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**Socio-cognitive Factors that Influence the
Reconstruction of Long-term Memory**

by

William O. Blois, B.A.hons.

A thesis submitted to
the Faculty of Graduate Studies and Research
in partial fulfillment of
the degree of

Master of Arts

Department of Psychology

Carleton University

Ottawa, Ontario

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Reconstruction of Long-term Memory

submitted by William O. Blois in partial fulfillment
of the requirements for the degree of

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Chair, Department of Psychology

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Abstract

The recent rise in the number of legal actions based on the discovery of "repressed" memories of childhood sexual abuse has raised concerns about the authenticity of these memories. This study sought to investigate the effects of different memory retrieval strategies, veracity and source similarity of leading information, frequency of prompting and time delays between initial and subsequent promptings to remember on the accuracy and confidence of subjects' long-term memories. Moreover, efforts were made to determine whether inaccurately reported memories reflected misinformation or compliance. Treatment groups (Hypnosis/Guided Imagery/Control) were balanced for hypnotizability and subjects were asked either twice or three times about their memories for the movie "Jaws". Results indicated that (a) information high in source similarity was reported with greater frequency, regardless of its veracity (b) confidence in memory reports varied as a function of the consistency, rather than accuracy, of subjects' memories with the leading information (c) subjects' responses were indicative of genuine misinformation and (d) time delay encouraged acceptance rather than rejection of source similar information. Furthermore, neither hypnosis nor prompting had much effect on subjects' memory reports. Implications of these findings for clinical and legal settings are discussed.

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Over the last thirty years, there has been a growing awareness of the incidence of child sexual abuse in our society and of the physical and emotional damage incurred by the victims of this crime (Cole & Putnam, 1992; Moeller, Bachmann & Moeller, 1993). Although much of this abuse has gone unpunished in the past, many adult survivors of abuse are now beginning to speak about their experience and seek legal retribution for their suffering. Some mental health professionals however, have questioned the authenticity of abuse claims made by adults who recover "repressed" memories of childhood abuse in therapy.

By itself, the therapeutic context in which repressed memories are recovered has led some researchers to question the authenticity of these memories (Bulkeley & Horwitz, 1994). Many clients who eventually recover repressed memories of childhood abuse had no idea that they had been abused before entering therapy (Wakefield & Underwager, 1992). If this initial lack of abuse memories was common, we should expect many therapists to have had clients who recover these memories without prior awareness of their abuse. Yet the "discovery" of repressed memories of childhood abuse is made much more frequently by some therapists than by others (Goodman, Bottoms & Shaver, 1991; Wakefield & Underwager, 1992). While it is possible that these findings indicate a special kind of memory that demands a clinical expertise possessed by only a few

therapists, they may also suggest that these "memories" are less a product of repression than of these specific therapeutic situations. If so, these findings suggest that recovered memories are frequently not memories at all. Instead, they may be therapy induced fantasies that clients come to interpret as memories.

Unfortunately, not only does the inculcation of erroneous memories of abuse have potentially serious personal and social ramifications for the client, but it has also led to a rising number of legal actions based on the discovery of repressed memories of childhood abuse (Bulkley & Horwitz, 1994). As a part of the therapeutic process, some clinicians and survivor manuals will urge adult children who recover memories of childhood abuse through therapy to take legal action against the alleged perpetrators (Loftus, 1993; Bass & Davis, 1988). If no evidence exists to corroborate the claims, recent legislative changes which effectively nullify the statute of limitations in these cases (Revised Statutes of Canada, 1985; Loftus, 1993) mean that often times the only evidence required in these litigations are the testimony of the plaintiff and the defense (Clark, 1993). Considering the controversial nature of the memories on which these cases are based, these legislative rulings give substantial legal empowerment to those who believe in an empirically questionable phenomenon.

The Dynamics of Counselling

In the middle part of this century, psychologists began to conceive of clinical counselling as a social psychological phenomenon (Robinson, 1955). Since this time, clinical and counselling psychologists have relied heavily on advances made within social psychology to better understand and improve upon the effectiveness of counselling treatments. Social psychology's most profound influence can be seen in the movement toward understanding counselling as a social influence process (Pepinsky, 1963).

Studies examining the structure of successful therapy support the conception of therapy as a social influence process (Tracey & Ray, 1984). Clients often hold attitudes and beliefs about the meaning of personal and interpersonal factors associated with their difficulties which serve to maintain the symptomatic behaviour. Consequently, the therapist will initially try to understand how the client views their problems and to draw out the symptomatic behaviour. Soon however, the therapist begins to introduce ideas about the client's situation and behaviour which are discrepant from the ideas held by the client. The introduction of a causal framework which is discrepant from the client's conception of their situation serves to promote change in the client's behaviour (Strong, Welsh, Corcoran & Hoyt, 1992). Although initially resistant to these new insights, the client eventually comes to accept the ideas

presented by the therapist. It is the client's adoption of the therapist's causal framework which is considered crucial for successful therapy because it replaces the client's maladaptive attitudes and beliefs which promote the symptomatic behaviour (Strong et al., 1992).

A myriad of different counselling techniques and treatments are available to promote client change but the effectiveness of a given treatment policy lies not in the essential "truth" of its constructs or theoretical framework but in the dynamic processes which underlie most, if not all, treatment policies (Strong & Claiborn, 1982; Strong et al., 1992). Meta-attributions, or literally "explanations of explanations", are commonly used to promote change of maladaptive attitudes and behaviours (Strong & Claiborn, 1982). When the therapist attributes the causes of a client's symptoms to negative internal characteristics, this stimulates the client to change the behaviours which led to this negative impression of themselves. If these negative characteristics are interpreted as intrinsic components of the client's personality however, they may be perceived as fixed and unchangeable. Thus, external meta-attributions of the client's negative personal characteristics are created so that the negative characteristics are themselves seen as externally created and consequently open to change.

Many treatment policies pinpoint the origins of clients' problematic social motives and cognitions in

childhood events, thereby explaining how the client came to possess these negative personality characteristics (Strong et al., 1992). These external meta-attributions serve to remove the client from responsibility for possessing the traits which led to the symptomatic behaviour and lead to an interpretation of these traits as externally created and thereby superficial and amenable to change. Of course, the literal truth of these meta-attributions need not be questioned as long as the attributions serve to make the client's problems more manageable. On the other hand, it is of crucial importance that the client believes in the therapist's account of their problems in order for a given treatment to effect therapeutic change (Strong & Claiborn, 1982).

The general dynamics of effecting therapeutic change through the creation of an externally based causal framework may apply to therapy situations involving the recovery of repressed memories of childhood abuse. These therapies attribute clients' negative personal characteristics as originating from abusive episodes in childhood. In the absence of any memory however, the plausibility of these meta-attributions relies upon a belief in certain mechanisms which would have to exist for these allegedly repressed memories to be considered authentic. A few common assumptions are used by recovered memory therapists to bolster client's belief in these mechanisms and

subsequently, the historical accuracy of the repressed memories themselves (Loftus, 1993; Lynn & Nash, 1994). These assumptions include the belief that (a) people are able to repress long-term memories of abuse and certain symptoms are indicative of this process, (b) it is common for memories of childhood abuse to be repressed, and (c) it is possible to recover accurate memories of early childhood events. The validity of these assumptions however has been called into question by a number of researchers (Lindsay & Read, 1994; Loftus, 1993).

Assumptions of Recovered Memory Therapy

Repression

When clients are initially confronted with the idea that they were abused as children, they are often incredulous given that they have no memories of the abusive episodes (Loftus, 1994). Frequently, this initial scepticism is overcome by explaining that their lack of memory is the result of repression.

The idea of repression is a cornerstone of psychoanalytic theory and a concept upon which much memory recovery therapy is based. According to this view, traumatic events are pushed out of consciousness because they are too painful to deal with. When these events are repressed, the anxiety caused by the memory may come to be expressed indirectly in the form of some disorder (Freud, 1927). It is

the presence of such a disorder which serves to alert a clinician to the possibility that repression of some experience has occurred.

Despite its widespread acceptance, there exists no sound empirical support for the concept of repression (Holmes, 1990). Even so, some clinicians who follow the general principles of psychoanalysis in their treatment of patients use a range of symptomatology, such as low self-esteem, sexual dysfunction, self-destructive behaviour, depression and anxiety as evidence of repressed memories of childhood sexual abuse (Lindsay & Read, 1994; Shaffer & Cozolino, 1992). These symptoms, in fact, may be indicative of a variety of problems other than early childhood trauma (Cole & Putnam, 1992; Moeller et al., 1993). Nevertheless, many psychotherapy clients with no memories of child abuse are encouraged to try to remember instances of abuse from their childhood based solely on the evidence that they are experiencing symptoms that many therapists erroneously believe to be unique indicators of repressed memories of abuse (Shaffer & Cozolino, 1992). Although no evidence exists in support of the concept of repression, the unfalsifiable nature of this construct means that there is also a paucity of direct evidence contradicting the idea of repression. This situation has led to much of the growing debate over the incidence of repressed memories of childhood abuse.

The Incidence of Repressed Memories

Many clinicians and survivor manuals are able to foster client belief in meta-attributions of repressed memories of childhood abuse through their assertions that the repression of these memories is common (Bass & Davis, 1988; Blume, 1990; Briere & Conte, 1993; Fredrickson, 1992; Ratican, 1992). When presented as scientific data, this information not only adds credibility to therapists' attributions of repressed memories of childhood abuse but may also allow the client to view their acceptance of the therapist's ideas as a product of his or her insight and reason rather than "weak submission" to the therapist's demands. As a consequence, the client perceives a greater a sense of personal control in the relationship which results in more persistent change of the maladaptive behaviours and cognitions in order to maintain this control (Strong & Claiborn, 1982).

Research that has examined the incidence of repressed memories of abuse however, has failed to provide clear support for the commonality of these memories. One study (Briere & Conte, 1993) of 450 women who had reported sexual abuse histories found that 59% of these women reported that they had at some time been amnesic for the abuse. As Loftus (1993) points out however, all of the women in this study were in therapy and may have reported amnesic periods based on inferences they drew from their therapists' beliefs about the commonality of repression. Furthermore, the eliciting

question used by the investigators was so broad as to allow for a multitude of interpretations. As such, a positive response to the researcher's question could not be confidently interpreted as an instance of repression. Instead of being truly amnesic for the abuse, it may simply be that the women, at different points in their lives, chose not to focus on the abuse, focused on other aspects of their lives or engaged in directed forgetting. Finally, there was a lack of independent confirmation of the abuse recalled by the women in this study.

To address the problems of therapeutic bias and interpretability of the eliciting question, Loftus, Polonsky and Fullilove (1994) conducted a survey of 105 women in outpatient treatment for substance abuse. In reducing the ambiguity of the eliciting questions and any possibility that clients' responses were based on their therapist's beliefs, they found that, of the women who reported having been abused, only 19% said they had forgotten the abuse for a time and then later recovered the memory. Although this 19% estimate is considerably lower than the results reported by Briere & Conte (1993), there is still the possibility that it overestimates the prevalence of amnesia for abuse given that the eliciting question does not reliably discount the possibility of normal or directed forgetting (Loftus et al., 1994).

A study by Femina, Yeager and Lewis (1990) addressed

the issue of independent confirmation of abuse. A sample of 69 young adults who had been incarcerated in their youths, and therefore had a documented history that detailed any abuse, was used. They found that 26 subjects gave histories of abuse which were discrepant from their juvenile records. Of the 11 subjects who agreed to a clarification interview, three subjects reported abuse that, according to their records, had never occurred while the remaining eight subjects failed to report their documented abuse. The most common reasons for a non-report of abuse were embarrassment, a wish to protect parents, and a desire to forget. None of the eight subjects gave memory failure as a reason for a non-report. Obviously, some survivors have a number of motives for not reporting their abuse and it would seem unreasonable to infer that their 'forgetting' is the product of a complex and unsubstantiated process like repression, without examining more probable and parsimonious alternative explanations.

These studies highlight the fact that there are presently no sound methods available to accurately assess the prevalence of amnesia for abuse. They also suggest that some of the available literature may greatly overestimate the prevalence of amnesia for abuse. Even so, many clinicians and survivor manuals maintain that repression of abuse is a very common phenomenon. Their ability to foster the belief that even one individual may forget and later

retrieve their memory of abuse may have the effect of legitimizing therapists' claims of repressed memories of abuse, thereby facilitating the generation of false memories by their clients (Loftus, 1993).

The Retrieval of Early Childhood Memories

A therapist's assertion that a client is repressing memories of childhood abuse would be of little consequence unless there was some hope that they might eventually recover accurate memories through therapy. Although some therapists assume that memories recovered in therapy are historically accurate, the available evidence suggests that people's memories are frequently expectancy-driven reconstructions that they come to interpret as real memories. Early investigations by Bartlett (1932) have shown that memory, and in particular long-term memory, is prone to a number of distortions and reconstructions. This effect is well demonstrated in a number of his experiments where he had subjects read and later recall an ambiguous short story, the most notable of which was "The War of the Ghosts". Bartlett read subjects this story and asked them to recall the story at various times after the initial reading. Bartlett found that, the longer the interval before recall, the fewer the details of the story that subjects were able to remember. Furthermore, Bartlett's subjects actively reconstructed the content of the story so that it made intuitive sense and became compatible with their cultural

biases, beliefs and personal experience.

Another consistently evident characteristic of adult memory is that people rarely remember incidents from early childhood (Wakefield & Underwager, 1992; Terr, 1988). This phenomenon has been described as infantile amnesia and is thought to result from maturational changes in the nervous system, as well as developmental changes in cognitive and linguistic functioning, which continue until the age of three or four and are required for the long-term retention of information (Howe & Courage, 1992; Moscovitch, 1985). As such, any memories recovered before this time are likely to be, at the very least, inaccurate. Despite this, in a survey of 600 families accused by their adult children of sexual abuse, Wakefield and Underwager's (1992) preliminary findings of 242 respondents found that 41% of the accusing children had recovered, in therapy, memories of abuse that allegedly took place before the age of two. Given the almost universal occurrence of infantile amnesia, these results are almost impossible to explain without reference to potentially confabulating influences in the clinical situation.

In summary, people's memories are clearly susceptible to inaccuracies and confabulations from a number of sources. Not only do most people lack memories from early childhood, but what we come to remember is often guided by social and contextual factors which may alter the content of memories.

Although some researchers suggest that the repression of memory renders it immune to distortion (Hovestead & Kristiansen, in press), the assumptions upon which some clinicians infer the existence of repressed memories of childhood abuse are of questionable validity. An alternative explanation suggests that repressed memories of childhood abuse are in fact therapy induced fantasies that clients come to interpret as memories.

Factors Affecting Memory Distortion

Recently, researchers have begun investigating certain factors which are commonly present in therapy situations and which may contribute to the production of abuse fantasies. Research on memory distortion has been primarily concerned with the effects of hypnosis and hypnotic susceptibility on memory, the influence of misleading post-event information on memory reports and the use of potentially flawed interview techniques to access memories, such as leading questioning and repeated prompting in the absence of any memories.

Hypnosis and Hypnotizability

In their efforts to uncover repressed memories, clinicians may use a variety of "special" techniques aimed at enhancing their clients' recall. While hypnosis is a popular method of accessing these memories (Lindsay & Read, 1994), most research has failed to show significant

increments in accurate recall due to hypnosis (Dinges, Whitehouse, Orne & Powell, 1992; Murray, Kinoshita & McConkey, 1990). In fact, hypnosis has, in some instances, been shown to increase inaccurate recall (Dinges et.al., 1992; Sheehan, 1988), and the acceptance of false information into memory (Sheehan, Statham & Jamieson, 1991).

Although some research seemingly supports the notion of hypnotic hypermnesia (Crawford & Allen, 1983; Shields & Knox, 1986), it has been argued that these results merely reflect a heightened willingness to report memories for information that, although accessible, would not normally be reported (Klatzky & Erdelyi, 1985; Whitehouse, Dinges, Orne & Orne, 1988). In these studies, researchers were unable to determine how much of the newly reported information may have been accessible prior to hypnosis because subjects were not required to disclose all information accessible to them on prior recall tests. As such, subjects may have begun to report this "new" information because they simply lowered their criteria of what constitutes a memory. Studies employing forced-choice recall procedures require subjects to provide a fixed number of responses on each recall test, thereby preventing changes in response criterion across recall trials by setting all subjects' output at the same level. Consequently, studies employing forced-choice recall procedures have found no difference among hypnotic and control subjects for accurately recalled information

(Whitehouse et.al., 1988).

