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(No) Thanks for the memories:

Creation of false memories for dramatic events

by

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ABSTRACT

Participants ($N = 69$) were exposed to a stressful event by watching a violent videotape, and were told that certain scenes had appeared that in fact had not. People were randomly assigned to either hear a theory of memory repression or not, and then mentally rehearsed a preselected, counterbalanced group of real and fake scenes over a two-day period. Major dependent measures were reported memory characteristics for scenes and confidence that scenes had appeared in the videotape. Analyses were conducted using a subsample of witnesses ($N = 48$) who had no missing data on crucial measures. All conditions contained equal numbers of people. People who were exposed to a repression-and-recovery memory theory were expected to report more detailed memories and to express more confidence that they had witnessed fake scenes than people who were not exposed to such a theory. This effect was expected to be enhanced as the number of rehearsals increased. Neither prediction was confirmed. Exposure to the repression theory had no effect on confidence or memory for scenes in any condition. Rehearsal and scene type produced main effects, and interacted with each other to influence both confidence and memory for scenes. As predicted, real scenes were recalled better than fake scenes, and people were more confident that they had seen real scenes than fake scenes. Rehearsal improved memory for real scenes, but not for fake scenes. In contrast, confidence that both real and fake scenes had appeared in the videotape improved following rehearsal. The memory-theory manipulation appears to have been unsuccessful not because people were reluctant to believe in the possibility of repression per se, but because they were unconvinced that they had repressed information in this situation. People appeared to accept the suggestion that they had witnessed scenes they had not, and their confidence increased after being encouraged to rehearse the scenes a number of times, even though no improvement in memory resulted. Accepting the suggestion that hidden memories exist may be the first step toward creating false memories.

INTRODUCTION

One of the modern world's most serious social concerns is the sexual abuse of children. Broadly defined, child sexual abuse includes both contact (e.g., touching or kissing, attempted or forced intercourse) and non-contact abuse (e.g., forced viewing of pornography or masturbation, "flashing"). Recent research indicates that the sexual abuse of children is prevalent in Western societies. On the basis of surveys of adults in the United States, it is currently estimated that one tenth of all men and between one fifth and one third of all women have experienced sexual victimization prior to the age of 18 (e.g., Finkelhor, Hotaling, Lewis, & Smith, 1990; Russell, 1988). Data from women's self-reports bolster these estimates. More than 30% of women in numerous samples report having experienced some form of sexual abuse as a child or adolescent (Finkelhor et al., 1990; Loftus, Pollonsky, & Fullilove, 1994; Russell, 1983, 1986; Wyatt, 1985). It has been suggested that such retrospective data actually underestimate the prevalence of child sexual abuse (e.g., Williams, 1994). Underlying this argument is the premise that self-report measures are subject to biases of omission. Some women may be embarrassed to report abusive experiences. Some may not have defined early sexual experiences as abusive, and so fail to report them when questioned as adults. Some may have forgotten the experiences, and, it is argued, some may have repressed the memories.

How valid is the assumption regarding repression? A recent rash of reports of memories of childhood abuse suddenly being "recovered" by adults in psychotherapy has fueled a debate among members of the psychological, psychiatric, and mental health communities over the concept of repressed memories. At issue in the debate is whether the emerging images are veridical representations of long-buried trauma, or whether they are simply manifestations of suggestive psychotherapy (e.g., Lindsay & Read, 1994, 1995; Loftus, 1993). A rough division of opinion between psychotherapists and cognitive scientists can be drawn, although by no means all members of either group agree with the predominant view. To oversimplify, therapists tend to believe that the repression and recovery of memories for traumatic experiences is possible, even probable. On the basis of clinical experience, they argue that there is no reason to doubt the accuracy of the memories generated by their clients, and that the prevalence of such reports supports their validity (e.g., Blume, 1990). Similarly, therapists claim that the use of various memory-recovery techniques is supported by their apparent success at uncovering hidden memories of abuse. Cognitive scientists, on the other hand, have argued that the concept of repression does not fit with what we know about normal memory processes, and that the reliable recovery of

decades-old memories is unlikely, if not impossible (e.g., Loftus, 1994). These research-oriented psychologists urge clinicians to search for supporting evidence, carefully examine empirical findings, and consider the possibility that the indiscriminate use of memory-recovery procedures might inadvertently create false memories of abuse in vulnerable clients.

The implications of this debate become obvious when one looks at the effect it is already having on the American legal system. Some therapists are urging clients to file lawsuits against remembered abusers. The goals of such actions have been described in terms of psychological healing, and of gaining retribution for years of mental suffering and distress stemming from alleged childhood trauma (e.g., Bass & Davis, 1992). A few years ago, bringing such suits would have been difficult, if not impossible. However, as a direct result of the publicity surrounding a few high-profile repressed memory cases, several states have recently lifted their statutes of limitations on sex crimes against minors such that compensation for damages is now possible years after the alleged crime took place (see Ernsdorff & Loftus, 1993). States that have applied these new rules generally allow three years to bring charges, not from the time of the crime, but from the time the crime was recalled. Thus, adults who claim to have recently recovered memories of childhood abuse now have recourse against alleged perpetrators. Under the "delayed discovery doctrine," civil suits are now possible in at least 20 states, and some states allow filing criminal charges. These changes have resulted in an increasing number of suits being brought against alleged abusers on the basis of delayed recall. Ofshe and Watters (1993) reported that over 300 suits had been filed against abusers in the U. S. alone, and by the end of 1994, the False Memory Syndrome Foundation reported that they were tracking around 800 such suits (Lipton, 1994). Attorneys and law firms have begun to specialize in handling recovered-memory lawsuits (e.g., see a list in Bass & Davis, 1992). However, legal proceedings have not been one-sided. Alleged perpetrators, mostly parents claiming to have been falsely accused, are beginning to fight back. In a landmark case, a California court recently ruled in favor of an accused father who sued his daughter's therapist for neglect of duty of care, charging that the therapist had helped his daughter recover false memories of abuse (*Ramona v. Ramona*, 1994). The debate among members of the mental health community over the authenticity of recovered memories has been made public as psychological scientists and clinicians have been called to provide expert testimony in high-profile cases. It is clear that the outcome of this debate will have serious consequences not only for the parties engaged in courtroom battles, but for the various branches of the mental health professions as well.

Theoretical Basis for Beliefs in Repression and Recovery

The concept of repression originated in early psychoanalytic theory (Freud & Breuer, 1893/1971). In a series of influential works outlining his "seduction theory," Freud explained how the roots of adult psychopathology could be traced to sexual experiences in early childhood (e.g., Freud, 1894/1971, 1896/1971, 1915/1971). On the basis of case-study data, Freud concluded that adults who exhibited neuroses almost invariably had suffered a traumatic childhood event of a sexual nature. According to Freud's theory, knowledge of such an experience could be so threatening that a person's ego-defenses would be engaged and all memories associated with the event would be repressed, or pushed into the unconscious recesses of the mind. By blocking the threatening material out of consciousness, repression would effectively bury the memories associated with the traumatic event, but the psychological and emotional damage would remain. Repressed memories could reside undisturbed in a person's unconscious for many years, exerting a powerful influence over everyday life. Freud believed that the nature of hidden memories could be revealed through such techniques as free association and dream analysis, and argued in an early paper that uncovering and reliving the pivotal childhood experience was the only way to effect a lasting cure for adult psychopathology (1896/1971).

An adapted version of Freud's theory provides the foundation for modern-day diagnosis and treatment of suspected survivors of childhood trauma. The basic theoretical tenets remain the same, including the focus on repressed or hidden memories of childhood sexual experiences. Many psychotherapists assume that traumatic childhood events (e.g., childhood sexual abuse) can produce long-lasting effects, often manifesting as physical, emotional, or psychological disturbances in adulthood. When symptomatic clients profess no history of abuse, some therapists assume that abuse did in fact occur, but the traumatic memories have been repressed. Modern-day repression has been broadly described as the complete banishment from consciousness of all memories associated with abusive experiences that occurred in one's childhood (Loftus & Ketcham, 1994).

Not all therapists endorse the idea of repression. Some prefer to characterize the process by which memories are blocked from consciousness as "dissociation" or "splitting." Regardless of preferred terminology, many psychotherapists share three basic beliefs: that traumatic childhood experiences can influence adult functioning, that memories for those experiences can be blocked from consciousness, and that hidden memories can be recovered in essentially unaltered form. Certain techniques are assumed to be effective at uncovering hidden memories, and the recovery of traumatic memories is thought to be of utmost importance for eventual healing. These beliefs form

the foundation of what have been termed "memory recovery therapies" (see Lindsay, 1994; Lindsay & Read, 1994). Although long-forgotten memories of childhood sexual abuse sometimes surface spontaneously outside of the context of psychotherapy, memory recovery therapies seem to be the principal setting in which such traumatic memories are recovered (see Lindsay & Read, 1995). Cognitive scientists have called into question therapies that actively seek traumatic memories where none currently exist.

Characteristics and Prevalence of Memory Recovery Therapies

In addition to a common theoretical base, memory recovery therapies share a reliance on various techniques and practices that are considered controversial by memory researchers and other scientists (Lindsay, 1994; Lindsay & Read, 1994, 1995). For example, some therapists use hypnotic age regression (i.e., encouraging clients to "relive" their childhoods while hypnotized) to help clients remember hidden histories of childhood sexual abuse (Andrews et al., in press). However, various professional organizations have cautioned that the use of hypnosis and certain other techniques may increase the likelihood of creating illusory memories or false beliefs in clients (e.g., American Medical Association Council on Scientific Affairs, 1985; American Psychiatric Association, 1993; British Psychological Society, 1994). In general, concerns about memory recovery therapies focus on the suggestibility of the methods used to uncover hidden memories, the inability of practitioners to discriminate between true and false memories, and the apparent unwillingness of practitioners to consider alternative explanations for clients' problems.

Clients suffering a wide variety of afflictions are quickly identified by memory recovery therapists as possible victims of childhood trauma, mainly sexual abuse, even in the absence of supporting memories. Early and confident diagnoses are facilitated by the belief that any number of presenting problems are indicative of having been sexually abused. To assist in identifying potential abuse "survivors" (i.e., adults who as children suffered abuse), therapists can refer to various symptom lists that have been developed in clinical practice with women who report such histories (e.g., Blume, 1990; Engel, 1989). These authors of these checklists encourage users to consider the possibility that unresolved issues stemming from traumatic childhood abuse may underlie such diverse symptomatology as sexual dysfunction, relationship problems, eating disorders, post-traumatic stress disorder, multiple personality disorder, and partial or complete absence of memory for portions of childhood. People showing symptoms but lacking memories for childhood abuse may be told that complete amnesia for childhood sexual abuse is common. One oft-quoted passage from the best-selling self-help book *The Courage to Heal* reassures people that

"If you think you were abused and your life shows the symptoms, then you were." (Bass & Davis, 1992, p. 22).

In order to access memories of childhood abuse, clients are urged to engage in various forms of "memory work" (see Loftus & Ketcham, 1994). Numerous techniques and practices (e.g., dream analysis, guided imagery, hypnotic age regression) are prescribed or provided with the aim of recovering memories of childhood abuse. Clients lacking memories for childhood trauma are also advised to join abuse survivors' groups and to read self-help books that describe exercises designed to assist in remembering sexual abuse.

What one discovers by following the latter advice are detailed instructions for various memory recovery techniques and a theory to support their use that is consistent with early Freud (e.g., Herman & Schatzow, 1987). Over 100 years ago, Freud said that if one wanted to cure the symptoms of hysteria, one needed to cause "an unaccomplished reaction to be completed" by compelling the patient to "experience (the trauma) a second time, but under hypnosis," thereby allowing a release of the emotion associated with the traumatic memory (Freud, 1896/1971, p. 39). Modern-day clinicians (e.g., Courtois, 1992; Frederickson, 1992) and other writers (Bass & Davis, 1992; Blume, 1990; Engel, 1989) repeatedly stress that solving one's problems is possible only by uncovering and facing hidden trauma memories head on; only by doing so can the trauma's power over one's life be defused. For example, in *The Courage to Heal*, Bass and Davis write, "Survivors often doubt their own perceptions. Coming to believe that the abuse really happened, and that it really hurt you, is a vital part of the healing process" (p. 58). Similarly, Engel writes:

Rather than forgive and forget, you will be freed only if you remember and release both pain and anger. You will need to . . . remember and relive the experience . . . and confront those dark shadows and villains, once and for all, so they can be banished forever. . . . Remembering these feelings, reliving the experience, can only serve to relieve their intensity. . . . The key to beginning recovery is to bring your experiences out in the open. This will rob the abuse of its potency. (p. 4)

Although evidence for the popularity of the theory and techniques associated with memory recovery therapy is not difficult to find in self-help books, one might ask how widespread such beliefs and practices are among highly trained professionals. Indirect evidence comes from the prevalence of therapeutic case reports and treatment recommendations recently published in books and professional journals (e.g., Briere, 1989; Courtois, 1992; Herman, 1992; Laidlaw & Malmo, 1990; Ratican, 1992; Richardson, 1994). These authors, and others, express the belief that the

absence of memory for portions of one's childhood is a reliable indicator of hidden trauma, provide as evidence case examples in which clients who initially had no memories of childhood abuse eventually developed them, and offer suggestions for how to go about recovering hidden memories of childhood trauma.

More direct evidence of the prevalence of memory recovery therapies comes from a recent survey of the beliefs and practices of psychotherapists from a variety of disciplines (Poole, Lindsay, Memon, & Bull, 1995). Licensed doctoral psychotherapists, randomly selected from two national registers in the United States and Great Britain, completed a survey regarding their therapeutic practices with women who were known or suspected survivors of childhood sexual abuse. They were also asked to state their opinions about memories of childhood sexual abuse recovered in therapy. Responses indicated that the majority of highly trained psychotherapists do not focus on treating survivors of childhood sexual abuse, but a sizable minority of therapists tend to see many cases. For example, although two thirds of the therapists indicated that less than 10% of their female clients in the last two years had reported histories of childhood sexual abuse, approximately 20 therapists (10%) said 30% or more of their clients had reported such histories. Over twice as many therapists (23%) believed that childhood sexual abuse was an important factor underlying the psychological distress of half or more of their clients. Thus, many therapists seem to believe that childhood trauma underlies much adulthood psychopathology.

Therapists in the survey (Poole et al., 1995) were also willing to endorse the concepts of repression and recovery. When specifically questioned about repressed memories of abuse, most therapists indicated that they had occasionally formed the opinion that a client who initially denied having been abused as a child probably had such a history, and a majority endorsed the belief that it is important to remember the abuse. However, there was little agreement among therapists as to what might indicate a history of abuse. Of the 85 indicators listed, only 22 were agreed upon by more than 5% of therapists ($n = 166$). In fact, when averaged across the three samples, the highest-ranked indicator (sexual dysfunction) was listed by only 14% of therapists. Likewise, although most therapists reported using at least one memory recovery technique with their clients, there was a distinct lack of agreement on which techniques they considered acceptable. Therapists seemed to be somewhat blind-sighted when it came to their own practices. Whereas nearly all therapists thought it was possible for a client to come to believe she was sexually abused as a child even though no abuse had occurred, very few suspected it had happened with their clients. Finally, 25% of therapists were identified as "memory focused." To meet this criterion, therapists

had to indicate a belief that memory recovery is important for successful therapy, that they sometimes formed the opinion that a client had been abused who denied it, that they were sometimes fairly certain of such a diagnosis after only one therapy session, and that they used two or more memory recovery techniques with suspected survivors of childhood sexual abuse. Most important, memory-focused therapists were over twice as likely as other therapists to report that their clients eventually recovered sexual abuse memories in therapy.

The data provided by Poole and her colleagues (1995) indicate that although memory-recovery therapy may not be the norm among highly trained psychologists, a substantial minority make the treatment of hidden sexual abuse their primary focus. Furthermore, a majority of psychotherapists believe the theory behind recovered memory therapy to be valid, and have used at least one technique to uncover repressed memories of abuse in their clients. Extrapolating to the wide range of registered and nonregistered therapists practicing in the United States and Britain, Poole et al. estimated that well over 100,000 women have worked with memory-focused psychotherapists in the past few years. Given this estimate, it is easy to imagine that substantial numbers of people may have recently recovered memories of childhood sexual abuse that may or may not have actually occurred (see also Lindsay & Read, 1994).

Prevalence of Repression and Recovery of Childhood Sexual Abuse Memories

How common is it to have no memory for childhood sexual abuse? Several studies have addressed this issue (e.g., Briere & Conte, 1993; Feldman-Summers & Pope, 1994; Herman & Schatzow, 1987; Williams, 1994). Herman and Schatzow reported that of 53 women in group therapy for incest survivors, 64% "did not have full recall of the sexual abuse" (p. 4). However, only those women who "reported that they had always remembered the abuse in detail," had not been aware of any major memory gaps, had not recently recalled any new memories, and did not recover additional memories in the course of therapy were judged to have no memory deficits (p. 4). Thus, women who may have recovered memories after entering therapy or who may have experienced normal decay of memories for decades-old events were included in the 64%. In a similar study, Briere and Conte gathered data from 420 women and 30 men in individual or group therapy who reported having experienced forced sexual contact before the age of 16 with someone five or more years older. Two hundred sixty-seven people (59.3%) responded affirmatively to the question, "During the period of time between when the first forced sexual experience happened and your eighteenth birthday was there ever a time when you could not remember the forced sexual experience?". In a survey asking 330 therapists about their personal experiences with

childhood sexual abuse, Feldman-Summers and Pope reported that 41% of those who admitted to such a history said that there had been times when they could not remember the abuse.

