients of therapists who induced false memories. In 1998, a malpractice suit was filed by a patient and her husband against her psychologist and was settled out of court for $175,000 (APA Monitor, September 1998). The plaintiffs' lawyer, who is also a psychologist, stated his belief that the willingness of the insurer to settle signifies the "demise" of recovered memory therapy.

THE SUGGESTIBILITY OF CHILDREN

The research on children's suggestibility is often contradictory; numerous studies claim that young children are very suggestible, while many others report that the opposite is the case. An analysis of the literature indicates that there are overall reliable age differences in suggestibility in which preschool children are more suggestible than are older children or adults (Ceci & Bruck, 1996). However, the presence of such blatant contradictions in the research indicate that methodological differences play an important role in the extent to which suggestibility occurs.

In some situations, when questioned by a neutral interviewer, children can be very resistant to false suggestions. Yet when children are questioned in the forensic arena, and in the experiments that replicate these situations, they are often subjected to interviewing practices that result in very high suggestibility (Ceci, Leichtman, & Bruck, 1995). During the past few years, researchers in this area have shifted their attention to the conditions that produce the greatest accuracy in memory for children, and the most resistance to suggestion (Ceci, 1994). Determining the optimal conditions for accuracy also requires the identification of factors that increase inaccuracy.

Procedures for interviewing children have been

suggested that are based on the available empirical evidence. Among these are recommendations that interviewers should: reduce the delay between the event and the interview, avoid repeated questioning, avoid specific and leading questions, be cautious in the use of anatomically detailed dolls, use age-appropriate language, and create a comfortable interviewing environment in order to reduce anxiety (Warren & McGough, 1996). Violation of these practices may have serious consequences for both the victim and the accused.

Several recent court cases involving child care workers who were charged with sexual abuse reveal how faulty interview techniques may elicit inaccurate child testimony (for a review of these cases see Ceci & Bruck, 1995). One well known case, involving workers from the Little Rascals Day Care Center in North Carolina, began with a vague allegation of abuse against a caretaker by a child's parent. Parents began to panic, and many sent their children to therapists. Few children made disclosures when initially questioned by their parents and police investigators, but many eventually made allegations after several months in therapy. Many of the claims were fantastic and improbable, and could not be corroborated by any physical evidence. A total of 90 children made allegations of abuse, and 85% of these were evaluated and treated by three therapists. Seven adults were arrested and charged with sexual abuse. There

were several convictions that were eventually overturned by the North Carolina Court of Appeals, but only after many of these individuals had spent years in jail.

Similar cases have occurred in which individuals were convicted of child abuse solely on the basis of children's testimony (e.g., State v. Michaels, 1988). Evidence indicates that suggestive and repeated interviewing techniques which took place over a long period of time resulted in the creation of the children's memories of abuse.

THE ADMISSIBILITY OF EXPERT TESTIMONY ON MEMORY

Prior to the 1970's, courts prohibited psychologists from testifying as expert witnesses on the basis that their testimony would "invade the province of the jury" (Cutler & Penrod, 1995). The traditional rule concerning the admissibility of expert testimony is found in United States v. Frye (1923). Under the Frye rule, an expert may testify if: (1) he or she is qualified to testify about the subject matter, (2) he or she testifies about a proper subject, (3) the testimony conforms to a generally accepted explanatory theory, and (4) the probative value of the testimony outweighs its prejudicial effect.

In 1975, the Federal Rules of Evidence (FRE) were enacted and applied to all proceedings in federal court. Rules 403 and 702 specifically address the use of expert testimony at trial. In accord with the Frye test, Rule 403

requires that the probative value of the proffered testimony outweigh its prejudicial impact. Rule 702 states that the expert must be qualified, his or her testimony must assist the trier of fact, and the testimony must be sufficiently reliable.

The enactment of the Federal Rules of Evidence led to more permissive rulings on the admissibility of expert testimony in federal courts. Unlike the Frye test, Rule 702 does not require that the expert's testimony conform to a generally accepted explanatory theory; it merely requires that the testimony is sufficiently reliable. For this reason, the new federal rules usually favor admissibility.

Guidance for the determination of admissibility under the Federal Rules of Evidence is provided by the Supreme Court in Daubert et al. v. Merrell Dow Pharmaceuticals (1993). To determine if expert testimony is admissible under Rule 702, the testimony must consist of scientific knowledge that is supported by appropriate validation, and must also assist the trier of fact to understand the evidence or determine a fact of issue. To assess whether testimony constitutes scientific knowledge, the judge should consider whether the theory can be (and has been) tested using scientific methodology, and whether the theory or technique has been subjected to peer review and publication.