If subjects merely lower their criteria of what constitutes a memory and report information about which they had previously been uncertain, changes in response criterion also imply that there should be a corresponding decrease in the confidence with which this new information is reported (Dywan, 1995). Much of the research examining the effects of hypnosis and hypnotic suggestibility on the confidence people place in their memories has found no differences in confidence between hypnotic and control subjects for accurately recalled information (Sanders, Gansier & Reisman, 1989; Spanos, Gwynn, Comer, Baltruweit & deGroh, 1989). In other studies, however, hypnotic subjects were more confident than non-hypnotic subjects in their inaccurate recall and recognition of information (Diamond, 1980; Orne, 1979; Spanos, Quigley, Gwynn, Glatt & Perlino, 1991; Whitehouse et.al., 1988), while still other research discovered overconfidence effects for high hypnotizable subjects only (Timm, 1985; Zelig & Beidleman, 1981). Even though the research is mixed, hypnosis and hypnotizability sometimes lead to increased confidence in inaccurate recall and there is no evidence to indicate that these factors decrease confidence in either accurate or inaccurate recall. Consequently, the response criterion explanation of hypermnnesia would seem inadequate in that it fails to account for the increased confidence that is sometimes

observed among hypnotic subjects relative to controls.

The increased confidence associated with hypnotically elicited recall of previously unreported information is best explained by the "balance of evidence hypothesis" (Baranski & Petrusic, 1994; Griffin & Tverski, 1992; Vickers, Smith, Burt & Brown, 1985). According to this view, confidence is determined by the balance of evidence accrued in favour of a given response, with the volume of evidence in support of a given response alternative taking precedence over the quality of evidence (Griffin & Tverski, 1992). As such, increased reporting of information, and the elevated confidence associated with these new disclosures, are due to changes in the amount of perceived evidence supporting the interpretation of this information as memory. More specifically, some researchers suggest that hypnotic recall may be perceived with greater vividness and fluency, thereby mimicking the perceptual characteristics associated with the retrieval of stronger memory (Dywan, 1995). These perceptual similarities are thought to be interpreted as evidence for the authenticity of the hypnotic recall, thereby contributing to both the increased reporting of and confidence in hypnotically elicited information.

Additionally, a number of contextual factors associated with the use of hypnotic procedures may be perceived as evidence supporting the accuracy of information elicited under hypnosis. For instance, positive rapport between the

client and hypnotist (Sheehan, Green & Treusdale, 1992), a formal social context (Barnier & McConkey, 1992), unverifiability of the target stimulus (Lynn, Milano & Weekes, 1992), perceived experimenter expertise (Smith & Ellsworth, 1987) as well as contextually generated expectations of accurate recall (Barnier & McConkey, 1992; Gwynn, Spanos, Nancos & Chow, 1993) have all been associated with increased reporting of pseudomemories (i.e., false memories) without accompanying decrements in confidence. Interestingly, many of these contextual variables are likely to be found in therapy situations which employ the use of hypnotic procedures to enhance recall (Lynn & Nash, 1994). According to the "balance of evidence hypothesis", increased pseudomemory reports that lack a corresponding decrease in confidence suggest that clients may perceive these contextual factors as evidence in support of the accuracy of hypnotically elicited recall. On the basis of this "evidence", subjects may be encouraged to not question their memories but to trust the hypnotic procedure to provide them with accurate recollections (Lynn & Nash, 1994).

Alternatively, when subjects are confronted with information which would cause them to question their hypnotically elicited recall, pseudomemory reports are reduced. A number of studies have found that subjects often disavowed their earlier pseudomemory reports when they are given the opportunity to do so without discrediting

themselves (Murrey, Cross & Whipple, 1992; Spanos & Bures, 1994; Spanos, Gwynn, Comer, Baltruweit & deGroh, 1989; Spanos & McLean, 1986). As such, these results suggest that these hypnotically induced pseudomemories reflect reporting biases rather than memory distortions. They are also consistent with the idea that contextual factors may have a powerful influence on the extent to which subjects interpret pseudomemory reports as real or false. In many therapy situations, few if any contextual factors would encourage clients to question their hypnotically elicited recall. As such, it remains unclear whether clients would come to disavow their initial memory reports in the absence of these cues or whether this initial compliance evolves into genuine memory distortions.

Despite evidence to the contrary, many therapists believe that hypnosis facilitates the accurate recall of previously forgotten memories (Yapko, 1994). This mistaken assumption may lead to the misapplication of hypnosis or other memory recovery techniques, such as guided imagery (Ofshe, 1992), when therapists seek to retrieve accurate memories of early childhood abuse. These memory recovery treatments may contribute to clients' belief in any information consistent with therapists' suggestions and causal framework (i.e., repressed memories of childhood sexual abuse) because the perceptual and contextual factors associated with their use may be perceived as evidence in

support of the interpretation of this information as authentic. Whether this initial interpretation reflects compliance to the implicit demands of the therapy situation or genuine memory distortion remains unclear. Experimental investigations might distinguish compliance from memory distortion by presenting subjects with both repeated and novel information on follow-up tests of memory. If subjects show increased reporting of repeated information relative to novel information, this could be validly interpreted as evidence of memory distortion. If so, this would suggest that the use of these procedures may increase the certainty with which clients come to believe in suggested rather than repressed memories.

Misinformation

To effect therapeutic change, clinicians will often introduce ideas which are discrepant from the clients conception of their situation. To the extent that the information communicated to the client about a recall event is inaccurate, there is the possibility that clients' recall will be affected by misinformation. Misinformation refers to the fact that people will sometimes incorporate erroneous post-event information into their memories of an event. Research suggests that many memory reconstructions arise in part due to this phenomenon (Garry & Loftus, 1994; Loftus & Hoffman, 1989), resulting not only in distortions of factual information but invoking alterations of the subjective and

emotional aspects of the memory as well (Toland, Hoffman, & Loftus, 1991).

Despite numerous replications of this phenomenon (Belli, Lindsay, Gales & McCarthy, 1994; Blois, Spanos, Ritt, DuBreuil, Burgess & Matheson, 1995; Garry & Loftus, 1994; Lindsay, 1990; Loftus, 1979) and a general consensus that it is possible for people to distort minor details in memory, it has been argued that the confabulation of entirely fictional traumatic events is most improbable (Kristiansen, 1994; Olio, 1994). However, various anecdotal and experimental accounts of highly salient but erroneous memories suggest the possibility for constructed memories to maintain all the characteristics of salient real life episodes, even those of a traumatic and emotional nature (Loftus, 1993; Neisser, 1993; Neisser & Harsch, 1992).

For instance, Loftus and Coan (in press) were able to demonstrate the production of elaborate yet completely illusory memories of mildly traumatic events from people's childhoods. With the aid of a family member, Loftus led subjects to believe that they had been lost in a shopping mall when they were five years of age. Subjects were asked to work on remembering this "event" on several occasions thereafter and four of the five subjects came to remember details of this fictional episode. For instance, one fourteen year old boy came to remember physical details of a man who offered to help him and this boy was very resistant

to the notion that these memories had been fabricated through suggestion. Thus, through repeated suggestion of misleading information, even complete confabulation of mildly traumatic events is possible.

Although the traumatic nature of memories purportedly "recovered" does not attest to their validity, it is possible that the negative affect associated with this type of memory may contribute to its fabrication. The array of symptoms included in the diagnostic repertoire for repression include the presence of negative mood states (i.e., depression) (Lindsay & Read, 1994; Shaffer & Cozolino, 1992). Further, clients displaying these symptoms may tend to recall experiences that are congruent with their present mood-states (Bower, 1981; Lewinsohn & Rosenbaum, 1987; Teasdale, Taylor & Fogarty, 1980). Together, these findings suggest that when they are pressured to remember repressed memories of abuse, clients displaying negative mood state symptomatology are more likely to recall negative experiences, thereby increasing the possibility of the confabulation and acceptance of information consistent with the therapists' suggestions that they were abused (Ganaway, 1989; Loftus, 1993; Lynn & Nash, 1994).

A number of other contextual factors that are often present in therapeutic situations have been investigated for their effects in contributing to misinformation. These include the type of information about which clients are

misled and the frequency with which clients are prompted to remember the misleading information. Also of importance to the clinical relevance of studies demonstrating misinformation is the extent to which these misinformation effects persist over time.

Information type. Misinformation is thought to be a product of people's inability to distinguish the sources from which the original and post-event information was learned. Contextual factors which mediate the extent to which these source confusions are made include the similarity of the misleading information to the original event (Zaragoza & Lane, 1994). Just as it is important for therapists to engender client belief in their attributions of clients' problems (Strong & Claiborn, 1982), the plausibility of the misleading information is an important determinant as to whether this information will be incorporated into client's memories of an event (Eugenio, Buckhout, Kostas & Ellison, 1982; Owens, Bower & Black, 1979).

Misinformation is also mediated by whether the circumstances at recall encourage retrieval of source relevant cues, such as the similarity of the retrieval context to the context of memory acquisition or the availability of evidence which contradicts the source confusion (Zaragoza & Lane, 1994). This suggests that misinformation effects may be exacerbated if the

distinctiveness of source characteristics for the misleading post-event information and the real event are degraded. Some research has found that misinformation of minor details occurs more frequently relative to misinformation of completely confabulated information (Dunning & Stern, 1992; Sanders & Chiu, 1988). However, information which errs only in detail, by definition, shares a similar source to the recall event and therefore may be more easily confused as having actually occurred in the context of that event. As such, it would be useful to determine the extent to which misinformation occurs for gross confabulations whose source is similar to that of the original recall event.

Repeated prompting. Recovered memory therapies often involve repeatedly prompting clients to recall repressed memories of childhood abuse. As Lindsay and Read (1994) point out, this pressure may contribute to the incorporation of the misleading information into memory;

"... some clinicians believe with such great conviction that certain symptoms ... are reliable indicators of repressed memories of childhood sexual abuse that they think it unethical to do anything but convince clients with those symptoms that abuse is the basis of their difficulties and distress." (p. 299)

The pressure to produce these memories may lead to an increased confabulation of information congruent with the alleged abuse (Eugenio, Buckhout, Kostas, & Ellison, 1982).

Furthermore, when clients are repeatedly prompted to remember information while employing recall strategies that lead them to believe their recall will be enhanced, these promptings may serve to solidify subjects' convictions in those memories, regardless of their accuracy (Lynn, Milano & Weekes, 1991; Weekes, Lynn, Green & Brentar, 1992).

Together, these findings indicate that therapists may contribute to the generation of abuse fantasies and the incorporation of inaccurate information into memory when therapeutic change is effected through high pressure techniques. Given the difficulty of providing independent corroboration of long-term memories, the effects of repeated prompting have yet to be demonstrated with reference to long-term memories.

Time Delay. An essential aspect in the investigation of memory distortions involves the extent to which these distortions persist over time. However, many experimental demonstrations of misinformation involve only short intervals between the exposure of subjects to misleading information and subsequent tests of subjects' memories (i.e., 15 minutes). Some researchers suggest that the results of these studies are not indicative of misinformation because subjects' initial belief in the misleading information stems from judgments about the familiarity of the information rather than from its incorporation into memory (Gilbert, 1990). It is thought

that the rejection of information comes later as the result of a more elaborate evaluative process and that people will eventually use secondary information, including source, which allows them to evaluate their memories with greater accuracy (Zaragoza & Lane, 1994). If so, the extent to which people's long-term memories are susceptible to misinformation should decrease when they are given sufficient time after their initial exposure to the misleading information to evaluate their memories.

Consistent with this explanation, research examining hypermnesia over time delays has found that subjects reported fewer confabulations when they were required to wait a week before reporting their memories for a videotaped crime using a free-recall format (Dunning & Stern, 1992). These subjects however, were never exposed to erroneous information about the videotaped crime and showed no evidence of hypermnesia when they were asked to recall using a multiple choice response format. In other research, misinformation effects were found to persist up to two weeks after subjects' initial exposure to the misleading information (Sheehan, Statham & Jamieson, 1991). Once again however, the effects of time delays between initial and subsequent promptings to remember leading information have yet to be demonstrated with the retrieval of long-term memories.

The Present Study

As a consequence of the unsubstantiated views about repressed memories of childhood abuse held by some therapists, they feel justified in pressuring their clients to recover these 'memories' through the use of hypnosis, leading questioning and repeated prompting. To date, the effects of these variables in encouraging persistent misinformation effects of long-term memories is not well documented due to the difficulty of providing independent corroboration of these memories. As well, the differential effects of misinformation for information which differs in terms of plausibility and source similarity warrants further investigation. The present study sought to examine the relationship among these variables.

Most memory research to date is limited by its focus upon short-term recall of information (Dinges et.al., 1992; Lindsay, 1990; Murray et.al., 1990). By studying short-term recall, researchers are able to make direct comparisons of memory reports to the recall items in order to make accurate assessments of the memories. However, in so doing, researchers limit the generalizability of their findings because the memories assessed in these studies are qualitatively different from those recovered in therapy. While it would be ethically impossible to study memories of abuse in a controlled laboratory setting, the study of long-term memory is one step closer to those memories purportedly

recovered in clinical and forensic settings.

A recent study (Blois et al., 1995) sought to overcome this problem by investigating long-term memories using a stimulus material that could be re-examined to assess recall accuracy, namely the original "Jaws" movie. Long-term memory was defined as a memory for an event that had occurred over five years ago. Subjects who had seen the movie "Jaws" over five years ago were pre-measured for hypnotizability and randomly assigned to one of three experimental conditions; a hypnotic group, a guided imagery group and a control group. Subjects were questioned in a leading fashion about their memories for two specific scenes from the movie using three types of leading questions; accurate, misleading (wrong in detail) and confabulated (completely fictitious). While neither hypnosis, guided imagery nor hypnotizability had an effect on the extent to which subjects' memories were accurate, the results showed that when subjects were prompted to remember these events using leading questions, their memories tended to become consistent with the leading information and their confidence in their memories varied as a function of this consistency rather than the accuracy of their memories. Based on these results, it was concluded that long-term memories are as prone to distortion by those factors which have been shown to lead to distortion of short-term memories. It remained unclear, however, whether the observed increase in reported memories for all the

question types was a product of misinformation, compliance with experimental demands or both. Since only the confabulated questions addressed the same information at both first and second recall, for all but the confabulated questions, no valid inference of misinformation could be made because the second recall questions addressed information to which subjects had not previously been exposed. The observed increase in reported memories for the confabulated questions however, demonstrated that it was indeed possible for misinformation of entirely erroneous events to occur.

The present study was designed as a partial replication of the Blois et. al. (1995) study, as well as an investigation of the effects of several other antecedent factors which may contribute to the reconstruction of long-term memory. In particular, this study sought to investigate the effects of different retrieval strategies, types of leading information, frequency of prompting and time delays on the accuracy and confidence of subjects' long-term memories. To examine these issues, subjects of high, medium and low hypnotizability were randomly assigned to one of three treatment groups; a hypnotic induction group, a guided imagery group and a control group, such that there was an equal proportion of subjects of different levels of hypnotizability in each group. This allowed for a replication of the effects of these recall strategies on

subjects' long delayed recall, as well as providing an opportunity to assess their effects when used in conjunction with repeated promptings and time lags between initial and subsequent promptings to remember different information types.

With the aid of different retrieval strategies, subjects who had seen the movie "Jaws" over five years ago and the movies "Jaws 2" and "Jaws 3" over three years ago responded to a number of questions about the movie "Jaws" either once or twice during an initial experimental session. All subjects were then presented with these same questions, as well as an equal number of new questions, at a one week follow-up interview.

The veracity of the leading questions was varied from being accurate to misleading (wrong in detail) to contextually confabulated (accurate detail from either "Jaws 2" or "Jaws 3" presented in the context of "Jaws") to confabulated (completely fictitious) in order to determine the accuracy and confidence with which different types of information were recalled. Specifically, these questions vary in terms of source similarity. If subjects were able to use source relevant information to evaluate their memories, as would be necessary to accurately respond to the contextually confabulated questions, they should have rejected the contextually confabulated information with greater frequency than the confabulated information.

Furthermore, a comparison of memory reports for misleading and confabulated leading information was made to determine whether differences exist in the extent to which subjects' long-term memories are prone to misinformation of details (misleading questions) and gross confabulations (contextually confabulated and confabulated questions).

The follow-up responses of subjects who had been prompted only once during each session (two prompting group) were compared with those of subjects who had been prompted twice in the first session and who were again prompted during the one-week follow-up session (three prompting group) to assess the effects of repeated prompting on the accuracy and confidence of subjects' memories.