Critics of these studies (e.g., Loftus, Pollonsky, & Fullilove, 1994; Ofshe & Watters, 1994) have pointed out that people in therapy for childhood sexual abuse may be subject to a number of biases, including overestimating their own probability of having been abused, that may unwittingly influence their responses. In addition, the way the key questions were worded may have resulted in misinterpretation. For example, in the Briere and Conte (1993) study, it cannot be determined how many people who responded affirmatively meant that there had been a period of time when they had not wanted to think about, or had not actually thought about the forced sexual experience. Although these three studies indicate that many people may report temporary or partial memory deficits for alleged abuse, these results should not be interpreted as evidence for widespread amnesia for abuse.

Loftus, Pollonsky, and Fullilove (1994) attempted to address these criticisms in their own study. Fifty-two women who reported childhood sexual abuse histories responded to an item asking them which of three descriptions best characterized their abuse memories. Sixteen of the women (31%) indicated some degree of forgetting. Specifically, six women (12%) reported that they had remembered only parts of the abuse their whole lives, and 10 women (19%) reported that they had forgotten the abuse for a period of time, but had the memory return later. Although much lower, these figures still suggest that a substantial proportion of people who report having been abused will have experienced some temporary lack of memory for the incidents. However, two criticisms remain relevant to this study: The participants were women undergoing treatment for substance abuse, which may rely on similar theories and techniques as sex-abuse therapy (e.g., group therapy, hypnotic suggestion), and again, the wording of the key item is rather confusing, so results must be interpreted cautiously.¹ Only one study with a non-clinical population has been reported to date. Sheiman (1993) surveyed 196 undergraduate students regarding their histories of

¹ The question instructions read: "People differ in terms of how they remember their abuse. Which of the following experiences best characterizes your memory? 1. Some people have always remembered their abuse throughout their lives, even if they never talked about it. 2. Some people have remembered parts of the abuse their whole lives, while not remembering all of it. 3. Some people forget the abuse for a period of time, and only later have the memory return." (Loftus, Pollonsky, & Fullilove, 1994, p. 75) It is possible that some people may have responded according to their beliefs about other people rather than describing their own memories.

childhood abuse. Of the 12% who reported having been sexually abused in childhood, half said that there had been a period of time during which they could not remember the abuse.

In a recently reported study, 129 women were re-interviewed 17 years after having been brought to a hospital as children following reports of sexual abuse (Williams, 1994). When asked to report on childhood sexual abuse experiences, 38% did not mention the incident that had brought them to the hospital, or any other incident involving the same perpetrator. Williams concluded that "having no memory for child sexual abuse is a common occurrence" (p. 1173), but critics have suggested alternative explanations for her data (Loftus, Garry, & Feldman, 1994). Williams noted that women who did not report the target event tended to be younger at the time of the abuse than the women who were able to report it. The women in the study ranged in age from 10 months to 12 years old when they were first brought to the hospital. These facts suggest at least two alternative explanations. First, it is possible that some of the women who did not mention the target childhood event did not understand the meaning of the event at the time it occurred. Second, at least some women may have been susceptible to normal childhood amnesia for the events, as they occurred within the first few years of life (for a discussion of infantile amnesia see Howe & Courage, 1994). Even if it is assumed that the girls were old enough to understand and remember at the time of the alleged abuse, the fact that many women did not report memories for the events in question does not mean that those memories were repressed, as some have claimed (e.g., Kandel & Kandel, 1994). Rather, it is more reasonable to assume that the women simply forgot the abuse (Loftus, Garry, & Feldman, 1994).

These six studies provide the best data regarding how often childhood sexual abuse memories might be at least temporarily forgotten. It remains difficult to reach a firm conclusion regarding the prevalence of *repression* for childhood sexual abuse memories. Repression and forgetting are not the same thing. Inherent to a definition of repression as it is currently understood is the possibility of relatively complete memory recovery. Many events that have been temporarily forgotten may later be remembered, but it is unlikely that the memories will be completely accurate. As I will describe in a later section, normal memory is prone to all sorts of deficits and decay. Thus, the most defensible statement one can make regarding the probability of repressing recoverable memories of childhood sexual abuse is that somewhere between 19% and 64% of self-identified survivors have experienced at least some period of forgetting for at least part of their abuse experiences.

The evidence supporting beliefs in repressed memories of childhood sexual abuse comes mainly from self-reports of clients who claim to have recovered memories for abusive experiences, and from case reports and surveys of psychotherapists who claim to have seen such clients in therapy, or who claim to have successfully used memory recovery techniques to uncover buried abuse memories. What is the value of such evidence?

Critique of "repression and recovery" evidence

Symptom checklists. It is assumed that symptom checklists provide valid indicators of abuse. Several lines of evidence indicate that this is a fallacious assumption. First and foremost, symptom lists (e.g., Bass & Davis, 1992; Blume, 1990; Engel, 1989) have been compiled by psychotherapists who specialize in treating the sequelae of childhood sexual abuse, and include characteristics common to their clients. Because no independent corroboration was sought regarding whether or not clients were actually abused, it is likely that these symptom lists are based both on self-identified victims of childhood abuse and on women who were identified as survivors on the basis of their symptoms alone. Obviously, this circularity is problematic. Using symptom lists to diagnose childhood sexual abuse runs the risk of identifying as survivors both women who have and have not actually been abused.

There are other problems. Symptom checklists are complex and often contradictory, and do not indicate what number or combination of symptoms is necessary to make an accurate diagnosis of abuse. It has been charged that, because the checklists include everything, they are diagnostic of nothing (e.g., Loftus & Ketcham, 1994). There are 34 general categories listed on Blume's "Incest Survivor's Aftereffects Checklist," and many include multiple, often opposite, characteristics (see Blume, 1990, pp. i-iv and xxvii-xxx). For example, one category includes "Trust issues: inability to trust (trust is not safe); total trust; trusting indiscriminately," and another, "High risk taking . . . inability to take risks" (p. ii). The most controversial symptom is perhaps "repression of memories," which appears under the heading "Denial" along with "having dreams or memories," having "sensory flashes," and "remembering the surroundings but not the event" (p. iv). As this example demonstrates, even a lack of memories is no deterrent to an incest-survivor diagnosis. In fact, in combination with telltale signs of trauma, a lack of memory is seen as a prime indicator that one is repressing memories of childhood sexual abuse (e.g., Engel, 1989, p. 2, writes, "If you have ever had reason to suspect that you may have been sexually abused, even if you have no explicit memory of it, the chances are very high that you were"; see also Bass & Davis, 1992; Blume, 1990).

The use of symptom checklists as a diagnostic tool rests on the assumption that a pattern of symptoms exists that reliably reveal hidden childhood abuse. There is little evidence, however, to indicate that a consistent set of symptoms, or "post-sexual-abuse syndrome" can be identified (Beitchman, et al., 1992). Support for diagnoses of childhood sexual abuse in the form of hard evidence (e.g., medical or police records) would seem crucial. It is unlikely, however, that such evidence will be sought in the context of therapy (Herman, 1992; Lindsay & Read, 1994). Therapists have asserted that their role is not to investigate whether or not abuse claims are valid; rather, their duty is to provide support and encouragement as their clients struggle to come to grips with possible past trauma (e.g., Blume, 1990). However admirable in spirit, this may be a somewhat dangerous practice. Indiscriminate use of symptom checklists without the benefit of corroboration may be subject to the charge that diagnoses of abuse in the absence of memory are indicative of nothing but the therapist's predisposition to believe everyone has been abused.

Repression. Although no one doubts the potential of the human mind to cope with horrific experiences in creative and unusual ways, the main problem with the evidence for repression is that it is anecdotal. It has been argued that the only evidence for repression comes from "psychoanalysts who presume the existence of the repressive mechanism" (Ofshe & Watters, 1993, p. 5). This conclusion is based in part on the lack of agreement among therapists as to which symptoms might be taken as reliable indicators of repressed memories, and in part on a lack of evidence in support of the concept of repression. In fact, in a review of over 60 years of experimental research, Holmes (1990) concluded that there is no convincing evidence that supports the existence of repression. Long before the advent of such research, even Freud had abandoned his seduction theory, recanting his early belief that adult neuroses were produced by traumatic sexual experiences in childhood that had been repressed (see Herman, 1992; Freud, 1894/1971). Instead, Freud came to believe that the coercive sexual experiences described by his patients were fantasized rather than truly experienced. As Freud was driven to reassess his theories and interpretations regarding repressed memories of childhood sexual abuse, so too are modern psychological scientists. Doubts about the existence of repression and what is considered to be its shaky theoretical foundation run to the extreme. One prominent critic recently wrote, "Recovered memory therapy is an example of the maxim that those who ignore history are doomed to repeat it" (see Ofshe & Watters, 1993, p. 7).

Memory recovery. Most psychologists believe that it is possible that some people with no recollections of childhood sexual abuse were actually abused but do not remember the

experience (Poole et al., 1995). Cognitive scientists consider it unlikely, however, that memories of traumatic childhood experiences might be recovered in pristine form years later, in adulthood (e.g., Loftus, 1993; Loftus & Ketcham, 1994). Few, if any, events in a person's life are later perfectly remembered. Many autobiographical memories may contain only elements of truth that have been mixed with interpretations and suggestions to form convincing, but inaccurate stories (e.g., see Loftus, 1979). Thus it is not the simple forgetting and later recall of events that is in question, but the mechanism of repression and the possibility of complete and accurate recovery of memories. It should be pointed out that no one doubts that the sexual abuse of children is all too common in our society. Few doubt the stories of people who say they were abused and have always remembered it, or that there were times when they did not think about the abuse. Even fewer doubt the sincerity of people's beliefs that they were abused in childhood but only recently recalled it. What many doubt is the veracity of newly-recovered memories of decades-old abuse that were previously not recalled, or even suspected (e.g., Lindsay & Read, 1994, 1995).

Anecdotal evidence that recovered memories are suspect comes from the reports of the False Memory Syndrome (FMS) Foundation. The FMS Foundation is a nonprofit organization based in Philadelphia that, among other things, provides information and support services to parents claiming to have been falsely accused of abuse by their adult children. Representatives report logging over 17,000 phone calls since the inception of the Foundation in 1989 (personal communication, October 27, 1994). Over 2500 people had become members of the organization by the end of its fifth year in existence. The membership includes a growing number of "retractors," people who have come to believe that the memories of abuse they recovered are in fact untrue. Retractions of abuse allegations that were based on formerly repressed memories have been widely reported (e.g., "Childhood sexual abuse?", 1993; Jaroff, 1993; Loftus, 1993). The FMS Foundation reports having conducted extensive interviews with 175 retractors, and to have received phone calls about an additional 125 undocumented retractions (personal communication, October 27, 1994). Although it is unknown at this time how many of these people recovered abuse memories while involved in therapy, FMS representatives report that over half of the retractors they have spoken to or heard about are suing their former therapists. Although there is no evidence that the people who have contacted the False Memory Syndrome Foundation are innocent of abuse or that retractors were not actually abused, the figures reported by the FMS Foundation suggest that the accuracy of at least some recovered memories of childhood sexual abuse may be questionable.

What makes the false-memory claim more convincing is the fact that several professional organizations (notably, the American Medical Association, American Psychological Association, and American Psychiatric Association) are looking into the possibility that certain techniques being used in therapy are ill-suited for the purpose of memory recovery. Public statements regarding this issue have warned that the use of such techniques may produce confidently held, but false, memories that in most cases are indistinguishable from real memories (e.g., American Medical Association, 1994; AMA Council on Scientific Affairs, 1985). Thus, memory-recovery therapies that incorporate suggestion, such as hypnotic age regression, sodium-amytal interviews, dream interpretation, and guided imagery, have been labeled "risky" and are not recommended (Lindsay & Read, 1994).

Evidence against repression and recovery

Normal memory processes. How likely is it that long-lost memories may suddenly be recalled in complete and accurate form after many years have passed? Research on normal memory processes indicates that the answer is "not very likely at all." The idea of complete repression and complete subsequent recovery of traumatic memories does not fit with what we know about normal autobiographical memory (see Lindsay & Read, 1994). The human perceptual system has been likened to a video camera, capable of accurately recording all stimuli in its focus and retaining them indefinitely. By this analogy, memories for events long past would be stored indefinitely in their original form, able to be called forth at some later time when they might be relived in their original intensity. Memory deficits are taken to indicate repression, and the accuracy of returning memories is assumed. In fact, recovered memories of decades-old abuse are often described as vivid, detailed recollections, complete with smells, feelings, and sounds. But are they accurate?

Evidence for the permanence of long-term memory is weak (Loftus & Loftus, 1980). Forgetting or other difficulties may occur at any stage of processing. Normal memories fade over time; forgetting is gradual and continuous (Squire, 1989). Without rehearsal or repetition, memory traces are subject to decay. Thus the failure to report a memory is often due to normal limitations of memory. When they are reported, normal autobiographical memories are rarely complete, and even more rarely are they completely accurate. Under the best of circumstances, detailed descriptions of past events may be difficult to produce, and harder to substantiate. Because it is clear that the human information processing system has limits, the analogy to a videotape recorder is simply not accurate (Loftus & Loftus, 1980). Given the breadth of the evidence regarding the

limited nature of normal human memory, it seems safe to say that lack of recall is not valid evidence of repression, and memories that are eventually reported may not necessarily be accurate.

Memory for traumatic events. Some therapists cite the emotional intensity of memory recovery as evidence that the resulting memories must reflect previous traumatic experiences (e.g., Bass & Davis, 1992). No one doubts that memories of abusive experiences might cause intense psychic and emotional pain when carried throughout a victim's life. There is little evidence, however, that people completely bury memories for such traumatic experiences. Data generally agree that people tend to retain long-term memories for at least parts of certain traumatic incidents they have experienced (e.g., Christianson & Loftus, 1987; Terr, 1991). For instance, Terr (1983, 1988) has reported two studies of children's long-term memory for traumatic events. In the first study, 25 children whose school bus had been hijacked were interviewed 4-5 years after the event. In the second study, Terr interviewed 32 children who had experienced various sorts of "psychic trauma." Terr reported that the memories of both groups of children remained "fairly accurate" across the time spans studied. What these examples demonstrate is that, at the very least, repression is not the rule in the experience of horrific events.

Although total repression is unlikely, most people who report having experienced traumatic childhood abuse consistently report some degree of forgetting (e.g., Briere & Conte, 1993; Herman & Schatzow, 1987; Loftus, Pollonsky, & Fullilove, 1994; Williams, 1994). Evidence from a controlled laboratory study indicates that although memories for the gist of traumatic events may be retained over time, memories for the details of those events tend to be impaired (Christianson & Loftus, 1987). Research on children's memories for relatively recent traumatic experiences also supports this finding (Terr, 1983, 1988). Although Terr's studies generally supported the long-term accuracy of children's memories for traumatic events, many of the children's reports were incomplete or contained distortions. On the basis of this evidence, it is clear that even memories for salient traumatic events are subject to omissions and errors of various kinds.

Research supporting the suggestibility of episodic memory

Numerous sources recount emotionally charged stories of survivors describing recently unearthed memories of childhood abuse (e.g., Loftus & Ketcham, 1994). Many accounts are replete with detailed descriptions of sights, sounds, smells, and sensations. Recovered memories are often recounted with difficulty, accompanied by great emotional distress. Recurring questions ask, Why would anyone make up such horrible stories if they were not true? Why would anyone put themselves through such pain? Although scientists and therapists generally agree that few

people deliberately make up memories, scientists argue that many recovered memories are likely the products of suggestive influences (e.g., Lindsay & Read, 1994; Loftus, 1993). Memory recovery therapies may provide an environment in which recovering traumatic memories is encouraged, and even expected. This section outlines possible mechanisms by which illusory memories for imaginary events might be generated.

Misleading suggestions. It is widely agreed that memory reports are subject to external suggestion (e.g., Lindsay & Johnson, 1989; Loftus, 1979; McCloskey & Zaragoza, 1985; Tversky & Tuchin, 1989; Wells & Loftus, 1984). Evidence regarding the malleability of episodic (i.e., event) memory reports comes from numerous studies that have used a misleading post-event information paradigm (Loftus, Miller, & Burns, 1978). After witnessing an event or series of events, people are exposed to misleading suggestions imbedded in a series of questions about those events. When later given a memory test, people often report memories consistent with the misleading suggestions rather than with the actual events that were witnessed. Although such studies do not conclusively show that event memories are irrevocably changed by exposure to misleading information (Zaragoza, McCloskey, & Jamis, 1987), they do show how easily memory reports can be influenced.