State courts are not bound by either the FRE or the Daubert decision, although many state codes of evidence have

adopted the language of FRE Rule 702 nearly verbatim. Twenty-three states have adopted Daubert and apply a standard of scientific methodology and peer review. Eighteen states uphold Frye as the standard and require that the profferred testimony conform to a generally accepted theory within the specific discipline. The remainder of states have adopted tests of admissibility which combine the reliability standard of Daubert with the general acceptability standard of Frye.

Many courts still refuse to allow expert testimony on eyewitness identification research despite the Daubert decision's emphasis on empirical validity as the determining factor of admissibility (Cohen, 1997). It has been suggested that expert psychological testimony on the factors that influence eyewitness memory would provide jurors with scientific information that is beyond their commonsense knowledge, and would thus improve juror decision making (Devenport, et. al., 1997). However, the tradition of relying solely upon the jury's ability to assess witness credibility remains the practice in most courts.

The Daubert ruling has been applied to the testimony of other psychological issues as well. The U.S. Eighth Circuit Court of Appeals allowed expert psychological testimony regarding a "practice of suggestibility" in the interviewing of alleged child victims of sexual abuse. The ruling prohibited experts from commenting on whether or not a

child's testimony is based on false memories, but allowed testimony regarding the presence of suggestive techniques in the interviewing process. United States v. Rouse, 100 F.3d 360 (8th Cir. 1996).

SUMMARY

This paper has examined the phenomenon of suggestibility from a multitude of perspectives. In the first section, a review of the literature outlined what is known about the misinformation effect in terms of research and theory, and explored the methodological factors, individual differences, and environmental situations that may have an impact on the tendency to accept misinformation.

In the two experiments that followed, an attempt was made to better isolate the variables associated with suggestibility as demonstrated by subjects' acceptance of misinformation. The first experiment established the presence of a misinformation effect by indicating that there were significant differences in memory scores between subjects who were misled and those who were not. This initial pilot study also examined the role of arousal on suggestibility, but results indicated that the arousal manipulation did not produce significant differences in memory scores. While there was no relationship found between dissociativity and suggestibility, a post-hoc finding demonstrated significant differences between memory scores for males and females, in which females performed

more poorly on the memory test than males.

A second experiment was undertaken to determine whether these gender differences would be replicated. This follow-up experiment also included an assessment of the arousal manipulation to determine its effectiveness in producing significant differences in subjective physiological arousal between the two conditions. Other variables were also examined in relation to suggestibility scores on the memory test; these variables included measures for hypnotizability, dissociativity (repeated from the first study), state-trait anxiety, and a five-factor personality inventory. Results in this study indicated the absence of gender differences. In addition, the arousal manipulation was found to have no effect on subjective physiological arousal. Finally, none of the variables assessed were found to have a relationship with scores on the dependent variable.

It was concluded from these results that a standardized test should be developed that more accurately measures rates of acceptance of misinformation. This would enable researchers to better isolate the mechanisms involved in suggestibility, and would provide a measure that is more sensitive to individual differences. Despite the insignificance of these results, however, the pursuit of additional research in this area may provide important information that is not only relevant to the field of psychology, but helpful from a legal standpoint as well.

Because of the real-life ramifications pertaining to suggestibility in the legal arena, this paper attempted to describe some of the forensic issues associated with this area of research. Lawsuits pertaining to recovered memories of sexual abuse have been particularly salient during the last two decades, and have affected patients, their families, and the therapists who treated them. Charges of child abuse in day care centers have been analogized to modern-day "witch-hunts." Because these issues are affected by our current knowledge in suggestibility research, the present status of admissibility on expert testimony concerning such research was discussed.

In addition to these larger issues, numerous day-to-day practices in forensic settings may involve means of influencing others by subtle or not-so-subtle suggestion. Some of these include the interrogation of adults in criminal settings, the questioning of children in abuse cases, and various eyewitness identification practices.

The ability to identify characteristics and circumstances associated with a greater tendency to accept misleading information would be of great benefit to those who are involved in assessing the reliability of memory for events, in clinical as well as forensic settings. In addition, many of the practices that are routinely employed in these settings may actually increase the likelihood that individuals will accept misleading information, such as the

use of leading questions, or long delays before questioning begins. Increasing general awareness of these issues would benefit not only those who unknowingly engage in potentially dangerous practices, but those whose fate may be determined by their actions.

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APPENDICES

APPENDIX A

INFORMED CONSENT FORM - EXPERIMENT I

University of Tennessee
Human Subject Consent Form

Investigator: Jennifer Sadoff
Office: 227 Austin Peay Building
Department: Psychology
Phone: 974-2161

Statement of Procedure:

We are asking you to participate in this experiment on people's reactions to news clips on videotapes. You will be shown a two minute videotape which may or may not involve violence. Following the videotape you will be asked to fill out some questionnaires, some of which are about the videotape. The entire process should take no more than one half hour, and you will receive class credit for your participation.