To assess whether subjects would be able to respond more accurately when given enough time to evaluate the leading information, comparisons were made between the responses subjects made to a second prompting during the first experimental session (no delay) and those of subjects who were prompted a second time only at the one-week follow-up session (delay). If time delays allow subjects to evaluate their long-term memories with greater accuracy, it was expected that subjects in the delay condition would be more accurate when prompted for the second time.

We also wished to determine whether subjects' follow-up responses were due to misinformation or mere compliance to the implicit demands of the experimental situation. To this

end, subjects' responses to the novel and repeated information during the follow-up interview were compared. If misinformation was in evidence, a greater frequency in reported memories for the repeated information was expected.

Finally, comparisons of the confidence subjects placed in their accurate and inaccurate responses were made individually for each question type. It was expected that subjects' confidence would vary less as a function of the accuracy of their responses than as a function of the consistency of their memory reports with the leading information.

Clearly, as with most laboratory investigations, this paradigm does not appear to replicate the clinical context in which recovered memory therapy takes place. Strong (1971) however, suggests that any research has implications for counselling if it affects the theory upon which a counselling treatment is based. More specifically, the research has direct implications if it satisfies five boundary conditions which distinguish counselling as (a) a conversation among persons (b) of different status (c) for an extended period of time (d) where the lower status person is motivated to change (e) to alleviate some psychological distress (Strong, 1971). Consistent with the first three conditions, subjects in the present study were involved in the experiment for two sessions over a one week period. Further, experimental studies clearly involve an interaction

between a subject and a higher status experimenter whom the subject frequently wants to please. Although we did not wish to manipulate subjects' motivations, Strong (1971) suggests that methods which have effected change among unmotivated participants should be even more effective among people who are motivated to change. In sum, according to Strong's criteria this study has clear implications regarding the processes involved in therapeutic contexts in which the recall of long-term memory occurs.

Method

Subjects and Procedure

Subjects were 84 introductory psychology students, 41 men and 43 women, all of whom indicated during a mass testing session that they had seen the movie "Jaws" at least five years ago and the movies "Jaws 2" and "Jaws 3" at least three years ago and had not seen any of them since (see Appendix A). Subjects were contacted to participate in a study designed to assess the effects of various memory retrieval strategies on the accurate retrieval of long-term memories¹.

In an initial pretesting session, subjects were

¹ To avoid cueing subjects to the contextually confabulated questions, subjects were not asked directly about whether they had seen Jaws 2 and 3 before being interviewed. It was essential however that they had not seen these movies in the recent past to avoid any substantial discrepancy in the availability of contextually confabulated information compared to the other question types. As such, following the follow-up interview the experimenter ensured that each subject had not seen either of these movies in the last three years.

administered the CURSS to determine their level of hypnotizability. This information was used in the experimental sessions to randomly assign subjects to a treatment group such that there were equal proportions of high, medium and low hypnotic subjects in each group.

At the beginning of the experiment, the experimenter verified that each subject had seen the movie "Jaws" over five years ago and had not seen it since. A description of the experimental procedure was then conveyed to subjects and they were asked to sign an informed consent form (see Appendix B). Upon completion of the informed consent, subjects were asked to verbally free-recall all that they could about the original Jaws movie and their permission to tape record this recall was sought. The hypnotic induction group and the guided imagery group were then given their respective treatments, while control subjects were read a statement concerning the nature of human memory (see Appendixes C, D & E, respectively).

Following this, subjects were again asked to free-recall all that they could about the movie "Jaws". For each of the two free-recall sessions, subjects were asked to rate their confidence in the accuracy of their recall using a scale from 0 (not at all confident) to 6 (extremely confident). Subjects then underwent an interview comprised of both free-recall and cued-recall tasks. During this interview subjects were cued to three scenes from the film;

two real scenes and one fictional scene. Following the description of each scene, subjects were asked to recall all that they could about the scene and to rate their confidence in the accuracy of their memory for the scene using the 0 to 6 rating scale. They were then asked whether they remembered a number of events within these scenes. Four types of leading questions were used to assess subjects' memories; accurate, misleading (wrong in detail), contextually confabulated (accurate information from either "Jaws 2" or "Jaws 3" presented in the context of "Jaws") and confabulated (completely fictitious) (see Appendix F).

Upon completion of the cued-recall interview, half of the subjects were verbally administered a second questionnaire comprised of 24 true or false questions, 16 of which provided information identical to that found in the first interview. The remaining 8 questions addressed novel accurate information from the film in order to balance the number of accurate and inaccurate statements in this questionnaire. For each response item, subjects were asked to rate their level of confidence in the accuracy of their responses using the 0 to 6 rating scale (see Appendix G). The same experimenter verbally administered both questionnaires.

All of the subjects were asked to return one week later to undergo a follow-up interview comprised of the same 24 true or false questions that were presented in the first

true or false interview along with 24 additional novel questions about the film. These new questions were made up of 12 accurate, 4 misleading, 4 confabulated and 4 contextually confabulated questions about the movie, thereby matching the proportions of original questions. Subjects were again asked to rate their confidence in the accuracy of each of their responses (see Appendix II).

After the completion of this final interview, each subject was asked to verify that they had seen both "Jaws 2" and "Jaws 3" and to estimate the year in which they last saw each of the three Jaws movies. Subjects were then debriefed (see Appendix I) and given experimental credit for their participation.

Treatments

Hypnotic induction. Subjects who received the hypnotic induction treatment were read a statement concerning the nature of human memory and told that hypnosis aids in the retrieval of old memories. Following this they were given imagery based instructions modelled after those used by Reiser (1980) and a hypnotic induction procedure taken from the CURSS (Spanos et al., 1983). The full transcript of this procedure is listed in Appendix C. The hypnotic induction procedure is 5 minutes in length and contains repeated suggestions of gradual relaxation, drowsiness and deep sleep.

At the conclusion of the hypnotic induction, subjects

were told to imagine a mental t.v. screen on which they would be able to "zoom in" and "freeze" scenes from the movie "Jaws" as they desired. At the conclusion of the session, subjects were told they would gradually emerge from their hypnotic sleep as the experimenter counted from five to one.

Guided imagery. Subjects in the guided imagery treatment were read a statement identical to that heard by the hypnotic subjects about the nature of human memory and were told that guided imagery aids in the retrieval of old memories. They were then given the same imagery based instructions as the hypnotic group, but all references to relaxation and hypnosis were removed from the procedure. A full transcript of this procedure is given in Appendix D.

Control group. Subjects in the control group were read a statement about the nature of human memory identical to the one given to both the guided imagery and hypnotic groups and were told that repeated recall attempts often aid in the retrieval of old memories. All hypnosis, relaxation and imagery based instructions were removed. A full transcript of this procedure is given in Appendix E.

Materials

CURSS. The Carleton University Responsiveness to Suggestion Scale (Spanos, Radtke, Hodgins, Stam & Bertrand, 1983) is a standard format audiotaped hypnotizability assessment procedure designed for group administration. This

instrument involves a hypnotic induction procedure followed by a total of seven auditory, motor and amnesia suggestions. The objective dimension of this scale is a measure of the degree to which people respond overtly to the seven suggestions. Scores on this dimension can range from 0-7. Depending on their objective score, subjects were classified as either low (0-2), medium (3-4) or high (5-7) hypnotizables.

Cued-recall questionnaire. This questionnaire described three scenes from the movie. The first scene described actually occurred in the movie and involved a highly dramatic incident at the beach when a boy on an air mattress was eaten by the shark. Following this description, subjects were asked to respond dichotomously (yes or no) as to whether they remembered 2 accurate, 2 misleading and 2 contextually confabulated events from this scene. For the accurate questions, all aspects of the event actually occurred in the film, for the misleading questions, some aspects of the event described were inaccurate and for the contextually confabulated questions, an accurate event from another Jaws movie was presented within the context of the original Jaws movie.

The second scene described to the subjects was completely fictional in all respects. Subjects were told of 4 confabulated events from this scene and asked if they remembered these events from the film.

The third scene described was a scene taken from the film and involved a highly dramatic hunt for the killer shark from a fishing boat. Subjects were told of 2 real, 2 misleading and 2 contextually confabulated events from this scene and asked to respond dichotomously (yes or no) as to whether they remembered these events.

Following each response, subjects were asked to rate their confidence in the response they gave using a scale from 0 (not at all confident) to 6 (completely confident).

Session 1 - true or false questions. This true or false questionnaire consisted of 12 accurate, 4 misleading, 4 confabulated and 4 contextually confabulated statements about the movie. These statements addressed information identical to that found in the first questionnaire, with the addition of 8 accurate statements which addressed novel information. The 8 new accurate statements were included in order to balance the number of accurate and inaccurate statements to which the subjects would be responding. Subjects were presented with these questions in a random order and were required to respond dichotomously (using a true or false response format) regarding whether the event described in the statement occurred in the movie. Subjects were asked to give a corresponding confidence rating using the same scale as was used for the cued-recall questionnaire.

Session 2 - true or false questions. This true or false

questionnaire consisted of 24 accurate, 8 misleading, 8 confabulated and 8 contextually confabulated statements about the movie. Sixteen of these statements addressed information identical to that found in the first questionnaire. The remaining 24 questions were composed of 12 accurate, 4 misleading, 4 confabulated and 4 contextually confabulated statements about the movie not found in the first questionnaire. Subjects were presented with these questions in a random order and were required to respond dichotomously (using a true or false response format) as to whether they remembered the event having occurred in the movie. Subjects were then asked to give a corresponding confidence rating using the same scale as was used for the cued-recall questionnaire.

Results

For each question in every questionnaire, subjects responses were coded for both accuracy (1 accurate, 0=inaccurate) and confidence (0=not at all confident to 6=extremely confident). The types of leading information presented to subjects were all plausibly associated with, or actually occurred in, the original recall event but varied in the extent to which they were accurate and they provided source relevant information (source similarity). Specifically, accurate and misleading questions are by definition high in source similarity. However, while both the remaining question types are complete confabulations

with regard to the recall event, contextually confabulated questions are high in source similarity while confabulated questions are low in source similarity. To determine the effects of both treatment (hypnotic/imagery/control) and question type (accurate/misleading/contextually confabulated/confabulated), as well as their potential interactions with the other variables, these factors were included in all the analyses'.

The effects of frequency of prompting (two/three prompting) on measures of accuracy and confidence for different question types across recall trials was assessed by comparing the final interview responses of subjects prompted twice with those of subjects prompted three times. Furthermore, mean accuracy and confidence scores for the second interview responses were compared among groups that differed in terms of the time delay between their initial and second promptings to remember different types of leading information (no delay/1-week delay). To determine whether subjects' simply complied or displayed genuine misinformation when exposed to leading information, accuracy and confidence scores were compared for subjects' one-week follow-up responses to both the novel and repeated

² Although each group was balanced for hypnotizability, this factor was not of central interest in the present study. Moreover, inclusion of this variable in the analyses would have resulted in inadequately small cell sizes once the full design was employed. Therefore, for the purposes of completeness only, results involving hypnotizability are presented separately in appendix J.

information. Finally, comparisons of subjects' confidence in their accurate and inaccurate responses for both the initial and follow-up interviews were performed separately for each question type to determine whether confidence varied as a function of accuracy.

All analyses were performed using analysis of variance (ANOVA) procedures. Wherever necessary, post hoc follow-up comparisons were performed using Bonferonni's t-tests, maintaining the familywise error rate to $\alpha \leq .05$. Significant sphericity for analyses involving within-subjects factors was corrected for using the Greenhouse-Geisser Epsilon.

Pre-measures

In order to assess between-group equivalence, separate multivariate analyses of variance (MANOVAs) were performed on the frequency and recency of subjects' viewing experiences for each of the three Jaws movies, as well as on the four hypnotizability sub-scales as measured by the CURSS. These analyses failed to yield any significant differences among treatment or prompting groups for any of these pre-measures.

The Effects of Frequency of Prompting

An equal number of subjects from each of the three treatment groups were prompted either once or twice for

their memories of the leading information. To determine whether the frequency of prompting affected subjects' memories for different information, separate 3 (Treatment; Hypnotic/Imagery/Control) $\times$ 2 (Promptings; Two/Three prompts) $\times$ 4 (Question Type; Accurate/Misleading/Contextually Confabulated/Confabulated) $\times$ 2 (Recall Trial; 1st recall/1-week follow-up) mixed analyses of variance (ANOVAs) were performed on the accuracy and confidence of subjects' responses to the questions that were common to the first and final follow-up interviews.

Accuracy. This analysis revealed significant main effects of both question type, $F(3,234)=43.89$, $p<.000$, $\eta^2=.36$, and recall trial, $F(1,78)=264.94$, $p<.000$, $\eta^2=.77$, as well as a significant two-way interaction between question type and recall trial, $F(3,234)=101.39$, $p<.000$, $\eta^2=.57$. Significant three-way interactions between treatment, question type and recall trial $F(6,234)=2.54$, $p<.05$, $\eta^2=.06$, and prompting, question type and recall trial, $F(3,34)=3.28$, $p<.05$, $\eta^2=.04$, were also found.

Simple effects analyses of the two-way interaction between question type and recall trial revealed significant simple main effects of recall trial for every question type (p 's $<.013$). Subjects were significantly more accurate in their responses to accurate questions at follow-up than at first recall. Conversely, subjects were less accurate in response to the misleading, contextually confabulated and

confabulated questions at follow-up than at first recall (see Table 1 for relevant means). If we consider that an accurate response to an accurate question requires a "yes" response while an accurate response to the other question types requires a "no" response, it would seem that over recall trials, subjects' memory reports became more consistent with the stimulus questions regardless of their veracity.

Table 1

Accuracy as a Function of Question Type and Recall Trial

	First Recall		Follow-up	
	M	SD	M	SD
Accurate	2.56	1.21	3.54	0.65
Misleading	2.82	1.06	0.89	1.01
Con. Confab.	2.66	1.03	1.07	0.98
Confabulated	3.29	0.83	1.43	1.30

The simple main effects of question type were significant at each recall trial (p 's $\leq .025$). Post hoc analyses of subjects' first recall responses revealed that subjects were significantly more accurate in response to confabulated questions than any of the other question types (p 's $< .009$). Post hoc analyses of subjects' follow-up responses revealed that subjects were significantly more accurate in response to accurate questions than any of the other question types and more accurate in response to confabulated questions than either the misleading questions

or contextually confabulated questions ($p's < .009$) (see Table 1). Although subjects came to report memories for all of the information with greater frequency at follow-up, subjects did so less frequently for all of the inaccurate information and least of all for the completely confabulated questions.

Further simple effects analyses of the three-way interaction involving treatment, question type and recall trial revealed significant simple interactions between question type and recall trial for each of the three treatment groups ($p's < .017$). The simple simple main effects of recall trial indicated that the two-way interaction reflecting subjects' increased accuracy in response to accurate questions and decreased accuracy in response to the inaccurate questions was qualified for hypnotic subjects ($p's < .012$). More specifically, the accuracy of hypnotic subjects' responses to accurate questions failed to differ across recall trials (see Table 2).

Analyses of the simple simple main effects of question type ($p's < .025$) revealed significant effects at first recall for the hypnotic and control subjects and at 1 week follow-up recall for all of the treatment groups. Post hoc analyses at first recall showed that, while the pattern of means suggested that all subjects were most accurate in response to confabulated questions, this difference was significant only in relation to accurate questions for control subjects and to contextually confabulated questions for hypnotic

Figure 1. Accuracy as a Function of Treatment, Question Type and Recall Trial.

subjects (see Figure 1). Post hoc analyses of the 1 week follow-up responses differed from previous analyses only in so far as the accuracy of subjects' responses to misleading and confabulated questions failed to differ (see Table 2).

Table 2

Accuracy as a Function of Treatment, Question Type and Recall Trial

	<u>Hypnosis</u>		<u>Imagery</u>		<u>Control</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
First Recall						
Accurate	2.93	0.94	2.64	1.16	2.12	1.37
Misleading	2.79	1.00	2.82	1.12	2.86	1.08
Con. Confab.	2.46	1.14	2.71	1.05	2.79	1.07
Confabulated	3.25	0.80	3.36	0.91	3.25	0.80
Follow-up						
Accurate	3.50	0.69	3.57	0.63	3.54	0.64
Misleading	1.07	1.09	0.82	1.12	0.79	0.79
Con. Confab.	1.29	0.94	1.11	1.10	0.82	0.86
Confabulated	1.82	1.28	1.25	1.21	1.21	1.37

Further simple effects analyses of the three-way interaction between prompting, question type and recall trial revealed significant simple interactions between question type and recall trial for both the two-prompting, $F(3,123)=69.16$, $p<.000$, and three-prompting groups, $F(3,123)=35.7$, $p<.000$. The simple simple main effects of recall trial for each question type indicated that the increased accuracy in response to accurate questions and the decreased accuracy in response to all of the inaccurate questions was not qualified by the effects of prompting

($p's < .013$) (see Table 3).

