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Abstract

The empirical foundation of traumatic memory is obscure, perplexing, and in many instances, candidly paradoxical. In some cases, trauma has been found to produce accurate and persistent memory, while in others, memorial distortions such as dissociative amnesia. Unfortunately, the vast majority of the literature is laboratory based, raising the issue of external validity and necessitating the need for more field research. This field study set out to explore this complicated and often empirically contradictory area. The objective was to review the relevant literature and to ultimately, while incorporating the present results, validate a model of eyewitness recall for criminal and other traumatic events. It was proposed that situational features of the event interact with both trait and state characteristics of the victim to ultimately produce recall. Thirty-six prostitutes were interviewed using the 'Step-Wise' semi-structured interview for adult assault victims. Employing a repeated measures design, participants were instructed to provide three autobiographical narratives (i.e., a sexual assault, a non-sexual traumatic event, and a positive event) which were audio-taped and then qualitatively coded for quantity of recall. After each narrative, participants were assessed for retrospective state dissociation and for current post-traumatic stress (PTSD) symptomology. In addition, participants completed a trait dissociation scale and were queried as to the extent of their substance abuse and sexual assault histories. Results are discussed in terms of implications for interviewing, expert testimony and credibility assessment concerning memory for traumatic events.
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Post-Traumatic Stress and Dissociative Autobiographical Memories:
Overview and Exploratory Study in a Sample of Prostitutes

There are many reasons why we forget things that we have noticed or experienced; and there are just as many ways in which they may be recalled to mind (Jung, 1964, p.37).

In recent years, the discipline of forensic psychology has witnessed a burgeoning of research in the area of memory for emotional/traumatic events. Essentially, this accretion is a consequence of three cardinal factors. First, psychologists often serve as expert witnesses to provide information to judges and juries about memory, particularly in relation to trauma. This stems from the reality that for certain types of crimes, for example, sexual assault, there are usually only two eyewitnesses, the victim and the perpetrator. Since, for obvious reasons, their accounts are often discrepant, the triers of fact (i.e., judges and juries) need to be properly educated as to the variables influencing eyewitness recall (see Leippe, 1995, for review) and as to the current state of psychological knowledge regarding memory for crimes, as chronicled early on in this century by Muensterberg (see Wigmore, 1909) and more recently by Kassin, Ellsworth, and Smith, (1989). Second, the North American Criminal Justice System's relatively recent increase in the number of "recovered" memory cases has sparked an emotionally charged debate (Merskey, 1996) over both the validity and accuracy of "repressed" memories (see Scheflin & Brown, 1996 for review), and to the research suggesting that the implantation of false memories is plausible (e.g., Lotus and Pickrell, 1995; Porter, Yuille, & Lehman, in press; for reviews, see

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1 Compounding this is the fact that these accounts are primarily the only evidence that a crime has or has not been committed (Lamb, Sternberg, Esplin, Hershkowitz, Orbach, & Hovav, 1997).
Hyman & Loftus, 1998; Loftus, 1993). Finally, and of the most profound importance, but not necessarily independent from the above reasons, is the fact that the current empirical foundation of traumatic memory is conflicting and in many instances paradoxical (see Christianson, 1992, for review) necessitating the need for more research in the area. In some cases, trauma has been found to produce accurate and persistent memories (e.g., Cutshall & Yuille, 1989; Yuille & Cutshall, 1986), while in others, memory distortions (e.g., Christianson, & Nilsson, 1984).

The present research was concerned with these differential memorial outcomes of trauma. Specifically, the prime interest laid in distinguishing why some people seemingly have a "remarkable" memory (Yuille & Daylen, 1998; Yuille & Tollestrup, 1992) for their experiences, while others have little memory or none at all (Christianson & Nilsson, 1989). Although the present objectives were multifaceted, the fundamental question was does "trauma" debilitate or facilitate recall? This empirical question has unfortunately not met the "Frye test" amongst a panel of eyewitness memory experts (see Kassin et al., 1989) and thus seems to be an imperative focal point of investigation.

For the purposes of the present study, the word trauma is used to refer to extreme psychological stress (i.e., trauma that cannot be ethically approximated and/or simulated in the laboratory), as opposed to trauma which is organic in nature (i.e., brain injury; see van der Kolk, Weisaeth, & van der Hart, 1996, for a historical analysis of this distinction; also see Marxsen, 1998). Although defining the word trauma is often problematic (Gershuny & Thayer, 1999), in line with van der Kolk and Fisler, (1995), it can be delineated as "the experience of an inescapable stressful event that overwhelms one's existing coping mechanisms" (p. 506). A
consistent but more elaborate definition of trauma is provided by the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV; American Psychiatric Association [APA], 1994, p.424): Trauma is the

(ex)perience of an event that involves actual or threatened death or serious injury, or other threat to one’s physical integrity; or witnessing an event that involves death, injury, or a threat to the physical integrity of another person; or learning about unexpected or violent death, serious harm, or threat of death or injury experienced by a family member or other close associate.

In agreement with Yuille and Daylen (1998), it is contended that the only valid avenue to study memory for such traumatic experiences is in situ (i.e., in vivo) considering “naturally occurring trauma is the only context that will permit the ethical study of the impact of trauma on eyewitness memory” (p.160).

This exploratory field study entailed interviewing victims concerning both traumatic and positive autobiographical experiences. Positive experiences were elicited in order to serve as control or baseline events. By quantitatively comparing different types of memories, it was hoped that some valid insight might be imposed onto the ongoing debate concerning the impact of trauma on memory. It is a premise of this study that only by using within subject comparisons can differences between divergent types of memories be discovered, if differences do indeed exist. It was anticipated that individual differences in stress symptomology and in both state and trait dissociative characteristics would play a mediating role. More specifically, by building on a recently developed model of recall for traumatic events (see Yuille & Daylen, 1998), it was proposed that certain attributes of the victim (e.g., general tendency to dissociate, history of trauma, stress response) interact with the demands of the situation (e.g., type of event, state dissociation) to ultimately produce the quantity and quality of memory recalled.
A secondary purpose was to explore the differences between different types of traumas on memory. More specifically, are memories of sexual trauma inherently or in some way fundamentally different than memories of other sorts of trauma? Are they more traumatic? To the dismay of many of his colleagues (e.g., Breuer, Fleiss), Freud argued for an intrinsic uniqueness and damaging effect of memories of sexual trauma (see Ellenberger, 1970; Sulloway, 1987). Empirically, with the exception of a few recent efforts (e.g., Dunmore, Clark, & Ehlers, 1999; Tromp, Koss, Figueredo, & Tharan, 1995), this issue has remained relatively unexplored. Thus, in the present study, two different types of traumas (i.e., sexual vs. non-sexual), in addition to a positive experience (i.e., a control event) were elicited from each participant and subsequently compared.

It may also be that different types of sexual victimization produce divergent psychological consequences. For example, a victim of incest may have a different emotional response to the trauma than a victim of a date rape, who in turn, may differ in some way from a victim who was raped by a complete stranger. Mills and Granoff (1992) have suggested that victims of date rape may suffer stronger physical and emotional reactions than those perpetrated by strangers, although this has not been empirically borne out (e.g., Dunmore, Clark, & Ehlers, 1999; Frank, Turner, & Duffy Stewart, 1980; Koss, Dinero, Seibel, & Cox, 1988). However, if differences do indeed exist, they may have memorial consequences. For example, Mechanic, Resick, and Griffin (1998) reported that in their sample of 92 rape victims, 58% of acquaintance rape victims but only 29% of stranger rape victims indicated significant amnesia for their experiences. Testing the reliability of the latter finding was another aim of the present study.

Another aspect of sexual victimization is the inclination for the offenders to use a weapon in the course of a sexual assault. It is thought that the presence of a weapon in a crime scene leads to a different memorial outcome than crime scenes that do not involve a weapon (Steblay,
1992). In the laboratory, it has been shown that the presence of a weapon in a crime scene causes the unfortunate "victim's" perceptual focus to narrow and thus to attend more so to the presence of the weapon than to other aspects of the scene (Kramer, Buckhout, & Eugenio, 1990; Loftus, Loftus, & Messo, 1987). Consequently, in such circumstances, it has been shown that one's memory for the event and/or perpetrator is impaired in comparison to those who viewed the same sequence of events without the weapon. Testing the reliability of this "weapon focus" phenomenon in the field was another goal of this study.

An additional focus of the present study concerned the impact of repeated traumas on subsequent dissociative tendencies. According to Terr (1991), dissociation may be one of the ultimate consequences of long-standing, regularly occurring traumas. For example, if a child is routinely sexually assaulted by a family member over the course of many years, the child may somehow eventually learn to dissociate his/her focus away from the attack as a coping strategy. According to Yuille and Daylen (1998), this focus can be external (e.g., watching the event from outside of the body) or internal (e.g., focusing on one's emotions) in orientation. Will this child utilize such coping responses in other situations? Waller and Ross, (1997) recently reported on a biometric study implicating 45% of the variance of pathological dissociation to environmental influences (e.g., sexual/physical abuse). This issue was put to the empirical test as well.

As alluded to above, an interesting aspect of dissociation is the tendency for the person who is dissociating to view themselves in the event from another perspective, such as an observer watching the event from above the scene (Marmar & Weiss, 1994; Yuille & Daylen, 1998). In this fashion, the person is seen as an actor in the event and has an "observer" memory for their experience (Schacter, 1996). This perspective is in stark contrast to having a field viewpoint,

5 Also see van der Kolk, van der hart, and Marmar, (1996).
where the person views the event through their own eyes (i.e., a "field" memory)\(^6\). Although a few studies have investigated this phenomenon (e.g., Nigro & Neisser, 1983; Robinson & Swanson, 1993), to date a comparison of the quantity of details across the two perspectives has not been conducted. The present study investigated this issue, not only within memories, but across multiply valenced experiences.

**Literature Review**

In the following sections, literature pertinent to the above areas are reviewed beginning with an overview of the historical roots of traumatic memory and then leading into current conceptualizations of trauma’s ensuing sequels. The current empirical foundation of traumatic memory is critically evaluated (both laboratory and archival/field findings), in addition to an overview of the various theoretical models that have been implicated as explanations as to the impact of trauma on memory. Thereafter, the present field research is presented in detail.

**Historical Foundation of Traumatic Memory**

For over a century, psychologists and psychiatrists have been interested in the effects that trauma has on memory (e.g., Freud, 1896, as cited in Ellenberger, 1970; Janet, 1889, as cited in van der Kolk, 1996; also see Sulloway, 1987). Janet (1925, as cited in van der Kolk & van der Hart, 1989, p.1) underscored this regard by postulating that:

(a)ll the famous moralists of olden days drew attention to the way in which certain happenings would leave indelible and distressing memories-memories to which the sufferer was continually returning, and by which he was tormented by day and by night.