A slightly different type of study shows the influence of misleading suggestions made in conjunction with one type of risky memory recovery technique, hypnosis (Laurence & Perry, 1983). While under hypnosis, 27 highly hypnotizable people were told they had experienced an event that did not actually occur: that loud noises had woken them up one night the week before. When questioned about the event post-hypnosis, the reports of 13 people were consistent with this suggestion. Even after being told that the memories were merely suggested under hypnosis, six people remained "unequivocal in their certainty" that they had actually been awakened by the noises (Laurence & Perry, 1983, p. 524). Other studies with highly hypnotizable people have shown how the power of suggestion can create pseudomemories for such unlikely traumatic experiences as past-life abuse (Spanos, Burgess, & Burgess, 1994) and satanic ritual abuse (Ofshe, 1992).

Source monitoring confusions. Even in the absence of hypnotic suggestion it has been demonstrated that people sometimes create memories for traumatic events that they did not actually experience. In a field study, 133 children were interviewed about a real-life sniper attack that had occurred at their grade school playground (Pynoos & Nader, 1989). Several children reported distorted memories of the attack. Specifically, some children's reports placed them nearer

the action or in more danger than they had actually been. For example, one child reported coming out of the school building to see the assailant standing over the body of her friend on the playground, but in fact the sniper had shot from across the street. Another child reported having been quite near the sniper when the shooting began, but in fact she was half a block away, safely out of the line of fire. Presumably, the children incorporated into their own memories stories they had heard from other children who had actually been traumatized by the experience (Loftus, 1993).

Anecdotes abound illustrating similar confusions between events that people actually experienced and events that they were only told about. One oft-related anecdote involves psychologist Jean Piaget's memory of an attempted kidnapping when he was two years old (see Loftus & Ketcham, 1994). Piaget vividly recalled the view from his stroller as his nanny struggled to fend off the kidnapper, and even vaguely recalled the resulting scratches on the nanny's face. For so heroically defending him, Piaget's nanny was rewarded with a watch. Evidently the experience weighed so heavily on the nanny's mind that she eventually returned the watch with a letter explaining that she had made up the entire incident. Piaget has forced to conclude that the memory he recalled so vividly from his childhood must have resulted not from having experienced the event, but from having repeatedly heard the story told to him as a child.

This type of source monitoring confusion (i.e., difficulty distinguishing the origin of one's memories) has been studied extensively in controlled laboratory experiments with both children and adults (see Johnson, 1988). In one study (Haugaard, Reppucci, Lourd, & Nauful, 1991), 142 girls in preschool and kindergarten (ages 4 to 7.3 years) twice watched a videotape in which they saw a man and young girl interacting. Later in the video, the girl lied about the interaction, saying she had been assaulted by the man. The children were questioned about the events in the videotape immediately after watching it. Consistent with the lie the girl in the videotape told but not with the actual events depicted in the tape, 41 children (29%) reported that the man in the videotape had hit the girl. Thus, these children were willing to report having seen what had only been suggested, even though the girl's story was inconsistent with what they had actually seen. This apparent source monitoring confusion is noteworthy for two reasons: First, it occurred for an event that is similar in content to many traumatic recovered memories; and second, it occurred despite the fact that the children appeared to pay close attention to the events as they occurred, and appeared motivated to respond correctly to questions about the events they had witnessed.

Reality monitoring errors. Reality monitoring errors (Johnson & Raye, 1981) compose a specific category of source monitoring confusions involving difficulties in

discriminating between real and imagined events. Johnson and Raye proposed that several types of information associated with memories (e.g., perceptual and contextual aspects) help distinguish between real and imagined events. For example, memories for real events tend to be more vivid, complete, and more easily generated than memories for imagined events (Johnson, Foley, Suengas & Raye, 1988). Sometimes, however, imagined memories may be especially intense, or have other characteristics that make them seem real (e.g., recurrent nightmares or fantasies involving everyday situations may seem especially realistic).

Suengas and Johnson (1988) have recently demonstrated that rehearsal (i.e., mental repetition) of certain aspects of imagined events can greatly influence their seeming reality. Participants in three studies were given a series of events to actually perform (perceived events), or to simply think about performing (imagined events). Over a period of days, they were asked to rehearse perceptual, cognitive, or affective aspects of the perceived and imagined events. Participants then completed a 39-item questionnaire assessing the characteristics of their memories for each event. Rehearsal increased reporting of thoughts and feelings associated with imagined events. In fact, repeated rehearsal of apperceptive event characteristics increased the thoughts and feelings associated with imagined events to the point that they became indistinguishable from perceived events along this dimension. In addition, rehearsal increased perceptual characteristics (e.g., clarity) associated with both kinds of memories. Suengas and Johnson (1988) postulated that repeatedly rehearsing imagined events while failing to rehearse perceived (actual) events would increase the similarity of memory for these types of events along perceptual dimensions as well, making reality monitoring extremely difficult. In other words, differential rehearsal of certain aspects of memories for real and imagined events might reduce discrepancies between such memories to the extent that they could become indistinguishable from one another.

"Memory implantation" studies. Recent experimental research has addressed the question of whether or not memories for traumatic events can be induced by repeated suggestion (Loftus & Coan, in press). Anecdotal evidence for memory implantation based on this unpublished study has been widely described (e.g., Lindsay & Read, 1994; Loftus, 1993; Loftus and Ketcham, 1994). Five people (two children, one adolescent, and two adults) were led to believe that they had experienced a mildly traumatic event that they had not actually experienced (having been lost in a shopping mall or department store at age 5). On several occasions, participants were asked to work on remembering the event. Adult participants were also asked to record their memories in a journal (as clients in psychotherapy might do; see Lindsay & Read, 1994). After varying amounts of time

and rehearsal, all five participants began to report vivid and detailed memories of the shopping mall experience (e.g., feeling panicky, crying for their mothers, etc.). One boy even reported a detailed description of the man who he said had found him and returned him to his mother. Loftus has concluded that this study provides evidence of the ease with which false memories of traumatic childhood events can be implanted, and has suggested that memories of traumatic childhood events "recovered" in therapy may be the products of similar influences.

This study, and the conclusions drawn from it, have been criticized on several grounds (see Olio, 1994). Although family members expressed their belief that the study participants had never actually been lost in a shopping mall, it is possible that participants were remembering actual experiences that they had never reported to anyone. The experience of getting lost as a child may have a high base rate in the population, whether often reported or not. More importantly, it has been argued that the recovery of a memory of this sort is qualitatively distinct from the recovery of abuse memories in therapy in several ways. The shopping-mall experience is a single event, but clients in therapy often recover memories for multiple traumatic experiences. The trauma associated with being lost in a shopping mall is obviously much less severe than that associated with childhood sexual abuse. In some cases, the memory was suggested by a trusted sibling or another authority figure to a suggestible child. Adults may be less suggestible. Nevertheless, there are direct parallels between the situation created in this experiment and recovered memory therapy. For instance, an authoritative experimenter may be analogous to a trusted therapist, and people in therapy may well be highly suggestible. It is important to note that although ethical considerations necessitated that the event used in this memory-implantation experiment be relatively mild, participants still created detailed, confidently-held memories. Despite criticisms, therefore, it can safely be concluded that it is possible to induce the experience of illusory memories for at least mildly traumatic events.

The question of iatrogenic memories

Studies demonstrating reality monitoring confusions (e.g., Suengas & Johnson, 1988) and misinformation effects (e.g., Loftus & Coan, in press) show that it is possible to influence people's reports of what they remember about everyday and even mildly traumatic events. Leading suggestions about events, whether made under hypnosis (e.g., Laurence & Perry, 1983) or not (e.g., Haugaard et al., 1991), can have a powerful impact on memory reports. Repeated rehearsals can even increase similarities between memories for real and imaginary events (e.g., Suengas &

Johnson, 1988). What do these lines of research suggest about memory-recovery therapies? Might illusory memories of abuse be created in therapy?

Several elements seem to be in place in memory-recovery therapies that are likely to increase the risk of inadvertently creating false memories of childhood abuse. According to research in the area of social influence (e.g., Petty & Cacioppo, 1986), message-related variables such as argument strength and repetition, and individual-difference variables such as personal relevance, motivation, and openness to persuasion all affect the likelihood that a person's beliefs will be affected by persuasive messages. All of these factors are pertinent to memory recovery therapies. People entering therapy may be highly motivated and highly suggestible, looking to the therapist for answers to long-standing problems that they have been unable to solve by themselves (see Loftus & Ketcham, 1994). The therapist may appear to be a powerful and credible source of knowledge, offering wisdom based on years of clinical experience or higher education. The therapist may provide assurance that other people with similar problems have found solutions with his or her help. The trust placed in the therapist, who serves as both confidante and ally, may increase clients' willingness to accept the suggestion that childhood abuse may underlie their problems, and may also increase their willingness to try to remember what might have happened to them.

Several other elements common to memory-recovery therapies may be particularly problematic. Poole et al. (1995) have established that many psychotherapists are using various sorts of suggestive techniques to prompt the recovery of memories for childhood sexual abuse, including instructions to work at remembering, instructions to give free reign to the imagination, journaling (e.g., writing down anything remembered about one's life that might reflect a history of abuse), guided imagery (i.e., leading the patient through imagining possible abuse scenarios), hypnosis, and dream interpretation (i.e., interpreting elements contained in dreams consistent with a sexual abuse theme). Several of these memory-recovery techniques freely encourage the formation of images and repeated attempts at recall. As research on reality monitoring shows, events that exist as products of the imagination alone can begin to seem more real with repeated generation (Suengas & Johnson, 1988). Lindsay and Read (1994) have argued that, whereas these techniques might be helpful for people who really were abused, they are likely to be unduly suggestive for people who have not. Combining multiple suggestive techniques in a prolonged search for hidden memories may make memory-recovery therapies particularly dangerous: The

expectation of finding trauma under these circumstances may promote the creation and confident reporting of false memories for events that never actually occurred (Lindsay & Read, 1994).

Taken together, research on persuasion and the suggestibility of memory provide convincing arguments supporting the possibility that false memories may be created in therapy. Memory-recovery therapies may set up a powerfully suggestive environment within which the potential for the generation of illusory memories is substantial. Can this type of situation be artificially simulated in the laboratory, and if so, will it contribute to increased reports of memories for events never experienced? In the current study, several elements of memory recovery therapy were simulated in order to explore their potential to create false memories. Participants were exposed to a mildly traumatic event, were told by an authority figure that they had experienced some memory loss for the event, and were encouraged to work on recovering their memories for the alleged event using variations on techniques common to memory recovery therapies (i.e., imagining and writing about "forgotten" events).

There were three major questions to be answered in this study: 1) Can combined exposure to a memory recovery theory and suggestive memory recovery techniques induce illusory memories for events that never occurred?; 2) Can simple exposure to a repression and recovery theory of memory lead to the generation of false memories for "forgotten" events?; and 3) In the absence of an explicit memory recovery theory, is the use of such memory recovery techniques as imagery and journalling sufficient for false memories to be produced?

The assumption underlying the first question is that a combination of suggestive theory and suggestive techniques may act as a powerful motivator toward creating illusory memories for events that were never experienced (e.g., Lindsay & Read, 1994). The primary hypothesis in this study is that theory and technique will interact to produce false memories for unexperienced events. If such an interaction is found, it would be beneficial to look at the separate contributions of each factor to the creation of false memories. It is possible that theory or technique alone may be enough to encourage the formation and reporting of illusory memories.

The second question assesses the power of suggestion in this type of situation. It asks whether mere exposure to a repression and recovery theory is enough to motivate the creation of illusory memories for events that never occurred. Previous laboratory research using a misleading post-event information paradigm supports the idea that suggestion alone may encourage false memory reports (e.g., Loftus, et al., 1978). Coming from a credible source, the suggestion that one

may be repressing a memory may begin to seem likely, and may eventually lead to false memory reports (Loftus & Ketcham, 1995).

The third question focuses on technique. It asks whether rehearsal alone, in the form of imagining and writing about difficult scenes, can lead people to experience enhanced memory and to produce false reports for scenes they did not view. Research on reality monitoring confusions has shown that rehearsal can increase the clarity and other aspects of imagined events (Suengas & Johnson, 1988). Repeated imagining may prove a powerful stimulus toward the creation of illusory memories.

Study Overview

Participants were exposed to a stressful event by watching a videotape that included scenes of explicit and implicit aggressiveness and sexual violence perpetrated on women and children. It was then suggested to participants that they had seen certain scenes that in fact they had not. Therefore, it became apparent to participants that although they remembered certain scenes from the videotape quite well (real scenes), they had evidently experienced some memory disruptions for other (fake) scenes. People in the experimental condition then saw a second videotape in which an actor portraying a clinical psychologist presented a theory of how memories for traumatic experiences can be repressed and subsequently recovered. Control subjects did not see this videotape. All participants were asked to mentally rehearse scenes that purportedly appeared in the violent videotape by engaging in imagery and journalling tasks (i.e., imagining and writing about the scenes) at various points over a 48-hour period. Participants described their memories for once-rehearsed and thrice-rehearsed real and fake scenes on Memory Characteristics Questionnaires (MCQs; adapted from Johnson, et al., 1988). They also completed a questionnaire regarding how confident they were that each scene on a list of rehearsed and unrehearsed real and fake scenes had actually appeared in the violent videotape, and a number of ancillary measures. The complete study design involved one between-subjects variable (memory theory) with two levels (control, repression), one within-subjects variable (scene type) with two levels (real, fake) and one within-subjects variable (rehearsal) with three levels (0, 1, or 3 rehearsals). Table 1 illustrates this design. The primary dependent variables were mean MCQ scores and mean confidence estimates.

Predictions

Memory characteristics

1) Memories for scenes that participants actually saw (real scenes) will be stronger than for scenes that participants did not see (fake scenes), as reflected in relatively higher MCQ scores.

Table 1

Study Design and Target Scenes

Rehearsals	Memory Theory			
	Control (n=24)		Repression (n=24)	
	Real	Fake	Real	Fake
3	abcd	efgh	abcd	efgh
1	abcd	efgh	abcd	efgh
0	i-t	u-x	i-t	u-x

Note. Individual participants rehearsed only two of the four scenes listed in each cell. Real and fake scenes were yoked, and the order in which scenes were rehearsed was counterbalanced. For example, an individual participant who rehearsed real scenes *a* and *b* three times would also rehearse fake scenes *e* and *f* three times in one of four predetermined orders: *aebf*, *afbe*, *beaf*, or *bfae*. The same participant would rehearse scenes *c*, *d*, *g*, and *h* during the second session.

2) As the number of rehearsals increases, so should the complexity of memory descriptions (e.g., Suengas & Johnson, 1988). Therefore, a main effect for rehearsals is expected such that MCQ scores will be higher for scenes rehearsed three times than for those rehearsed only once.

3) Repeated rehearsal should lead to a greater increase in reported memory characteristics for fake scenes than for real scenes. Real scenes should be recalled clearly after the first rehearsal. Additional rehearsals are unlikely to substantially improve one's memory for scenes about which there was little doubt in the first place. Memories for fake scenes, on the other hand, may be greatly enhanced by rehearsal. Research has shown that repeated rehearsals of imaginary events can result in reality monitoring errors (Suengas & Johnson, 1988). Rehearsing fake scenes three times should make memories for them much more vivid than rehearsing them only once.

4) People who hear the repression theory will describe more complex event memories than people who hear no memory theory. The suggestion that one may have repressed recoverable

memories in effect gives free reign to the imagination, and may result in increased reporting of memories (Lindsay & Read, 1994).

5) Fake scenes will be described more vividly by participants in the repression condition than those in the control condition. Participants in the control condition would have no reason to report memories of which they are unsure (e.g., memories for fake scenes). The repression theory gives permission to identify images as memories, and provides the motivation to report them.

6) Repeated attempts to generate memories for fake scenes should enhance the tendency to report memories for such scenes, especially when one has been exposed to a repression and recovery theory. When repeated attempts to generate memories are made, people may begin to believe more strongly in the validity of their memories if they have been given reason to do so than if they have not. The repression theory provides a basis for recovering traumatic memories as well as a label for any images that are generated by subsequent rehearsals. People who have no such theory on which to rely may simply dismiss resultant images as random figments of the imagination rather than identifying them as reliable products of memory.

Confidence

1) People will be more confident in their memories for real scenes than for fake scenes. They will be more confident that they actually saw the real scenes than the fake scenes.

2) Participants in the repression condition should be more confident than control participants that fake scenes actually appeared in the violent videotape. The presentation of the repression theory by a credible source combined with support and encouragement from the experimenter may increase people's confidence that there is something to be remembered, even if they are unable to recall anything from those scenes. Repression-theory and control participants should be equally confident that they saw the real scenes from the violent videotape.

3) The increased confidence, relative to control participants, that repression-condition participants place in their memories for fake scenes should be enhanced by repeated rehearsals. Repeated attempts to imagine fake scenes should enhance memory characteristics for those scenes, as well as confidence that the scenes actually occurred. Even if participants are unable to recall "forgotten" scenes from the violent videotape after several attempts to imagine them, their confidence that they saw the scenes may still be affected by having heard a repression theory. People in the repression condition may be more likely than those in the control condition to believe that the memory is there, but temporarily inaccessible. Because scenes that actually

appeared in the violent videotape should be well-remembered by everyone from the start, rehearsal should not increase confidence in memory for real scenes.