Table 3

Accuracy as a Function of Prompting, Question Type and Recall Trial

	<u>Two-prompting</u>		<u>Three-prompting</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
First Recall				
Accurate	2.43	1.19	2.69	1.22
Misleading	2.98	1.02	2.67	1.07
Con. Confab.	2.74	1.11	2.57	1.06
Confabulated	3.21	0.78	3.36	0.88
Follow-up				
Accurate	3.64	0.58	3.43	0.70
Misleading	0.74	0.99	1.05	1.01
Con. Confab.	0.88	0.94	1.26	0.99
Confabulated	1.26	1.11	1.60	1.47

For both the two and three-prompting groups, the simple main effects of question type were significant for both the first and 1-week follow-up recall trials ($p < .025$). Post hoc analyses revealed that the frequency of prompting qualified the results at first recall ($p's < .008$) in that the accuracy of two-prompting subjects' responses to confabulated and misleading questions failed to differ. However, the pattern of results was consistent with the conclusion that subjects' responses to the confabulated questions were most accurate (see Figure 2). For both the two and three-prompting subjects, post hoc analyses of the 1 week follow-up responses differed from previous analyses only in so far as the accuracy of subjects' responses to

Figure 2. Accuracy as a Function of Prompting, Question Type and Recall Trial.

misleading and confabulated questions failed to differ (see Table 3). No other main effects nor any further interactions were significant.

Overall these results are consistent with what was expected. Subjects came to report memories for all of the leading information with greater frequency at follow-up than at initial recall. The exception to this pattern was the hypnotic subjects, whose responses to accurate questions did not become more accurate, perhaps because their accuracy in response to these questions at first recall was already highest, although not significantly different from the other groups (see Figure 1). Although initially more accurate in response to confabulated questions than any other question type, subjects were more accurate in response to accurate questions than any other question type at follow-up and maintained higher accuracy in response to confabulated questions relative to contextually confabulated questions. This latter finding suggests that, although they came to accept the confabulated questions with greater frequency at follow-up, subjects' were less prone to false memory reports of the confabulated questions relative to the contextually confabulated questions. This finding is consistent with what was expected given that the contextually confabulated questions are higher in source similarity than confabulated questions and are therefore more difficult to distinguish from accurate information.

The three-way interactions however, qualified subjects' first recall responses in terms of significance levels, even though the pattern of means was consistent across levels of treatment and prompting (see Figures 1 and 2). More specifically, the accuracy of subjects' responses to confabulated questions failed to differ from either the misleading or accurate questions for hypnotic subjects, failed to differ from any other question type for guided imagery subjects, failed to differ from either misleading or contextually confabulated questions for control subjects and failed to differ from misleading questions for two-prompt subjects. This would indicate that not all subjects were equally able to evaluate the confabulated questions on the basis of their low source similarity. Overall however, the consistency of the follow-up results for both the treatment and prompting groups with the two-way analysis, together with the considerably smaller effect sizes for the three-way interactions, suggests that treatment and prompting had little influence on the accuracy of subjects' responses.

Confidence. Once again, this analysis revealed significant main effects of both question type, $F(3,225)=58.65$, $p<.000$, $\eta^2=.44$, and recall trial, $F(1,75)=9.02$, $p<.01$, $\eta^2=.11$, as well as a significant two-way interaction between question type and recall trial, $F(3,225)=3.24$, $p<.05$, $\eta^2=.05$. Simple effects analyses showed a significant simple main effect of question type for both

first and 1 week follow-up recall ($p's < .025$). At both the first and follow-up recall trials, post hoc analyses revealed that, contrary to their levels of accuracy, subjects were more confident in their responses to accurate questions than any of the other question types and were more confident in their responses to misleading and contextually confabulated questions than they were in their responses to confabulated questions ($p's < .008$) (see Table 4).

The simple main effects of recall trial were significant for both accurate and misleading questions ($p's < .013$). Subjects were more confident in their follow-up responses to accurate and misleading questions than their first recall responses (see Table 4). No other main effects nor any further interactions were significant.

Table 4

Confidence as a Function of Question Type and Recall Trial

	<u>First Recall</u>		<u>Follow-up</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Accurate	3.28	1.32	3.86	1.22
Misleading	2.81	1.11	3.21	1.22
Con. Confab.	2.93	1.34	3.20	1.19
Confabulated	2.34	1.54	2.47	1.21

Time Delay Between Recall Trials

To determine the effects of time delays between initial and subsequent attempts to recall leading information, separate 3 (Treatment; Hypnotic/Imagery/Control) $\times$ 2 (Time

Delay; Delay/No Delay) x 4 (Question Type; Accurate/Misleading/Contextually Confabulated/Confabulated) mixed ANOVAs were performed on the accuracy and confidence of subjects' second recall attempts for leading information that had already been presented on the initial interview.

Accuracy. Significant main effects of question type, $F(2,234)=128.73$, $p<.000$, $\eta^2=.62$, and time delay, $F(1,78)=16.74$, $p<.01$, $\eta^2=.10$, as well as a significant two-way interaction between question type and time delay, $F(3,198)=4.11$, $p<.05$, $\eta^2=.05$, were found for the accuracy of subjects' second trial responses. Simple effects analyses revealed significant simple main effects of question type for both the delay, $F(3,123)=88.10$, $p<.000$, and no delay conditions, $F(3,123)=45.26$, $p<.000$. Consistent with previous analyses, post hoc comparisons showed that, in both the delay and no delay conditions, subjects were more accurate in response to accurate questions than any of the three remaining question types (see Table 5).

Table 5

Accuracy as a Function of Time Delay and Question Type at Second Recall

	<u>Delay</u>		<u>No Delay</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Accurate	3.64	0.58	3.52	0.77
Misleading	0.74	0.99	1.41	1.17
Con. Confab.	0.88	0.94	1.71	1.27
Confabulated	1.26	1.11	1.67	1.43

The simple main effect of time delay proved to be significant for only the misleading, $F(1,82)=10.61$, $p<.006$, and contextually confabulated questions, $F(1,82)=16.57$, $p<.001$. For both of these question types, the no delay subjects were significantly more accurate than the delay subjects (see Table 5), suggesting that, contrary to expectations, time delay actually encouraged the acceptance of this information rather than allowing subjects to evaluate it with greater accuracy. No further main effects nor any further interactions were significant.

Confidence. A significant main effect of question type, $F(3,234)=62.35$, $p<.000$, $\eta^2=.44$, and a significant two-way interaction between time delay and question type, $F(3,234)=2.69$, $p<.05$, $\eta^2=.03$, were found for the confidence of subjects' second trial responses. The simple main effects of question type were significant for both the delay, $F(3,246)=35.90$, $p<.000$ and no delay conditions, $F(3,246)=29.08$, $p<.000$. Post hoc analyses revealed the same pattern of results for both groups. Consistent with previous results, subjects were more confident with respect to accurate questions than any other question type and more confident in response to misleading and contextually confabulated questions than to confabulated questions (see Table 6).

The simple main effects of time delay were significant for the misleading questions only, $F(1,82)=8.65$, $p<.01$.

Subjects in the delay condition were significantly more confident in their second trial responses to misleading questions than were subjects in the no delay condition (see Table 6). This result is consistent with the results from the analysis of accuracy scores with respect to subjects' responses to misleading questions and suggests once again that, if anything, time delay fostered an acceptance rather than an accurate evaluation of misleading information.

Table 6

Confidence as a Function of Time Delay and Question Type at Second Recall

	<u>Delay</u>		<u>No Delay</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Accurate	3.92	1.20	3.84	1.10
Misleading	3.36	1.11	2.91	1.27
Con. Confab.	3.29	1.17	2.92	1.30
Confabulated	2.33	1.14	2.42	1.30

Compliance vs Misinformation

To determine whether subjects' responses to the leading questions were simply a matter of compliance or whether they reflected misinformation, at follow-up, subjects were asked an equal number of novel questions in addition to the questions that were repeated at all recall trials. Separate 3 (Treatment; Hypnotic/Imagery/Control) x 2 (Promptings; Two/Three-prompts) x 4 (Question Type; Accurate/Misleading/Contextually Confabulated/Confabulated) x 2 (Information Novelty; Novel/Repeated Information) mixed ANOVAs were

performed on the accuracy and confidence of subjects' responses to these questions at final recall.

Accuracy. This analysis yielded a significant main effect of treatment, $F(2,78)=3.17$, $p<.05$, $\eta^2=.08$. Post hoc analyses showed that hypnotic subjects ($M=2.00$, $SD=0.44$) were significantly more accurate than controls ($M=1.68$, $SD=0.45$) in their follow-up responses. The inconsistency of this result with those of previous analyses suggests that this result is likely attributable to hypnotic subjects' accuracy in response to the novel information.

Additionally, significant main effects of both question type, $F(3,234)=68.77$, $p<.000$, $\eta^2=.47$, and question novelty, $F(1,78)=6.91$, $p<.05$, $\eta^2=.08$, as well as a significant two-way interaction between question type and information novelty, $F(3,234)=52.58$, $p<.000$, $\eta^2=.40$, were found. Simple effects analyses of the two-way interaction revealed significant simple main effects of information novelty for all four question types ($p's<.013$). Consistent with what would be expected for misinformation, subjects were more accurate in response to repeated accurate questions than novel accurate questions. Conversely, for the three remaining question types, subjects were less accurate in response to the repeated information than to the novel information (see Table 7).

Table 7

Accuracy as a Function of Information Novelty and Question Type at Final Recall

	<u>Repeated</u>		<u>Novel</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Accurate	3.54	0.65	2.26	1.11
Misleading	0.89	1.01	1.68	1.07
Con. Confab.	1.07	0.98	1.88	1.07
Confabulated	1.43	1.30	1.86	1.20

The simple main effects of question type were significant for both the repeated and novel information ($p's < .025$). For novel information, post hoc analyses showed that subjects were significantly more accurate in response to accurate questions than misleading questions ($p's < .008$). As before, for repeated information, subjects were significantly more accurate in response to the accurate questions than any of the other question types and were more accurate in response to the confabulated questions than misleading questions ($p's < .008$) (see Table 7). Thus, when responding to misleading, contextually confabulated and confabulated questions, subjects were less accurate in response to repeated information than novel information while the opposite was true of the accurate questions. These findings are consistent with what would be expected if subjects were displaying genuine misinformation as opposed to compliance. No other main effects nor any further interactions were significant.

Confidence. This analysis revealed significant main

effects of both question type, $F(3,234)=37.77$, $p<.000$, $\eta^2=.33$, and question novelty, $F(1,78)=76.97$, $p<.000$, $\eta^2=.50$. Furthermore, a significant two-way interaction between question type and question novelty, $F(3,234)=44.19$, $p<.000$, $\eta^2=.36$, a significant three-way interaction between prompting, question type and question novelty, $F(3,234)=5.12$, $p<.002$, $\eta^2=.06$ and a significant four-way interaction between treatment, prompting, question type and question novelty, $F(6,234)=2.30$, $p<.05$, $\eta^2=.06$, were also found.

Simple effects analyses of the two-way interaction between question type and information novelty revealed significant simple main effects of information novelty for accurate, misleading and contextually confabulated questions but not for confabulated questions (p 's $<.013$). For these question types, subjects were more confident in response to repeated information than novel information (see Table 8). The simple main effects of question type were significant for both the repeated and novel information, (p 's $<.025$). As before, for repeated information, subjects were significantly more confident in response to accurate questions than any of the other three question types and more confident in response to the misleading and contextually confabulated questions than the confabulated questions (p 's $<.008$). Post hoc analyses of the novel information showed that subjects were more confident in

response to accurate questions than misleading questions and were more confident in response to contextually confabulated questions than either the misleading or confabulated questions ($p's < .008$) (see Table 8). Again, for all but the repeated confabulated questions, these results are consistent with what would be expected if subjects were displaying misinformation as opposed to merely complying with the implicit demands of the experiment.

Table 8

Confidence as a Function of Information Novelty and Question Type at Final Recall

	<u>Repeated</u>		<u>Novel</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Accurate	3.88	1.21	2.69	1.10
Misleading	3.28	1.21	2.44	1.07
Con. Confab.	3.20	1.19	2.83	1.09
Confabulated	2.44	1.22	2.59	1.16

This analysis also revealed a significant three-way interaction between prompting, question type and question novelty. However, analyses of the four-way interaction between treatment, prompting, question type and question novelty revealed that the simple three-way interaction between prompting, question type and question novelty was significant for hypnotic subjects only, $F(3,78)=4.28$, $p < .01$. Further, no significant interaction between treatment, question type and question novelty was found. Together, these results suggest that, for imagery and control

subjects, the two-way interaction between question type and question novelty accurately described their pattern of responses.

Further analyses of the significant simple three-way interaction between prompting, question type and question novelty for hypnotic subjects revealed significant simple two-way interactions between question type and question novelty for both the two and three-prompt subjects ($p's < .025$) and between prompting and question type, but for contextually confabulated questions only ($p's < .013$). For both the two and three-prompt groups, the simple main effects of question type were significant for repeated information only ($p's < .013$). Post hoc analyses indicated that the three-prompt hypnotic subjects were more confident in response to accurate and misleading questions than confabulated questions ($p's < .008$). The two-prompt hypnotic subjects were more confident in response to accurate, misleading and contextually confabulated questions than confabulated questions and were more confident in response to accurate questions than misleading questions, but not from contextually confabulated questions ($p's < .008$) (see Table 9). Therefore, for hypnotic subjects, the greater frequency of prompting led to less distinction in confidence as a function question accuracy and source similarity.

For two-prompt subjects, the simple main effects of information novelty did not differ from the

results obtained in the earlier two-way (question type x question novelty) interaction. Two-prompt hypnotic subjects were more confident in response to the repeated information than to the novel information for all but the confabulated questions. For three-prompt subjects however, the simple simple main effects of information novelty were significant for accurate and misleading questions only ($p's < .008$). For each of these question types, subjects were more confident in response to the repeated questions than the novel questions (see Table 9). Once again, these results differ from those of the earlier two-way interaction (question type by question novelty) with regard to contextually confabulated questions only. No difference between repeated and novel contextually confabulated questions was found among three-prompt hypnotic subjects.

For contextually confabulated questions, the simple simple main effects of question novelty were significant for the two-prompt subjects only ($p's < .025$). As in previous analyses, the two-prompt subjects were more confident in response to repeated rather than novel contextually confabulated questions. The simple simple main effect of prompting indicated that the two-prompt subjects were more confident than the three-prompt subjects in response to leading contextually confabulated questions (see Table 9).

Table 9

Confidence as a Function of Treatment, Prompting,
Information Novelty and Question Type at Final Recall

	<u>Hypnosis</u>		<u>Imagery</u>		<u>Control</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
<u>Two-prompt</u>						
<u>Repeated</u>						
Accurate	4.20	0.95	3.37	1.37	3.82	1.27
Misleading	3.41	1.10	3.25	1.18	3.43	1.11
Con. Confab.	3.73	1.37	3.09	0.91	3.05	1.14
Confabulated	2.46	1.24	2.21	1.04	2.30	1.20
<u>Novel</u>						
Accurate	2.86	1.07	2.59	1.20	2.57	0.85
Misleading	2.71	1.08	2.34	0.93	1.91	0.73
Con. Confab.	2.96	0.88	2.52	1.29	2.79	1.16
Confabulated	2.96	1.29	2.65	1.34	2.46	1.10
<u>Three-prompt</u>						
<u>Repeated</u>						
Accurate	3.48	1.17	4.09	1.27	3.96	1.26
Misleading	3.04	1.07	3.09	1.65	3.21	1.25
Con. Confab.	2.82	1.28	3.38	1.31	3.11	1.05
Confabulated	2.36	0.90	2.93	1.56	2.36	1.38
<u>Novel</u>						
Accurate	2.84	1.04	2.84	1.32	2.41	1.18
Misleading	2.41	0.75	2.79	1.52	2.48	1.18
Con. Confab.	2.95	0.84	2.93	1.32	2.84	1.08
Confabulated	2.36	0.87	2.71	1.21	2.41	1.22

In summary, the higher confidence associated with subjects' follow-up responses to repeated information relative to novel information would suggest that the misinformation effect, as indicated by the accuracy of subjects' responses, was robust for all but the confabulated questions. For confabulated questions, subjects' were no more confident in response to novel information than repeated information. Given that subjects also reported

fewer memories for the novel confabulated questions, this would suggest that they were equally confident when rejecting the novel confabulated information as they were when reporting memories for the repeated confabulated questions.