\(^6\) Also called participant vs. spectator point of view (Robinson & Swanson, 1993).
According to Janet (1889, as cited in van der Kolk, 1996), traumatic events may not fit into extant cognitive schemata and hence "split off" from consciousness. In this fashion, it was thought that psychological trauma could exert such stress on the mind that the memory for the traumatic event, and the emotion surrounding that memory could be literally "dis-associated" from each other, hence the term dissociation. In this view, normally integrated mental processes such as emotion and memory can be structurally separated through the process of dissociation leaving dissociated memories unavailable (Speigal & Cardena, 1991). In essence, different aspects of the conscious experience are isolated from each other (Holtgraves & Stockdale, 1997). Consequently, the resultant memory may contain unusual qualities such as fragmentation and even gaps, referred to today in the DSM-IV as dissociative amnesia (APA, 1994). Janet wrote of traumatic memories accompanied by "vehement emotions" stored automatically into the "subconscious" (van der Kolk & van der Hart, 1989). These "vehement emotions" were thought to vary in intensity, depending on the psychological state of the victim and their assessment of the traumatic situation (van der Kolk, van der Hart, & Marmar, 1996). These un-integrated "dissociated" memories would then persist as psychological "automatisms" ultimately resulting in "hysterical symptoms" such as obsessional pre-occupations and somatic re-experiences (van der Kolk & van der Hart, 1989). Paradoxically, the hysterical patient would have complete retrograde amnesia for the initial traumatic event which Janet (1920) argued was invariably the cause of the hysteria.

In a similar vein, Freud argued that traumatic events may become "repressed", or unavailable to consciousness manifesting in hysterical symptomology, only later resurfacing (i.e., "the return of the repressed"; see Ellenberger, 1970; Sullloway, 1987). This premise was alluded to over a century ago, when Freud (1896, as reported in Strachey, 1966) wrote extensively on the relationship between sexual trauma and "hysteria". Although the concept of hysteria has lost its
clinical validity over the years and has been dropped from modern nomenclature (Spitzer, Spelsberg, Grabe, Mundt. & Freyberger, 1999), the phenomenon is arguably analogous to current conceptualizations of Posttraumatic Stress Disorder (PTSD) and certain dissociative disorders in both etiology and symptomology (for example, see Darves-Bornoz, 1997). For example, age old clinical descriptions of hysteria included such symptoms as anxiety, agoraphobia, hypervigilance, insomnia, and sexual disturbances (Ellenberger, 1970). Anxiety disorders (Kilpatrick, Resick, & Veronen, 1981; Kilpatrick, Veronen & Resick, 1979), social phobia (Weissman & Bothwell, 1976), and sexual dysfunction (Becker, Skinner, Abel, & Treacy, 1982), are still being implicated in the aftermath of sexual trauma whereas sleep disturbances and arousal problems are associated with diagnoses of PTSD (APA, 1994). Further, there is an accumulating body of research implicating early sexual trauma as a precursor for certain dissociative disorders such as dissociative identity disorder (DID) and dissociative amnesia (Spiegal & Cardena, 1991; Terr, 1991).

Jung (1964) gave Freud due credit for his clinical descriptions of cases involving the “‘forgetting’ of disagreeable memories - memories that one is too ready to lose” (p.36). He further noted that it is because of the memories’ “disagreeable and incompatible nature” that they are subject to such a “repressive” process (p.34). Although most discussions of repression center around Freud’s theories and teachings, it was actually Johann Friedrich Herbart (1776-1841) who first reported on the process whereby ideas could be repressed or “verdrangt” from consciousness (Sulloway, 1992, p.67). Moreover, in his early clinical formulations, Freud was heavily influenced by many prominent figures of the time. For instance, Jean Martin Charcot, referred to as the “Napoleon of Neuroses” (see Ellenberger, 1970) for his flamboyant demonstrations of hysteria at the famed Salpetriere in Paris, was the first to demonstrate to Freud that more than one state of consciousness could concurrently exist in the same individual (Sulloway, 1992). In
essence, Charcot exhibited the existence of the "unconscious" to Freud, although the actual term had been coined by Oppenheim (1858-1919) years earlier. Further, in the early 1880's, Charcot distinguished organic from traumatic amnesia (Sulloway, 1992), no doubt an instrumental influence in the formulation of the concept of repression.

In the early 1890's, Freud and colleague Joseph Breuer formulated the Breuer-Freud theory of hysteria (Sulloway, 1992). "Hysterics suffer mainly from reminiscences" (Freud, 1893, as cited in Sulloway, 1992, p.61), was the gist of the theory, rooted in the fact that the reminiscences were related to "unconscious psychic traumas" (p.68). The subsequent estrangement between Freud and Breuer over the predominant etiology of the neuroses largely stemmed from Breuer's reluctance to endorse Freud's view that hysterical symptoms were "exclusively caused by psychical defense rather than by Breuer's more physiological mechanism of hypnoid states" (Sulloway, 1992, p.70). Further, and arguably more important, was Freud's insistence, despite Breuer's reluctance, to accept the inherently important role of sex in the etiology of hysteria. Originally, Freud viewed early sexual experiences as the root of all hysteria but later abandoned this seduction hypothesis in favor of the role that childhood sexual fantasies played in the etiology (see Masson, 1984, for debate). This was in contrast to Janet, also a student of Charcot, who commented on a range of traumatic experiences that could result in "repression" or dissociation of traumatic experiences (van der Kolk & van der Hart, 1989).

Although there is compelling clinical anecdotal support for the existence of repression (e.g., Russell, 1995; van der Kolk & Kadish, 1987; Weene, 1995), to date, there remains no uncontroversial empirical evidence to support the phenomenon (see Brewin & Andrews, 1997; Davis, 1987; Hembrooke & Ceci, 1995; Holmes, 1990; Kihlstrom, 1995; Kopelman, 1997; Merskey, 1996; Nash, 1994; Pope & Hudson, 1995). Survey studies that have attempted to display prevalence estimates concerning repressed memories of child sexual abuse (e.g., Briere
and Conte, 1993; Hermann & Schatzow, 1987) have been thoroughly criticized (e.g., Pope & Hudson, 1995; Schooler, Bendiksen, & Ambadar, 1997) on a number of grounds. For example, methodological limitations, such as identifying “repressors” or instances of recovered memories on the basis of a single yes/no self-report question, which may have confused participants or in some way influenced demand characteristics, have plagued the validity of many research efforts (e.g., Melchert, 1998). The issue is further complicated by the fact that there is no objective record of memory in past clinical discussions (Goodman, Redlich, Qin, Ghetti, Tyda, Schaaf, & Hahn, 1999) and a lack of clear external corroboration of abuse in more recent empirical efforts (e.g., Herman & Schatzow, 1987).

On the other hand, the concept of dissociation has been receiving fruitful empirical attention as of late. Dissociative experiences can be reliably estimated in both clinical and non-clinical samples (Bernstein-Carlson & Putman, 1993) and have been shown to be related to memorial impairments (Mechanic, Resick, & Griffin, 1998). Such experiences can even be induced in the laboratory through a variety of methods (see Leonard, Telch, & Harrington, 1999). There has been such renewed interest into dissociative phenomena that the American Psychiatric Association in the publication of the DSM III-R (1987), recognized dissociative disorders such as dissociative amnesia, fugue states, and the most extreme of the dissociative disorders, multiple personality disorder (MPD). Further, in 1988, a journal, Dissociation: Progress in the Dissociative Disorders, was developed, solely dedicated to the study of dissociation. According to Spiegel and Cardena, (1991, p.366) this “resurgence of interest” is due to, among other factors, the association between witnessing traumatic events and subsequent dissociative symptoms and the ensuing accentuating high prevalence of PTSD and dissociative related diagnoses in the aftermath.
Modern Day Dissociation and PTSD

Waste and tragedy have come to run their fingers through your toes (The Smalls, 1995, track 11).

Current views on dissociation delineate a dissociative response to a wide variety of traumas including physical and sexual abuse (Darves-Bornoz, 1997; Dunmore, Clark, & Ehlers, 1999; Herman, 1996; Mechanic et al., 1998; Spiegel & Cardena, 1991;) natural disasters (Koopman, Classen, & Speigal, 1994), torture (Weisaeth, 1989), and combat (Marmar, Weiss, Schlenger, Fairbank, Jordan, Kulka, & Hough, 1994). Most studies found significantly higher levels of dissociation in traumatized samples (Putman, 1995) as compared to controls (for reviews, see Foa & Hearst-Ikeda, 1996; Gershuny & Thayer, 1999). Furthermore, it has been shown that dissociating during a trauma is associated with both the subsequent development of PTSD symptoms (Koopman, et al., 1994) and a diagnosis of PTSD (Dunmore et al., 1999; Marmar et al., 1994; for review see Gershuny & Thayer, 1999).

In its' original formulation by Kardiner (1941, as cited in van der Kolk, 1997), PTSD encompassed symptoms in response to extreme war zone stressors. It is now known that PTSD can be expressed in victims who were involved in a wide assortment of traumatic events such as child sexual abuse (e.g., Rowan, Foy, Rodriquez, & Ryan, 1994; Saunders, Kilpatrick, Hanson, Resnick, & Walker, 1999), rape as an adult (e.g., Darves-Bornoz, 1997; Darves-Bornoz, Pierre, Lepine, Degiovanni, & Gaillard, 1998), bombings (e.g., Tucker, Dickson, Pfefferbaum, McDonald, & Allen, 1997), shootings (e.g., North, Smith, & Spitznagel, 1997; Schwartz & Kowalski, 1991), motor vehicle accidents (e.g., Blanchard, Hickling, Taylor, Buckley, Loos, & Walsh, 1998; Douglas & Koch, in press; Harvey, Byrant, & Dang, 1998), and involvement in prostitution (Farley, Baral, Kiremire, & Sezgin, 1998; Farley & Barkan, 1998).

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7 MPD is now referred to as dissociative identity disorder (DID) in the DSM-IV (APA, 1994).
According to the DSM-IV (APA, 1994), PTSD can occur when someone has had a direct personal encounter with an extremely traumatic stressor such that intense fear, horror, or helplessness are experienced. Core symptoms include persistent intrusions (e.g., re-experiencing parts of the event in thoughts, dreams, etc.), avoidance of trauma stimuli (e.g., avoiding thoughts, feelings, places that may cause reminiscences), and elevated arousal or hypervigilence (e.g., insomnia, difficulty concentrating).

van der Kolk, McFarlane and Weisaeth (1996) depict the trauma victim as exhibiting dissociative symptoms such as alterations in the experience of person (i.e., depersonalization, out of body experiences), time (i.e., slowed down or accelerated), and place (i.e., a sense of unreality). The frequency, duration, and intensity of the traumatic experience are all thought to be variables effecting the existence of dissociative states (Hartman & Burgess, 1993) and the ensuing consequences of such. For example, Terr (1991, p.14) conjectures that unanticipated "single-blow" traumas (i.e., Type I traumas) are likely to lead to detailed unforgettable memories, while repeated instances of trauma (e.g., long standing incestuous abuse; Type II traumas) are more likely to induce a dissociative process. Similarly, Beere (1995) hypothesizes that different types of traumas produce divergent dissociative responses.

Also of importance, is a possible predisposition to dissociate. Factors such as rigidity, and low levels of emotional responsiveness to negativity have been found to correlate highly with trait measures of dissociation (Beere & Pica, 1995). Although the original formulation of the construct was of a pathological nature, restricted to “unhealthy” individuals, the current prevailing view is of a dimensional construct, present to some degree in all individuals (Putman, 1995; Waller, Putman, & Carlson, 1996), with only a subset (i.e., 3.3%) experiencing pathological dissociation (Waller & Ross, 1997). As noted by Kluft (1997), "dissociation seems
to be a demonstrable and readily researchable phenomenon" (p.44). Accordingly, it is a measurable construct in terms of both trait and state characteristics.