METHOD

Participants

Sixty-nine women recruited from the undergraduate psychology pool at Iowa State University participated in individual sessions in which they were randomly assigned to one of the two between-subjects conditions (control or repression). Participants in this study earned two extra-credit points to be applied toward course grades. People particularly sensitive to media violence were discouraged from signing up for this study, and the violent nature of the first videotape was explained to participants both orally and on a written consent form. Two women stopped the videotape and did not complete the first session. Four other women failed to return for a second session. A total of 63 women completed both phases of the study.

Stimulus Materials

Violent videotape

The videotape consisted of a series of 16 fast-paced scenes, gathered from 13 different PG- or R-rated Hollywood-produced films that depicted violence or abusive acts. Film clips were chosen to be somewhat analogous to the types of abusive incidents reported by clients in memory-recovery therapies. The tape included scenes of implied and actual sexual abuse, as well as verbal and physical abuse of both women and children. The violent film clips were spliced together without any breaks. Individual scenes lasted between 15 and 49 s, and the completed tape lasted 8.6 minutes.

The violent videotape was designed to induce negative affect in participants and to serve as a stimulus for later memory tests. There is support for the idea that watching media violence may be a powerful way to elicit negative thoughts and emotions in viewers (e.g., Bushman & Geen, 1990). As a manipulation check of emotional reactivity to the stimulus tape, 22 women in a pilot study rated the violent videotape on six dimensions. The women indicated how exciting, suspenseful, amusing, stressful, frightening, and disturbing they perceived the videotape to be by marking 150 mm lines with endpoints labeled *not at all* and *very*. Except ratings of how amusing the videotape was ($M = 28.8$, $SD = 28.9$), average reactions on the emotional response dimensions fell at or above the scale midpoints. Means (with standard deviations in parentheses) for the remaining five dimensions were as follows: exciting, 75.1 (38.5); suspenseful, 95.1 (33.7); stressful, 112.3 (28.8); frightening, 96.2 (40.9); and disturbing, 112.0 (30.2). These data show that the violent videotape is capable of eliciting negative emotional reactions in women.

Pilot testing of the violent video also gave a measure of the memorability of individual scenes. Eight female participants watched the completed videotape and ranked the scenes in terms of how well they could remember them. Table 2 shows scene titles, length, and averaged ranks for the 16 violent scenes in the order that they appear in the videotape.

Table 2
Order, Length, and Memorability of Violent Videotape Scenes

Scene Title	Length (s)	Memorability Ranking
1. Women getting hair cut off (i)	27	2
2. Woman beaten in front of mirror (j)	46	3
3. Boys playing football (k)	15	14
4. Woman trying to cook a TV dinner (l)	49	4
5. Woman with candle in dark house (c)	37	15
6. Man shoves jar into boy's face (m)	27	7
7. Woman pouring beer into sink (n)	32	6
8. House being robbed (a)	20	16
9. Train crashes into truck (o)	40	11
10. Woman shot in chest (p)	27	5
11. Tennis player being stalked (q)	42	8
12. Man and boys fishing (r)	22	9
13. Boy locked in closet (b)	38	12
14. Boy stabbing woman in bed (s)	27	10
15. Man and woman fighting on boat (d)	23	13
16. Women fighting in attic (t)	49	1

Note. Letters in parentheses correspond to scene labels in Table 1. Scenes #5, 8, 13, and 15 (a-d) were chosen as target scenes for the imagery and journalling tasks based on memorability and scene length.

Memory theory videotape

This videotape served as a manipulation of participants' exposure to a theory of memory repression and recovery. Participants were told that the study was designed to test certain techniques that were commonly used in therapy to retrieve hidden memories. The videotape would explain both the theory behind memory recovery and how the specific techniques to be tested in the study were being used in psychotherapy. This videotape depicted an interview with an experienced clinical psychologist who described a theory of how traumatic memories may be repressed and subsequently recovered. The videotaped segment included persuasive case examples demonstrating the successful use of imagery (imagining forgotten events) and journalling (writing about imagined events) to recover repressed memories.

Two non-professional actors portrayed the interviewer and psychologist. In accordance with the principles of persuasion (Petty & Cacioppo, 1986), the psychologist was portrayed as a competent, credible source, possessing impressive credentials (e.g., a Ph.D. in psychology and 20 years of research experience with human memory) and speaking confidently about his beliefs and practices. The psychologist's discussion of the repression and recovery theory was imbedded in an interview about his general practice, and was supported with a case description highlighting the effectiveness of certain techniques (i.e., imagery and journalling) to reliably elicit hidden traumatic memories. The psychologist's statements were based on beliefs commonly held by memory-recovery therapists, and the case description was based on recent reports of therapy-assisted traumatic-memory recovery (see Loftus & Ketcham, 1994). Three crucial points were made in the psychologist's presentation: that it is common for memories of traumatic or affect-laden events to be at least temporarily disrupted, that memories for such events may later be recovered, and that certain techniques have been shown to be successful at prompting memory recovery in the context of psychotherapy. The psychologist also provided a link to participants' apparent memory deficits for scenes from the violent videotape by noting that it is common to experience repression for events associated with anxiety, even if the events don't seem traumatic at the time. The script for this videotape appears in Appendix A.

Imagery materials

Shortly after viewing the violent videotape, participants completed one of two ranking lists comprised of eight scenes that ostensibly appeared in the video. Target scenes on these lists were used as stimuli for subsequent imagery and journalling tasks (i.e., rehearsal). The ranking lists

included six scenes that appeared in the violent videotape (real scenes) and two scenes that did not appear (fake scenes).

To generate two comparable ranking lists for the main study, a median split was used to divide the ranked list of scenes from the pilot study (see Table 2) into high and low-memorability categories. The goal of the ranking and rehearsal procedures in the main study was to provide participants with an experience of relatively diminished memory for several scenes. Thus, four of the lowest-ranked scenes (memorability rankings 12, 13, 15, and 16) were chosen a priori as target scenes for rehearsal. These four scenes were matched for memorability and length, paired, and counterbalanced across the two ranking lists. Scenes ranked 5-8 (relatively memorable scenes) were chosen to appear on both ranking lists as fillers. Finally, fake scene titles were generated to fit the general theme of the scenes that actually appeared in the violent videotape (i.e., abuse against women and children). These fake scene titles were matched for relative similarity and distributed across the two lists (e.g., each list contained a fake scene title referring to an interaction between a father and daughter that could be interpreted as sexual in nature). The resulting ranking lists contained the same four real (filler) scenes, two matched real (target) scenes, and two matched fake (target) scenes. The final ranking lists appear in Appendix B.

Dependent Measures

The Memory Characteristics Questionnaire

The 39-item Memory Characteristics Questionnaire (MCQ) developed by Johnson et al. (1988) was modified for use as the primary dependent measure. The MCQ provides a sensitive measure of differences in memory quality between real and imaginary events (Suengas & Johnson, 1988). Items involving qualities that were not characteristic of the events depicted in the violent videotape (e.g., an interpretable story line, whether the mood was positive or negative), that were not possible to glean from the videotaped events (e.g., the date or hour at which the events took place), or that did not apply to events experienced vicariously through the medium of videotape (e.g., smell, touch, or taste associated with the events) were omitted from the revised questionnaire. The remaining 18 items assessed clarity and vividness of memory for the events, memory for spatial and temporal qualities of the events, valence and strength of affective reactions to the events, amount of event rehearsal, and confidence in event memories. Two additional items were included on MCQs administered during the second session to assess how often participants had talked or thought about the videotape between sessions. All responses were made on 7-point scales. The revised MCQ appears in Appendix C.

Confidence measure

Participants rated how confident they were that various scenes appeared in the violent videotape using a 7-point scale that ranged from not at all confident to completely confident. The confidence rating list included the titles of all 16 real scenes that had appeared in the violent videotape (4 rehearsed and 12 unrehearsed), as well as the names of 8 fake scenes (4 rehearsed and 4 unrehearsed). Scene titles were listed in random order (Appendix D).

Manipulation checks and ancillary measures

Manipulation checks on memory theory, amount of rehearsal, and participants' beliefs were imbedded as items on a final set of questionnaires (Appendix E). In both recall (free response) and recognition (multiple choice) format, participants were asked to reiterate what the expert in the videotape concluded about traumatic memories generated with memory recovery techniques. Their personal beliefs about such recovered memories were assessed in a separate question. Participants were also asked to indicate how much time they spent on the take-home rehearsal task and at what time they completed the task to assess whether they had followed instructions. Finally, they completed a number of additional items regarding their familiarity with the violent film clips, and provided demographic information.

Procedure

Session 1

Participants were told that the goal of the study was to assess women's reactions to media violence. Participants were informed orally and in writing that they would be asked to watch a videotape containing violent scenes depicting human injury and suffering, bleeding wounds, and partial nudity. After giving written consent, participants watched the violent videotape. Following the videotape, they were asked about their overall reactions to the tape on a short emotional-response measure. Participants indicated on 150-mm lines how exciting, suspenseful, amusing, stressful, frightening, and disturbing they found the videotape.

After completing the emotional-response measure, participants were given one of two ranking lists. Participants were asked to rank-order eight scenes that "people in previous studies had the most trouble remembering" according to how well they could recall the clips. To ensure similar interpretation of this instruction, participants were told that their response should be based on the ease with which they could mentally reconstruct each scene from beginning to end. The scene they remembered the best should be assigned a rank of 1, the scene they remembered the

least a rank of 8, and all other scenes an ordered rank in between. Participants were not told that the list included scenes that had not actually appeared on the videotape (i.e., fake scenes).

After completing the ranking task, participants were told that memory for events associated with fear or anxiety is sometimes disrupted, and that any difficulty they were having remembering particular scenes was completely normal. The experimenter explained that the experiment was designed to test the usefulness of certain techniques for improving memory for disturbing or stressful experiences.

The experimenter next gave instructions for the guided imagery task. Participants were asked to close their eyes and attempt to visualize four scenes "as if you were watching (them) on the videotape again" for two minutes each. Two real and two fake target scenes that appeared on the participant's ranking list had been preselected for this task, and were imagined in a counterbalanced order such that a real scene was always followed by a fake scene. Participants were asked to generate a mental image of the first (real) scene, focusing on both perceptual and apperceptual characteristics of the scene (i.e., what they remembered seeing, hearing, thinking, and feeling while watching the scene). After two minutes, participants completed a Memory Characteristics Questionnaire (MCQ) describing their memories for the scene. They then repeated the imagery and MCQ procedure for the three remaining scenes. This procedure generated Time 1 MCQ1-MCQ4 for each participant.

The experimenter again briefly discussed with participants their apparent lack of memory for certain portions of the videotape (i.e., the fake scenes). Participants were reminded that it is not uncommon to experience some memory failure when exposed to stressful or disturbing events. At this point, participants in the experimental (repression) condition viewed the second videotape. The memory-theory videotape was introduced by the experimenter as an example of how an imagery technique similar to the one used in the study has been used in the real world. In the videotape, a psychologist explained the theory of memory repression and recovery, and presented a case study as an illustration of how he had successfully used imagery and journalling techniques to help people recover hidden memories for traumatic experiences. Following this viewing, participants were told that the theory and techniques presented by the psychologist in the videotape needed further testing. The experimenter explained that the study was designed to test whether imagery and journalling are capable of improving memory for stressful events.

All participants were given verbal and written instructions for the take-home imagery and journalling task. They were asked to repeat the imagery task on the same four scenes, in the same

order, at approximately the same time the next day. As a reminder, the experimenter listed the four scenes to be imagined on an instruction sheet in the order in which they were imagined during the first session. Imagery and journalling instructions for the take-home task appear in Appendix F. Participants recorded free narratives on the take-home journalling task in small notebooks marked only with an identification number for matching.

Session 2

Participants were asked to turn in their blue-book journals. The experimenter reiterated that the study was concerned with testing the effects of imagery and journalling on memory. Participants were asked to engage in a final round of imagery and to fill out a second set of Memory Characteristics Questionnaires for the same four scenes that they had imagined on the two previous days. When this task was completed, participants were asked to imagine four additional scenes (two real and two fake) and to fill out corresponding MCQs, for comparison purposes. These four matched, preselected scenes appeared on the ranking list that the participant did not receive in the first session. Thus a total of eight scenes were imagined during the second session; four that had been imagined during the first session and at home, and four they had not previously imagined nor seen on the list of ranked scenes. Thus, the final imagery task and eight MCQs were completed for two previously-rehearsed real scenes, two previously-rehearsed fake scenes (a total of three rehearsals apiece), and for two previously unrehearsed real scenes and two previously unrehearsed fake scenes (a total of one rehearsal apiece). This procedure generated Time 2 MCQ1-MCQ8 for each participant.

The eight preselected low-memorability scenes (4 real and 4 fake) were always used in the imagery and journalling tasks, in counterbalanced order. Referring back to Table 1, the letters *a*, *b*, *c*, and *d* denote real scenes, whereas the letters *e*, *f*, *g*, and *h* denote fake scenes. Participants who received List 1 rehearsed scenes *a*, *b*, *e*, and *f* three times in one of four orders: *aebf*, *afbe*, *beaf*, or *bfae*. They rehearsed scenes *c*, *d*, *g*, and *h* once in one of four orders: *cgdh*, *chdg*, *dgch*, or *dhcg*. For participants who received List 2, the number of rehearsals on the two sets of scenes was reversed, but the orders retained the same counterbalancing scheme (e.g., a participant who rehearsed ordered scenes *cgdh* three times would rehearse scenes *aebf* once).

After completing the last MCQ, participants filled out a final set of questionnaires that included manipulation checks, general questions regarding their participation in the study, and the confidence measure.

Finally, each participant was fully debriefed. The experimenter briefly summarized the goals of the study and the methods that were used to encourage formation of illusory memories, including how names of scenes that did not actually appear in the violent videotape were imbedded on the ranking and imagery tasks. The experimenter explained to participants that one goal of the study was to see if people are susceptible to misleading suggestions of this type, and assured them that responding to such suggestions was perfectly normal. Every effort was made to ensure that people left the laboratory feeling positively about their participation in the study, with a sense of the importance of the research and their contribution to it. The full script for the study appears in Appendix G. This research was approved by the Iowa State University Human Subjects Review Committee.

Subsample Used for Analyses

Of the 63 women who completed the study, three women left substantial missing values on key dependent measures (i.e., Memory Characteristics Questionnaires). Discarding data from these three participants resulted in unequal between-subjects cell sizes, and disrupted the counterbalancing scheme within cells. Potential effects of the order in which scenes were imagined made equalizing the counterbalancing within cells desirable. To accomplish this, data from an additional 12 participants were excluded from analyses. These 12 participants were randomly selected within cells from those with missing data on variables of lesser importance (i.e., questions on ancillary measures). Analyses were thus conducted on data from 48 participants, 24 in each between-subjects condition. According to standard power tables (Cohen, 1988), 24 people per cell allows detection of a standardized mean difference of 0.80 (a large effect) with power=.77 and a two-sided alpha level of .05.

Of the 48 participants included for analyses, 42 were White (87.5%), 2 were Black (4.2%), 2 were Asian (4.2%), and 2 were Hispanic/Latina (4.2%). Most were native English-speakers (93.8%), but three were not (6.2%). Ages ranged from 18 to 23 ($M = 19.1$, $SD = 1.1$ years).

RESULTS

Manipulation Checks

Participants were asked in a multiple-choice question what the videotaped psychologist concluded about "the effects of stress on memory and the way the mind works." Twenty-three of the 24 control participants (95.8%) accurately responded that they did not see a videotaped psychologist. Of the 24 people who did view the second tape, 23 (95.8%) accurately identified what the psychologist had discussed regarding memory repression (i.e., that "the mind will sometimes completely block out memories of events that occurred under stressful conditions"), but only 14 (58%) correctly identified what he had said about memory recovery (i.e., that "accurate and complete memories can be recovered later, after the stress has passed"). Nine people believed the psychologist had said that "although some true memories may be recovered after the stress has passed, some false information will also be recovered." One person in the repression condition erroneously recalled the psychologist having concluded that repression of stressful memories is unlikely, and that any recovered memories are likely to be false.

To verify that all participants rehearsed four target scenes a total of three times during the experiment, it was important to determine whether they had diligently completed the take-home imagery and journaling task, and to identify any differences between people in the control and repression conditions. All participants returned their journals to the experimenter at the beginning of their second session. No one returned an incomplete journal -- all had made entries for each of the target scenes they had been asked to imagine. Participants were asked to report what day and at what time they had completed the take-home imagery and journaling task. Responses were coded to reflect the amount of time that had passed between the beginning of the first session and the time at which they reported having completed the take-home task. All 48 participants reported having completed the task prior to returning for their second session, M time = 38.9 hours. Although it appeared as though people in the repression condition completed the take-home task somewhat later than people in the control condition, the time difference was not statistically significant, M s = 42.7 and 35.1 hours, SD s = 26.7 and 21.9, respectively, $t(46) = -1.08$, $p = .28$, $d = 0.32$. Participants were also asked to report the amount of time they had spent on the take-home imagery and journaling task. Again, there were no differences between people in the repression and control conditions in the time spent on the take-home task, M s = 17.4 and 18.5 minutes, SD s = 9.4 and 8.0, respectively, $t(46) = .45$, $p = .66$, $d = 0.13$. Thus, all participants appear to have

complied with the experimenter's request to rehearse the four scenes a second time before returning to the laboratory.