The four-way interaction indicated that hypnotic subjects' responded differently from the other groups. More specifically, they responded differently to the repeated contextually confabulated questions (see Figure 3). The three-prompt hypnotic subjects' responses to repeated and novel contextually confabulated questions failed to differ and two-prompt subjects were more confident than three-prompt subjects in response to repeated contextually confabulated questions. As well, these results differed from those of previous analyses in that no significant differences between confidence for repeated confabulated and contextually confabulated questions was found among three-prompt hypnotic subjects and no significant differences between confidence for repeated accurate and contextually confabulated questions was found among two-prompt hypnotic subjects. Considering the results from previous analyses which show that the highest confidence in response to repeated information was associated with accurate questions while the lowest was associated with confabulated questions, together these results suggest that the hypnotic three-prompt subjects were less confident in response to repeated

Figure 3. Confidence as a Function of Prompting, Information Novelty and Question Type for Hypnotic Subjects.

contextually confabulated questions while two-prompt hypnotic subjects were more confident in response to these questions.

Confidence in Accurate and Inaccurate Responses

To determine whether subjects' confidence varied as a function of the accuracy of their responses, separate 3 (Treatment: Hypnotic/Imagery/Control) $\times$ 2 (Response Accuracy: Accurate/Inaccurate) mixed ANOVAs were performed on confidence ratings for each question type at first and final recall. These analyses were performed separately to avoid a listwise loss of data for those subjects who reported completely accurate or inaccurate memories for any question type at either recall trial.

Accurate Questions. This analysis revealed a significant main effect of response accuracy at first, $F(1,51)=77.54$, $p<.000$, $\eta^2=.60$, and final recall, $F(1,25)=39.15$, $p<.000$, $\eta^2=.61$. For both recall trials, subjects were significantly more confident in their accurate responses to accurate questions than their inaccurate responses to these questions (see Table 10).

Misleading Questions. This analysis revealed a significant main effect of response accuracy at first, $F(1,48)=30.85$, $p<.000$, $\eta^2=.43$, and final recall, $F(1,39)=36.31$, $p<.000$, $\eta^2=.48$. For both recall trials, subjects were significantly more confident in their

inaccurate responses to misleading questions than their accurate responses to these questions (see Table 10).

Table 10

Confidence as a Function of Response Accuracy, Question Type and Recall Trial

	<u>Accurate</u>		<u>Inaccurate</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
First Recall				
Accurate	3.89	1.38	2.20	1.31
Misleading	2.60	1.27	3.66	1.31
Con. Confab.	2.76	1.57	3.67	1.30
Confabulated	1.94	1.65	3.21	1.32
Follow-up				
Accurate	4.01	0.91	2.28	1.52
Misleading	2.31	1.35	3.54	1.34
Con. Confab.	2.58	1.69	3.68	1.40
Confabulated	2.05	1.30	2.90	1.37

Contextually Confabulated Questions. This analysis revealed a significant main effect of response accuracy at first, $F(1,50)=18.77$, $p<.000$, $\eta^2=.27$, and final recall, $F(1,45)=23.52$, $p<.000$, $\eta^2=.34$. For both recall trials, subjects were significantly more confident in their inaccurate responses to contextually confabulated questions than their accurate responses to these questions (see Table 10).

Confabulated Questions. At first recall, a significant main effect of response accuracy, $F(1,37)=38.56$, $p<.000$, $\eta^2=.51$, and a two-way interaction between treatment and response accuracy, $F(2,37)=5.22$, $p=.01$, $\eta^2=.22$, were found.

While none of the simple main effects of treatment were significant, the simple main effects of response accuracy were significant for both the hypnotic, $F(1,13)=16.4$, $p<.01$, and control groups, $F(1,14)=42.35$, $p<.000$, but not for the guided imagery group. At first recall, both the hypnotic and control subjects were significantly more confident in their inaccurate responses to confabulated questions than in their accurate responses to these questions (see Table 11).

Table 11

Confidence as a Function of Response Accuracy and Treatment for Confabulated Questions at First Recall

	<u>Accurate</u>		<u>Inaccurate</u>	
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>
Hypnotic	2.19	1.69	3.93	1.40
Imagery	2.46	1.87	2.83	1.36
Control	1.33	1.34	3.20	1.25

At final recall, the analysis revealed a significant main effect of response accuracy, $F(1,45)=15.31$, $p<.000$, $\eta^2=.25$. Subjects were significantly more confident in their inaccurate responses to confabulated questions than their accurate responses to these questions at final recall (see Table 10).

In summary, subjects were significantly more confident in their accurate responses to accurate questions at both first and final recall. Conversely, with the exception of imagery subjects' responses to confabulated questions at

first recall, subjects were significantly more confident in their inaccurate responses to the other three question types at both recall trials. These results suggest that subjects' confidence varied less as a function of the accuracy of their responses but rather was determined by whether subjects indicated that they could, as opposed to could not, remember an event.

Discussion

Recently, the rise in the number of legal actions based on the discovery of repressed memories of childhood sexual abuse has raised practical concerns over the authenticity of these memories. While the assumptions upon which recovered memory therapists infer the existence of these memories are of questionable validity, researchers have begun to investigate a number of contextual factors which may be associated with the confabulation of memories of abuse in therapy situations. The present study sought to investigate the effects of different memory retrieval strategies, veracity and source similarity of leading information, frequency of prompting and time delays between initial and subsequent promptings to remember long-term memories. Moreover, efforts were made to determine whether reported memories reflected genuine memory distortion as opposed to compliance with experimental demands and whether confidence in the reported memories varied as a function of their

accuracy or their consistency with leading information.

The Effects of Memory Retrieval Strategies

A basic assumption of recovered memory therapy is that it is possible to retrieve accurate memories of early childhood events. Despite research which suggests that the retrieval of long-term memories, especially memories from early childhood, is prone to a number of distortions and inaccuracies (Bartlett, 1932; Howe & Courage, 1993; Moscovitch, 1985; Neisser, 1992), clinicians will often employ questionable techniques in an attempt to access these memories.

Due to its widespread use and the lack of empirical evidence in support of its effectiveness in accessing memory, hypnosis is one of the most controversial techniques employed in the recovery of repressed memories. Consistent with the results of much of the previous research (Dinges et al., 1992; Murray et al., 1990), the present study provided further evidence that hypnosis does not enhance the accurate recall of memory. Rather, for the most part in the present study, the recall strategy employed to recover subjects' long-term memories, whether it was hypnosis, guided imagery or no recall strategy, did not affect or qualify the accuracy or confidence of subjects' memories.

At first glance however, certain results involving hypnosis may be viewed as suggestive of hypnotic

hypermnnesia. For instance, the non-significant difference between hypnotic subjects' first and final recall responses to the accurate questions seems to suggest that hypnotic subjects displayed hypermnnesia when initially exposed to the accurate leading information. Although not significantly different from the other treatments, hypnotic subjects had the highest frequency of reported memories for accurate questions at first recall. Results of the treatment groups' first recall responses to different question types suggests that this may have been the product of hypnotic subjects' initial reliance upon source relevant information to evaluate their memories. Although the observed pattern of means for all treatment groups at first recall was consistent with the finding that all the subjects were more accurate in response to confabulated questions than the other question types, this difference was significant only in relation to contextually confabulated questions for the hypnotic subjects. Consider that reporting no memory for either confabulated, contextually confabulated or misleading information is indicative of an accurate response. As such, hypnotic subjects reported significantly more memories for the contextually confabulated information than the other confabulated information. For guided imagery subjects, there was no difference in the accuracy of subjects' responses to different question types at first recall, suggesting that initially, they were equally likely to report that they had

no memory for different types of inaccurate information. Control subjects were more accurate in response to confabulated questions than accurate questions only, suggesting that initially, they too were equally likely to report they had no memory for different types of inaccurate information. Although highly tentative, together these results suggest that, rather than initial hypermnesia in response to accurate information, when initially exposed to source similar leading information, hypnotic subjects were more likely to report this information as memory.

Another finding which could be interpreted as evidence of hypnotic hypermnesia involved the pattern of results regarding the accuracy of reported memories among the treatment groups across both novel and repeated information at final recall. In this analysis, hypnotic subjects reported more accurate memories for the accurate questions than control subjects. At first glance this finding would seem to suggest that, relative to control subjects, hypnotic subjects displayed hypermnesia in response to accurate questions at follow-up. The lack of a significant difference among the treatment groups when only the repeated information was included however, suggests that this effect was the result of a greater frequency of reported memories for novel information among hypnotic subjects. As such, these results are consistent with the suggestion that hypnotic subjects were more reliant on source relevant

information when initially exposed to new information. Additionally, the lack of a significant treatment by question novelty interaction at final recall suggests that the pattern of responses for all the treatment groups were consistent.

Overall, the results of the present study show that neither hypnosis nor guided imagery substantially affected the accuracy of subjects' memories for the leading information. Further, with the exception of hypnotic subjects' responses to accurate questions, all subjects reported more memories for the leading information at follow-up, regardless of the accuracy of the information. The consistency of these null effects with the results of previous investigations (Dinges et al., 1992; Murray et al., 1990) suggests that hypnosis and guided imagery are no more effective in the accurate retrieval of long-term memories than they are for short-term memories.

The combination of hypnosis and repeated prompting however, did affect subjects' confidence in their memories for leading information. Relative to the other groups at final recall, hypnotic three-prompt subjects' confidence in response to contextually confabulated questions in particular was lower while two-prompt hypnotic subjects' confidence in response to these questions was higher. According to the balance of evidence hypothesis, response confidence reflects the amount of perceived evidence in

support of a given response alternative. In view of this, since both confabulated and contextually confabulated questions are completely erroneous with regard to the original recall event, the lower confidence associated with three-prompt subjects' memory reports for contextually confabulated questions was likely due to the fact that contextually confabulated questions are high in source similarity with the original recall event. Overall however, hypnotic subjects initially reported more memories for the contextually confabulated questions relative to the other treatment groups. Thus, while it would seem that hypnosis may initially impede subjects' ability to evaluate leading information on the basis of source relevant criteria, the frequency with which hypnotic subjects were prompted to remember leading information may have led to less distinction in confidence as a function of question accuracy and source similarity. In particular, although tentative, the combination of hypnosis and more frequent prompting may have improved subjects' ability to distinguish the contextually confabulated questions on the basis of source relevant criteria. As such, these subjects were less confident in their memories for contextually confabulated questions because less evidence supported the interpretation of this type of information as memory.

Misinformation

Confidence in Accurate and Inaccurate Responses. The confidence people hold in their memories is often construed as evidence of the memories veridicality. However, the results of the present study suggest that confidence varied less as a function of the accuracy of subjects' responses than as a function of whether their responses were perceived to be consistent with the leading information. This finding is consistent with what would be expected according to the balance of evidence hypothesis (Vickers, 1985). With the exception of imagery subjects' responses to contrabulated questions, it is not surprising that at first recall, subjects were more confident in their reported memories than in the information they indicated they could not remember. Importantly however, the higher confidence associated with reported memories was maintained at final recall, even though subjects came to report more memories for information that they previously indicated they could not remember and by extension, were previously less confident about. This finding provides strong evidence for the hypothesis that the contextual factors associated with the retrieval of subjects' long-term memories were construed as evidence in support of the interpretation of the leading information as authentic memory. Additionally, they suggest that subjects not only reported memories for all the information with greater frequency at final recall but that they also came to

believe in these memory reports.

Information Type. Much of the past research on memory distortion has demonstrated misinformation of erroneous details, but relatively few have demonstrated misinformation of entirely confabulated events (Loftus, 1979). Those that have compared the relative frequency of misinformation for details and complete confabulations have found that the confabulation of entirely erroneous memories occurs less frequently than misinformation of details (Dunning & Stern, 1992; Sanders & Chiu, 1988). Consequently, some researchers question the clinical relevance of experimental demonstrations of misinformation by suggesting that the confabulation of entirely fictional events is improbable (Kristiansen, 1994; Olio, 1994). However, the infrequency of memory reports for confabulated information may also be a product of the greater source discriminability of this information relative to information which errs only in detail. Consequently, the present study sought to investigate the relative frequency of memory reports for confabulated information which differed in terms of source similarity with the original recall event. To this end, four types of leading questions were used to assess subjects' memories; accurate, misleading (wrong in detail), contextually confabulated (accurate information from either "Jaws 2" or "Jaws 3" presented in the context of "Jaws") and

confabulated (entirely fictional). While both the confabulated and contextually confabulated questions are entirely erroneous with respect to the original Jaws movie, the source of the contextually confabulated questions is more similar to that of the original recall event.

Relative to their first recall responses, subjects in the present study came to report memories for all of the question types with greater frequency at final recall, regardless of the veracity of the leading information. If we consider that an accurate memory for accurate information requires a "yes" response while an accurate memory for any other question type requires a "no" response, over recall trials, it appears that subjects came to report more memories for all the information irrespective of accuracy.

In terms of subjects' accuracy in response to the different question types, the results indicate that subjects were initially more accurate in response to confabulated information than any of the other question types. When asked on subsequent interviews about their memories for the same information however, this enhanced accuracy was lost. With repeated questioning, subjects became more accurate in response to accurate questions than any other question type, although they were still more accurate in response to confabulated questions than contextually confabulated questions. Furthermore, the frequency with which subjects reported memories for misleading and contextually

confabulated information failed to differ. This would suggest that when differences in the source similarity for different leading information is reduced, subjects are as prone to false memory reports of information which is entirely confabulated within the context of recall as they are to distortions of minor details.

Subjects' confidence also varied as a consequence of the types of leading information to which they were exposed. At both first and final recall, subjects were more confident in response to accurate questions than any other question type and more confident in response to misleading and contextually confabulated questions than confabulated questions. Further, relative to their initial responses, subjects were more confident in their memories for accurate and misleading information at final recall. The lack of a significant difference in confidence for the contextually confabulated questions was likely due to the fact that confidence in response to these questions was initially higher than confidence in response to the misleading questions, although not significantly so (see Table 4). These results are consistent with the findings from the analyses of accuracy scores where no differences in the frequency of reported memories for misleading and contextually confabulated questions were found and suggest that, when differences in source similarity are reduced, subjects' may hold as strong a conviction in false memory

reports of confabulated information as they do for minor distortions of detail. Consequently, it would seem that confidence is more a function of having some memory for the event rather than the accuracy of the memory, as long as the sources from which the different types of information were originally learned are similar.

These findings are particularly relevant with regard to the clinical excavation of repressed memories of abuse. To begin with, these results demonstrate that the misinformation of entirely confabulated events can occur with the same frequency and confidence as misinformation of details. Furthermore, they suggest a mechanism through which the confabulation of memories of childhood abuse occurs in therapy. The confabulation of memories of abuse may involve more than simply being unable to recognize the source of post-event information as distinct from their personal history. Rather, just as subjects in the present study had seen both the original and the subsequent Jaws movies, clients may in fact be confusing the sources of two different memories; personal versus abuse consistent recollections. When clients are encouraged to remember repressed memories of abuse without any prior recollection of the abusive episodes, the affective congruence of clients' negative mood states with suggestions of abuse may lead to the recall of information that is consistent with the therapists' suggestions of abuse (Ganaway, 1989; Loftus,

1993; Lynn & Nash, 1994). The context in which clients' are encouraged to remember information consistent with memories of abuse however, may degrade the source discriminability of biographical and abuse consistent recall. For instance, both the clients' recall of his or her personal history and their recall of information consistent with therapists' suggestions of abuse share a similar source in that they are generated by the client from his or her past experience. Furthermore, the recall of both types of memory occurs within the same therapy context. Over the course of treatment, clients may come to confuse the sources from which both their historically accurate personal recollections and suggestion congruent recollections originally came and incorporate information consistent with memories of abuse into their memories of early childhood. Thus, the confabulation of memories of abuse may not simply be a case of confusing therapists' suggestions as personal history. It may also involve confusing memories of childhood with memories of other events and information which had been learned prior to therapy but which are consistent with therapists' suggestions of abuse. Clients would likely be very confident in these memories of abuse because they are in fact memories; memories of information learned from sources other than personal experience, be it the movies, television, or survivor's stories. Therefore, irrespective of the accuracy of leading suggestions of abuse, the recall

of some consistent memories may be sufficient to believe with conviction that abuse occurred.