Although several scales exist, reflecting both clinical and biological variables (for example, see Sanders, 1986; Tellegen & Atkinson, 1974; Torem, Egtvedt, & Curdue, 1995), Bernstein and Putman (1986) arguably introduced the first valid and reliable instrument to quantify dissociative experiences. The 28-item, self report Dissociative Experiences Scale (DES) serves as a trait measure of dissociation. It assesses a person’s general tendency to dissociate in everyday life when not under the influence of drugs and/or alcohol. The total DES score serves as an index of both the types and frequency of dissociative experiences and has proven reliably able to distinguish between those with and without a dissociative disorder (Bernstein & Putman, 1986). Utilizing both the DES and the Structured Clinical Interview for DSM-III-R Dissociative Disorders (SCID-D; Steinberg, Rounsaville, & Cicchetti, 1991), Steinberg and colleagues have suggested an appropriate DES cutoff score of between 15 and 20 when screening for dissociative disorders. Elevated scores ranging from 30 and 40 have been reported in samples with PTSD, and scores above 50 have been recorded in DID samples (Bernstein-Carlson & Putman, 1993).

The term "peritraumatic dissociation" was introduced by Marmar and colleagues (for example, Marmar et al., 1994) to account for acute dissociative coping responses to trauma. Accordingly, the Peritraumatic Dissociative Experiences Questionnaire (PDEQ; Marmar et al., 1994) has been formulated to measure retrospective accounts of dissociation specific to a traumatic incident in question. Elevated scores on the PDEQ have been shown to be significantly correlated with scores on the DES and a diagnosis of PTSD (Marmar et al., 1994).

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8 Note: the Questionnaire of Experiences of Dissociation (QED; Riley, 1998) is an alternative measure also receiving fruitful empirical attention as of late (see Ray & Faith, 1995; r = .80 with DES).
In a recent study of rape victims (Griffin, Resick, & Mechanic, 1997) it was reported that those with high PDEQ scores were significantly more likely to suppress physiological autonomic responses (i.e., heat rate and skin conductance levels) than those with low PDEQ scores. Additionally, 94% of the high PDEQ scorers who exhibited "general physiological numbness" met the criteria for PTSD. More importantly for the present purposes, in a later study (Mechanic, Resick, and Griffin, 1998), peritraumatic dissociation was shown to be related to significant amnesia in participants who were raped when memory was assessed two weeks after the incident.

Peritraumatic dissociative responses and the level of trauma exposure were found to be the two most predictive variables of later PTSD symptoms in a study of survivors of the 1991 Oakland-Berkeley firestorm (Koopman, Classen, & Spiegel, 1994). This finding was in part replicated in a study by Bernat, Ronfeldt, Calhoun, and Arias (1998), who reported that peritraumatic dissociation, as measured by the PDEQ, was a significant predictor of posttraumatic stress symptomology in a large sample of college students who had experienced a variety of traumatic events. Similarly, Dunmore et al. (1999) have demonstrated that symptoms of detachment (i.e., a feature of dissociation) during both physical and sexual assaults were significantly related to the subsequent onset of PTSD.

As outlined earlier, another interesting aspect of dissociation is the perspective one takes when perceiving and/or remembering an event (i.e., field vs. observer perspective; see Schacter, 1996; Yuille & Daylen, 1998). Question #5 on the PDEQ is directly pertinent to this process. It asks participants if there "were moments when [they] felt as though [they] were spectators[s] watching what was happening to [them]- for example, did [they] feel as if [they] were floating above the scene or observing the event as an outsider" (Marmar & Weiss, 1994)? It appears that

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9 Also called "secondary dissociation" (van der Kolk, Van der Hart & Marmar, 1996)
this phenomenon is determined by the emotionality of the event in question (Nigro & Neisser, 1983), however, the impact of this on memory is currently unknown.

In sum, it is well established that dissociative responses to trauma are prominent, often leading to symptoms of PTSD, yet the memorial consequences of such processes are unclear. Take for example the following DSM-IV descriptive characteristics of PTSD. On the one hand, intrusions of the previous stressor are a core feature of PTSD (APA, 1994). On the other hand, and somewhat paradoxically, an inability to recall an important aspect of the experience is a symptom of persistent avoidance, another core aspect of PTSD. If one has recurring unwanted recollections of a past trauma, why would one have an inability to recall parts of the event? This issue is further complicated by the fact that dissociative amnesia, as defined by the DSM-IV, includes symptoms of memory loss but cannot occur comorbidly with PTSD, which also includes symptoms of memory loss (see APA, 1994). Meanwhile, diagnoses of both dissociative amnesia and PTSD primarily occur after witnessing traumatic events. How does one explain this discrepancy?

Empirically, it has been shown that as the level of PTSD symptoms heightened, veteran’s memory for combat exposure displayed increasing inconsistencies (Southwick et al., 1997). Further, Vasterling, Brailey, Constans and Sutker (1998) found memorial deficits on a range of cognitive tasks in Gulf War veterans with PTSD. In contrast, McNally and Amir (1996) did not find an impairment of memory in Vietnam combat veterans with PTSD. In another study, adults with PTSD stemming from histories of both physical and sexual abuse displayed significantly poorer performance on some memorial tasks (i.e., verbal short term recall, immediate and delayed recall) but not in others (e.g., visual recall), as compared to healthy matched controls.

Note: an inability to recall falls under criterion D in the ICD10-DCR and under criterion C of the DSM-IV (see Peter, Slade, & Andrews, 1999, for a comparison of the two diagnostic systems).
Bremner, Randall, Scott, Capelli, Delaney, McCarthy, & Charney, 1995). Clearly, this is a confusing state of affairs. This may be due, in part, to the fact that clinicians and researchers investigating naturally occurring trauma have memorial processes as a secondary empirical focus, if a focus at all. Rightfully so, most trauma investigators' primary objective is the assessment and treatment of abnormal reactions to extreme external stressors. Aside from a few recent exceptions (e.g., Harvey et al., 1998; Southwick et al., 1997), if memory processes are an empirical objective, rarely is the focus on autobiographical or episodic memory. Deficits in memory processes (e.g., as assessed by cognitive/neuropsychological methods) are important from both a clinical and research perspective. However, in the forensic arena, autobiographical memory for past crimes/victimizations is a central concern.

Fortunately, there is a wealth of empirical research in the eyewitness memory literature which focuses on episodic memory for traumatic events. Although a collaborative effort between clinicians who treat trauma survivors and researchers who investigate autobiographical memory would be ideal (Yuille & Daylen, 1998), this amalgamation has unfortunately been a rare phenomenon. Thus, the onus has primarily been put upon eyewitness memory researchers to investigate the impact of trauma on episodic memory. Unfortunately, as illustrated below, the current empirical foundation of traumatic memory is obscure and perplexing.

**Current Empirical Foundation of Traumatic Memory**

Empirically, laboratory, archival and field studies often produce results that are at odds with each other (Christianson, 1992; Yarmey, 1983). Some studies have produced results highlighting the malleability of memory (e.g., Brigham Maas, Snyder, & Spaulding, 1982; for reviews see Loftus & Christianson, 1989; Zola, 1998) or the detrimental influence that trauma

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11 Also called declarative memory (see Zola, 1998).
has on memory (e.g., Brigham, Maas, Martinez, & Whittenberger, 1983; Christianson & Nilsson, 1984; Christianson et al., 1986; Clifford & Hollin, 1981; Clifford & Scott, 1978; Hosch et al., 1984; Kramer, Buckout, Fox, Widman, & Tusche, 1991; Kuehn, 1974; Loftus & Burns, 1982; Yarmey & Jones, 1983). Paradoxically, others have succeeded in showing a facilitative effect of trauma on memory (e.g., Brown & Kulik, 1977; Cutshall & Yuille, 1989; Hosch & Bothwell, 1990; Hosch & Cooper, 1982; Yuille & Cutshall, 1986), while others have yielded mixed results (e.g., Christianson, 1984; Christianson, 1989; Christianson & Loftus, 1987,1990; Scrivner & Safer, 1988; Tollestrup, Turtle, & Yuille, 1994).

Closer scrutiny of the vast majority of studies investigating traumatic memory reveals that they are largely laboratory based, raising the issue of ecological validity. In fact, many have questioned the generalizability of laboratory based memory research to real-world situations (e.g., Brigham, Maas, Snyder, & Spaulding, 1982; Clifford & Bull, 1978; Fisher, 1995; Goodman, Redlich, Qin, Ghetti, Tyda, Schaaf, & Hahn, 1999; Tulving & Madigan, 1970; Yarmey, 1983; Yuille, 1993; Yuille & Daylen, 1998; Yuille & Tollestrup, 1992). The generalization is arguably “an inferential leap that is scientifically dubious” (Baars & McGovern, 1995, p.68). For obvious ethical reasons, researchers cannot “traumatize” experimental participants and then test their memory, as there is a limit to the stress or “trauma” that can be exerted upon those participating in empirical research. Consequently, laboratory based researchers have thus chosen to simulate “trauma” in the controlled circumstances of the laboratory by using an analogue approach to trauma. Arguably stemming from the classic Von Litz experiments conducted almost a century ago (see Muensterberg, 1908, as reported in Yuille & Daylen, 1998), in the typical modern “simulated trauma” memory experiment, participants, usually undergraduate students, are divided into two conditions, a “trauma” or “stress” condition and a control condition. Emotional words (e.g., Kleinsmith & Kaplan, 1963, 1964), slides (e.g.,
Christianson, 1984, 1987; Christianson & Loftus, 1987; Christianson & Nilsson, 1984; Yarmey & Jones, 1983), videotapes (e.g., Clifford & Hollin, 1981; Clifford & Scott, 1978; Loftus & Burns, 1982), and staged crimes (e.g., Hosch & Bothwell, 1990; Hosch & Cooper, 1982; Hosch, Leippe, Marchioni, & Cooper, 1984; Kassin, 1984; Muensterberg, 1908, as reported in Yuille & Daylen, 1998) have been used as stimuli in order to increase stress or arousal levels in the laboratory. Typically, participants in both conditions would view the same event for a period of time while at the end of the viewing, participants in the “traumatic” condition would see a traumatic conclusion, such as a violent gun shooting or a bloody car accident, while the control condition participants would view a relatively mundane conclusion, such as a couple strolling on a beach. A modal finding in these sorts of analogue studies is a detrimental memorial influence in the “traumatic” condition, leading one to the conclusion that trauma has a debilitating effect on recall. However, this is not a consensus conclusion among eyewitness memory experts (Kassen et al., 1989). Disregarding the issue of external validity for the moment, the reasons for this are clear. Past research, muddled with diverse methodologies, coupled with researcher’s focal biases have made comparisons across studies a dubious adventure. For example, in many laboratory studies (e.g., Loftus & Burns, 1982) it is unclear if the actual “traumatic” event was well remembered, since researchers chose to focus on the poor ability of participants to recall relatively trivial aspects in the scene’s periphery or in scenes subsequent to the actual event in question. Some laboratory studies (e.g., Christianson & Loftus, 1987; Safer, Christianson, Autry, & Osterland, 1998; see Christianson, 1992, Christianson & Engelberg, 1997, for review) suggest that memory for peripheral details of a “traumatic” event may be sacrificed at the expense of increased elaboration for more critical/central aspects of the event. The core actions of the event are thought to be more amenable to encoding, as opposed to more peripheral aspects of the scene.
such as the physical features of the perpetrator (Goodman, Redlich, Qin, Ghetti, Tyda, Schaaf, & Hahn, 1999).

Given the critical role of arousal in trauma (see Christianson, 1992), various arousal theories have been put forth to explain these findings. In fact, the effect of arousal on cognitive performance has been a focus of countless reports since the turn of the century (e.g., Walker, 1958). Two of the more popular theories implicated in the arousal/memory debate are the classic papers by Yerkes and Dodson (1908) and Easterbrook (1959).