Memory Characteristics

Overall memory for the eight scenes rehearsed during Session 2 was assessed by calculating total scores on each participant's Memory Characteristics Questionnaires. Responses on items 1-18 were summed to produce total MCQ scores that could range from 18-126. Higher MCQ scores reflect better memory for a scene.

A 2 x 2 x 4 analysis of variance (ANOVA) was conducted separately on total MCQ scores for each of the eight scenes rehearsed during Session 2 (Time 2 MCQ1-MCQ8) to test for differences between these scenes, and for potential effects of the order in which scenes were rehearsed. This design reflects the two-level between-subjects factor *memory theory* (control vs. repression); the two-level between-subjects factor *list* (1, 2); and the four-level between-subjects factor *order* (aebf/cgdh, afbe/chdg, beaf/dgch, bfae/dhcg). No significant effects of these variables were found for any of the rehearsed real scenes. A list effect was found for fake scenes that were rehearsed three times (MCQ2 and MCQ4), $F(1, 32) = 11.64, p < .005, d = 1.21$ for MCQ2, and $F(1, 32) = 5.87, p < .05, d = 0.86$ for MCQ4, respectively. Participants reported stronger memories for fake scenes that appeared on List 2 (Woman shoots her attacker; Father molesting daughter) than they did for fake scenes that appeared on List 1 (Man throwing furniture during fight; Father tearing at daughter's clothes). For MCQ2, List 2 $M = 45.8$ ($SD = 25.1$) and List 1 $M = 28.5$ ($SD = 9.4$); and for MCQ4, List 2 $M = 42.1$ ($SD = 23.5$), and List 1 $M = 29.2$ ($SD = 10.0$). Apparently the fake scene titles on List 2 led participants to generate more detailed memories than did those on List 1. Because these list effects did not interact with memory theory or order, and because list and order were counterbalanced within memory-theory condition, the effects of list and order were not further analyzed.

The remaining analyses were conducted on mean MCQ scores, which were calculated across items 1-18 for each of the four scenes imagined during Session 1 (Time 1 MCQ1-MCQ4) and for each of the eight scenes imagined during Session 2 (Time 2 MCQ1-MCQ8). Higher mean scores indicate more detailed memories for the scene. It was desirable to make two kinds of comparisons: between-subjects, comparing the same scenes rehearsed once versus three times (at Time 2); and within-subjects, comparing the first and third rehearsal of the same scenes (at Time 1 and Time 2, respectively). Thus, a 2 (Memory Theory) x 2 (Scene Type) x 3 (Rehearsal) ANOVA was conducted to test for mean differences on MCQ scores. The three levels of rehearsal refer to

the first rehearsal (Time 1) of scenes rehearsed multiple times, the first rehearsal of scenes rehearsed only once (Time 2), and the third rehearsal of scenes rehearsed multiple times (Time 2). Results of this analysis appear in Table 3. A full table of means and standard deviations for this analysis is reported in Appendix H.

Table 3
Full Design Analysis of Variance for Memory Characteristics Questionnaire Means

Source	<i>df</i>	<i>SS</i>	<i>F</i>	η^2
Between subjects				
Theory	1	0.28	0.16	.003
Subject within-group error	46	80.94	(1.76)	
Within subjects				
Scene type (S)	1	285.96	160.91*	.778
Theory x Scene	1	0.07	0.04	.001
Scene x Subject within-group error	46	81.75	(1.78)	
Rehearsal (R)	2	13.17	22.86*	.332
Theory x Rehearsal	2	0.09	0.16	.003
Rehearsal x Subject within-group error	92	26.50	(0.29)	
Scene x Rehearsal	2	17.04	22.53*	.329
Theory x Scene x Rehearsal	2	1.82	2.41	.050
S x R x Subject within-group error	92	34.80	(0.38)	

Note. Values in parentheses represent mean square errors.

* $p < .0005$

People in the repression condition were expected to report enhanced memories for the violent scenes, compared to people in the control condition. This difference was expected to be especially apparent for fake scenes, especially after repeated rehearsals of those scenes. There were, however, no significant effects for the between-subjects variable of memory theory. Exposure to a repression theory of memory did not affect people's memory for either real or fake scenes under any rehearsal condition. Significant main effects were found for the within-subjects variables of scene type and rehearsal, which also interacted with each other to influence MCQ scores. In order to better assess the nature of the within-subjects effects, a 2 (Scene Type) x 3 (Rehearsal) ANOVA with planned orthogonal contrasts was performed, excluding the between-subjects variable, memory theory. Results of this analysis are reported in Table 4. In both analyses, the Mauchly sphericity test revealed a problem with the variable *rehearsal*. Therefore, Greenhouse-Geisser adjusted degrees of freedom are reported in the text for all rehearsal effects.

As predicted, real scenes were described in greater detail as measured by mean MCQ scores than were fake scenes, $F(1, 47) = 164.26, p < .0005, d = 3.74$; $M_s = 4.14$ and 2.14 , respectively. There was also a main effect for rehearsal, $F(1.7, 79) = 23.28, p < .0005$. Planned orthogonal contrasts revealed two significant differences, only partly confirming prediction 2. As predicted, the same scenes were recalled better by people who had rehearsed them three times over the two-day period than by people who rehearsed them only once (during Session 2), $F(1, 47) = 23.17, p < .0005, d = 1.40$; $M_s = 3.24$ and 2.85 , respectively. People tended to show a decrease in memory for scenes that were repeatedly rehearsed $F(1, 47) = 32.25, p < .0005, d = 1.66$. People remembered scenes better after the first rehearsal during Session 1 than after the third rehearsal during Session 2, $M_s = 3.34$ and 3.24 , respectively. These effects are clarified by a significant Scene Type x Rehearsal interaction, $F(1.7, 79) = 21.88, p < .0005$.

Planned orthogonal contrasts again revealed two significant effects. The first significant interaction was between scene type and rehearsals at Time 2, $F(1, 47) = 28.24, p < .0005, d = 1.55$. Real scenes were recalled better by people who had rehearsed them three times than by people who rehearsed them only once during the second session, $M_s = 4.45$ and 3.50 , respectively, but there was no difference in memory reported during Session 2 for fake scenes rehearsed three times versus only once, $M_s = 2.02$ and 2.19 , respectively. The second significant interaction was for scene type by session, $F(1, 47) = 25.49, p < .0005, d = 1.47$. There was no improvement in memory for real scenes after repeated rehearsals (i.e., from the first to the third rehearsal, $M_s = 4.46$ and 4.45 , respectively), and there was a slight decrement in memory for fake scenes from the

Table 4

Within-subjects Analysis of Variance for MCQ Means with Special Contrasts

Source	<i>df</i>	<i>SS</i>	<i>F</i>	η^2
Scene type (S)	1	285.96	164.26*	.778
Scene x Subject within-group error	47	81.82	(1.74)	
Rehearsal (R)	2	13.17	23.28*	.331
Rehearsal x Subject within-group error	94	26.59	(0.28)	
Univariate contrasts:				
Reh (1,3)	1	7.29	23.17	.330
Contrast within-group error	47		(0.31)	
Time (1,2)	1	11.90	32.25*	.407
Contrast within-group error	47		(0.37)	
Scene Type x Rehearsal	2	17.04	21.88*	.318
S x R x Subject within-group error	94	36.62	(0.39)	
Interaction univariate contrasts:				
Scene x Reh (1,3)	1	14.83	28.24*	.375
Contrast within-group error	47		(0.53)	
Scene x Time (1,2)	1	10.33	25.49*	.352
Contrast within-group error	47		(0.41)	

Note. Values in parentheses represent mean square errors. Reh = Rehearsal effect (1 vs. 3 rehearsals measured at Time 2); Time = Time effect (1 vs. 3 rehearsals measured at Time 1 and Time 2, respectively).

* $p < .0005$

first to the third rehearsal, $M_s = 2.22$ and 2.02 , respectively. Means and standard deviations for this set of analyses appear in Table 5.

Although no significant effects for memory theory were found in the overall analysis of MCQ mean scores, it is possible that the memory-theory manipulation may have differentially affected responses on individual MCQ items. Therefore, an exploratory 2 (Memory Theory) \times 2 (Scene Type) \times 3 (Rehearsal) analysis of variance was performed on each of the 18 MCQ items to assess potential effects of the memory-theory manipulation that may have been masked in the initial analysis of mean MCQ scores. Individual item analyses revealed the same pattern of effects as the analysis of mean MCQ scores. Although main effects of scene type and rehearsal and an interaction between the scene-type and rehearsal variables were found for nearly every MCQ item,

Table 5
Memory Characteristics Questionnaire (MCQ) Means

Scene Type	Rehearsals		
	Time 1	Time 2	
	1	1	3
Real			
<i>M</i>	4.46 ^a	3.50 ^b	4.45 ^a
<i>SD</i>	0.79	0.94	0.84
Fake			
<i>M</i>	2.22 ^a	2.19 ^{a,b}	2.02 ^b
<i>SD</i>	0.96	0.96	0.87

Note. Means within a row that have different superscripts are significantly different at $p < .05$.

no main effects or interactions were found for the memory-theory manipulation (all $ps > .10$).

A complete table of means and standard deviations for the individual MCQ items appears in Appendix J.

Confidence

At the end of the second session, participants rated how confident they were that each of 16 real and 8 fake scenes appeared in the violent videotape. Mean confidence was calculated separately for 12 unrehearsed real scenes, 4 unrehearsed fake scenes, 4 rehearsed real scenes, and 4 rehearsed fake scenes. Each participant contributed multiple data points to the confidence analysis. A 2 (Memory Theory) \times 2 (Scene Type) \times 3 (Rehearsal) ANOVA was performed on mean confidence scores. The three levels of rehearsal for this analysis were 0, 1, and 3. Results appear in Table 6. A full table of means and standard deviations corresponding to this analysis appears in Appendix I.

People who heard the repression-and-recovery theory of memory were expected to be more confident that they had witnessed the fake scenes than people who had not heard such a theory. This effect was expected to be enhanced by repeated attempts to recall the fake scenes. These predictions were disconfirmed. As with MCQ scores, there was no main effect of memory theory on confidence, nor did memory theory interact with any other variable to influence confidence ratings. There were, however, significant main effects and interactions of the within-subjects variables of scene type and rehearsal on confidence ratings. To clarify these results, a 2 (Scene Type) \times 3 (Rehearsal) within-subjects ANOVA with planned orthogonal contrasts was performed on mean confidence ratings. The results of this analysis are reported in Table 7. Corresponding means are reported in Table 8.

As predicted, there was a significant main effect of scene type on confidence, $F(1, 47) = 301.39$, $p < .0005$, $d = 5.06$. People were more confident that they had actually witnessed the real scenes than the fake scenes, $Ms = 5.99$ and 2.22 , respectively. There was also a significant main effect for rehearsal, $F(2, 94) = 12.57$, $p < .0005$. Orthogonal univariate contrasts aided the interpretation of this effect.

The first contrast examined the effect of rehearsing scenes on confidence. People were more confident that they had seen scenes they had rehearsed (1 or 3 rehearsals) than scenes they had not rehearsed (0 rehearsals), $F(1, 47) = 11.70$, $p < .005$, $d = 1.00$; $Ms = 4.26$ and 3.80 , respectively. The second contrast revealed that the number of rehearsals was also important. People

Table 6
Full Design Analysis of Variance for Confidence Measures

Source	<i>df</i>	<i>SS</i>	<i>F</i>	η^2
Between subjects				
Theory	1	0.14	0.07	.002
Subject within-group error	46	92.07	(2.00)	
Within subjects				
Scene type (S)	1	1023.47	296.54*	.866
Theory x Scene	1	0.84	0.24	.005
Scene x Subject within-group error	46	158.76	(3.45)	
Rehearsal (R)	2	28.00	12.40*	.212
Theory x Rehearsal	2	0.81	0.36	.008
Rehearsal x Subject within-group error	92	103.87	(1.13)	
Scene x Rehearsal	2	29.80	20.78*	.311
Theory x Scene x Rehearsal	2	0.08	0.06	.001
S x R x Subject within-group error	92	65.97	(0.72)	

Note. Values in parentheses represent mean square errors.

* $p < .0005$

were more confident they had viewed scenes rehearsed three times than those rehearsed only once, $F(1, 47) = 13.54, p < .005, d = 1.07$; $M_s = 4.53$ and 3.80 , respectively.

The Scene Type x Rehearsal interaction was also significant, $F(2, 94) = 21.20, p < .0005$. To aid interpretation of this interaction, nonorthogonal univariate contrasts on mean confidence scores were conducted separately for real and fake scenes. People were more confident they had seen real scenes that were rehearsed three times than real scenes that were only rehearsed once,

Table 7

Within-subjects Analysis of Variance for Confidence with Special Contrasts

Source	<i>df</i>	<i>SS</i>	<i>F</i>	η^2
Scene type (S)	1	1023.47	301.39**	.865
Scene x Subject within-group error	47	159.60	(3.40)	
Rehearsal (R)	2	28.00	12.57**	.211
Rehearsal x Subject within-group error	94	104.68	(1.11)	
Univariate contrasts:				
Reh (0 vs. 1, 3)	1	13.65	11.70*	.199
Contrast within-group error	47		(1.17)	
Reh (1 vs. 3)	1	14.36	13.54*	.224
Contrast within-group error	47		(1.06)	
Scene Type x Rehearsal	2	29.80	21.20**	.311
S x R x Subject within-group error	94	66.05	(0.70)	

Note. Values in parentheses represent mean square errors.

* $p < .01$

** $p < .0005$

$F(1, 47) = 36.47$, $p < .0005$, $d = 1.76$, or that were not rehearsed at all, $F(1, 47) = 41.92$, $p < .0005$, $M_s = 6.73$, 5.43 , and 5.81 , respectively. The means for real scenes rehearsed once and unrehearsed real scenes did not significantly differ, $F(1,47) = 3.92$, $p = .05$, $d = .58$. In other words, multiple rehearsals served to boost people's confidence that they had seen real scenes.

In contrast, people were more confident that they had seen rehearsed than unrehearsed fake scenes, regardless of the number of rehearsals. Nonorthogonal univariate contrasts showed that people were more confident they had seen fake scenes rehearsed either once or three times than fake scenes that they had never rehearsed, $F(1, 47) = 12.74$, $p < .005$, $d = 1.04$ for one versus zero

Table 8
Mean Confidence by Scene Type and Number of Rehearsals

Scene Type	Rehearsals		
	0	1	3
Real			
<i>M</i>	5.81 ^a	5.43 ^a	6.73 ^b
<i>SD</i>	0.75	1.47	0.62
<i>n</i>	12	2	2
Fake			
<i>M</i>	1.78 ^a	2.54 ^b	2.33 ^b
<i>SD</i>	0.86	1.64	1.56
<i>n</i>	4	2	2

Note. Means within a row that have different superscripts are significantly different at $p < .05$.

rehearsals; $F(1, 47) = 6.52$, $p < .05$, $d = 0.74$ for three versus zero rehearsals; M s = 2.33, 2.54, and 1.78 for 3 rehearsals, 1 rehearsal, and 0 rehearsals, respectively. The means for fake scenes rehearsed once versus three times did not differ, $F(1,47) = 1.41$, $p = 0.24$, $d = 0.35$. Thus, the number of rehearsals was an important influence on people's confidence that they had seen real scenes, whereas the mere act of rehearsal impacted people's confidence that they had seen fake scenes.

Correlations

Hearing a repression-and-recovery theory of memory did not affect people's confidence that they had seen fake scenes, nor did it affect their tendency to report memories for such scenes. Regardless of whether or not they were exposed to a repression theory during the study, it is

possible that people's personal beliefs regarding the likelihood of repression and subsequent recovery of stressful memories may be related to their confidence and willingness to report such memories. Participants were asked near the end of the study to report their personal beliefs regarding repression and the potential for memory recovery. Responses reflected one of three sets of beliefs: that repression is unlikely, and therefore any memories recovered are likely to be false; that repression is possible, but that both true and false memories are likely to be recovered; or that repression is possible, and accurate and complete memories are likely to be recovered. This repression-and-recovery beliefs variable was dummy coded and ordered such that higher scores reflect stronger beliefs in the possibility of repressing and subsequently recovering accurate memories for traumatic events. Repression beliefs were then correlated with MCQ scores and confidence for both rehearsed and unrehearsed real and fake scenes (see Table 9).

Table 9
Correlations Between Participant Beliefs, Confidence, and Memory Characteristics
Questionnaire (MCQ) Scores

Scene Type	Belief	MCQ	Confidence for Rehearsed Scenes	Confidence for Unrehearsed Scenes
Real				
Belief	--	0.25	-0.04	0.10
MCQ		--	0.38**	0.31*
Confidence - Rehearsed			--	0.36*
Fake				
Belief	--	0.28	0.29*	0.37**
MCQ		--	0.69**	0.51**
Confidence - Rehearsed			--	0.43**

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

Although the correlations between repression beliefs and MCQ scores were not significant at the $p = .05$ level, people who held stronger beliefs in the possibility of memory repression and recovery did show a tendency toward increased reporting of memories for both real and fake scenes, $r_s = 0.25$ and 0.28 , respectively. Repression beliefs were not associated with confidence in having witnessed real scenes from the violent videotape, but they were associated with confidence in having witnessed fake scenes. People who believed more strongly in the idea that stressful memories might be repressed and later recovered reported increased confidence that fake scenes (scenes they had not actually witnessed) had appeared in the violent videotape, $r_s = 0.29$ and 0.37 for rehearsed and unrehearsed fake scenes, respectively. The correlations between repression beliefs and confidence for real scenes were not significant at the $p = .05$ level, $r_s = -0.04$ and 0.10 for rehearsed and unrehearsed real scenes, respectively.