Frequency of Prompting. Recovered memory therapists will often repeatedly prompt their clients to remember abuse from their childhood based solely on the evidence that they are displaying potentially unrelated symptomatology. Some researchers are concerned that the pressure to produce these memories may lead to the confabulation of information consistent with the therapist's suggestions. Furthermore, some research supports the notion that when people are repeatedly prompted to remember leading information while employing recall strategies that lead them to believe that their memories will be improved, the promptings may serve to solidify the person's conviction in those memories, regardless of their veracity.

Contrary to the results of previous research, the present results suggest that the frequency with which subjects were prompted to remember the leading information had little or no effect on the accuracy of their recall. The combination of prompting and hypnosis did however affect subjects' confidence in their final recall responses to contextually confabulated questions, although not in the manner suggested by the previous research. The finding that three-prompt hypnotic subjects were less confident and two-prompt hypnotic subjects were more confident in their

responses to contextually confabulated questions suggests that the combination of prompting and hypnosis may have encouraged subjects to evaluate these questions on the basis of source relevant criteria. Overall, however, the frequency of prompting was found to have little effect on either the accuracy or confidence of subjects' memories for the leading information. The fact that the only significant results associated with prompting were confined to the confidence of subjects' responses to contextually confabulated questions and that the prompting groups differed by only one presentation of the leading information suggests that the power of the present manipulation to detect a difference associated with the frequency of prompting may have been insufficient. As such, more evidence on the effects of prompting on the recall of long-term memory is required before any firm conclusions can be drawn.

Time Delay. Recently, some researchers have suggested that experimental demonstrations of misinformation reflect responses based on the familiarity of the leading information rather than genuine memory distortions (Gilbert, 1990). This criticism stems from findings that indicate that subjects will initially base their judgments about their memories on the familiarity of leading information and that the rejection of misleading information comes later as the product of a more elaborate evaluative process.

Contrary to this hypothesis, the present results showed that subjects who were given a one-week delay before being asked a second time about their memories for the leading information were significantly less accurate in response to misleading and contextually confabulated questions than were subjects who were given no time delay before being asked a second time about their memories for the same information. Furthermore, subjects in both the delay and no delay groups were equally inaccurate in response to the misleading, contextually confabulated and confabulated questions.

Moreover, delay subjects' confidence in their responses to the misleading information was significantly higher than the no delay subjects' confidence in their responses to these same questions. Although no significant differences were found between delay and no delay subjects' responses to the contextually confabulated questions, it is useful to note that, consistent with the results of previous analyses, there was no difference in the confidence of subjects' responses to misleading and contextually confabulated questions for either the delay or no delay groups.

Together, these results suggest that, contrary to expectations, time delay fostered an acceptance rather than a critical evaluation of both the misleading and contextually confabulated questions. Furthermore, the similar rates of misinformation for both of these types of questions provides additional evidence of the role of source

similarity in the misinformation of entirely fictional events. In view of this evidence, it would seem that the criticisms levelled against experimental demonstrations of misinformation are not warranted. As well, the absence of an effect for the confabulated questions suggests that the time delay actually hampered, rather than improved, subjects' ability to discriminate these questions on the basis of source relevant information. Given that a one week time delay between initial and subsequent attempts to recall leading information is more consistent with the context in which recovered memory therapies take place, these results are likely indicative of the effects observed in these therapy situations.

Compliance vs. Misinformation

A number of investigations have demonstrated that when subjects are allowed the opportunity to rescind their earlier false memory reports without losing face they often do so (Murrey et al., 1992; Spanos & Bures, 1994; Spanos et al., 1989; Spanos & McLean, 1986). The results of these studies are interpreted as evidence that subjects' "pseudomemory" reports reflect reporting bias rather than misinformation. However, these disavowals are also consistent with the notion that subjects are heavily influenced by the extent to which contextual factors associated with the retrieval of these memories support the

interpretation of this information as genuine memory. In particular, the experimenter-communicated doubt about the authenticity of subjects' memories in these studies was essential for these disavowals to occur and would rarely, if ever, occur in therapy situations for the recovery of repressed memories. Consequently, the debate over whether the results of experiments that demonstrate misinformation of leading information reflect compliance with experimental demands or genuine memory distortions continues.

Consistent with the memory impairment hypothesis, the results of subjects' final recall responses in the present study showed that, relative to novel information, subjects reported significantly more memories for information to which they had previously been exposed. The differential confidence of subjects' responses to the repeated and novel information at final recall is also consistent with the interpretation of these results in terms of misinformation. Relative to the novel information, subjects were more confident in response to repeated accurate, misleading and contextually confabulated questions, but not repeated confabulated questions. At first glance, it would seem as if subjects simply complied to experimental demands when responding to the completely confabulated information, and this conclusion would be warranted if there were no differences in accuracy rates for these information types. However, as noted previously, subjects reported the novel

confabulated questions significantly less frequently than the repeated confabulated questions suggesting that they were confident when rejecting the novel confabulated questions as well as more cautious in their acceptance of the repeated confabulated questions. This is consistent with the idea that confabulated information would be easier to reject based on its low source similarity to the original recall event. Similarly, the lower confidence associated with novel misleading and contextually confabulated questions suggests that subjects were less sure when rejecting this information given its plausibility and source similarity.

Interestingly, in contrast to subjects' first recall responses, fewer discrepancies in the accuracy of subjects' memories as a function of the different types of novel information were found. Although subjects' responses to the novel information at final recall indicated that they were more accurate in response to accurate questions relative to misleading questions, there was no difference in the accuracy of subjects' memories for novel confabulated information relative to either novel misleading or contextually confabulated information. Consistent with the accuracy of subjects' memory reports, there were fewer discrepancies in the confidence associated with subjects' memories for different novel questions as well. In contrast to their first recall responses, no differences were found

for subjects' confidence in response to novel accurate and contextually confabulated questions. However, subjects were more confident in response to novel contextually confabulated questions than either misleading and confabulated novel questions.

Together, these results suggest that subjects' ability to distinguish these question types on the basis of source relevant criteria may have been hampered by their previous exposure to the repeated information. This implies that subjects' previous exposure to the repeated information may have impaired their ability to accurately evaluate the novel material. Although highly tentative, these results are consistent with those obtained by Schooler et al. (1988) who found that when subjects were previously exposed to misleading information they were less accurate in response to new information. These researchers interpreted this finding as evidence of memory impairment and suggest that when misinformation occurs it may alter or overwrite the original memory trace, thereby hampering people's ability to accurately recall other information associated with the original recall event. In the present paradigm, although consistent with other results suggesting that subjects' memories were indeed impaired, this specific hypothesis would require further investigation before any firm conclusions could be drawn.

Implications of the Present Study

The results of the present study demonstrate the potentially deleterious consequences of leading questioning on the accuracy and confidence of peoples' long-term memories. Overall, the type of memory retrieval strategy employed to retrieve long-term memories and the frequency with which subjects were encouraged to recall leading information had little effect on the confidence and accuracy of subjects' memory reports. The combination of hypnosis and repeated prompting however, may have encouraged subjects in the present study to evaluate their memories on the basis of source relevant criteria, although this result requires further investigation before any firm conclusions can be drawn.

The confidence of subjects' memories did not vary according to the memory's accuracy but rather as a function of the consistency of the memory report with the leading information. Moreover, subjects' memory reports varied dramatically as a function of the type of leading information to which they were exposed. While subjects reported more memories for all the different types of information at final recall, the extent to which they did so for inaccurate information depended in part on the degree to which the source of the inaccurate information was similar to the original recall event. This finding suggests that, not only does leading questioning encourage the

incorporation of all types of information which vary in terms of accuracy but, contrary to some opinion, the misinformation of entirely erroneous events is as likely as the misinformation of detail when the source discriminability of the confabulated information is degraded. More importantly, it may imply that the confabulation of abuse memories is not simply a matter of confusing a therapist's suggestion of abuse as personally accurate, but may involve the source confusion of personal and abuse consistent ideas and memories which are internally generated and consequently more easily accepted and believed in by the client.

These results also have implications for the validity of experimental demonstrations of misinformation. Rather than an accurate evaluation of long-term memory, the present results found that a time delay between initial and subsequent promptings to remember source similar information actually encouraged the incorporation of this information into long-term memory. Further, a comparison of subjects' memory reports for novel and leading information at final recall suggested that subjects responses were indicative of misinformation rather than compliance. Consequently, in view of the present results, criticisms of experimental demonstrations of misinformation on the basis of insufficient time delays or the suggestion that the results reflect compliance rather than genuine memory distortion may

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be unwarranted.

Based on the nature of the materials used to test subjects' memories, the contrived context of testing and the use of unmotivated subjects, some researchers might argue that the demonstration of misinformation in an experimental setting does not accurately reflect the circumstances involved in the recovery of repressed memories of childhood abuse. There are however, several reasons why the findings of the present study should be considered relevant. To begin, while it would be ethically impossible to investigate the retrieval of traumatic memories in an experimental setting, the recall event about which subjects were questioned in this study involved the retrieval of long-term memory. As such, this stimulus material is more closely associated with the type of memory purportedly recovered in recovered memory therapies. Secondly, according to Strong's (1971) criteria, the contextual factors associated with the retrieval of memory in the present paradigm are consistent with those found in therapy contexts. Strong (1971) also suggests that methods which effect change among unmotivated participants should be even more effective among people who are motivated to change. In sum, these findings have clear implications regarding the processes involved in therapeutic contexts in which the retrieval of long-term memory occurs.

It remains unclear however, whether the observed

effects of prompting on the confidence of hypnotic subjects' memories for contextually confabulated questions were due to an increased accessibility of source relevant information or whether subjects were differentially cued to these questions when asked repeatedly, about them. By the same token, the effects of time delay on the accuracy of subjects' memories for misleading and contextually confabulated questions may have been due to a genuine internalization of this inaccurate information into memory over the one week time delay or the fact that subjects who were asked twice about these questions without an intervening time delay became aware of the significance of these questions and consequently reported fewer memories for these information types. On the other hand, given that the effects of time delay were not observed in relation to the confabulated questions, it is likely that an internalization of this information was at least partially responsible for the observed effects. It would be useful in future research to attempt to distinguish between these alternative explanations.

All in all, the present findings suggest that the methods employed in memory recovery therapies are flawed and potentially harmful. As suggested by these results, the frightening ease with which an authority figure can encourage the misinformation of clients' long-term memory is illustrative of the responsibility clinicians must have for

their clients' mental and emotional well-being. Serious consideration of these factors in training and legislation relating to recovered memories is required to encourage clinical understanding of the influential role played by both the therapist and the therapy context in the recall of long-term memories.

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Appendix A
Mass-testing Questionnaire

Name: _____ Student #: _____

Phone number: _____

Please indicate your gender: Male _____ Female _____

Please indicate your date of birth: _____

Below is a list of movie titles. In each case, please indicate whether you have seen the movie, how many times you've seen it and your best estimate of the year in which you last saw it. If you cannot remember whether you have seen a movie, please circle NO.

MOVIE	Saw It		# of times	How long ago?		
	Yes	No		1-2yrs	3-4yrs	5yrs+
The Exorcist	Yes	No	_____	_____	_____	_____
Jaws I	Yes	No	_____	_____	_____	_____
Jaws II	Yes	No	_____	_____	_____	_____
Jaws III	Yes	No	_____	_____	_____	_____
Apocalypse Now	Yes	No	_____	_____	_____	_____
The Shining	Yes	No	_____	_____	_____	_____
Carrie	Yes	No	_____	_____	_____	_____
Dead Calm	Yes	No	_____	_____	_____	_____
Cape Fear	Yes	No	_____	_____	_____	_____
The Killing Fields	Yes	No	_____	_____	_____	_____
Rocky I	Yes	No	_____	_____	_____	_____
Rocky II	Yes	No	_____	_____	_____	_____
Rocky III	Yes	No	_____	_____	_____	_____
Amadeus	Yes	No	_____	_____	_____	_____
Taxi Driver	Yes	No	_____	_____	_____	_____
The Shining	Yes	No	_____	_____	_____	_____

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Appendix B Informed consent

The following people are involved in this research project and may be contacted at any time: Bill Blois (Research Personnel, 788-2600 ext. 2683) and/or Dr. Kim Matheson (Faculty Supervisor, 788-2600 ext. 7513). Should you have any ethical concerns about this study, please contact Dr. Lise Paquet (Chair, Department of Psychology Ethics Committee, 788-2600 ext. 2692) or Dr. W. Jones (Chair, Department of Psychology, 788-2600 ext. 2648).

We are interested in the effects of (hypnosis or guided imagery or multiple trials) on the retrieval of long-term memories. Before you agree to participate in this experiment, we would like you to be aware of the procedures involved.

Hypnotic and guided imagery conditions only:

For the purposes of this experiment, you will be administered a (hypnotic induction procedure or guided imagery procedure) that will aid in the retrieval of long-term memories, specifically your memories about the movie "Jaws".

All conditions:

In this session you will be asked to recall all that you can about the movie "Jaws". You will then be asked to recall certain scenes from the movie "Jaws", followed by specific questions about these scenes. If for any reason you feel uncomfortable in answering any of these questions, you may skip the question without explanation or penalty.

You will be asked to return in a weeks time to undergo a second interview. At the end of this second session you will be fully debriefed and given experimental credit.

I, the undersigned, am aware that my participation in this study is voluntary and if, for any reason and at any time, I wish to leave the experiment, I may do so without explanation and without penalty.

Furthermore, I am aware that the data gathered in this study are confidential with respect to my personal identity.

I have read the above information and I consent to participate in this study.

Participant's signature

Date

Investigator's signature

Appendix C
Hypnotic Induction Treatment

Free Recall Instructions

In today's session you will be asked about your memories of the movie "JAWS". If at any point you need clarification about what is being asked of you, please feel free to ask.

To begin, I will simply ask you to recall all that you can about the movie. I would also like to record your recall if I may.

Now, please close your eyes. I would like you to recall everything that you can about the movie "JAWS". Take as much time as you need and recall in as much detail as you can remember.

TURN AUDIOTAPE ON

Okay. Now take the next few moments and try to recall anything else you can about the movie.

TURN AUDIOTAPE OFF

Hypnotic Induction Rationale (1st session only)

In this next phase of the study I will again ask you to recall the movie "Jaws". First, however, I will administer a hypnotic induction procedure and instructions aimed at enhancing your ability to remember the movie. You see, human memories are stored in neural traces. Newer traces can interfere with older neural traces and lead to memory failures. This is called retro-active interference. However, it is important to realize that memory failures are rarely due to a failure to store the original information. Instead, the problem is an inability to retrieve the information. With the aid of hypnosis, you can retrieve memories from even very old neural traces.

Memory traces are activated when we recreate the environment that was present during the initial experience. For instance, if you visit some place you haven't been to since childhood, you are likely to be flooded with old memories that you thought had been completely forgotten. In this case, the place you visited caused a reactivation of memories associated with that place. These memories reactivated other memories with which they were associated and so on.

It is not necessary to physically travel back to old places in order to reactivate old memories. The same effect can be achieved by mentally recreating old environments. In other words, by imagining and thinking about a particular experience during hypnosis, and by using hypnosis to mentally recreate the feelings and emotions you felt during a specific experience, you will be able to reactivate your memory of this experience and get a continuous record of

even the smallest details. Hypnosis allows people to relive their earlier experiences.

After you have been hypnotized, I will ask you to tap into your natural abilities by imagining a mental t.v. screen on which the movie will appear. Once you are primed in this way to reactivate your memories of the movie "Jaws", you will be able to get close ups of the specific scenes which I will describe. I will ask you to focus on specific areas, such as individual's clothing, and ask you what you see.

Hypnotic Induction (all sessions)

Please close your eyes. Your ability to be hypnotized depends on your willingness to cooperate. It has nothing to do with your intelligence. As for your willpower, if you want to, you can pay no attention to me and remain awake all the time. On the other hand, if you pay close attention to what I say, and follow what I tell you, you can easily fall into a hypnotic sleep. Hypnosis is nothing fearful or mysterious. It is merely a state of strong interest in some particular thing. In a sense, you are hypnotized whenever you see a good show and forget you are part of the audience but instead, feel part of the show. Your cooperation, your interest is what I ask for. Your ability to be hypnotized is a measure of your willingness to cooperate. Nothing will be done that will in any way cause you the least embarrassment.