In a landmark paper, Yerkes and Dodson (1908) reported on an inverted U shaped curve to explain the relation between arousal and task performance. It was proposed that as arousal increased, performance increased until an optimal level of arousal was attained. At higher levels of arousal, performance would decrease accordingly. Although widely embraced by introductory psychology textbooks, and countless arousal researchers as an explanation for arousal’s effect on memory, the original, rather restrictively simplistic view, has not been validated by current research (Christianson, 1992; Yuille & Daylen, 1998; for a recent, albeit controversial\(^\text{12}\) exception, see Bahrick, Parker, Fivush, & Levitt, 1998). Further, not only is it extremely difficult, if not impossible, to retrospectively discern someone’s “optimal level of arousal”, the original model was tested on mice, leaving questions of external validity open for debate.

Alternatively, researchers (e.g., Christianson & Loftus, 1987; Maass & Kohnken, 1989; Yuille & Tollestrup, 1992) have increasingly turned to Easterbrook’s (1959) formulations.

In Easterbrook’s (1959) seminal review paper, it was proposed that increases in emotional arousal reliably reduce the range of cues that an organism can attend to. This narrowing of

\(^{12}\) Controversial in the sense that although the inverted U was reported, many of the questions in the protocol were multiple, suggestive and leading, i.e., "What was it like in the house? Lights? Flashlights? Radio? TV? Water? Rainwater? Anything break or fall?". Thus, one may question the validity of the results (see Fisher & Geiselman, 1992, for a discussion of the limitations of asking both multiple and leading questions.)
attention is assumed to lead to a loss of peripheral cues, while maintaining the central focus of an event. Thus, during times of stress or high arousal, one would tend to focus attention on the main facets of the event, ignoring aspects of the scenes' periphery. Similarly, elaborating on the "Easterbrook hypothesis", Safer, Christianson, Autry, and Osterland (1998) have argued that trauma may cause “tunnel memory”. It is thought that the highly arousing nature of certain events such as pointing a gun at someone, or the less fortunate converse, could lead to this phenomenon, leading to accurate focused recall for the central aspects of the event, at the expense of peripheral details.

According to Loftus, Loftus, and Messo (1987), it is the presence of a weapon in a crime scene, as opposed to arousal per se, that causes this narrowing of perceptual focus onto the central aspect of the event (e.g., the gun) with a subsequent detriment in memory for other parts of the event. In a series of two laboratory studies, Loftus et al. investigated this “weapon focus” phenomenon. Two groups of participants viewed virtually identical slide sequences except that one group viewed slides depicting a man pointing a gun, in contrast to the other participants who viewed the same slides, except the gun was replaced with a check. It was reported that those in the “gun” condition made significantly more eye fixations on the gun as well as fixating for a longer duration on the gun that those in the “check” condition. More importantly, those in the “gun” condition performed significantly worse on a line-up identification task than those in the “check” condition.

So is it arousal or the presence of a weapon that causes this perceptual narrowing? Kramer, Buckhout, and Eugenio, (1990) investigated the interaction between arousal, the presence of a weapon, and eyewitness memory. In their first experiment, they showed that “highly aroused” participants who viewed a highly visible weapon in a series of slides performed significantly poorer on a test of recall pertaining to the description of the perpetrator than those
participants who reported low arousal and viewed a weapon with poor visibility. Since it was still unclear if it was arousal or the visibility of the weapon that produced weaker recall, four additional experiments were conducted with arousal controlled for. Combining their results into a regression analysis showed that it was indeed the weapon, as opposed to arousal, that led to the memorial detriment. They argued accordingly that "weapon focus need not necessarily be tunnel vision, fixed by the glue of emotional arousal. During a real crime, the weapon may be the ultimate source of information" (p.182). But how then does one explain the results reported from among the plethora of laboratory studies indicating a debilitating effect of arousal on memory when the arousing stimuli did not include a weapon (e.g., Christianson & Nilsson, 1984; Clifford & Scott, 1978; Kramer et al., 1991)? Thus, whether it is a weapon that causes focused attention or if it is mediated by arousal is still open for debate.

Although increased emotional arousal (e.g., Christianson, 1984, 1987; Christianson & Nilsson, 1984; Kramer, Buckhout, & Eugenio, 1990) stress and anxiety (e.g., Kramer, Buckout, Widman, & Tusche, 1991; Seigal & Loftus, 1978), and arousal via aversive stimulation (e.g., Brigham, Maas, Martinez, & Whittenberger, 1983; Christianson, Nilsson, Mjordal, Perris, & Tjellden, 1986) have been deemed by some to be relatively synonymous to experiencing trauma, this may be an erroneously naïve conclusion. Empirically, traumatic stress cannot be ethically simulated. Clearly, the types of experiences that lead to PTSD cannot be approximated in the laboratory (van der Kolk, 1996). According to van der Kolk and Fisler (1995), "if trauma is defined as the experience of an inescapable stressful event that overwhelms one's existing coping mechanisms, it is questionable whether findings of memory distortions in normal subjects exposed to videotaped stresses in the laboratory can serve as meaningful guides to understanding traumatic memories" (p.506). As later noted by van der Kolk (1996), "clearly, there is little similarity between viewing a simulated car accident on a TV screen, and being the responsible
driver in a car crash in which one's own children are killed" (p. 279). Moreover, is watching any sort of violence on a TV screen even “stressful”, let alone traumatic, in this day and age? As noted by Myers (1990, as cited in Yuille & Daylen, 1998), the average American has viewed approximately 25,000 violent deaths on TV or in the movies before their high school graduation. Some degree of habituation cannot be ruled out.

Even if the obvious differences between the laboratory and a crime scene are ignored, researchers utilizing laboratory simulations primarily view arousal or stress as uni-dimensional stipulations (i.e., high vs. low) arguably blurring a more complex interaction of arousal and valence, i.e., positive or negative (Hervé, 1999). A sadist and a "normal" university undergraduate may, for example, have similar physiological responses to viewing a violent picture or film, but their appraisal of their emotional affect may be quite different. As an example, Bockheler (1995) found that although the level of arousal was no different between experienced and novice sky divers at various points in a jump sequence, the predominant emotion felt by the novice group was fear, as opposed to the excitement endorsed by more experienced sky divers. Additionally, Lane, Chua, & Dolan (1999) have demonstrated that arousal and emotional valence independently activate the visual cortical and anterior temporal areas of the brain. Thus, divergent emotional responses may effect memory above and beyond arousal levels. Of course, this is an empirical question yet to be tested.

Furthermore, what does the typical memory participant have in common with a victim or witness of an actual crime? According to Cutshall and Yuille (1989), the events typically seen in laboratory experiments may not be comparable to actual criminal events. The availability of cues and arousal levels may differ between contexts. Moreover, the typical laboratory participant may act quite differently than an actual witness or victim of a crime (Cutshall & Yuille, 1989). The
personal significance of the event as well as the consequences of their actions, may not be tantamount to what is experienced outside the laboratory. Divergent motivations at recall (e.g., laboratory "victims" would probably not be as vindictive in an identification task as would real crime victims) are always a possibility (Kassin, 1984). At best, the typical memory participant is akin to the uninvolved/unaffected bystander/observer at a crime scene (Tollestrup et al., 1994), not to the victim. Much empirical attention has been devoted to the memorial processes of this uninvolved bystander, however, in actuality, they constitute an infrequent type of eyewitness in the forensic context (see Yuille & Tollestrup, 1992). Moreover, Yarmey (1983) has noted that as opposed to the unexpected, stressful and confusing nature of most crimes, the typical laboratory participant is usually aware that they are witnessing a simulated crime and of an upcoming memory test.

Thus, archival and field studies, in which actual victims and witnesses to genuine crimes are studied, are in great need in order to circumvent the external validity problems usually associated with laboratory based research (Yuille, 1993). Although field and archival studies usually lack high internal validity due to small sample sizes and confounding variables (Goodman, Redlich, Qin, Ghetti, Tyda, Schaaf, & Hahn, 1999), according to Yuille (1993), "we should do a combination of controlled, archival, and field research, make comparisons, and then draw conclusions" (p.573). Similar sentiments were also expressed by Tulving (1991) and by Tollestrup et al. (1994). Unfortunately, to date, only a scant number of both archival and field studies have been conducted, and as noted earlier and highlighted below, the literature is replete with divergent methodologies and discrepant results.

13 Various structures in the temporal lobe are known to be imperative for memory functioning (see Zola, 1998).
Archival studies

An archival study employed by Kuehn (1974) focused on information extracted from police reports. The characteristics of both the crime and the victim were compared to the completeness of the perpetrator's description made by the victim. Kuehn reported that in general, most victims were able to render roughly full descriptions of their assailants. More specifically, 85% provided six or more characteristics concerning the appearance of the alleged perpetrator. Certain variables such as the type of crime, the injury to the victim, and the victim's sex were found to have exerted an influence on the completeness of descriptions. Of importance was the fact that victims of rapes and assaults gave less full descriptions than victims of robberies. By depicting criminal victimizations on a “traumatic continuum” from robberies at one end to sexual violations at the other extreme, this finding illustrates trauma’s detrimental influence on memory. Similarly, if the victim sustained an injury, smaller amounts of information were provided as compared to an uninjured victim.

Results that contrasted with Kuehns' (1974) findings were reported in an archival study by Tollestrup et al. (1994) which focused on Royal Canadian Mounted Police (RCMP) reports of actual victims' and witnesses' memories of robbery and fraud. The types of robberies ranged from purse snatchings to armed bank robberies while the frauds largely consisted of passing bad cheques. A premise of the study was that fraud victims would have the lowest level of trauma exposure (due to the fact that most do not even know a crime has been committed until much later) while witnesses and victims to robberies would have higher levels of trauma exposure, respectively. It was reported that victims and witnesses to robbery recalled significantly more total details concerning the events and provided more clothing descriptions of the perpetrator than fraud victims. Further, robbery victims were reported to have recalled more details pertaining to the physical descriptions of the perpetrators than fraud victims. In general, robbery
victims were able to provide an increased amount of detail than robbery witnesses, who in turn provided more information than victims of fraud. This is in stark contrast to Kuehn who found that the more the trauma exposure, the less detailed the descriptions.

Although no data was available concerning the accuracy of the fraud victim’s descriptions, it was reported that victims of robbery did not differ from witnesses in terms of the accuracy of weight and age estimates although witnesses estimated height better than victims (Tollestrup et al., 1994). Concerning just the cases in which the police suspects confessed, it was reported that, on a photo-spread identification procedure, victims of robbery selected the police suspect more often than robbery witnesses who, in turn, selected the police suspect more often than fraud victims. Thus, in contrast to Kuehn (1974), Tollestrup et al. did not find a general detrimental influence of trauma exposure on memory. As shown below, the results from field studies also share inconsistent and contrasting conclusions.

Field studies portraying trauma’s detrimental influence

Recently, Desert Storm veterans were surveyed about traumatic events that they had experienced in combat (Southwick, Morgan, Nicolaou, & Charney, 1997). Veterans filled out combat related questionnaires one month after returning from the Gulf War and again two years later. After the responses were compared between the two time points, it was apparent that 88% changed their answers on at least one of the questions two years later, and 61% responded differently on two or more of the questions. Most common altered responses had to do with threats to personal safety, viewing bizarre disfigurement of bodies, and witnessing others wounded or killed. The authors concluded that traumatic events are not "fixed, indelible, or stable over time" and may be subject to forgetfulness, suppression, repression, dissociation, post-event information, or denial (Southwick et al., 1997, p. 175).
Similarly, Mechanic, Resick, and Griffin (1998) also assessed the memories of trauma victims at two different time periods. In their study of rape victims, it was reported that 37% of the participants assessed at time one attested to “significant levels of amnesia for parts of the rape” (p.952). Two important factors were identified as being related to the amnesia. Those with reported amnesia at time one reported significantly higher levels of peritraumatic dissociation, and were more likely to have been raped by acquaintances than strangers. A “hypernesia” effect was shown as evidenced by the fact that only 16% of the sample indicated significant amnesia at time two.