DISCUSSION

Memory Characteristics

This experiment tested the effects of exposure to a repression-and-recovery theory of memory and of rehearsal on memories for traumatic events. Hearing a repression theory had no effect on people's memories for traumatic events, nor did it facilitate the creation of false memories for events they did not witness, even when the suggestive theory was combined with suggestive memory recovery techniques. Thus, the answer to two of the major questions in this study must be "no". Mere exposure to a repression theory of memory did not stimulate the creation of false memories, nor did the combination of theory and technique. The answer to the third question, regarding whether or not suggestive techniques alone can encourage the creation of false memories, also appears to be "no," at least in this study. Multiple rehearsals did not enhance memory for events that never occurred. In fact, reported memory for repeatedly rehearsed fake scenes was somewhat lower after the third rehearsal than after the first. The fact that people reported equally poor memories for fake scenes rehearsed several times over the 48-hour period following the videotape as they did for fake scenes that they had rehearsed only once after a two-day delay also supports the conclusion that rehearsal was not instrumental to increasing the perceived memorability of fake scenes.

Events that were actually witnessed (real scenes) were recalled relatively well following a single rehearsal, so it is not altogether surprising that repeated rehearsals did not further enhance memories for such scenes. However, real scenes were more memorable when rehearsed immediately and repeatedly over a two-day period than when rehearsed for the first time following a two-day delay. In other words, the natural decline over time in memory for scenes that were actually witnessed was offset by rehearsing those scenes. Although increased rehearsals did not substantially improve memory for real scenes, this procedure was effective at keeping them in memory for a longer period of time than they would otherwise have been.

Why was hearing a repression-and-recovery theory of memory ineffective at stimulating the "recovery" of traumatic event memories? There are several possible explanations. First, participants may not have been convinced by the videotaped psychologist's message regarding the possibility of repressing and subsequently recovering traumatic event memories. Results indicated that this was possible. Participants in the repression-theory condition rated the videotaped psychologist's competence, the believability of a recovered-memory case study he had discussed, and the convincingness of his presentation on 7-point scales ranging from *not at all* to *very*

competent, believable, and convincing, respectively (see *Reactions to videotaped psychologist* measures, Appendix E). Although all but two people rated the psychologist at or above the midpoint of the competence scale (91.6%), participants rated the videotaped psychologist as being only moderately competent, on average, $M = 5.00$ ($SD = 1.10$). Participants also reported only moderately strong beliefs in the psychologist's story of a "woman he saw" (i.e., had treated) who had recovered repressed memories, $M = 4.83$ ($SD = 1.46$). Finally, participants reported that they were only somewhat convinced by the expert's presentation, $M = 4.50$ ($SD = 1.47$). Nineteen people (79.2%) rated the expert at or above the scale midpoint on the believability and convincingness items. These results suggest that the videotaped psychologist's presentation was only moderately convincing overall, and could certainly use some improvement.

Another possible explanation for the failure of the theory manipulation is that participants may not have accurately perceived the videotaped psychologist's message. A second possible explanation for why the theory manipulation was not effective is that participants may have forgotten or incorrectly understood the videotaped psychologist's conclusions regarding the possibility of recovering repressed, or temporarily forgotten, memories. This appears to be the case. Recall that, although nearly everyone in the repression condition correctly interpreted the expert's message regarding repression (i.e., that it is possible), only 58% of participants in that condition were able to accurately identify what he had said about the possibility of memory recovery (i.e., that true memories, exclusively, were likely to be recovered after the stress had passed). People who believed that the psychologist said both true and false memories could be recovered (37.5% of those in the repression condition) may have disregarded images generated by repeated rehearsals as false recollections. Thus, they would be less likely than people who accurately perceived the psychologist's message to report enhanced recollection for fake scenes. This pattern of beliefs may have neutralized any effects theory may have had on reported memory characteristics.

A related point is that people's beliefs regarding the repression and recovery of traumatic memories may have influenced their perceptions of what the psychologist said, and tempered the overall effectiveness of the theory manipulation. When participants were asked about their personal beliefs in the possibility of repressing and recovering memories for events that occurred under stressful conditions (see *repression beliefs*, Appendix E), most people reported believing that repression of such memories is possible (i.e., "the mind is capable of completely blocking out memories of events that occurred under stressful conditions"), and that both accurate and

inaccurate memories may later be recovered. Eighteen people in the repression condition (75%) and 17 people in the control condition (70.8%) expressed this pattern of beliefs. Only 4 people in the repression condition (16.7%) believed that only "accurate and complete memories" are likely to be recovered following repression. Seven people in the control condition believed that this was likely (29.2%). Even more problematic was the fact that two people in the repression condition (8.3%, compared to 0% of people in the control condition) believed that repression of memories associated with stress is unlikely, and that recovered memories are likely to be inaccurate. Participants who did not believe in the possibility of repressing memories associated with stress or in the possibility of recovering accurate memories for such events were unlikely to be affected by the expert's message. Thus, although repression beliefs were associated with reporting memories and confidence for fake scenes (see analysis of correlations), the majority of participants in the repression condition did not appear to hold a strong belief in the possibility of recovering accurate memories following the repression of memories for stressful event.

There is a fourth possible explanation for the apparent failure of the theory manipulation. Even when correctly interpreted, people may have had difficulty applying the psychologist's general message regarding the possibility of repressing and recovering memories to their own specific experiences in the laboratory. Participants may not have been convinced that it was possible for them to have repressed memories for scenes from the violent videotape, or that they would be able to recover memories for such scenes during the course of the study.

The first condition that had to be met to make the idea of repression plausible was to expose people to a somewhat traumatic or arousing event. Participants' reactions to the violent videotape were assessed along a number of dimensions to determine whether or not they found it arousing (see *Videotape impressions* measures, Appendix E). Participants reported their impressions of the violent videotape by marking six 150-mm lines with endpoints labeled *not at all* and *very exciting*, suspenseful, amusing, stressful, frightening, and disturbing, respectively. Participants perceived the violent videotape to be relatively suspenseful, frightening, stressful, and disturbing ($M_s = 85.13, 88.79, 92.27, \text{ and } 113.04$, respectively), but not very exciting or amusing ($M_s = 58.33 \text{ and } 25.77$, respectively). People in the control and repression groups did not significantly differ on these items, $t_s(46) = -.02 \text{ to } .98, p_s > .10$. These results confirm that an arousing situation was created in which repression may have been plausible.

The second condition that had to be met was to convince participants that they were having difficulty remembering various scenes (i.e., fake scenes) from the violent videotape. Mean

MCQ scores indicated that people did, indeed, have trouble visualizing fake scenes (Session 1 $M = 2.22$), adding credence to the theory that there was something from the tape that might have been repressed. But did people believe those scenes were repressed, or might they have been suspicious from the start that the fake scenes did not, in fact, appear in the violent videotape?

Participants were asked to respond whether or not they believed that they might have repressed certain portions of the violent videotape (see *Repression beliefs*, Appendix E). Ten people in the control condition (41.7%) and 15 people in the repression condition (62.5%) said that they did not think they had repressed anything from the violent videotape. Only 8 people in the repression condition (33.3%) expressed a belief that they might have repressed anything from the violent videotape, and only five of those people unequivocally said "yes," they believed they had repressed something (3 said "maybe" or "don't know"). These findings suggest that few people were convinced that repression was a plausible explanation for their relative lack of memory for fake scenes, even after having been exposed to the repression theory. This makes it unlikely that many people believed they would be able to recover any information from the violent videotape that they had been unable to recall at the time of the first attempt. If they did not believe there was anything hidden in their memories, they were not likely to recall anything more, even after repeated attempts were made.²

Taken together, these findings indicate that although most people appeared to have no trouble believing in the possibility of repressing traumatic memories and in the possibility of recovering memories with some degree of accuracy at a later time, at least some people in the repression condition did not believe that full recovery of accurate memories for stressful events is likely. Furthermore, the majority of people (52% of the sample) did not appear to believe that repression and recovery were possible for them in this situation. This finding would not be problematic if all of those people were in the control condition. However, nearly two-thirds (62.5%) of participants in the repression condition were unconvinced that they had repressed anything from the violent videotape. Thus, the theory manipulation appears to have been ineffective not because the idea of repression was implausible in general, but because it was perceived as implausible in this situation. Acceptance of repression as an explanation for a lack of

² It should be pointed out that although reported memory characteristics for fake scenes were relatively low ($M = 2.14$ overall), they were not nonexistent. This suggests that, in fact, false memories for fake scenes may have been created, even though they were not influenced by the memory-theory manipulation.

traumatic memories is undoubtedly more likely in a therapeutic situation, due to characteristics of the clients and the situation that were not recreated in this study. For instance, clients in therapy are likely to be experiencing chronic stress and a strong desire to overcome the aversiveness of their symptoms. In contrast, ethical considerations demand that the anxiety created in a laboratory situation be acute and relatively benign. The suggestion of repression by a therapist is also likely to be much stronger and more personalized than the suggestions given in this study (e.g., Engel, 1989). Repeatedly emphasizing the likelihood of repression and the usefulness of recovery as a cure for aversive symptoms may be a powerful prompt to false memory reports. Although study participants may be willing to search for an explanation for their lack of memory, it is unlikely that they will be as motivated as therapy clients to discover hidden memories or to create false memories.

The effects of scene type and rehearsals on MCQ scores were strong, but they did not correspond to effects found in an earlier study (Suengas & Johnson, 1988). Suengas and Johnson reported substantial improvements in MCQ scores following rehearsal of both real and imaginary events. In the current study, rehearsal served only to maintain memories for real events over a two-day period, but was ineffective at serving this function for fake events. However, there are important differences between the current study and the study reported by Suengas and Johnson. First, different Memory Characteristics Questionnaire items were used in the two studies. Several items were omitted from the current study due to the nature of the stimulus videotape. Therefore, the same pattern would only have been expected on similar items, at best. Second, differential rehearsal effects were reported in the Suengas and Johnson study on factor scores, whereas mean scores were analyzed in the current study. Because a number of MCQ items were omitted in the current study, similar factors could not be analyzed. Third, participants in the Suengas and Johnson study were provided with scripts for the imagined events, whereas in the current study, only labels for the events (i.e., fake scenes titles) were provided. Guiding participants through the imagery task by telling them what they should be visualizing moment by moment may be a more powerful stimulus to creating illusory memories. Finally, Suengas and Johnson postulated that the relative amount of rehearsal of real and imaginary events may be an important determinant of how well each is remembered. Specifically, discrepancies between real and imaginary events might be most effectively reduced by imagining fake scenes much more often than real scenes. Memory traces for real scenes are likely to be strong in the beginning but decay over time in the absence of rehearsals. In contrast, rehearsing imaginary events may increase associated memory

characteristics. Therefore, the combined decay of memories for real events and improvement of memories for imaginary events may eventually result in relatively similar reported memories. Because real and fake scenes were rehearsed an equal number of times in the current study, memory for fake scenes was unlikely to show significant improvements relative to memory for real scenes. This theory was not adequately tested in the current study, and remains an intriguing possibility for future research.

Confidence

People's confidence that they had actually seen particular scenes in the violent videotape was not influenced by the theory manipulation. People were no more confident that they had seen either real or fake scenes when they were told about the possibility of repression than when such a possibility was not discussed. Hearing a repression-and-recovery theory was likely to have its greatest influence on memory for fake scenes, because it provided an explanation for why scenes were not recalled, and the impetus to try to recall them. The same factors that accounted for the lack of theory effects on MCQ scores apply to the confidence measures. If participants were not convinced that they had repressed material from the violent videotape, it is unlikely that they would feel confident that scenes they could not remember (i.e., fake scenes) actually appeared in the videotape. The fact that repeated rehearsals of certain scenes failed to result in more detailed memories may have reinforced people's doubts that they had ever witnessed the fake scenes.

Rehearsal, on the other hand, did influence confidence. Participants were more convinced that they had seen rehearsed scenes than unrehearsed scenes. This was true for both real and fake scenes, but the specific effects of rehearsal were slightly different depending upon scene type. The act of rehearsal, but not the number of rehearsals, determined how confident people were that they had witnessed fake scenes. People were equally confident that fake scenes rehearsed once or three times had appeared in the videotape, and they were more confident that they had witnessed the rehearsed fake scenes than fake scenes they had not rehearsed. On the other hand, increased rehearsals actually increased confidence that people had seen real scenes. People were equally confident in their memories for real scenes whether they were rehearsed once or not at all. Their confidence that the real scenes had appeared in the videotape became even stronger after rehearsing real scenes three times. Thus, it took more rehearsals of scenes that were remembered well in the first place (i.e., real scenes) to enhance confidence in those memories than it did to enhance memories in scenes that were not remembered very well (fake scenes).

The fact that confidence in fake-scene memories increased is important. People's confidence that they had witnessed scenes they had not increased over time when they were asked to focus on those scenes, even though their memory for the scenes did not improve. This suggests that people must have been convinced that there was something to remember, not because they were beginning to remember more, but because the experimenter told them they should remember more. The fact that people were willing to report even the slightest memory for scenes that did not occur provides evidence that people succumbed to the suggestion that they might be harboring hidden memories. Accepting the suggestion that one has hidden memories may be the first step in actually creating those memories.

Conclusion

The three major questions to be answered in this study were: 1) Can combined exposure to a memory recovery theory and suggestive memory recovery techniques induce illusory memories for events that never occurred?; 2) Can simple exposure to a repression and recovery theory of memory lead to the generation of false memories for "forgotten" events?; and 3) In the absence of an explicit memory recovery theory, is the use of such memory recovery techniques as imagery and journalling sufficient for false memories to be produced?

Despite the apparent believability and convincingness of the expert, the memory theory manipulation was not effective in creating false memories for traumatic events. Memories for violent scenes were not differentially affected by the manipulation of exposure to a repression-and-recovery theory of memory.

It is possible, however, that false memories will be produced only when an explanation for memory failure is combined with a method by which to retrieve memories. By now, thousands of people in therapy have been exposed to the theory of repressed memories (e.g., Lindsay & Read, 1994), but only some of them will have recovered false memories of abuse. What accounts for the propensity to recover false memories? No one knows, but it is likely to be a combination of things (Lindsay & Read, 1994). Memory recovery techniques are unlikely to be used in the absence of theory (for examples, see Bass & Davis, 1992; Blume, 1990; Frederickson, 1992). Although in this study, the combination of theory and technique was not a sufficient stimulus for the creation of false memories, the parameters of the study may have limited the potential results. Given a longer delay between the stressful stimulus and the initial memory test, the accuracy of memories may decay and fake scenes may seem more plausible. More intensive imagery instructions including stronger suggestions regarding the content of the fake scenes and an increased number of

rehearsals may also increase the probability of stimulating false memory reports. None of these suggestions are impossible in the laboratory, and all are consistent with the type of pressure that may be applied in the context of some memory recovery therapies (e.g., Lindsay & Read, 1994; Poole et al., 1995). All provide intriguing directions for future research.

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APPENDIX A: SCRIPT FOR THE REPRESSION THEORY VIDEOTAPE

Interviewer: Dr. Smith, could you tell us a little bit about yourself?

Psychologist: Certainly. I received my Ph.D. in clinical psychology from Wake Forest University. I was an intern in the psychiatric unit at New York City General Hospital before moving here to Minneapolis with my wife and opening my private practice. I am a member of the American Psychological Association, as well as the Division of Clinical and Counseling Psychology, and I have served on the Minnesota state licensing board for clinical practice.

I: How long have you had your own practice?

P: I've been seeing clients privately for about 17 years now.

I: Do you specialize in any particular area of treatment?

P: No, not really. I am willing to see people with all types of problems, or mild disorders. I have helped my clients deal with things like alcohol or drug abuse, work-related stress, children with behavioral problems . . . a little bit of everything really. Most of my clients are regular people who may appear to be functioning normally if you meet them on the street or in the grocery store, but do have some difficulties that they need some professional help in trying to resolve.

I: You mentioned that you sometimes have children as clients. How important do you think our childhood experiences are to the way that people end up as adults?

P: Well, of course our early childhood experiences affect our development in many ways. And often the habits that we develop, how we view the world, and so on, continue to shape what we do as adults. What I find interesting is the way I've seen young children react to different events. Their responses are quite different from how you or I might act. For example, I had a mother bring her 5-year old son in. He had been having severe nightmares, and although he wouldn't say what they were about, his mother told me that the child had become withdrawn, and was very resistant to leaving the house. She informed me that the family had been in car accident during a vacation about a month earlier, and although no one was really hurt, she thought that the accident might have something to do with the changes in her son's behavior. In talking to the child over a period of a few weeks, it became clear that he was experiencing symptoms associated with having experienced a traumatic event -- and yet he had no real conscious recollection of the events surrounding the accident. That type of situation is very complex, because the only way to help the child work through his feelings and his fears, and often his confusion, is to get the child to recall the event, the accident in this case, and not be threatened by it.