Now relax and make yourself entirely comfortable. Relax completely. Relax every muscle of your body. Relax the muscles of your legs. Relax the muscles of your arms. Make yourself perfectly comfortable. Let yourself be limp. Relax more and more, more and more. Relax completely. Relax completely. Relax completely.

Your legs feel heavy and limp, heavy and limp. Your arms are heavy, heavy, heavy as lead. Your whole body feels heavy, heavier. You feel tired and sleepy, tired and sleepy. You feel drowsy and sleepy, drowsy and sleepy. Your breathing is slow and regular, slow and regular.

You feel pleasantly drowsy and sleepy as you continue to listen to my voice. Just keep your thoughts on what I am saying. You are going to get much more drowsy and sleepy. Soon you will be deep asleep, but you will have no trouble hearing me. You will not wake up until I tell you to. Remember that the dangers of hypnosis are a myth. Nothing will be done that is in any way harmful to you.

I shall now begin to count. At each count, you will feel yourself going down, down, down, into a deep, comfortable, a deep, restful sleep. A sleep in which you will be able to do all sorts of things I ask you to do. One - you are going to go deeply asleep ... Two - down, down, into a deep sound sleep ... Three .. Four - more and more, more and more asleep ... Five .. Six .. Seven - you are sinking, sinking into a deep, comfortable, a deep restful

sleep. Nothing will disturb you. Pay attention only to my voice and the things I tell you. Eight .. Nine .. Ten .. Eleven .. Twelve - deeper and deeper, always deeper sleep ... Thirteen .. Fourteen .. Fifteen. You will always hear me clearly no matter how deeply asleep you may be. Sixteen .. Seventeen - deep asleep. Nothing will disturb you. You are going to experience many things that I will tell you to experience. Eighteen .. Nineteen .. Twenty. Deep asleep. You will not awaken until I tell you to do so. You will wish to sleep and have the experiences I shall presently describe.

You are feeling comfortable, relaxed, thinking of nothing, nothing but what I say. Your eyes are closed, comfortably closed, and you are thinking of nothing, nothing but what I say. Your arms and legs are heavy, your arms and legs are heavy and you are relaxed. The muscles of your face, arms and legs are relaxed, your whole body is relaxed. Drift deeper. It feels as though you are going backward into the darkness, backward into the darkness, and as you go backward into the darkness you feel more and more comfortable, more and more relaxed. You are listening to absolutely nothing, concentrating only on my voice, listening only to my voice. You are feeling comfortable and relaxed, comfortable and relaxed, and you are in a deep sound sleep - a deep sound sleep - fully prepared to respond to and experience what I will ask you to.

Now, take the next few moments to imagine a mental T.V. screen on which the movie will appear. With this mental T.V. screen, you can access your memories of the movie and you will be able to zoom in and freeze scenes as you desire.

Now, I would like you to recall everything that you can about the movie "JAWS". Take as much time as you need and recall in as much detail as you can remember.

TURN AUDIOTAPE ON

Okay. Now take the next few moments and try to recall anything else you can about the movie.

In this phase of the study, I will be asking you questions about your memories for certain characters and scenes from the film. If at any time you are unsure about what is being referred to, I urge you to ask me to clarify.

I will also ask you to rate your confidence in the accuracy of your memories for these events using a scale from 0 to 6; 0 indicating that you're not at all confident and 6 indicating that you're extremely confident.

To clarify, if you indicate that you remember a specific event, I would like to know how confident you are in the accuracy of your memory. Conversely, if you indicate that you don't remember a specific event, I would also like to know how confident you are in the accuracy of your

memory. In other words, how confident are you that, because you don't remember the event, the event never occurred in the movie.

Do you have any questions before we begin?

ADMINISTER QUESTIONNAIRE

Wake-up Procedure

You are going to wake up in a few minutes. You will feel refreshed, wide awake, and in a good mood. I will count from five to one and with each count you will be more fully awake. Five .. you are starting to awaken ... Four .. more and more awake ... Three .. still more and more awake ... Two .. becoming more and more awake ... One .. wide awake. Open your eyes .. wide awake.

Appendix D
Guided Imagery Treatment

Free Recall Instructions

In today's session you will be asked about your memories of the movie "JAWS". If at any point you need clarification about what is being asked of you, please feel free to ask.

To begin, I will simply ask you to recall all that you can about the movie. I would also like to record your recall if I may.

Now, please close your eyes. I would like you to recall everything that you can about the movie "JAWS". Take as much time as you need and recall in as much detail as you can remember.

TURN ON AUDIOTAPE

Okay. Now take the next few moments and try to recall anything else you can about the movie.

TURN AUDIOTAPE OFF

Guided Imagery Rationale

In this next phase of the study, I will again ask you to recall the movie "Jaws". First, however, I will administer a guided imagery procedure and instructions aimed at enhancing your ability to remember the movie. You see, human memories are stored in neural traces. Newer traces can interfere with older neural traces and lead to memory failures. This is called retro-active interference. However, it is important to realize that memory failures are rarely due to a failure to store the original information. Instead, the problem is an inability to retrieve the information. With the aid of guided imagery, you can retrieve memories from even very old neural traces.

Memory traces are activated when we recreate the environment that was present during the initial experience. For instance, if you visit some place you haven't been to since childhood, you are likely to be flooded with old memories that you thought had been completely forgotten. In this case, the place you visited caused a reactivation of memories associated with that place. These memories reactivated other memories with which they were associated and so on.

It is not necessary to physically travel back to old places in order to reactivate old memories. The same effect can be achieved by mentally recreating old environments. In other words, by imagining and thinking about a particular experience during guided imagery, you will be able to reactivate your memory of this experience and get a continuous record of even the smallest details. Guided imagery allows people to relive their earlier experiences.

During the guided imagery procedure, I will ask you to tap into your natural abilities by imagining a mental t.v. screen on which the movie will appear. Once you are primed in this way to reactivate your memories of the movie "Jaws", you will be able to get close ups of the specific scenes which I will describe. I will ask you to focus on specific areas, such as individual's clothing, and ask you what you see.

Guided Imagery Procedure

Now, take the next few moments to imagine a mental T.V. screen on which the movie will appear. With this mental T.V. screen, you can access your memories of the movie and you will be able to zoom in and freeze scenes as you desire.

Now, please close your eyes. I would like you to recall everything that you can about the movie "JAWS". Take as much time as you need and recall in as much detail as you can remember.

TURN AUDIOTAPE ON

Okay. Now take the next few moments and try to recall anything else you can about the movie.

In this phase of the study, I will be asking you questions about your memories for certain characters and scenes from the film. If at any time you are unsure about what is being referred to, I urge you to ask me to clarify.

I will also ask you to rate your confidence in the accuracy of your memories for these events using a scale from 0 to 6; 0 indicating that you're not at all confident and 6 indicating that you're extremely confident.

To clarify, if you indicate that you remember a specific event, I would like to know how confident you are in the accuracy of your memory. Conversely, if you indicate that you don't remember a specific event, I would also like to know how confident you are in the accuracy of your memory. In other words, how confident are you that, because you don't remember the event, the event never occurred in the movie.

Do you have any questions before we begin?

ADMINISTER QUESTIONNAIRE

Appendix E
Control Condition

Free Recall Instructions

In today's session you will be asked about your memories of the movie "JAWS". If at any point you need clarification about what is being asked of you, please feel free to ask.

To begin, I will simply ask you to recall all that you can about the movie. I would also like to record your recall if I may.

Now, please close your eyes. I would like you to recall everything that you can about the movie "JAWS". Take as much time as you need and recall in as much detail as you can remember.

TURN AUDIOTAPE ON

Okay. Now take the next few moments and try to recall anything else you can about the movie.

TURN AUDIOTAPE OFF

Control Rationale

In this next phase of the study I will again ask you to recall the movie "Jaws". First, however, I will explain a few things about human memory. You see, human memories are stored in neural traces. Newer traces can interfere with older neural traces and lead to memory failures. This is called retro-active interference. However, it is important to realize that memory failures are rarely due to a failure to store the original information. Instead, the problem is an inability to retrieve the information. It has been shown that repeated attempts to remember information may allow people to retrieve memories from even very old neural traces.

Now, please close your eyes. I would like you to recall everything that you can about the movie "JAWS". Take as much time as you need and recall in as much detail as you can remember.

TURN AUDIOTAPE ON

Okay. Now take the next few moments and try to recall anything else you can about the movie.

In this phase of the study, I will be asking you questions about your memories for certain characters and scenes from the film. If at any time you are unsure about what is being referred to, I urge you to ask me to clarify.

I will also ask you to rate your confidence in the accuracy of your memories for these events using a scale from 0 to 6; 0 indicating that you're not at all confident

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and 6 indicating that you're extremely confident.

To clarify, if you indicate that you remember a specific event, I would like to know how confident you are in the accuracy of your memory. Conversely, if you indicate that you don't remember a specific event, I would also like to know how confident you are in the accuracy of your memory. In other words, how confident are you that, because you don't remember the event, the event never occurred in the movie.

Do you have any questions before we begin?

ADMINISTER QUESTIONNAIRE

Appendix F
Cued-Recall Questionnaire

A) The following scene occurred in the movie. The police chief believes there may be a shark in the water and is at the beach watching the bathers. In the water are children and one in particular is further out than the others. This child is attacked.

Please take a few moments to describe, in as much detail as you can, all that you can remember about this scene.

How confident are you in the accuracy of your memory for this scene?

not at all 0 1 2 3 4 5 6 extremely
confident confident

MIS1) Just before the child is attacked, a man is throwing a frisbee into the water for his dog to fetch. Can you remember the dog swimming in the water to retrieve the frisbee?

Yes ___ No ___ Conf ___

*What do you remember about this event?

ACC1) Zero in on the inflated air mattress on which the child is riding at the time of the attack. Can you remember the air mattress?

Yes ___ No ___ Conf ___

*What do you remember about this event?

CC1) Zoom in on the waterskiers doing acrobatics beyond the beach. Can you remember the waterskiers driving past the beach?

Yes ___ No ___ Conf ___

*What do you remember about this event?

MIS2) Zero in on the police chief as he dives into the water trying to rescue panicking bathers. Can you remember the chief pulling bathers out of the water?

Yes ___ No ___ Conf ___

*What do you remember about this event?

CC2) Zero in on the police chief as he pulls out his revolver and fires upon the shark. Can you remember the police chief shooting at the shark?

Yes ___ No ___ Conf ___

*What do you remember about this event?

ACC2) Zero in on mother of the child as she rushes through the crowd toward the shore. Can you remember the mother as she walks along the shore calling for her son?

Yes ☐ No ☐ Conf ☐

*What do you remember about this event?

B) The following scene occurred in the movie. A man is fishing from the beach with a rod and reel. He is wearing high rubber boots and walks into the water almost to his waist. The shark attacks and drags him into the ocean.

Please take a few moments to describe, in as much detail as you can, all that you can remember about this scene.

How confident are you in the accuracy of your memory for this scene?

not at all 0 1 2 3 4 5 6 extremely
confident confident confident

CON1) Zoom in on the fisherman as he comes out of a small shack near the waters edge. Can you remember the fisherman as he turns to close the door to the shack?

Yes ☐ No ☐ Conf ☐

*What do you remember about this event?

CON2) Zero in on the fisherman as he stands on the shore looking for his knife. Can you remember the fisherman as he searches through the pockets of his tan fisherman's vest?

Yes ☐ No ☐ Conf ☐

*What do you remember about this event?

CON3) Watch the fisherman as he begins to reel his line in. Can you remember him jerk forward when the shark grabs on to his fishing line?

Yes ☐ No ☐ Conf ☐

*What do you remember about this event?

CON4) Zero in on the cooler full of beer that the fisherman has left sitting on the beach. Can you remember the beer cans in the cooler?

Yes ☐ No ☐ Conf ☐

*What do you remember about this event?

C) The following scene occurred in the movie. Chief Brody and Matt Hooper (a marine biologist) go out to hunt the shark on Quint's boat. Once at sea, the three men try to catch the shark by shooting it with spears tied to large barrels. The shark then begins to attack the boat.

Please take a few moments to describe, in as much detail as you can, all that you can remember about this scene.

How confident are you in the accuracy of your memory for this scene?

not at all 0 1 2 3 4 5 6 extremely
confident confident

ACC3) Zero in on Quint and Matt Hooper as they tie the spear lines to the end of the boat. Can you remember the boat being dragged backward through the water?

Yes ___ No ___ Conf ___

*What do you remember about this event?

MIS3) Zero in on Chief Brody and Quint as they lower Matt Hooper into the water in a shark repellent cage. Can you remember Matt injecting the shark with strychnine as it attacks the cage?

Yes ___ No ___ Conf ___

*What do you remember about this event?

ACC4) Zoom in on Quint as the shark jumps onto the sinking boat. Can you remember Quint sliding down boat's deck toward the shark?

Yes ___ No ___ Conf ___

*What do you remember about this event?

CC3) Zero in on Quint as he is attacked by the shark. Can you remember Quint's severed arm sinking to the ocean floor?

Yes ___ No ___ Conf ___

*What do you remember about this event?

CC4) Zoom in on the shark as it tries to attack Brody in the sinking boat. Look closely at Quint's hand, still clutching a grenade, as it dangles from the shark's mouth. Can you remember Chief Brody using a pole to pull the pin out of the grenade?

Yes ___ No ___ Conf ___

*What do you remember about this event?

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MIS4) Zero in on Chief Brody as he begins to search for Matt Hooper after the shark is killed. Can you remember Chief Brody swimming about the wreckage looking for Matt?

Yes ____ No ____ Conf ____

*What do you remember about this event?

Appendix G

Session 1 - True or False Questionnaire

CC1*) Just before the boy is attacked, waterskiers are seen driving past the beach.

True ____ False ____ Confidence (0-6) ____

ACC) The shark's first victim is a woman who went skinny dipping in the ocean at night.

True ____ False ____ Confidence (0-6) ____

CON1*) Before walking down to the beach, the fisherman turns to close the door of the shack.

True ____ False ____ Confidence (0-6) ____

ACC) When he first learns about the shark, the mayor prevents Brody from closing the beach because he is concerned it will hurt tourism.

True ____ False ____ Confidence (0-6) ____

CON2*) Before wading into the water, the fisherman searches through the pockets of his tan fisherman's vest.

True ____ False ____ Confidence (0-6) ____

MIS4*) Once the shark is killed, Chief Brody begins to swim about the boat in search of Matt Hooper.

True ____ False ____ Confidence (0-6) ____

ACC) While out one night, two men try to catch the shark by tying a chain to a wharf and baiting it with a roast.

True ____ False ____ Confidence (0-6) ____

ACC3*) When the men tie the speargun rope to the back of the boat, the shark drags the boat backward.

True ____ False ____ Confidence (0-6) ____

ACC1*) When he is attacked by the shark, the boy at the beach is riding an air mattress.

True ____ False ____ Confidence (0-6) ____

ACC) At a town meeting to determine what to do about the shark, Quint gets everyone's attention by dragging his fingernails across a blackboard

True ____ False ____ Confidence (0-6) ____

CC2*) After the boy is eaten by the shark, chief Brody fires upon the shark with his revolver.

True ____ False ____ Confidence (0-6) ____

MIS2*) When the boy is attacked at the beach, chief Brody dives into the water, trying to rescue panicking bathers.

True ____ False ____ Confidence (0-6) ____

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CC4*) As the shark tries to attack him in the sinking boat, Chief Brody pulls the pin out of the grenade clutched in Quint's hand, which dangles from the sharks mouth.

True ___ False ___ Confidence (0-6) ___

ACC) After the first shark is caught, Chief Brody and Matt Hooper verify that it's not Jaws by slicing it's stomach open at the wharf.

True ___ False ___ Confidence (0-6) ___

CON4*) After the fisherman is attacked, his cooler full of beer remains on the shore unattended.

True ___ False ___ Confidence (0-6) ___

ACC4*) When the shark jumps onto the sinking boat, Quint slides down the boat's deck toward the shark.

True ___ False ___ Confidence (0-6) ___

MIS3*) As the shark attacks the shark repellent cage, Matt Hooper injects the shark with strychnine.

True ___ False ___ Confidence (0-6) ___

ACC) While out at sea, Quint originally tried to catch the shark using a rod and reel.