From the above two retrospective field studies, it seems apparent that memorial deficiencies after trauma are not uncommon. Furthermore, dissociation seems to be an important memorial influencing individual difference variable in so much that it has been shown to be associated with amnesia. In addition, the nature of the victim/offender relationship appears to exert a mediating effect on memory. What about studies that are prospective in nature?

In a prospective study by Widom and Morris (1997) where adults with documented histories of childhood sexual abuse were interviewed 20 years later, it was reported that 84% of the men and 36% of the women failed to disclose their sexual abuse histories. In another prospective study by Widom and Shepard (1996) utilizing the same data as above, adults with documented histories of childhood physical abuse some 20 years earlier were also re-interviewed. It was reported that almost 40% of the women victims failed to recount being physically abused as children as assessed by the Conflict Tactics Scale (Straus, 1979). According to the authors, “whether these people did not report because of embarrassment, a wish to protect parents, a sense of having deserved the abuse, a conscious wish to forget the past, or a lack of confidence in or rapport with the interviewer, we do not know” (p.418). Intuitively and theoretically speaking, such high lack of reporting rates could also be due to memorial distortions.
In another prospective study, Darves-Bornoz (1997) investigated the symptomology of rape victims at various time periods. Diagnoses of PTSD were prominent, ranging from 65%-85% depending on the assessment period (i.e., higher levels at smaller latency since rape periods). A significant predictor of PTSD at six months post-rape was the relationship between the victim and the perpetrator. Specifically, the existence of an incestuous relationship (i.e., the offender was a father, stepfather, uncle, brother or grandfather of the victim) between the victim and the offender, as opposed to when the perpetrator was unknown to the victim, was a critical predictor of subsequent PTSD levels. This finding, in part, echoes the results reported by Mechanic et al. (1998) in so much that both high levels of dissociation and PTSD were shown to be pathological and mediated by the victim/perpetrator relationship. Also of importance was the high frequency of dissociative disorders (i.e., 69%) reported by Darves-Bornoz, as assessed by the structured clinical interview for the DSM-IV dissociative disorders (SCID-D, 1994).

Imperative to the present study, it was shown that a diagnosis of psychogenic/dissociative amnesia (i.e., an inability to recall all or parts of the event in question) was given for 44% of the participants with PTSD.

Thus, it seems clear that deficits in autobiographical memory can manifest after being an adult victim of rape (e.g., Darves-Bornoz, 1997; Kuehn, 1974; Mechanic et al., 1998), a childhood victim of both physical and sexual abuse (e.g., Widom & Morris, 1997; Widom & Shepard, 1996), and after combat exposure (e.g., Southwick et al., 1997). As illustrated below, these results are in stark contrast to other field studies highlighting remarkable memories of trauma.

Note: the victim-offender relationship appears to be an important mediator of subsequent PTSD levels, a factor that was left unacknowledged in a recent American National survey of women (see Saunders, Kilpatrick, Hanson,
Field studies showing trauma's facilitative effect

The first in situ (i.e., in vivo) investigation of eyewitness memory for a violent crime was conducted in a field study by Yuille and Cutshall (1986). Thirteen eyewitnesses to a violent gun shooting were interviewed by the police within two days of the incident and subsequently agreed to participate in research interviews conducted four to five months later. The crime involved a thief shooting a gun store owner twice and the gun store owner retaliating with six shots, resulting in the death of the thief. Forensic evidence was sufficient for recreating the crime scene, as to assess the accuracy of the witnesses' statements.

Yuille and Cutshall (1986) reported that central witnesses produced twice as many details in both the police and research interviews than peripheral witnesses. This was assumed to reflect the amount of the incident that the witnesses had seen, which also depended on their respective vantage points. Both central and peripheral witnesses gave highly accurate accounts in both the police and research interviews. In the police and research interviews, central witnesses were 84.56% and 81.75% accurate, respectively. Not significantly different from the central witnesses, the peripheral witnesses were 79.31% and 79.39% accurate, respectively. These results indicated that the witnesses were highly accurate in their accounts, with no significant decrement following a four to five month delay. Further, the effect of stress did not exert a negative effect on the witnesses' accounts either. Actually, the more "stressed out" witnesses were reported to have provided more accurate accounts than those reporting little anxiety.

A few years later, additional field studies of eyewitness memory for violent crimes were carried out by Cutshall and Yuille (1989). In particular, they focused on a restaurant shooting, a bread line shooting, and a number of bank robberies. The former occurred after an armed thief had successfully robbed a bank and was chased by a pedestrian into the kitchen of a nearby

Resnick, & Walker, 1999).
restaurant. Eight witnesses to the shooting were interviewed by the police shortly after the incident. It was reported that the witnesses were 100% accurate in their accounts to the police.

Two years after the shooting, Cutshall and Yuille (1989) interviewed four of the eight witnesses initially interviewed by the police. All were central witnesses to the shooting. The witnesses were 92.3% accurate in their accounts replicating the high degree of accuracy found in the earlier Yuille and Cutshall (1986) study. Furthermore, analyses of the restaurant shooting clearly indicated high accuracy and retention over time.

The context of another field study by Cutshall and Yuille (1989) consisted of a lineup where people were waiting for food, whereupon a stabbing and a subsequent shooting took place. The police interviewed eighteen witnesses shortly after the violent incident and overall, it was reported that the witnesses were 92.1% accurate in their accounts. Cutshall and Yuille interviewed six of the original witnesses between 13 and 18 months after the incident. Again, the witnesses retained a high level of accuracy over time, such that in the research interviews, they were on average, 84.6% accurate. Cutshall and Yuille were again successful in demonstrating that witnesses to a violent event can be highly accurate and detailed in their accounts, even after a long retention interval.

In order to determine whether witnesses to non-violent crimes memorially behave in a similar fashion as witnesses to violent crimes, Cutshall and Yuille (1989) conducted another field study which focused on bank robberies. Twenty banks were robbed by two separate men, and witnesses were interviewed immediately after each robbery by the police. Although central witnesses provided more than double amounts of information than peripheral witnesses did, it was reported that both types of witnesses were over 90% accurate in their accounts to the police. After an average of two years since the robberies, Cutshall and Yuille conducted research interviews with 17 of the original witnesses and accuracy in their accounts was reported to be
When recognition memory was assessed through a photo spread identification task, there was low rate of correct identifications and an elevated rate of false positives. From the field studies by Cutshall and Yuille, it appears as if nonviolent bank robberies are not remembered as well as violent shootings. However, the extent to which violence or “trauma” per se plays a role in this interaction remains unclear.

Analyses of episodic memory across divergent latencies have been a focus of studies for more long-standing traumas as well. For instance, Wagenaar and Groenberg (1990) analyzed testimonies of victims of Nazi concentration camps at two different time periods and compared them for their consistencies. In total, 78 victims were interviewed between the periods of 1943 and 1947 and again between 1984 and 1987. In general, the results indicated "a remarkable degree of remembering" in so much that most victims could remember the basic facts of their camp experiences (Wagenaar & Groenberg, 1990, p.80). The authors highlighted this by stating, “there is no doubt that almost all witnesses remember Camp Erika in great detail, even after 40 years. The accounts of the conditions in the camp, the horrible treatment, the daily routine, the forced labor, the housing, the food, the main characters of the guards, are remarkably consistent” (p.84). Interestingly, it was reported that many of the survivors forgot a number of essential details over the years. For instance, 3 of 38 forgot the name of one of their captors who had tortured and maltreated them, and 14 of 55 could not identify a picture of the latter captor. The authors argued that somehow these details were "lost from memory" (p.86). If one classifies the gist of the victim's camp experiences as central details and the latter details as peripheral, then the results of this study support the findings of some laboratory studies highlighting good recall for central details of a traumatic event(s) at the expense of peripheral details (e.g., Christianson & Loftus, 1987; Safer, Christianson, Autry, & Osterland, 1998).
Peterson and Rideout (1998) recently highlighted the remarkable nature of even very young children’s traumatic memories. The authors interviewed one and two year old children who had experienced an injury severe enough for hospital emergency attention. The children were interviewed in the hospital emergency room, and again at 6, 12 and 18 months afterwards. Although the majority of the children under the age of two could not recall their trauma’s (which was attributed to infantile amnesia\textsuperscript{15}), 11 of the 12 two year olds accurately recalled the major details of their experiences, even after a delay of more than a year and a half.

Children’s ability to produce accurate accounts of trauma have also been reported in more severe circumstances. For instance, Bidrose and Goodman (in press, as cited in Goodman et al., 1999) looked at child sex abuse victims who were audio-taped and photographed while performing sexual acts for male perpetrators. In their interviews with the courts and to the police, it was reported that the children were highly accurate in their accounts based on the objective record that was available.

Although the above field studies reported on victims and witnesses “remarkable” degree of remembering over time, by virtue of both high accuracy and consistency, they failed to provide a control event as a comparison. This methodological flaw was remedied in a recent field study by Thompson, Morton, and Fraser (1997). The authors analyzed the accounts of the 27 of 80 survivors of the 1989 Marchioness ferry sinking tragedy in which 51 people were killed. The survivor’s statements pertaining to the sinking were made at two possible time periods, approximately 4 and 7 months after the event. The authors then compared the accounts of the ferry sinking to a non-traumatic event, a dinner party (i.e., the control event), in which seven of the participants were in attendance, and an objective record of the event was established. Of the 86 statements collected from the 27 survivors, 70 received external corroboration through a

\textsuperscript{15} See Zola (1998) for a discussion of infantile amnesia.
system of cross validation networks indicating that, on average, the survivors were 80% accurate in their accounts of the trauma. It should be noted that 3 of the survivors reported memory lapses for certain aspects of the event, which, according to the authors was reminiscent of traumatic amnesia. However, the authors later stated that “the Marchioness accounts cannot be looked at for evidence of extensive traumatic amnesia” (p.630). In contrast, regarding the control event, it was reported that 5 of the 7 participants erred not only in terms of reporting false details, but failed to spontaneously recount certain unusual and striking subparts of the event. In sum, the authors concluded that “although a few have forgotten some aspects of the disaster, and a few openly say that they have deliberately tried to forget it, the overwhelming majority gave detailed accounts with few lapses or inconsistencies, and with many instances of confirmation from other survivors” (p.629).

Are these “remarkable” memories of trauma described above examples of “flash-bulb” memories? Brown and Kulik (1977) have contended that emotionally arousing memories can be remembered quite well and remain highly accurate over time. These "flashbulb memories" are thought to be attributed to Livingstons' (1967) special neurological "Now Print" device which, in theory, becomes activated when a "biologically significant" event meets the canonical criteria of being surprising and consequential. In Brown and Kuliks' classic study, participants were asked about their clearest, most vivid nationally important autobiographical memories, such as assassinations of public figures. More specifically, they were asked to recollect the circumstances in which they first heard of a surprising, consequential historical incident. It was reported that these circumstances were retained as "photographic pictures" with no loss of clarity over time.