I: Are people's memories for traumatic events somehow different from our normal memories? Why do people sometimes forget when something very scary happens to them?

P: In answer to your first question, I'd say yes. People's memories for traumatic or even very stressful events that they experience can be quite different from normal event memories. The human mind is very powerful, and in some cases very adaptive to the world around us. You've

heard of the concept of repression. In fact, our minds are capable of repressing or completely blocking out our memories for things that we are consciously unable to deal with - at least at the time. Events that are associated with some level of stress or anxiety are especially susceptible to repression. Such events may not necessarily seem traumatic at the time, even to the individual experiencing them, but the anxiety surrounding them can lead a person to block them out.

I: Can such memories ever be recovered?

P: When the mind does repress the memory for an event, or even a series of events, the memory does not simply disappear. Such memories are still there, stored in the brain, and can be retrieved or recovered with effort. The conditions under which that can happen will vary from person to person, just as not every person will experience the trauma in such a way that their mind will repress that memory in the first place. It is the job of the therapist, in such cases, through various techniques, to help the client recover that memory.

I: How is it that people are able to suddenly "remember" something that they were unable to recall, sometimes for years? Some people might say that these are surely not real memories.

P: Under conditions of extreme stress the human body undergoes a number of changes - our heart rate increases, we become more alert, in fact all of our senses become more active. The brain operates differently as well. In crisis situations people often must react to their environment. The human mind will often repress the experiences that are very traumatic, keeping them from the conscious mind so the individual can cope with the situation and ultimately remove themselves from the dangerous environment. This type of defense mechanism is quite common. When the person is no longer threatened, the mind is free to release those memories, intact, into consciousness. Sometimes this will happen spontaneously. In other cases a therapist can help the person recover such memories. But there is no reason to believe that these memories aren't accurate and relatively complete. In fact, years of clinical research support the idea that repressed memories for traumatic events can be recovered, and that this is an important step toward successful therapy.

I: What are the techniques that therapists use to recover repressed memories, and how well do they work?

P: There are any number of techniques that clinicians and therapists might use in cases of repressed traumatic memories. In addition to regular therapy sessions, things such as hypnosis, age regression, relaxation therapy, guided imagery, and daily journaling can be used to help a person recover memories that have been repressed during a traumatic event.

I: Do you use any of those techniques with your patients?

P: I personally do not use hypnosis or age regression with any of my clients although they can be effective tools for the recovery of repressed memories. I have had success using guided imagery techniques, as well as having clients keep journals of their thoughts and feelings about the traumatic experience. For example, there was a woman in her late 20's who came to me because she was experiencing some trouble in her marriage. After she described her problems to me in a

bit more detail, it became clear that her problems were deeply rooted, extending to other aspects of her life besides her marriage. In essence, she was having trouble adjusting in all phases of her life. From the symptoms she described -- including a history of anxiety attacks, bingeing and purging, and bouts of depression -- I began to wonder if she hadn't suffered some sort of traumatic experience in her childhood that might have led to these destructive patterns in her life. At first she couldn't pinpoint any traumatic childhood incidents. In fact, she was having difficulties recalling substantial portions of her childhood. I felt that these gaps in her memory might be significant. After spending some time exploring her childhood memories using relaxation therapy, guided imagery, and journalling techniques, this young woman was able to slowly uncover and face a series of abusive experiences from her childhood that she had been repressing for years, and that clearly explained the symptoms she had been experiencing.

I: What do you think made it possible for this woman to recall such experiences after so many years?

P: There are several factors that not only apply to the specific case I was talking about just now, but to these cases in general. A supportive atmosphere is very important. Often, people whose histories include traumatic experiences or periods of great distress have had very little exposure to unconditional support. They don't feel comfortable opening up, and they have difficulty trusting other people. So establishing an atmosphere of trust is very important. And I think the specific techniques that I have used with clients whom I think might be harboring such memories are quite successful in unearthing them. Relaxation is a large part of what makes guided imagery successful. When we relax, our minds can open up to thoughts and ideas and even memories that we didn't know we had. It often takes a relaxed mind and a supportive environment for a person to feel safe enough to access and explore things that normally would be blocked out of consciousness -- things that make us anxious or uncomfortable. Free-writing, or journalling, works in much the same way. When a person is able to relax and just let the words flow, and not censor the thoughts and feelings that are expressed, they are often surprised to find out that there is more there than they expected.

APPENDIX B: RANKING LISTS WITH REAL AND FAKE TARGET SCENES

Real scenes a, b, c, and d, and fake scenes e, f, g, and h were used in the imagery and journalling tasks. Real scenes m, n, p, and q served as fillers on both lists (i.e., were never used in the imagery and journalling tasks).

List 1:

- ___ Man shoves jar into boy's face (m)
- ___ Woman pouring beer into sink (n)
- ___ Man throwing furniture during fight (e)
- ___ House being robbed (a)
- ___ Father tearing at daughter's clothes (f)
- ___ Woman shot in chest (p)
- ___ Tennis player being stalked (q)
- ___ Boy locked in closet (b)

List 2:

- ___ Man shoves jar into boy's face (m)
- ___ Woman pouring beer into sink (n)
- ___ Woman shoots her attacker (g)
- ___ Woman with candle in dark house (c)
- ___ Father molesting daughter (h)
- ___ Woman shot in chest (p)
- ___ Tennis player being stalked (q)
- ___ Man and woman fighting on boat (d)

APPENDIX C: MEMORY CHARACTERISTICS QUESTIONNAIRE

Instructions: For each question, please circle the response that best describes your memory for the scene you were just imagining.

1. My memory for this event is:

dim 1 2 3 4 5 6 7 sharp/clear

2. My memory for this event involves visual detail

little 1 2 3 4 5 6 7 a lot
or none

3. My memory for this event involves sound

little 1 2 3 4 5 6 7 a lot
or none

4. The overall vividness of my memory for this event is:

vague 1 2 3 4 5 6 7 very vivid

5. My memory for the event is:

sketchy 1 2 3 4 5 6 7 very detailed

6. My memory for the location where the event takes place is:

vague 1 2 3 4 5 6 7 clear/distinct

7. Relative spatial arrangement of objects in my memory for the event is:

vague 1 2 3 4 5 6 7 clear/distinct

8. Relative spatial arrangement of people in my memory for the event is:

vague 1 2 3 4 5 6 7 clear/distinct

9. The event seems:

short 1 2 3 4 5 6 7 long

10. I remember how I felt at the time when the event took place:

not at all 1 2 3 4 5 6 7 definitely

11. My feelings at the time were:

negative 1 2 3 4 5 6 7 positive

12. My feelings at the time were:

1 2 3 4 5 6 7
not intense very intense

13. As I am remembering now, my feelings are:

1 2 3 4 5 6 7
not intense very intense

14. I remember what I was thinking at the time:

1 2 3 4 5 6 7
not at all clearly

15. Overall, I remember this event:

1 2 3 4 5 6 7
hardly very well

16. I remember events that took place in advance of the event:

1 2 3 4 5 6 7
not at all clearly

17. I remember events that took place after the event:

1 2 3 4 5 6 7
not at all clearly

18. Do you have any doubts about the accuracy of your memory for this event?

	1	2	3	4	5	6	7
a great							no doubt
deal of doubt							whatsoever

Additional Questions included on the Session 2 MCO:

19. Since it happened, I have thought about this event:

1	2	3	4	5	6	7
not at all						many times

20. Since it happened, I have talked about this event:

1	2	3	4	5	6	7
not at all						many times

APPENDIX D: CONFIDENCE RATINGS

How confident are you that each of the scenes listed below appeared in the violent videotape you watched two days ago? For each scene, write a number in the blank that corresponds to how confident you are that you actually saw the scene. Some of the scenes listed may not have appeared in the videotape you watched.

	1	2	3	4	5	6	7	
<i>not at all</i>								<i>completely</i>
<i>confident</i>								<i>confident</i>

- ___ WOMAN BEATEN IN FRONT OF MIRROR
- ___ TENNIS PLAYER BEING STALKED
- ___ FATHER MOLESTING DAUGHTER
- ___ WOMAN TRYING TO COOK A TV DINNER
- ___ WOMAN SHOT IN CHEST
- ___ CHILDREN WATCHING PARENTS FIGHT
- ___ BOY LOCKED IN CLOSET
- ___ WOMAN SHOOTS ATTACKER
- ___ MAN SHOVES JAR INTO BOY'S FACE
- ___ WOMEN FIGHTING IN ATTIC
- ___ BOY STABBING WOMAN IN BED
- ___ BOYS PLAYING FOOTBALL
- ___ FATHER TEARING AT DAUGHTER'S CLOTHES
- ___ MAN AND WOMAN FIGHTING ON BOAT
- ___ WOMAN POURING BEER INTO SINK
- ___ WOMEN GETTING HAIR CUT OFF
- ___ GIRL MOLESTED AT PARTY
- ___ WOMAN WITH CANDLE IN DARK HOUSE
- ___ TRAIN CRASHES INTO TRUCK
- ___ MAN THROWING FURNITURE DURING FIGHT
- ___ HOUSE BEING ROBBED
- ___ WOMAN CHASED BY MEN IN CAR
- ___ WOMAN HIDES BEHIND DOOR
- ___ MAN AND TWO BOYS FISHING

APPENDIX E: MANIPULATION CHECKS AND ANCILLARY MEASURES

Manipulation Checks

Memory theory condition:

What did the psychologist in the videotape conclude about the effects of stress on memory and the way the mind works?

- a) The mind will sometimes completely block out memories of events that occurred under stressful conditions, and accurate and complete memories can be recovered later, after the stress has passed.
- b) The mind will sometimes completely block out memories of events that occurred under stressful conditions, and although some true memories may be recovered after the stress has passed, some false information will also be recovered.
- c) The mind generally does not block out memories of events that occurred under stressful conditions, and any "memories" that are eventually recovered are likely to be false.
- d) I did not see a videotaped memory expert.

Number of rehearsals:

What day and at what time of day did you do the take-home imagination and journalling exercise?

How much time did you spend on the take-home imagination and journalling exercise? (specify in minutes)

Ancillary measures

Repression beliefs:

One theory of memory states that the mind will sometimes repress, or block out, certain memories when these memories are associated with shock or distress. Do you think that you might have repressed certain portions of the violent videotape?

Which of the following statements best summarizes your own personal views about the effects of stress on memory and the way the mind works?

- a) The mind generally does not block out memories of events that occurred under stressful conditions, and any "memories" that are eventually recovered are likely to be false.
- b) The mind is capable of completely blocking out memories of events that occurred under stressful conditions, and accurate and complete memories can be recovered later, after the stress has passed.
- c) The mind is capable of completely blocking out memories of events that occurred under stressful conditions, and although some true memories may be recovered after the stress has passed, some false information will also be recovered.

Reactions to videotaped psychologist: (Experimental condition only)

How would you rate the competence of the psychologist in the videotape?

1	2	3	4	5	6	7
not at all competent						completely competent

How believable was the psychologist's discussion of the woman he saw who recovered repressed memories?

1	2	3	4	5	6	7
not at all believable						completely believable

How convincing was the psychologist's presentation about how memory works?

1	2	3	4	5	6	7
not at all convincing						completely convincing

Additional questions: (Session 2, all participants)

How many times did images from the violent film clips spontaneously come to mind over the last 48 hours (when you weren't trying to remember them)?

Compared to 48 hours ago, how much information from the violent videotape do you think you remember now?

- a) much less than before
- b) somewhat less than before
- c) about the same as before
- d) somewhat more than before
- e) much more than before

Have you seen any of these movies before? (Other than in the film clips.) Please indicate in the first space preceding the movie name how many times you have seen that film. In the second space, indicate how long ago you last saw that film:

_____	Playing for Time	_____	Needful Things
_____	True Romance	_____	Marie: A True Story
_____	Radio Flyer	_____	Cold Comfort
_____	The Burning Bed	_____	Blue Steel
_____	The Stranger	_____	The Stepfather
_____	This Boy's Life	_____	Dead Again
		_____	Dead Calm

Ease of Visualization Questions:

Please indicate by marking a slash on the line how easy or difficult it was for you to visualize each of the eight scenes.

Scene #:

|-----|

Extremely easy
to visualize

Extremely hard
to visualize

Videotape impressions: (Session 1)

What were your overall impressions of the violent videotape that you watched? Make a slash mark indicating your impressions on each of the following dimensions.

|-----|

not at all
exciting

very
exciting

|-----|

not at all
suspenseful

very
suspenseful

|-----|

not at all
amusing

very
amusing

|-----|

not at all
stressful

very
stressful

|-----|

not at all
frightening

very
frightening

|-----|

not at all
disturbing

very
disturbing

**APPENDIX F: IMAGERY AND JOURNALLING INSTRUCTIONS
FOR THE TAKE-HOME TASK**

In two days, you will be coming back to the lab to answer some questions about your memory for the violent events on the first videotape you saw today. In the meantime, you are asked to spend some time thinking about the scenes and writing down what you can remember from them. Below is a list of four scenes from the videotape that you indicated you had difficulty remembering.

Around this time tomorrow, you are asked to spend 2 minutes thinking about, and up to 5 minutes writing about what you can remember from each scene on this list. You should repeat the imagery procedure you followed today for each of the four scenes: Close your eyes and try to imagine the specific scene. Run it through your mind from start to finish. You should actually try to SEE the scene before your eyes, and watch as it goes by. After about 2 minutes, stop and write down as much as you can remember about the scene in your blue book, including what you remember seeing, hearing, thinking, and feeling as you watched the scene. Repeat this process for each of the scenes.

Scene 1:

Scene 2:

Scene 3:

Scene 4:

Please remember to bring your journal (blue book) back with you in two days!

APPENDIX G: STUDY PROTOCOL

INITIAL SESSION:

1. Greet and give a brief introduction to the study.

"Hi, are you (name)? How are you? Thank you for coming. My name is _____. As you probably noticed on the posting form, this is a study on women's reactions to media violence. Before I give you the consent form, I want to make sure you understand what you will be asked to do in this study. If you agree to participate, you will watch a short videotape of some movie clips today, and then answer some questions about them. This study requires that you come back in two days to answer some additional questions about the tape. You will also be asked to fill out some materials at home and bring them with you when you come back in two days. You will get 2 credits if you complete the study, which should take about two hours total."

"The videotape that you are going to see contains some scenes that portray violent acts and human suffering, but all the scenes are from Hollywood-produced, commercially released movies. I need to warn you that some scenes include partial nudity, bleeding wounds, and profanity. Do you feel like you're okay with watching the videotape?" (If not, tell her that's fine; debrief, give credit, and send home.)

"The take-home materials should only take about 20 minutes to complete. Do you think that you will have some free time available to do that part? Will you be able to come back for a second session in two days? That would be at this time on (2 days later)."

"Here is a consent form I would like you to read and sign before we begin, indicating your willingness to participate in the study. Let me remind you that if at any time in this experiment you feel that this is too much for you, you are free to withdraw."

2. Have the participant read and sign the consent form and give the participant an extra credit card.

3. "I'm going to give you a set of headphones to put on when you're ready to view the tape. If at any time you find the tape too disturbing and wish to stop watching it, you can just press the STOP button. After you have watched the tape, I will give you a questionnaire that will ask you various things about what you saw."

4. Show the participant how to operate the VCR, and give her the headphones. Tell her to start the tape whenever she is ready. Turn off the VCR when the tape finishes.

5. Give her the video impressions questionnaire (exciting-disturbing ratings).

"The first questionnaire I'd like you to fill out asks about your overall reactions to the tape you just watched."

6. While she is filling out the video impressions questionnaire, consult the running list to see which ranking list she should receive (1 or 2).

7. Pick up the video impressions questionnaire when she is through.

"In this study, we are also interested in the effect that violence has on memory, so the next thing I'd like you to do is look at a list of some of the clips you saw in the videotape. (Give her the ranking list.) Overall, these scenes were rated among the ones that people in previous studies had the most difficulty remembering. What I would like you to do is rank them from one to eight in terms of how well you

remember them. I am interested in your overall rating of the scene, not one just based on an actor you recognized or a specific event you remembered. You should think about how well you can reconstruct the entire scene in your mind from beginning to end and base your judgment on that. Number one should be the scene you can remember the most, and number eight should be the scene you can remember the least."

If a participant expresses difficulty in remembering a scene or says that she doesn't think she saw a scene, assure her that it is normal to have memory problems for materials of this nature, and tell her that she can just rank that scene low on the list.

8. After she completes the ranking task, explain:

"We know from past research that sometimes memory for events associated with anxiety or fear can be disrupted, so any trouble you might have had remembering certain scenes is perfectly normal. One of the questions we're asking in this study is whether or not certain techniques can help to improve memory for disturbing or stressful experiences. In this study we are testing a couple of these different techniques."

"I am going to take four of the scenes you indicated having some trouble with, and we are going to work on your memory for them, okay? We're going to use a variation of a technique called 'guided imagery.' What this means is I'm going to ask you to close your eyes and try to visualize each scene for about 2 minutes. During that time, I will ask you to think about a specific scene, running it through your mind from beginning to end. I want you to try to actually SEE the scene before your eyes, and watch it as it goes by. Do you understand what I mean?"