True ___ False ___ Confidence (0-6) ___

CON3*) As the fisherman reels his line in, the shark pulls on his fishing line and drags him into the water.

True ___ False ___ Confidence (0-6) ___

ACC) After the boy is attacked at the beach, his torn air mattress washes up on the shore.

True ___ False ___ Confidence (0-6) ___

CC3*) As the shark attacks him, Quint's severed arm sinks to the ocean floor.

True ___ False ___ Confidence (0-6) ___

ACC2*) After her child is attacked at the beach, the mother of the boy walks along the shore calling for her son.

True ___ False ___ Confidence (0-6) ___

MIS1*) Just before the boy is attacked, a man is throwing a frisbee into the water for his dog to fetch.

True ___ False ___ Confidence (0-6) ___

ACC) One night at sea, Quint explains how he survived the sinking of the USS Indianapolis during the second world war.

True ___ False ___ Confidence (0-6) ___

Appendix H
Session 2 - True or False Questionnaire

CC) When the boy is attacked at the beach, Chief Brody shouts from atop the shark tower for people to get out of the water.

True ____ False ____ Confidence (0-6) ____

ACC) At sea, Quint smashes the two-way radio when Brody attempts to reach the coast guard for help.

True ____ False ____ Confidence (0-6) ____

CON) When Brody investigates a shark sighting, he stumbles upon some nude bathers on a deserted strip of beach.

True ____ False ____ Confidence (0-6) ____

CC1*) Just before the boy is attacked, waterskiers are seen driving past the beach.

True ____ False ____ Confidence (0-6) ____

ACC) When Matt Hooper and Chief Brody request that the beaches be closed, the mayor complains that someone vandalized the town's tourist billboard by painting a giant dorsal fin on it.

True ____ False ____ Confidence (0-6) ____

ACC) The shark's first victim is a woman who went skinny dipping in the ocean at night.

True ____ False ____ Confidence (0-6) ____

ACC) After the boy is attacked at the beach, his torn air mattress washes up on the shore.

True ____ False ____ Confidence (0-6) ____

ACC) While out one night, two men try to catch the shark by tying a chain to a wharf and baiting it with a roast.

True ____ False ____ Confidence (0-6) ____

CON1*) Before walking down to the beach, the fisherman turns to close the door of the shack.

True ____ False ____ Confidence (0-6) ____

ACC) When he first learns about the shark, the mayor prevents Brody from closing the beach because he's concerned it will hurt tourism.

True ____ False ____ Confidence (0-6) ____

CON2*) Before wading into the water, the fisherman searches through the pockets of his tan fisherman's vest.

True ____ False ____ Confidence (0-6) ____

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MIS4*) Once the shark is killed, Chief Brody begins to swim about the boat in search of Matt Hooper.

True ___ False ___ Confidence (0-6) ___

ACC) Chief Brody's son nearly falls victim to the shark when his sailboat is capsized in the lagoon

True ___ False ___ Confidence (0-6) ___

ACC) Upon learning of the shark, Brody orders his deputy to put up signs closing the beach.

True ___ False ___ Confidence (0-6) ___

ACC) Two young boys create a panic at the beach by swimming under water with a fake fin attached to their backs.

True ___ False ___ Confidence (0-6) ___

MIS) When the first shark caught is displayed at the wharf, Matt Hooper suspects it's not Jaws because it's tail is too small.

True ___ False ___ Confidence (0-6) ___

ACC3*) When the men tie the speargun rope to the back of the boat, the shark drags the boat backward.

True ___ False ___ Confidence (0-6) ___

ACC) One night on the boat, Quint and Hooper compare the scars they've received from shark attacks.

True ___ False ___ Confidence (0-6) ___

ACC) At the town meeting, Quint asks for ten thousand dollars to catch the shark.

True ___ False ___ Confidence (0-6) ___

CC4*) As the shark attacks him in the sinking boat, Chief Brody pulls the pin out of the grenade clutched in Quint's hand, which dangles from the sharks mouth.

True ___ False ___ Confidence (0-6) ___

ACC) At the town meeting, Quint gets everyone's attention by dragging his fingernails across a blackboard

True ___ False ___ Confidence (0-6) ___

CC2*) After the boy is eaten by the shark, chief Brody fires upon the shark with his revolver.

True ___ False ___ Confidence (0-6) ___

ACC) After the shark attacks the boat, Quint destroys the boats engine in his effort to drive it back toward shore.

True ___ False ___ Confidence (0-6) ___

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CON) At the marina, one of the townspeople who rents horses brags to Matt Hooper that business has never been so good.

True ___ False ___ Confidence (0-6) ___

ACC) At the town meeting, the mayor announces that Mrs. Kintner is offering a three thousand dollar reward for the sharks capture.

True ___ False ___ Confidence (0-6) ___

MIS2*) When the boy is attacked at the beach, Chief Brody dives into the water trying to rescue panicking bathers.

True ___ False ___ Confidence (0-6) ___

ACC) After the first shark is caught, Chief Brody and Matt Hooper verify that it's not Jaws by slicing it's stomach open at the wharf.

True ___ False ___ Confidence (0-6) ___

CON4*) After the fisherman is attacked, his cooler full of beer remains on the shore unattended.

True ___ False ___ Confidence (0-6) ___

CC) When out looking for the shark, Chief Brody and Matt Hooper come upon an abandoned yacht.

True ___ False ___ Confidence (0-6) ___

CON) While at the beach, the fisherman wears a hat in which he keeps his fishing lures.

True ___ False ___ Confidence (0-6) ___

ACC4*) When the shark jumps onto the sinking boat, Quint slides down the boat's deck toward the shark.

True ___ False ___ Confidence (0-6) ___

MIS3*) As the shark attacks the shark repellent cage, Matt Hooper injects the shark with strychnine.

True ___ False ___ Confidence (0-6) ___

MIS) When the first shark is caught, Mrs. Kintner, the mother of the boy who was attacked at the beach, approaches Chief Brody at the dock and embraces him.

True ___ False ___ Confidence (0-6) ___

ACC) After hearing of a reward for the shark's capture, the marina is swamped with fishermen going out to hunt the shark.

True ___ False ___ Confidence (0-6) ___

CC) In an effort to keep his son out of the water, Brody gets his son a job doing small repairs on the beach.

True ___ False ___ Confidence (0-6) ___

ACC) While out at sea, Quint originally tried to catch the shark using a rod and reel.

True ☐ False ☐ Confidence (0-6) ☐

CON3*) As the fisherman reels his line in, the shark pulls on his fishing line and drags him into the water.

True ☐ False ☐ Confidence (0-6) ☐

MIS) When Matt Hooper comes to dinner, chief Brody's wife explains how much Brody loves the water.

True ☐ False ☐ Confidence (0-6) ☐

ACC) After the boy is attacked at the beach, his torn air mattress washes up on the shore.

True ☐ False ☐ Confidence (0-6) ☐

CC3*) As the shark attacks him, Quint's severed arm sinks to the ocean floor.

True ☐ False ☐ Confidence (0-6) ☐

ACC2*) After her child is attacked at the beach, the mother of the boy walks along the shore calling for her son.

True ☐ False ☐ Confidence (0-6) ☐

MIS1*) Before the boy is attacked, a man is throwing a frisbee into the water for his dog to fetch.

True ☐ False ☐ Confidence (0-6) ☐

CC) Brody first becomes suspicious of a shark when he discovers a shark bite in the carcass of a killer whale which has washed ashore.

True ☐ False ☐ Confidence (0-6) ☐

ACC) One night at sea, Quint explains how he survived the sinking of the USS Indianapolis during the second world war.

True ☐ False ☐ Confidence (0-6) ☐

MIS) While at the hospital, Chief Brody forces the mayor to sign a voucher which would compensate the shark victim's families.

True ☐ False ☐ Confidence (0-6) ☐

ACC1*) When he is attacked by the shark, the boy at the beach is riding an air mattress.

True ☐ False ☐ Confidence (0-6) ☐

CON) The fisherman is wearing hipwaders as he walks into the water.

True ☐ False ☐ Confidence (0-6) ☐

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ACC) After the shark is killed, a large number of seagulls descend upon it's remains.

True ____ False ____ Confidence (0-6) ____

Appendix I
Debriefing

There is more to this study than I have told you so far. Before I explain though, I would like to explain why it is sometimes necessary not to tell people about the purpose of the study before they participate. In some kinds of studies, if we tell people about the purpose of the study before they participate, they may deliberately respond by doing what they think we want them to do, rather than what they would do naturally. Conversely, they may also respond by doing the opposite of what they think we want them to do. In either case, the person would be influenced by what they thought the purpose of the study was, rather than the specific conditions we are trying to investigate. This is in no way meant to imply that you would react in this way. However, in order to ensure that our measures are valid, it was necessary that people who participated in this study were not aware of its purpose before they began. I would now like to explain exactly what we were trying to get at in this study.

To begin, we wanted you to be aware that, while some evidence suggests that memories are stored in neural traces and that memory may be reconstructive in nature, these are only hypotheses, espoused by some researchers, about the nature of human memory. Furthermore, while there is some evidence to suggest that the use of memory enhancing techniques such as hypnosis and guided imagery are effective in retrieving very old memories, these too are only hypotheses believed to be true by some researchers.

A good deal of evidence now suggests that human memory is expectancy driven and reconstructive in nature. It has been found that people often recall things inaccurately and fill in gaps in memory by recalling what they expect happened or what they believe must have happened. There has been substantial research done on the accuracy of short-term memory, but limited laboratory research on the accuracy and confidence in recall of long-term memories. We used the movie "Jaws" because it was an important and vivid film seen by many students at least five years ago. The cued-recall scenes and the true or false questions contained some real and some misleading questions. We would greatly appreciate it if you did not discuss this aspect of the study with anyone else. It is crucial that all subjects are unaware of the stimulus questions before coming in to participate in this study.

Frequently, the elicitation of "pseudomemories" or false memories involves the use of hypnotic procedures to enhance recall. A great deal of current controversy concerns whether hypnotic procedures bias recall and/or enhance confidence in inaccurate recall to a greater extent than do nonhypnotic procedures. Consequently, one purpose of this

study was to compare hypnotic and nonhypnotic procedures in the elicitation of and degree of confidence placed in both true and false memory reports.

Another purpose of this study was to vary the frequency of and the amount of time between promptings to remember, in order to assess the degree to which these factors affect the accuracy and confidence of long-term memories. Furthermore, we were interested in evaluating memory reports for different types of information based on their similarity to target events. As such, we tested individuals who had seen the movies Jaws one through three. Of these people, half were given two questionnaires during the first interview while the other half received only one. All people were then given the second true or false questionnaire a week after their first interview.

We want to thank you for your participation in this study. If you have any questions about this experiment, the following people involved in this research project may be contacted at any time; Bill Blois (Research personnel, 788-2600 ext. 2683) and/or Dr. Kim Matheson (Faculty supervisor, 788-2600 ext. 7513). Should you have any ethical concerns regarding this study, please contact any of the following faculty members;

Dr. L. Paquet, 788-2600 ext.2692, (Chair, Department of Psychology Ethics Committee)

Dr. W. Jones, 788-2600 ext. 2648, (Chair, Psychology Department).

Appendix J
Results of Analyses Including Hypnotizability

All of the original analyses presented in the main body of this paper were re-run with hypnotizability included as a between-subjects factor. Only those analyses that indicated a significant effect of hypnotizability are presented here.

Time Delay

Separate 3 (Treatment; Hypnotic/Imagery/Control) x 2 (Time delay; Delay/No Delay) x 3 (Hypnotizability; High/Medium/Low) x 4 (Question type; Accurate/Misleading/Contextually Confabulated/Confabulated) mixed analyses of variance (ANOVAs) were performed on the accuracy and confidence of subjects' second trial responses.

Accuracy. This analysis revealed a significant three-way interaction between treatment, time delay and hypnotizability, $F(4,66)=5.29$, $p<.02$, $\eta^2=.16$. However, none of the simple interactions for this effect proved to be significant.

Accuracy as a Function of Treatment, Hypnotizability and Time Delay at Second Recall

	N	Delay		No Delay	
		M	SD	M	SD
Hypnotic					
High	(3)	2.08	0.48	2.50	0.66
Medium	(5)	1.50	0.43	2.65	0.55
Low	(6)	1.88	0.47	2.13	0.75
Imagery					
High	(3)	1.00	0.43	2.08	0.88
Medium	(5)	1.55	0.45	2.05	1.05
Low	(6)	1.83	0.66	1.63	1.03
Control					
High	(3)	1.75	0.43	1.17	0.14
Medium	(5)	1.75	0.43	2.00	0.95
Low	(6)	1.29	0.43	2.33	0.54

Confidence. This analysis revealed a significant two-way interaction between treatment and hypnotizability, $F(4,66)=2.69$, $p=.05$, $\eta^2=.14$. Once again, none of the simple main effects was significant.

Confidence as a Function of Treatment and Hypnotizability for Repeated Information at Second Recall

	N	Hypnotic		Imagery		Control	
		M	SD	M	SD	M	SD
High	(6)	4.23	0.44	2.93	1.17	2.38	0.88
Medium	(10)	2.95	1.13	3.32	0.87	3.06	1.09
Low	(12)	3.03	0.88	2.96	1.20	3.32	0.98

Accurate and Inaccurate Response Confidence

Separate 3 (treatment: hypnotic/mnemonic/control) $\times$ 3 (hypnotizability: high/medium/low) $\times$ 2 (question response: accurate/inaccurate) mixed ANOVAs were performed on confidence scores for each questions type at both first and follow-up recall trials.

Accurate Questions. Analyses of subjects first trial responses to the accurate questions revealed a significant three-way interaction between treatment, hypnotizability and response accuracy, $F(4,48)=3.31$, $p=.02$, $\eta^2=.22$. Once again, further analyses failed to provide any significant simple interactions for this effect.

Confidence as a Function of Treatment, Hypnotizability and Response Accuracy for Accurate Questions at First Recall

	N	Accurate		Inaccurate	
		M	SD	M	SD
Hypnotic					
High	(2)	3.58	0.12	1.75	2.48
Medium	(7)	3.52	1.34	2.29	1.80
Low	(10)	3.22	0.90	2.27	1.10
Imagery					
High	(5)	3.00	1.97	2.63	1.67
Medium	(7)	5.26	0.61	2.76	1.12
Low	(7)	3.64	1.58	1.69	1.20
Control					
High	(4)	4.92	0.88	1.42	1.26
Medium	(8)	4.19	1.43	2.17	0.76
Low	(7)	3.91	1.36	2.24	1.63

Contextually Confabulated Questions. Analyses of subjects first trial responses to contextually confabulated questions revealed a significant two-way interaction between treatment and hypnotizability, $F(4,47) = 2.23$, $p < .05$, $\eta^2 = .19$. Simple effects analyses revealed a significant simple main effect of treatment for low hypnotizables, $F(2,21) = 6.44$, $p < .01$, and a significant simple main effect of hypnotizability for imagery subjects, $F(2,16) = 6.24$, $p < .01$. Post hoc analyses (Bonferonni's t-tests) failed to provide any further significant results.

Confidence as a Function of Treatment, Hypnotizability and Response Accuracy for Contextually Confabulated Questions at First Recall

	High			Medium			Low		
	M	SD	N	M	SD	N	M	SD	N
Hypnotic	4.08	0.87	(6)	3.4	1.16	(6)	3.34	0.95	(8)
Imagery	2.94	1.26	(4)	3.55	1.42	(8)	2.13	1.03	(7)
Control	3.67	0.79	(4)	2.04	0.81	(4)	3.42	1.18	(9)

Compliance vs Misinformation

Confidence. A 3 (Treatment; Hypnotic/Imagery/Control) x 3 (Hypnotizability; High/Medium/Low) x 4 (Question type; Accurate/Misleading/Contextually Confabulated/Confabulated) x 2 (Question Novelty; leading/novel questions) mixed ANOVA was performed on the confidence of subjects responses at second recall. This analysis revealed a significant 2-way interaction between treatment and hypnotizability, $F(4,66) = 3.15$, $p < .02$, $\eta^2 = .16$. Further analyses however, failed to provide any significant simple main effects.

Confidence as a Function of Treatment, Hypnotizability and Information Novelty

	N	High		Medium		Low	
		M	SD	M	SD	M	SD
Hypnotic	(6)	3.89	0.44	2.55	0.95	2.87	0.78
Imagery	(10)	2.65	1.12	3.18	1.12	2.90	1.19
Control	(12)	2.09	0.66	3.11	0.93	2.95	0.88

END

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FIN