Subsequent to Brown and Kuliks' (1977) acclaimed study, many have questioned both the validity and the reliability of their results (e.g., Christianson, 1992; McCloskey, Wible, & Cohen,
1988; Tromp et al., 1995; see Winograd & Neisser, 1992 for review). According to Christianson (1992), one main criticism that generalizes to all studies of real-life events is the fact that researchers usually fail to provide a comparable baseline control event (i.e., a salient, everyday incident). As illustrated above, Thompson and colleagues (i.e., Thompson et al., 1997) were the only field researchers to include such an event in their study. Acknowledging this methodological deficiency, Christianson (1989) conducted an experiment with a similar design as Brown and Kulik, but included a control measure. In his study, Swedish participants were asked to recall the circumstances in which they first heard of the assassination of Swedish prime minister Olof Palme. An initial telephone interview explored these memories within two months of the assassination. Additionally, the interviewers inquired about the participant's "most vivid memory from [the] last Saturday" before the assassination (i.e., the control event). One year later, these same participants were telephoned again and were questioned about their initially reported incidents. Christianson's results indicated that the participant's recollections of the assassination of their prime minister were 53% accurate over time using strict scoring criteria, and 80% accurate over time when lenient scoring criteria were utilized. Interestingly, participants who rated themselves higher in emotionality at the first interview were significantly more accurate in their responses a year later. Taken together, these results were considered an indication that the participants were able to provide the gist (i.e., central details) of their memories while the specific (i.e., peripheral) details suffered a deterioration of accuracy over the one year delay. Although a substantial loss of detail information over time, memory loss was reported to be even more extensive for the control event. Thus, although the "flashbulb" memories were remembered more accurately than the control events, Christianson concluded that the memorial "decrement itself is evidence against a special flashbulb mechanism" (p.441-442). He further noted that these memories are "merely reconstructions that follow the same pattern of
recollection as has been demonstrated in laboratory studies involving highly emotional events" (p.442). Similarly, Loftus and Kaufman (1992) stated that “the prevalence of errors is one way in which flashbulb memories are like “ordinary memories”- in this way, they are unremarkable” (p.214). These conclusions were in line with earlier inferences such as from Neisser (1982, as cited in Christianson, 1989, p.435) who postulated that "apparently flashbulbs can be just as wrong as other kinds of memories; they are not produced by a special quasiphotographic mechanism".

Literature Review Summary

With regards to the above literature review some conclusions can be made. After witnessing traumatic events, the memorial consequences can be viewed on a continuum. At the far left is complete amnesia while at the far right is very good memory. Between the two polar opposites are various forms of partial memory and narrative reconstructions arguably effected by the “seven sins of memory” (see Schacter, 1999). On the one hand, the amnesiac processes have been labeled a multitude of different epithets, e.g., dissociation, repression, psychogenic amnesia, traumatic amnesia, hysterical amnesia, dissociative amnesia etc., but the bottom line is some sort of memorial distortion. On the other hand, although the term "flash-bulb" memory has been routinely and aptly criticized, many have empirically illustrated that traumatic memories can be remarkably well recalled. It thus appears as if both good and bad memory can manifest after viewing a traumatic event. As Kluft recently (1997, p.36) highlighted:

Traumatic memory may not be a uniform phenomenon but consist(s) of detailed recollections, vague recollections, fragmentary recollections and implicit memories inferred from symptoms, reenactments, and somatic memories [and unconscious flashbacks].
How can one explain this paradoxical state of affairs? Although it is primarily laboratory studies that highlight the malleability of memory for traumas (e.g., Christianson et al., 1984; Clifford & Hollin, 1981; Clifford & Scott, 1978), some archival and field studies have reached the same conclusion (e.g., Kuehn, 1974; Mechanic et al., 1998; Southwick et al., 1997). These findings, in conjunction with other field and archival research, which are increasingly reporting “remarkable” memories of traumas (e.g., Cutshall & Yuille, 1989; Thompson et al., 1997; Wagenaar & Groenber, 1990; Yuille & Cutshall, 1986), may represent the true state of affairs concerning traumatic memory, i.e., variability. Accordingly, after reviewing the literature on stress and memory (lab, archival and field), Goodman et al. (1999) recently stated:

Whether stress has a negative impact on memory may partly depend on the type of information (e.g., central versus peripheral) being tested. It may also be mediated by individual difference variables. Even if the stress involved in many criminal events does inhibit memory, which is still open for debate, this does not mean that witnesses to traumatic incidents will remember nothing or that what they do remember will be fraught with error. It may simply mean that their memories will be relatively limited. What they do remember might still be quite accurate.

Recently, Yuille and Daylen (1998) have constructed a model illustrating this variability evident in memory for traumas. Based upon both clinical and research experience, and a review of the relevant literature, seven different patterns of recall were formulated. Briefly, they are as follows:

(1) “Remarkable” memories: an event of impact (e.g., a witness to a shooting, a victim of a single sexual assault) leading to detailed and accurate recall over time (e.g., Cutshall & Yuille, 1989; Thompson et al., 1997; Yuille & Cutshall, 1986;). Terr (1991, p.14) refers to these
"full, detailed etched-in memories" as stemming from Type I (i.e., "single blow") traumas.

(2) Dissociation at time of event:

(A) External focus/observer memory: detailed account from an unusual perspective (see Schacter, 1996); similar to pattern I; Note: this pattern has yet to be empirically investigated from a forensic standpoint.

(B) Internal focus: small quantity of detail with subjective qualities; Note: this pattern has yet to be empirically investigated.

(3) State-dependent amnesia/"Red-out": offender amnesia for central details of the event; thought to occur during a rage state and/or crime of passion (e.g., catathymic homicide, see Dutton & Yamini, 1995; also Swihart, Yuille, & Porter, 1999).

(4) "Normal" forgetting: routine event leading to loss of detail with time (e.g., fraud victims, see Tollestrup et al., 1994); routinely studied in laboratory with trauma simulations (Yuille & Tollestrup, 1992).

(5) Script memory: blended episodes of abuse into a "script" memory (i.e., how things used to happen; e.g., repeated instances of child sexual abuse may lead to a script memory; see King & Yuille, 1987).

(6) Dissociative amnesia (APA, 1994): inability to recall all or part of a traumatic experience (e.g., Christianson & Nilsson, 1989); Terr (1991) refers to this consequence as ensuing from Type II (i.e., repeated) traumas.

(7) Active forgetting: conscious attempts to forget leading to a loss of details (in theory, it appears as if this process is similar to the neo-Freudian notion of suppression); Note: this pattern has yet to be empirically investigated.
From the review of the literature, it appears as if this is the first comprehensive model to describe the variability evident in memory for traumatic events. To date, many of the patterns of recall in this model have not been the subject of firm empirical investigation. In part, the present study was undertaken for such a purpose. Although not operationally defined, it was expected that some, but not all, of the above patterns of recall would manifest in the present study. In particular, remarkable memories (i.e., pattern 1) were expected due to the fact that events of impact were elicited (e.g., sexual assaults). It was also anticipated that dissociation during many of the experiences would be prominent, given both the accumulating theory (e.g., Foa et al., 1996; Putman, 1995;) and research (Bernstein & Putman, 1986; Bernstein-Carlson & Putman, 1993; Mechanic et al., 1998) indicating a dissociative response to traumatic events. By dichotomizing participants on the basis of their responses to question #5 on the PDEQ, an observer/field perspective distinction was explored (i.e., pattern 2a). State-dependent amnesia (i.e., pattern 3) was not expected due to the fact that, in theory, this pattern is thought to occur primarily in offenders (Schacter, 1986). Further, even if this pattern is not restricted to such circumstances, no attempts were made in the present study to cognitively recreate the original traumatic context (e.g., as in the Cognitive Interview, see Fisher & Geiselman, 1992; Fisher, 1995; Kohnken, Schimossek, Aschermann, & Hofer, 1995; Miller & Fremouw, 1995) thought to be necessary for contextual or state dependent retrieval (Eich, 1980). Normal forgetting (i.e., pattern 4) was expected to occur for the control (i.e., positive) events or for events that did not lead to a dissociative and/or significant stress response. Script memories (i.e., pattern 5) were expected given that sexual abuse memories were queried. However, the present interviewers were trained to make every attempt to elicit a specific memory when possible. Instances of dissociative amnesia (i.e., pattern 6) were expected in those participants who had severe levels of dissociation, and consequently little recall for their experiences. The last pattern, active
forgetting (i.e., pattern 7) was not anticipated, due in part, to the fact that it is the least understood (Yuille & Daylen). Further, for the present purposes, no attempts were made to quantify the phenomenon.

Thesis Objectives

To date, a qualitative analysis of the quantity of details recalled across multiply valenced events has not been conducted. This was the design and purpose of the present study. In this thesis, the effects of extreme trauma on memory were explored in a field study. The field nature of this study is highlighted because of the unfortunate lack of such ecologically valid research in the extant literature and the according necessity for this method of investigation, as voiced by many prominent trauma and eyewitness memory researchers and clinicians (e.g., Clifford & Bull, 1978; Tollestrup et al., 1994; Tulving, 1991; van der Kolk, 1996; van der kolk & Fisler, 1995; Yuille, 1993; Yuille & Daylen, 1998). In the present study, prostitutes were interviewed about past autobiographical traumatic events. This sample was chosen due to the recent research highlighting the astoundingly high prevalence of traumatic events, including sexual assaults, and subsequent PTSD diagnoses in sex trade workers (see Farley, Baral, Kiremire, & Sezkin, 1998; Farley & Barkan, 1998). The participants were asked to provide a verbal narrative regarding a time in which they were sexually assaulted. A sexual assault narrative was chosen due to both theory (see Ellenberger, 1970; Sulloway, 1987) and research (e.g., Tromp et al., 1995) on the subject that suggests the possibility of sexual assault memories containing different qualities than other types of traumatic memories. Additionally, the participants were asked to recall a non-sexual autobiographical traumatic event as well as a positive incident from anytime in their past. These three stories were then compared for the amount of recall (i.e., details) produced. As
stated previously, there has been a paucity of such within-subject comparisons in the eyewitness memory literature.

Individual differences in response to trauma were anticipated given the expanding literature on both PTSD and dissociation (e.g., Rowan et al., 1994; Spiegel & Cardena, 1991). While dissociative and PTSD symptoms are prominent in response to a variety of traumas, not everyone dissociates and further, not everyone develops PTSD (see Gershuny & Thayer, 1999). Accordingly, the participants were asked to complete a number of self-report inventories concerning both state (i.e., PDEQ) and trait dissociation (i.e., DES), and current PTSD symptomology (i.e., Impact of Event Scale [IES]; Horowitz, Wilner, & Alvarez, 1979). Given that Marmar et al. (1994) found both state and trait dissociation and PTSD symptoms to be strongly associated in a sample of Vietnam veterans, this relationship was expected to be robust as well. Thus, significant inter-correlations between the above three scales were anticipated.