There is a minimal risk associated with this testing procedure. Although the level of violence on the videotape is no more than what you might expect on television nightly news, you might find it to be troubling in the same way television news might be troubling. If you feel you do not wish to view a videotape of this nature, please tell the experimenter and you will receive class credit without your participation. Participation in this experiment is voluntary; you may refuse to participate or withdraw from the study at any time without penalty or loss of benefits.

This study will help us determine the way people react to different types of events on videotape. Although the study offers no direct benefits to you at this time, it may increase our knowledge of how people process certain types of visual information.

All your responses are anonymous. Your name appears nowhere in the data file. Once you leave today we have no way of identifying your responses with your name. Therefore, the responses are anonymous and confidential.

If you have any questions about this experiment, please feel free to contact the investigator of the study, Jennifer Sadoff, whose address and number is listed above.

I certify that I have read and understood this statement of procedure and know that I may withdraw at any time without penalty. I agree to participate.

_____
Name of subject (print)

_____ _____
Signature Date

APPENDIX B

INFORMED CONSENT FORM - EXPERIMENT II

University of Tennessee
Human Subject Consent Form

Investigator: Jennifer Sadoff
Office: 227 Austin Peay Building
Department: Psychology
Phone: 974-2161

Statement of Procedure:

We are asking you to participate in this experiment on people's reactions to news clips on videotapes. Before the videotape is shown, you will be given a measure for hypnotizability. This will involve you being hypnotized in a group setting and answering some questions afterwards. Not everyone can be hypnotized, and you will not be made to do anything uncomfortable or against your will. There is very little risk associated with this procedure. Hypnosis is actually a state of very deep relaxation and many people find it a pleasant experience. However, if you are uncomfortable with this procedure, please tell the experimenter and you will receive class credit without your participation.

You will be shown a two minute videotape which may or may not involve violence. Following the videotape you will be asked to fill out some questionnaires, some of which are about the videotape. The entire process should take no more than two and a half hours, and you will receive class credit for your participation.

There is minimal risk associated with this testing procedure. Although the level of violence on the videotape is no more than what you might expect on television nightly news, you might find it troubling in the same way television news might be troubling. If you feel you do not want to view a videotape of this nature, please tell the experimenter and you will receive class credit without your participation. Participation is voluntary; you may refuse to participate or withdraw from the study at any time without penalty or loss of benefits.

This study will help us determine the way people react to different types of events on videotape. Although the study offers no direct benefits to you at this time, it may increase our knowledge of how people process certain types of visual information.

All your responses are anonymous. Your name appears nowhere in the data file. Once you leave today we have no way of identifying your responses with your name. Therefore, the responses are anonymous and confidential.

If you have any questions about this experiment, please feel free to contact the investigator of the study, Jennifer Sadoff, whose address and number is listed above.

I certify that I have read and understood this statement of procedure and know that I may withdraw at any time without penalty. Not only have I read this statement, but this experiment has been explained to me and each and every one of my questions has been answered. I agree to participate.

_____
Name of subject (print)

_____ _____
Signature Date

APPENDIX C

RECOGNITION TEST I - MISLEADING INFORMATION

Recognition Test I

Please answer **all** of the following questions. You may not be sure of each answer, but go ahead and put down your best guess.

1. The first scene showed

   a) a city skyline b) airport buildings

2. This scene showed a TWA plane

   a) taking off b) landing

3. The letters on this jet were

   a) green b) red

4. The next scene showed a plane taking off. Between the plane and the camera were

   a)open fields b) other planes

5. The next scene showed two planes that were stationary on the runway; the name of the airline on these planes was

   a) Ozark b) TWA

6. The letters on these jets were

   a) green b) red

7. Next you saw a black-nosed airplane taxi in, with engines that were

   a) propeller driven b) jet driven

8. Passengers were then seen getting onto a plane with stripes on its sides that were

   a) red/black b) blue/brown

9. As passengers walked away from the terminal, the outside of the terminal building was seen to be

   a) gray b) blue

10. Inside the terminal we hear an intercom announcing a flight, while two people

    a) face each other b) face the window

11. Next we see an arrested man being escorted through the airport. His hands are

    a) in front of him b) behind him

12. This man was Caucasian and had a

    a) moustache only b) moustache and beard

13. He wore a long sleeved, print shirt and pants that were

    a) green b) blue

14. The style of his shirt was a

    a) button-down b) pull-over

15. On the right side of this man was an escort, who had

    a) a moustache b) no facial hair

16. The escort had on a button-down shirt that was

    a) yellow b) white

17. He was carrying his coat, which was

    a) green b) blue

18. Behind them is a man in a phone booth who quickly turns around. He is wearing a tan

    a) baseball hat b) cowboy hat

19. The man who was arrested falls, and we see that he is wearing

    a) cowboy boots b) athletic shoes

20. A printed message on the screen appeared and said "EXCLUSIVE WBRZ." The color of the letters was

    a) white b) yellow

21. A man in a tan coat rushes to the man in the phone booth. He wrestles with the man in the phone booth

    a) alone b) with the help of the escort

22. During this scene, someone says

    a) "Son of a bitch" b) "Police officer"