9. Consult the running sheet to determine the order in which the four scenes (A, B, E, & F if she got Ranking list 1; C, D, G, & H if she got List 2) should be imagined. You will use the four target scenes indicated on the running sheet even if the participant did not rank these four scenes lowest (as the four she remembered the least).

10. Give the participant imagery instructions for the first scene:

"Okay, now I would like you to close your eyes, relax and try to imagine the (name of the appropriate) scene. I want you to try to "see" this scene as if you were watching it on the tape again. Try to remember the details you saw and the sounds that you heard. Remember what you were thinking and feeling as you watched the scene. Run through the scene as many times as you can. If you find this scene hard to remember, that's okay. Just relax and try to focus. You can start now."

**** She might say that she doesn't remember the scene at all or that she is having a hard time remembering it. Tell her that it is okay, but you would like her to imagine it for two minutes. It is important to encourage a belief that this scene may have occurred. If she still doesn't remember anything about the scene after trying to imagine it, she will be able to indicate that on the MCQ.**

11. Time the imagery task on the first scene for 1 minute and 30 seconds.

When time is up:

"Okay, you can open your eyes. I am going to give you a questionnaire that asks you to describe certain aspects of your memory for the scene you just thought about. Try to answer the questions as well as you can."

Give her a Memory Characteristics Questionnaire for Scene 1. Pick it up when she is through.

12. Repeat the imagery task followed by an MCQ (steps 11 and 12) for each of the 3 remaining scenes, in the order specified on the running sheet. For each scene, repeat the imagery instructions that appear in step 11 and the MCQ instructions in step 12.

13. Check the running sheet to see if the participant is assigned to the control or experimental condition. Participants in the experimental condition will now watch a videotape of an "expert" talking about the theory of repression. The participants in the control condition will not see this videotape.

14a. EXPERIMENTAL CONDITION ONLY:

Cue up second videotape of "expert" talking about imagery and repression. Continue:

"I'm going to ask you to watch another short videotape containing an interview with a professional psychologist. In this tape the psychologist will describe how he uses imagery as a therapeutic tool with some of his own clients. He'll be explaining the benefits of using these techniques to improve people's ability to recall previous information."

When the tape is finished, continue:

"I wanted to show you that videotape as an example of how techniques similar to the ones we're using have been applied in other settings. The psychologist in the tape was explaining a common theory about how traumatic memories can be repressed, and describing how he's used certain techniques to recover hidden memories. What we're doing in this study is testing whether or not the techniques he talked about are helpful for retrieving memories for stressful and disturbing events."

Participants in the experimental condition now follow the same procedure as the control condition, as described below.

14b. CONTROL CONDITION:

Give the participant a blue book and set of journalling instructions to take home. Write the four scene names on the instruction sheet in the order they were imagined. Print the date and time the participant is to return and the participant's code number on the front.

"In two days, you will be coming back here to answer some questions about your memory for the events on the violent videotape you saw today. In the meantime, I would like you to spend a few more minutes thinking about the scenes we worked on today. I am giving you a blue book to take home that has a set of instructions and list of scenes inside the front cover."

Show the participant the sheet and go through the instructions with her.

"Around this time tomorrow, if that's possible, I'd like you to spend a little time at home trying to visualize each of the four scenes you thought about today. The sheet inside your blue book lists the scenes in the order I'd like you to work on them. Instead of filling out a questionnaire after you imagine each scene like you did today, what I'd like you to do is write down as much as you can remember about the scene. Do you understand what you're going to be doing? Will you be able to take a few minutes around this time tomorrow and complete this task?"

Ask her to make sure she does the imagery and journalling task before she comes back, even if she forgets to do it when she is supposed to.

"Before you sit down to do the imagery task tomorrow, please go over the instructions inside the blue book and follow them carefully. Please remember to bring your blue book back with you on (day she is to return)."

15. Answer any questions and thank her.

SECOND SESSION:

Before the participant arrives:

Get eight Session 2: 20-item MCQs and final questionnaires ready. Mark the MCQs and "Ease of Imagining" questionnaire with the scene names in the order that they appear on the running sheet. The first four scenes will be the ones that the participant rehearsed during the first session and at home, in the same order as before. The last four MCQs should be marked with the names of the second set of four scenes in the order specified on the running sheet for session 2.

When the participant arrives:

1. Collect journal; hand out extra credit card. If the participant has forgotten her journal, ask her to drop it off later.

2. "If you remember, last time I told you we are interested in testing different techniques used to improve people's memory for stressful or disturbing events. Today we're going to use the guided imagery task again on a few scenes. So, just as before I am going to give you a scene and I would like you to just relax, close your eyes and try to actually see the events in the scene."

3. "Okay, I would like you to relax and try to imagine the (name of the appropriate) scene. I want you to try to "see" this scene as if you were watching it on the tape again. Follow the action as it occurs. Try to remember the details you saw, the sounds that you heard, and what you were thinking and feeling as you watched the scene. Run through the scene as many times as you can. If you find this scene hard to remember, that's okay. Just relax and try to focus. You can start now."

4. After 1 minute and 30 seconds have passed:

"Okay, you can open your eyes. Now I'm going to give you a questionnaire that asks you to describe certain aspects of your memory for the scene you just thought about. Try to complete it the best you can."

Give the participant a Session 2 MCQ labeled with the scene name.

5. Repeat the imagery task and MCQ (steps 3 and 4) in order for the other three scenes she rehearsed before.

6. Consult the running sheet to determine the order for the second set of scenes to be imagined. If she did ABEF first, she'll do CDGH now, and vice versa. Read these instructions:

"Now, for comparison purposes, I'm going to ask you to imagine four more scenes from the videotape. We will follow the same procedure as we have been. I'll give you the name of a scene, give you a few seconds to get relaxed, and then we'll begin the imagery task. Okay?"

Repeat steps 3 and 4 (the imagery task for each scene, immediately followed by an MCQ) for the second set of four scenes in the order specified on the running sheet.

7. "Okay, I have a final set of questionnaires for you to complete, and then I will take a few minutes to summarize the study for you and answer any questions you might have."

Give her the final questionnaire (3 pages) in this order:

- 1) Ease of visualization;*
- 2) repression, movies, demographics;*
- 3) confidence ratings.*

8. *Debrief participant:*

"I would like to thank you for participating in this study. I'm going to spend just a few minutes summarizing the goals of this research project."

"Two days ago, you watched a videotape that included some graphic scenes of violence and human injury that were selected from R-rated Hollywood films. You might be wondering why we used spliced-together film clips instead of showing one continuous scene. We are interested in people's memories for fast-paced, emotionally arousing events. When people view material that is fast-paced, complex, and constantly changing, it can be very difficult to remember much of what they saw. Some things just happen too fast to notice the details, and the continuous changes from one scene to another can produce interference in memory. In this case, interference occurs when the scene being viewed prevents you from thinking about the scene you just finished viewing, so your memory for the previous scene is disrupted. This type of memory disturbance is very common."

"An important question we are studying involves the possibility that people's beliefs about how memory works can affect their later reports about what they remember. We know that people sometimes report remembering events that they did not actually experience but instead simply imagined or confused with other memories. This might be especially likely to happen when people are led to believe that they have memories that have been repressed, or when they have made repeated attempts to remember events."

"In this study, some people saw a videotape of an expert who suggested that repression is a very real phenomenon, and that the recovery of repressed memories is possible at a later time. We are testing the hypothesis that people who are led to believe in memory repression and recovery will report more memories and be more confident in the accuracy of their memories than people who were not exposed to a repression and recovery theory. We are also predicting that memories for scenes that were imagined a number of times will be stronger than memories for scenes that were only imagined once."

"If you viewed the videotape of the expert discussing the possibility of repression, you should be aware that we don't think it is likely that you actually repressed any memories of violent scenes from the videotape. Your failure to recall everything from the violent video was more likely due to normal limitations on the amount and rate at which people can process and store complex information. We used the violent materials to make it seem more plausible that repression of parts of the video was possible. We are not suggesting that repression never occurs or that no recovered memories are valid. We just do not think it is likely under these circumstances."

"Do you understand the purpose of this study? Do you have any questions about the study?"

"I would like to ask you again not to tell anyone about the details of this study. Because of the nature of this research, it is important that people who participate are unaware of the specific scenes they might see and the questions they will be asked to answer. We want people's memories to be based on what they actually saw, rather than what they might have heard about. Do you understand why it is important not to tell anyone about the details of this study and specific scenes they might be asked about?"

"Your cooperation is greatly appreciated. One last thing I'd like to mention is that there is a possibility that some people may experience some lingering discomfort from watching the violent video scenes. We are encouraging people to call us if this happens so we can help them deal with that, or to direct them to someone at the Student Counseling Center. We want people to have a positive research experience. If you have any questions or concerns about this study after you leave today, feel free to contact the project supervisor, Sheila Seelau, at the phone number listed on the posting form for this study."

"Do you have any questions about the study? Thanks again for your help."

APPENDIX H: MEANS FOR 2 x 2 x 3 ANOVA ON MCQ SCORES*Memory Characteristics Questionnaire (MCQ) Means by Memory Theory, Scene Type and Rehearsal*

Scene Type	Rehearsals		
	Time 1	Time 2	
	1	1	3
Real			
Repression	4.40 (0.78)	3.52 (0.84)	4.54 (0.81)
Control	4.53 (0.81)	3.48 (1.05)	4.36 (0.88)
Fake			
Repression	2.40 (1.02)	2.20 (1.05)	1.98 (0.84)
Control	2.04 (0.89)	2.18 (0.88)	2.07 (0.90)

Note. Standard deviations appear in parentheses below means.

APPENDIX I: MEANS FOR 2 x 2 x 3 ANOVA ON CONFIDENCE

Confidence Means by Memory Theory, Scene Type and Rehearsal

Scene Type	Rehearsals		
	Time 1	Time 2	
	1	1	3
Real			
Repression	5.83 (0.70)	5.44 (1.31)	6.60 (0.68)
Control	5.79 (0.81)	5.42 (1.65)	6.85 (0.54)
Fake			
Repression	1.87 (0.84)	2.67 (1.56)	2.35 (1.27)
Control	1.70 (0.90)	2.42 (1.74)	2.31 (1.84)

Note. Standard deviations appear in parentheses below means.

APPENDIX J: MCQ ITEM MEANS*Means and Standard Deviations for Memory Characteristics Questionnaire Items 1-4*

	Real Scenes			Fake Scenes		
	Rehearsals			Rehearsals		
	Time 1	Time 2		Time 1	Time 2	
	1	1	3	1	1	3
MCQ1						
Repression	4.90 (1.18)	3.98 (1.38)	5.40 (1.01)	2.13 (1.20)	2.23 (1.27)	1.83 (1.08)
Control	5.25 (1.18)	4.10 (1.34)	5.29 (1.24)	1.92 (1.14)	2.31 (1.22)	1.94 (1.25)
MCQ2						
Repression	5.38 (0.95)	4.13 (1.23)	5.52 (1.03)	2.52 (1.50)	2.23 (1.31)	1.90 (1.02)
Control	5.58 (1.21)	4.31 (1.70)	5.42 (1.39)	2.00 (1.29)	2.42 (1.56)	2.02 (1.50)
MCQ3						
Repression	3.69 (1.63)	2.85 (1.23)	3.85 (1.33)	1.83 (1.16)	1.85 (1.03)	1.63 (0.88)
Control	3.79 (1.62)	3.35 (1.56)	3.92 (1.58)	2.00 (1.09)	1.94 (1.31)	1.77 (1.04)
MCQ4						
Repression	4.73 (1.19)	3.85 (1.31)	5.06 (1.21)	2.13 (1.25)	2.00 (1.24)	1.69 (0.91)
Control	5.10 (1.22)	4.02 (1.48)	5.21 (1.23)	1.75 (0.99)	2.10 (1.21)	1.73 (0.96)

Means and Standard Deviations for Memory Characteristics Questionnaire Items 5-8

	Real Scenes			Fake Scenes		
	Rehearsals			Rehearsals		
	Time 1	Time 2		Time 1	Time 2	
	1	1	3	1	1	3
MCQ5						
Repression	4.83 (1.14)	3.73 (1.25)	5.04 (1.21)	1.96 (1.21)	1.92 (1.22)	1.75 (1.00)
Control	4.79 (1.30)	3.79 (1.55)	5.00 (1.25)	1.71 (1.03)	2.02 (1.14)	1.77 (1.03)
MCQ6						
Repression	5.90 (1.16)	4.52 (1.42)	5.73 (1.12)	2.15 (1.26)	2.04 (1.33)	1.94 (1.10)
Control	5.96 (1.89)	4.67 (1.75)	5.71 (1.32)	1.73 (0.97)	2.06 (1.41)	2.00 (1.33)
MCQ7						
Repression	4.60 (1.21)	3.52 (1.17)	4.98 (1.16)	2.02 (1.08)	1.83 (1.21)	1.77 (1.02)
Control	4.71 (1.42)	3.73 (1.63)	4.92 (1.50)	1.52 (0.90)	1.98 (1.03)	1.65 (0.89)
MCQ8						
Repression	5.35 (1.26)	4.19 (1.25)	5.46 (1.15)	2.25 (1.28)	2.08 (1.30)	1.85 (1.12)
Control	5.44 (1.28)	4.19 (1.68)	5.52 (1.37)	1.96 (1.23)	2.10 (1.23)	2.00 (1.32)

*Means and Standard Deviations for Memory Characteristics Questionnaire
Items 9-12*

	Real Scenes			Fake Scenes		
	Rehearsals			Rehearsals		
	Time	Time 2		Time	Time 2	
	1			1		
	1	1	3	1	1	3
MCQ9						
Repression	3.90 (0.97)	3.67 (1.38)	4.56 (1.35)	2.81 (1.39)	2.65 (1.45)	2.46 (1.44)
Control	3.77 (1.32)	3.63 (1.46)	4.17 (1.54)	1.98 (1.05)	2.38 (1.41)	2.38 (1.53)
MCQ10						
Repression	4.67 (1.09)	3.40 (1.48)	4.71 (1.31)	2.38 (1.32)	2.15 (1.37)	1.81 (1.05)
Control	4.92 (1.38)	3.08 (1.86)	4.31 (1.69)	1.94 (1.11)	2.04 (1.24)	1.77 (0.96)
MCQ11						
Repression	2.31 (1.02)	2.25 (1.06)	2.63 (1.19)	2.23 (1.09)	2.40 (1.22)	2.21 (1.10)
Control	2.35 (0.91)	2.69 (1.01)	2.50 (1.00)	2.31 (1.04)	2.54 (1.17)	2.69 (1.20)
MCQ12						
Repression	4.63 (1.20)	4.46 (1.18)	4.83 (1.10)	4.27 (1.62)	3.92 (1.56)	3.79 (1.59)
Control	4.48 (1.10)	4.08 (1.29)	4.38 (1.24)	3.58 (1.33)	3.60 (1.65)	3.48 (1.49)

*Means and Standard Deviations for Memory Characteristics Questionnaire
Items 13-16*

	Real Scenes			Fake Scenes		
	Rehearsals			Rehearsals		
	Time 1	Time 2		Time 1	Time 2	
	1	1	3	1	1	3
MCQ13						
Repression	3.85 (1.17)	3.04 (1.45)	3.48 (1.56)	3.63 (1.51)	2.60 (1.62)	2.46 (1.57)
Control	3.60 (1.19)	2.10 (0.93)	2.69 (1.34)	2.90 (1.44)	2.17 (1.51)	2.29 (1.52)
MCQ14						
Repression	4.50 (1.33)	3.38 (1.51)	4.50 (1.41)	2.35 (1.39)	2.08 (1.39)	1.77 (1.08)
Control	4.85 (1.39)	3.15 (1.77)	4.19 (1.72)	1.88 (1.18)	2.06 (1.41)	1.88 (1.12)
MCQ15						
Repression	4.96 (1.13)	3.81 (1.42)	5.23 (1.34)	2.10 (1.30)	2.02 (1.26)	1.63 (0.89)
Control	5.23 (1.15)	4.06 (1.50)	5.33 (1.27)	1.77 (0.96)	2.04 (1.05)	1.88 (1.15)
MCQ16						
Repression	3.25 (1.29)	2.46 (1.49)	2.94 (1.75)	2.04 (1.52)	1.81 (1.55)	1.69 (1.14)
Control	3.27 (1.70)	1.83 (1.06)	2.33 (1.38)	1.79 (1.22)	1.42 (0.72)	1.75 (1.28)

*Means and Standard Deviations for Memory Characteristics Questionnaire
Items 17-18*

	Real Scenes			Fake Scenes		
	Rehearsals			Rehearsals		
	Time 1	Time 2		Time 1	Time 2	
	1	1	3	1	1	3
MCQ17						
Repression	3.02 (1.49)	2.42 (1.43)	2.92 (1.75)	2.08 (1.49)	1.81 (1.55)	1.83 (1.27)
Control	3.27 (1.59)	1.90 (1.29)	2.25 (1.43)	1.79 (1.26)	1.40 (0.69)	1.75 (1.32)
MCQ18						
Repression	4.67 (1.44)	3.79 (1.57)	4.83 (1.37)	2.17 (1.32)	1.90 (1.28)	1.56 (0.88)
Control	5.15 (1.24)	3.90 (1.86)	5.29 (1.45)	2.42 (1.89)	2.65 (1.91)	2.48 (2.04)