Considering the lack of convergence in the literature as to the true state of affairs regarding traumatic memory, many of the following hypotheses are purely exploratory in nature. The following set of objectives concerned the ultimate question: does trauma facilitate or debilitate recall? More precisely, will participants provide a more detailed account of their positive experience or of their traumatic experiences? Yuille and colleagues (e.g., Cutshall & Yuille, 1989; Yuille & Cutshall, 1986) have shown that traumatic events can be recalled and retained with remarkable accuracy and persistence. Furthermore, Thompson et al. (1997) have demonstrated that traumatic events can be recalled more accurately than relatively mundane events. Thus, relatively more recall in the traumatic conditions was anticipated, in contrast to the results of many laboratory simulations (e.g., Loftus & Burns, 1982; Yarmey & Jones, 1983) where problems with ecological validity are prominent. Individual differences in both trait and state dissociation and in PTSD symptomology were expected to play a mediating role in the
amount of recall provided. It has been empirically demonstrated that if one has a dissociative
disposition (as assessed by the DES) one would be likely to dissociate during a traumatic
experience (as assessed by the PDEQ; Marmar et al., 1994). In both theory (see Spiegel &
Cardena, 1991) and research (e.g., Mechanic et al., 1998) it has been illustrated that such a
dissociative response leads to memorial impairments. Accordingly, less recall for traumas in
both high trait and state dissociators was expected. Considering the confusing state of affairs
regarding PTSD and memory, no a priori hypotheses are offered on this topic.

What about across different traumatic experiences? Are memories of sexual trauma more
traumatic (as assessed by the IES) than other types of traumatic experiences? Tromp et al. (1995)
have shown that rape memories are remembered differently, however, to date no one has
investigated PTSD symptoms across the two types of experiences. Given Freud's propositions on
the subject (see Ellenberger, 1970; Masson, 1984; Strachey, 1966; Sulloway, 1987), it was
expected that memories of sexual trauma would indeed be more traumatic than other types of
traumatic experiences. However, since the impact of this, in terms of the amount of memory
provided is currently unknown, no hypotheses on this subject are offered.

The nature of the victim/perpetrator relationship in memories of sexual assaults was
predicted to have an effect on subsequent PTSD symptomology and consequently, on the amount
of recall provided. Victims of incest commonly report feelings of guilt and shame concerning
these sexual experiences (Christianson & Engelberg, 1997; Terr, 1991). Furthermore, Irwin
(1998) has shown that these feelings are significant predictors of subsequent dissociative
tendencies. Given that dissociation is closely intertwined with both PTSD symptomology
(Koopman et al., 1994) and PTSD diagnoses (Marmer et al., 1994), it was anticipated that the
more intimate the relationship between the victim and the perpetrator, the higher would be the
levels of PTSD symptoms. With regards to the amount of recall across divergent
victim/perpetrator relationships, Mechanic et al. (1998) has shown that the closer the relationship, the poorer the memory. This association was expected as well.

If there was a weapon involved in the sexual assault, does this lead to better or poorer memory? As reviewed above, in the laboratory it has been shown that the presence of a weapon in an event leads to a perceptual narrowing of attention on the weapon (Loftus et al., 1987), with consequently less focus on the perpetrator, leading to an inferior performance in describing the perpetrator (Kramer et al., 1990). However, in a study with actual victims, Tollestrup et al. (1994) reported an increased amount of total details in events involving a weapon in comparison to similar events that did not comprise a weapon. Considering that the present thesis is not a trauma simulation, but a field study, it was expected that the present results concerning the weapon focus phenomenon would support this latter finding.

It is also possible that a history of trauma may play a role on subsequent dissociative and memorial processes. For example, if someone has been raped hundreds of times over the years by his/her father, which is unfortunately not uncommon in cases of incestuous abuse, will they have a better memory for a specific experience, than someone who has been assaulted once? These repeated, "Type II" traumas have been clinically suggested to be associated with dissociation (Terr, 1991). However, since there is a lack of empirical evidence to support this supposition, these issues were explored with no a priori hypotheses.

The perspectives (i.e., field vs. observer) that participants held at the time of the events were anticipated to be mediated by acute dissociation levels. According to Freud, (1974, as reported in Robinson & Swanson, 1993) observer memories are clear signs of memorial distortion. Accordingly, since higher levels of peritraumatic dissociation have been shown to be pathological (e.g., Koopman et al., 1994), it was anticipated that observer memories will contain higher levels of peritraumatic dissociation, and thus higher levels of PTSD symptomology. This
rationale is further supported by Nigro and Neisser's (1983) findings that observer memories tend to contain higher levels of emotionality than field memories. Since the memorial consequences of this distinction, in terms of the amount of detail recalled, has not be empirically investigated, no a priori hypotheses are offered.

Method

Participants

Participants were 51 female prostitutes interviewed at a safe house\textsuperscript{16} for prostitutes located in the downtown east side of Vancouver, B.C., Canada. The mean age of the women was 35.2 years (MD = 35.5; SD = 7.8) ranging from 19 to 59 years. The women reported to have been working as prostitutes from a mean age of 21.4 years, ranging from age 11 to 45. The ethnic group membership of the sample consisted of approximately 50% Native American or Metis and 50% Caucasian. Ninety-four percent of the sample reported habitually utilizing psychotropic drugs of which 84% were of a "hard" nature such as cocaine, crack cocaine, and heroin. Interested participants were informed to attend the safe-house when they were not under the influence of drugs and/or alcohol and that they would be receiving a $25 honorarium for their participation at the conclusion of the interview.

Excluded participants

Eight participants were dropped from the statistical analyses because of incomplete data and/or inaudible cassette tapes. An additional seven participants were removed because they admitted to being under the influence of psychoactive drugs (i.e., marijuana, heroin, crack

\textsuperscript{16} A "safe-house" called Grandma's house was established in downtown Vancouver in order to provide support to women in need.
cocaine) at the time of the interview. Thus, the final sample used in the following analyses consisted of 36 participants. Although participants were instructed to provide memories when they were not under the influence of drugs or alcohol, this was not always the case. In instances in which drug/alcohol memories were provided, they were subsequently dropped from the analyses. Accordingly, at various points in the following analyses, degrees of freedom fluctuate due to incomplete data.

Measures

Assessment of post-traumatic stress symptomology

Impact of Events Scale (IES). The IES (Horowitz, Wilner, and Alvarez, 1979) is a 15 item self-report measure of subjective distress, which assesses two core components of PTSD, intrusions and avoidance. This scale assesses the frequency and severity of PTSD symptoms experienced over the past 7 days regarding an identified stressful event. The frequency of items are endorsed on a 6-point Likert scale ranging from 0 = not at all, to 5 = often. The inventory is reported to have high split half reliability (r = 0.86), internal consistency (using Cronbach’s Alpha, intrusion = 0.78, avoidance = 0.82), and test-retest reliability (0.87; Horowitz et al.). According to McDonald (1997), the IES is one of the most frequently used measures of reactions to post-traumatic stress, and has proven to reliably distinguish between those with and without PTSD (Arata, Saunders, & Kilpatrick, 1991). Although the IES is not diagnostic of PTSD per se, scores of 14 or greater on each of the sub-scales have been reported to be highly correlated with a SCID diagnosis of PTSD (Rowan, Foy, Rodriguez, & Ryan, 1994; see also, Kuyken & Brewin, 1994, as cited in Reynolds & Brewin, 1999).
Assessment of trait dissociation

*Dissociative Experiences Scale* (DES). The DES (Bernstein & Putman, 1986) is a 28 item self-report inventory used as a means of quantifying lifetime dissociative experiences in both clinical and non-clinical adult samples. The original DES required the participant to make a slash mark on a 100 mm. line to indicate the percentage of time in which they have experienced certain dissociative phenomena. For ease of scoring, an alternative scale was developed (Bernstein-Carlson & Putman, 1993) which requires the participant to circle an answer ranging from 0% of the time to 100% of the time regarding a certain type of experience. This was the scale utilized for the purposes of this study. The DES reliably distinguishes between normal adults, those with PTSD, and those with DID (Bernstein & Putman, 1986). Test-retest reliability, internal reliability, construct validity (e.g., discriminative, convergent, and criterion), and other psychometric properties are all reported to be sound (see Bernstein-Carlson & Putman, 1993, for review).

Assessment of state dissociation

*Peritraumatic Dissociative Experiences Questionnaire -Rater Version* (PDEQ-RV). The PDEQ-RV (Marmar & Weiss, 1994) is a 10-item clinician administered scale that measures participants’ retrospective accounts of dissociative phenomena regarding a specified traumatic incident. With the traumatic incident in mind, participants are asked to rate, using a 1-4 Likert format, the degree to which they experienced altered body image, altered time perception, amnesia, an out of body experience, derealization, and depersonalization. For the purposes of this study, one question was removed as it was deemed confusing following a pilot interview (i.e., Did you get the feeling that something that was happening to someone else was happening to you ?). Thus, in the present study, scores can range from 0 to 18, with higher scores representing higher peri-
traumatic dissociation. PDEQ scores have been shown to be significantly related (i.e., $r = .41$) to DES scores and to PTSD symptomology (Marmar et al., 1994).

Procedure

Interview

Participants were informed that participation in the study required them to provide three autobiographical memories, one of which was a time in which they were sexually assaulted. They were also informed that the interviews were to be audio recorded and kept completely confidential. After providing informed consent (see appendix), participants were queried as to their demographics (e.g., age, ethnic group) and drug use histories (e.g., type, frequency, age of onset). All interviewers were thoroughly trained in and utilized the Adult “Step-Wise” Assault Interview protocol (Yuille, 1990). This semi-structured interview is routinely used as an investigative tool for victims with allegations of sexual assault and domestic violence (see Yuille, Marxsen, & Cooper, 1999, for review). The main tenet of the interview is to use a funnel approach to questioning. After developing rapport, the interviewers were trained to begin with the most general form of questioning (i.e., elicit a free narrative) to then proceed to open-ended questions, and to ask specific questions only to resolve any uncertainties. This approach to interviewing (i.e., a focus on an uninterrupted free narrative, and a higher proportion of open-ended questions than specific/closed-ended questions) has been suggested (e.g., see Fisher, 1995; Jones, 1996) and empirically proven to elicit the most unbiased accounts (e.g., see Porter, Yuille, & Bent, 1995). As previously noted, the three autobiographical narratives consisted of a positive experience, a sexual assault, and a traumatic event that was not sexual in nature. The order of the narratives was counter balanced into a Latin square design as to prevent an ordering
effect of recall. However, for the sake of clarity for the following descriptions, the positive memory will be delineated as the first memory, the sexual assault as the second, and the traumatic non-sexual experience as the third. As such, for the first memory each participant was asked to “think back to a happy, positive enjoyable experience” that they have had in their lives and to try to recall all that they could remember, starting from the beginning. After the free narrative was exhausted, open-ended questions such as, “do you remember anything else about that event?” were employed. General questions such as, “do you remember what you or any one else was wearing” were then asked, occasionally followed by specific non-leading questions to clarify any inconsistencies. For example, if a participant made a statement that contradicted a previous one, or if there were large gaps evident in the story, interviewers asked specific clarifying questions. Following, the participants were asked if they could give an estimate of how many times they had talked about the memory prior to the interview. The interviewers were instructed to be consistent in the number of questions asked across narratives. After the positive memory was completed, the participants were orally administered\textsuperscript{18} the PDEQ to assess for retrospective state dissociation symptomology at the time of the event.

For the second memory, each participant was asked to “think back to a time when someone sexually assaulted [them]”. Sexual assault was defined as having sex with someone against the person’s own will through the use of force and/or threats. The participants were instructed to recall everything that they could remember about what happened starting from the beginning. The participants were questioned about their second memory in the same funnel fashion employed for the first narrative. Following completion of the second narrative, the participants were orally presented both the PDEQ and the IES and were asked if they could give

\textsuperscript{17} See Fisher and Geiselman (1992), for a discussion of the disadvantages of asking closed-ended questions.
an estimate of how many times they had talked about the memory prior to the interview. The last narrative required each participant to “think back to a time when [they] had a traumatic experience that was not sexual” and to try to recall everything that they could remember, starting from the beginning. After the memory was exhausted using the same “step-wise” approach as in the other narratives, the participants were orally presented both the PDEQ and IES and again it was inquired as to how many retellings of the memory had occurred.