23. The escort goes to the man who has fallen and

    a) touches his side b) checks his pulse

24. Next we see a close-up of the man who was in the phone booth. He grins at the camera and looks down, and we see he has on

    a) clear glasses b) tinted glasses

25. He is wearing a golf shirt that is

    a) striped b) solid

APPENDIX D

RECOGNITION TEST I - CORRECT INFORMATION

Recognition Test I

Please answer **all** of the following questions. You may not be sure of each answer, but go ahead and put down your best guess.

1. The first scene showed

   a) a city skyline b) airport buildings

2. This scene showed an Ozark plane

   a) taking off b) landing

3. The letters on this jet were

   a) green b) red

4. The next scene showed a plane landing. Between the plane and the camera were

   a)open fields b) other planes

5. The next scene showed two planes that were taxiing down the runway; the name of the airline on these planes was

   a) Ozark b) TWA

6. The letters on these jets were

   a) green b) red

7. Next you saw a black-nosed airplane taxi in, with engines that were

   a) propeller driven b) jet driven

8. Passengers were then seen getting off of a plane with stripes on its sides that were

   a) red/black b) blue/brown

9. As passengers walked away from the plane, the outside of the terminal building was seen to be

   a) gray b) blue

10. Inside the terminal we hear an intercom paging a passenger, while two people

    a) face each other b) face the window

11. Next we see an arrested man being escorted through the airport. His hands are

    a) in front of him b) behind him

12. This man was Caucasian and had a

    a) moustache only b) moustache and beard

13. He wore a long sleeved, solid shirt and pants that were

    a) green b) blue

14. The style of his shirt was a

    a) button-down b) pull-over

15. On the left side of this man was an escort, who had

    a) a moustache b) no facial hair

16. The escort had on a button-down shirt that was

    a) yellow b) white

17. He was carrying a garment bag, which was

    a) green b) blue

18. Behind them is a man in a phone booth who quickly turns around. He is wearing a white

    a) baseball hat b) cowboy hat

19. The man who was arrested falls, and we see that he is wearing

    a) cowboy boots b) athletic shoes

20. A printed message on the screen appeared and said "EXCLUSIVE WBRZ." The color of the letters was

    a) white b) yellow

21. A man in a tan coat rushes to the man in the phone booth. He wrestles with the man in the phone booth

    a) alone b) with the help of the escort

22. During this scene, someone says

    a) "Son of a bitch" b) "Police officer"

23. The escort goes to the man who has fallen and

    a) touches his side b) checks his pulse

24. Next we see a close-up of the man who was in the phone booth. He glances at the camera and looks down, and we see he has on

    a) clear glasses b) tinted glasses

25. He is wearing a golf shirt that is

    a) striped b) solid

APPENDIX E

RECOGNITION TEST II

Recognition Test II

1. The first scene showed a plane taking off. The name on the plane was

   a) Ozark b) TWA

2. The next scene showed another plane that was

   a) landing b) taking

3. The next scene showed two TWA planes on the runway that were

   a) stationary b) taxiing

4. Passengers were then seen outside the terminal who were

   a) getting onto a plane b) getting off of a plane

5. Inside the terminal we see two people facing out the window, while an intercom

   a) announces a flight b) pages a passenger

6. The man who was in handcuffs was wearing a long-sleeved shirt that was a

   a) solid b) print

7. This man's escort was on the handcuffed man's

   a) left side b) right side

8. The escort was carrying a green

   a) coat b) garment bag

9. The man who was waiting at the phone booth was wearing a hat that was

   a) tan b) white

10. The last scene is a close-up of the man who was in the phone booth. Before he looks down, he

    a) glances at the camera b) grins at the camera

VITA

Jennifer Sadoff was born in Oakland, California on September 20, 1968. She moved to Charlotte, North Carolina at age two where she attended public school and graduated from West Charlotte High School in 1986. She entered the University of North Carolina at Chapel Hill in 1986 and graduated in 1990 with a Bachelor of Arts in Psychology with Honors. After teaching English as a second language in Taiwan for a year, she spent several months traveling throughout Asia and Europe. In August, 1993, she entered the Doctoral program in Clinical Psychology at The University of Tennessee, Knoxville, and received her degree on May, 2000.

She is presently working in rural Appalachia at a community mental health center located in eastern Kentucky.