After completion of the three narratives, the participants were queried as to their past sexual abuse and prostitution histories. The women were asked how many times they were sexually assaulted both before and after their introduction into the sex trade. In addition, they were questioned as to what age they began working in prostitution, and how they were “turned out”. Following, the participants were orally administered the DES. In the last stage of the interview, the participants were asked to rate their 3 narratives on a scale of 1-10, 1 being the event did not bother them at all, and 10 being the most traumatic event of their lives. Subsequently, each participant was debriefed as to the purposes of the study, and provided with the telephone number of the forensic laboratory at UBC for possible counseling referrals.

Transcribing, coding, and scoring

All audiocassettes were transcribed onto computer disks by trained research assistants. Because of the poor audio quality of some of the tapes, all interviews were double transcribed and only the final transcriptions were coded. The coders were instructed to code only for a specific memory in each of the narratives, as opposed to coding for details of a “script memory”. For example, it is not uncommon for victims of chronic intra-familial sexual abuse to have a

18 Note: because some of the participants were illiterate and there was a need for consistency, all scales were orally presented.
general recollection of what "used to happen" (i.e., a script) as opposed to or in conjunction with details of specific happenings (see King & Yuille, 1987). Because the present research was interested in comparing three distinct memories, script memories were not coded\(^{19}\).

The coding procedure consisted of first partitioning the statements into single units of information (i.e., details) and then quantifying each unique piece (Yuille, Daylen, Porter, Cooper, & Ghani, 1999). In total, 6 different types of details were coded for (i.e., person, object, action, relational, subjective, and conversational details). Generally, the units/details consisted of verb and adverb phrases (for action orientated details) or noun and adjective phrases (for person/object descriptive details). Specifically, person descriptive details referred to the people and their descriptions (e.g., hair color, height, clothing on the person etc.) in the event. For example, the statement, "she was about five feet tall and had green eyes", contains three person descriptive details (i.e., "she", "five feet tall", and "green eyes"). Object descriptive details pertained to objects and to descriptions of these objects in the narrative (e.g., nature of a weapon, furniture, clothing not on a person). For example, the statement, "I got into his little red sports car" contains four object descriptors (i.e., "little", "red", "sports", and "car"). Action details referred to information relating to the actions of people, animals or objects involved in the witnessed event (e.g., pointing a gun, talking, running, etc.). For example, the statement, "I was working and this guy picked me up", contains 2 action details (i.e., "working" and "picked me up"). Relational details concerned descriptions of time and space (e.g., where and when an event took place, the kind/time of day or night, etc.). For example, each of the following statements, "last year sometime...", "we were at my friend's house", and "by this time he was behind me" contains one relational detail each. Subjective details pertained to descriptions of the mental state of the

\(^{19}\) Note: Instances of script memories were indeed elicited. However, in such circumstances, the interviewers consequently probed for specific events.
eyewitness, as well as attributions of other person’s mental state in the narrative (e.g., thinking, feeling, etc.). For example, each of the following statements, “I was wondering why I never heard Amber cry all night”, “She seemed really upset” has one subjective detail. The last type of detail that was coded for concerned pieces of conversation. Because it was unclear if the participants' reportings of such statements were verbatim, each piece of conversation was coded as one half of a detail.

After the statements were partitioned into the different types of details, the details were transferred to a separate scoring sheet and quantified. Disregarding pieces of conversation, all unique details were allocated one point each. For example, if the same person was mentioned in the narrative at three different points, only one person detail would be allotted. The same was true for all other types of details. The scoring sheet was divided into sections to represent how the narratives were recalled. The participant’s responses to the free narrative instructions (e.g., “I’d like you to try and recall everything that you can remember, starting from the beginning”) and to open-ended questions (e.g., “Can you remember anything else?”) formed one category. Responses to specific questions (e.g. “Do you remember what he was wearing?”) constituted a separate category. Occasionally, participants described events that arose out of the main event, hereby referred to as “consequences”. For example, after describing the main event, one participant stated, “so the next day we went to the police station and...”. In these situations, the consequences were underlined, and the above six types of details were coded, but not counted as part of the memory. Responses to free narrative instructions and to open questioning were added to statements in response to specific questioning to form a total score for each narrative. These total scores were subsequently analyzed for mean differences.
Coding Reliability

Inter-coder reliability was assessed on the total scores for each memory within each of 6 randomly selected interviews. Both a Pearson's r and an intraclass r revealed that the reliability across the two coders was high (i.e., r > .95, p<.001). In addition, an independent samples t-test across coders did not reveal any mean differences with regards to the total number of details coded for (t[34] = .009, p>.50).

Results

In cases in which large variability was evident in the following analyses, medians are reported in addition to means. This is in part due to the fact that because of the small sample size and large variability, medians may be more illustrative of central tendency that means.

Type I Error Rate

For each of the following statistical analyses, the alpha level of significance was set at $p = .05$ (i.e., a contrast-based type I error rate). While this may appear to be unduly liberal, homogeneity of variance was assessed whenever a comparison was unbalanced and the appropriate procedure was utilized accordingly. Further, it should be emphasized that this is primarily an exploratory study with an emphasis on practical rather than statistical significance.

Relationships Between Scales

Relationship between PTSD symptoms and state dissociation

Bivariate Pearson r correlations were employed to examine the relation between dissociating at the time of a traumatic event (as measured by the PDEQ) and subsequent PTSD

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20 Note: a study investigating the quality of recall across memories will be presented separately in the future.
symptomology (as measured by the IES). It was discovered that dissociating at the time of both sexual and non-sexual traumas was significantly related to total PTSD symptomology (i.e., r = .45, p<.025, r = .37, p<.05, respectively). Focusing on the IES sub-scales revealed a significant relation between dissociating during sexual trauma and subsequent avoidance symptoms (i.e., r = .50, p<.01), but not in terms of intrusion symptoms. By comparison, the opposite pattern was observed for the traumatic non-sexual events. Dissociating during these traumas was found to be significantly related to subsequent PTSD intrusion symptoms (i.e., r = .44, p<.01) but not to avoidance symptoms.

Relationship between PTSD symptoms and trait dissociation

Scores on the DES (i.e., trait dissociation) and the IES were subjected to bivariate Pearson r correlational analyses in order to illustrate the relationship between trait dissociative tendencies and PTSD symptoms. DES scores were found to be significantly correlated with total IES scores regarding sexual traumas (i.e., r = .35, p<.05) but not for non-sexual traumas. Similarly, DES scores were significantly related to IES avoidance symptoms pertaining to sexual traumas (i.e., r = .34, p<.05), but not for non-sexual traumas. IES intrusion scores for both the sexual and non-sexual traumas were not found to be significantly related to DES scores.

Relationship between trait and state dissociation

Bivariate Pearson r correlations were conducted on participant’s scores on the DES and PDEQ's across narratives in order to examine the relationship between trait and state dissociative tendencies. It was subsequently revealed that one's trait dissociative tendencies were significantly related to one's state dissociative reactions during a sexual trauma (i.e., r = .57, p<.01). In contrast, dissociating during a positive event or during a non-sexual trauma were not
found to be significantly related to one's dissociative disposition. By focusing on just the PDEQ scores across narratives, it was also found that state dissociative reactions were significantly related for positive experiences and non-sexual traumas (i.e., \( r = .48, p < .01 \)) and for sexual and non-sexual traumas (i.e., \( r = .50, p < .01 \)) but not for positive experiences and sexual traumas.

Memorial Results

Possible memorial confounds

When did the memories occur?

The memories that the participants recalled took place, on average 13.91 (MD = 12.75; SD = 10.88) years ago. More specifically, as illustrated in table 1, the positive experiences transpired on average, 10.52 (MD = 6.00; SD = 10.27; range: 0-36) years ago, while the traumatic non-sexual and sexual assault memories happened approximately 14.66 (MD = 13.00; SD = 10.31; range: 1-36) and 16.58 (MD = 18.5; SD = 12.15; range: 5-43) years ago, respectively. Although there was a pattern for the traumatic experiences to be relatively older than the positive experiences, these differences were not statistically significant. Thus, time decay was ruled out as a memorial-influencing factor.

It is worthwhile to note that participants' memories were relatively old, with many, especially the sexually traumatic memories, stemming from participants' childhood. Considering the high prevalence of traumatic events, including both physical and sexual assaults, in the lives of prostitutes (see Farley et al., 1998; Farley & Barkan, 1998), it is interesting that many of the present participants chose sexual assault memories from their childhood years, before they had started working in the sex trade.
<table>
<thead>
<tr>
<th></th>
<th>Positive</th>
<th>Sexual Assault</th>
<th>Non-Sexual Trauma</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean  SD  n</td>
<td>Mean  SD  n</td>
<td>Mean  SD  n</td>
</tr>
<tr>
<td>Years ago</td>
<td>10.52  10.27  27</td>
<td>16.58  12.15  26</td>
<td>14.66  10.31  29</td>
</tr>
<tr>
<td>Rehearsals</td>
<td>21.75  36.01  14</td>
<td>14.52  44.04  20</td>
<td>11.32  23.64  17</td>
</tr>
<tr>
<td>PDEQ</td>
<td>6.44   5.53  34</td>
<td>*12.32  4.78  28</td>
<td>*11.29  5.85  34</td>
</tr>
<tr>
<td>Details</td>
<td>31.52  19.01  28</td>
<td>44.19  27.30  24</td>
<td>34.29  14.16  29</td>
</tr>
</tbody>
</table>

* Significantly higher than Positive at the .01 level
How often were the memories previously recalled?

As previously noted, the participants were asked if they could provide a "ballpark" estimate of how many times they had talked about the three memories prior to the interview. In response to this question, it is apparent that the participants recalled the memories approximately 15.44 (MD = 3.00; SD = 35.04) times previously. As shown in table 1, on average, the positive experiences were recited 21.75 times (MD = 4.00; SD = 36.01; range: 0-100), the sexual assaults 14.52 (MD = 2.50; SD = 44.04; range: 0-200) times, and the traumatic non-sexual experiences, 11.32 (MD = 3.00; SD = 23.64; range: 0-100) times. Although this pattern suggests less retellings for the traumatic memories than the positive memories, a repeated measures ANOVA did not reveal any significant differences between the three memories. Accordingly, the number of prior recalls were ruled out as a contributing factor for any differences across memories.

Quantity of details across memories

Averaging the number of details across memories revealed that the participants provided a mean of 36.27 (MD = 31.00; SD = 19.73) details per narrative. This result appears to be relatively lower than the average number of details recalled by murder witnesses in the Yuille and Cutshall (1986) study. These researchers reported that central witnesses recalled a mean of 71.93 (range: 53.5-95.5) details in the police interviews and a mean of 103.71 (range: 85.5-123.5) in the research interviews, while peripheral witnesses provided means of 24.33 (range: 17-30.5) and 55.25 (range: 38-61.5) details in the two interviews, respectively. However, the present mean is more in line with those reported in the Cutshall and Yuille (1989) studies. For example, in the restaurant shooting, witnesses reported, on average, 11.6 details in the police interview and 76.9 details in the research interview. From the breadline incident, witnesses recalled a mean of 28.7 details in the police interview and 41.8 details in the research interview.
Regarding the Cutshall and Yuille bank robberies, on average, 14.3 details were recalled by the witnesses in the police interview and 21.1 details in the research interviews.

In the present study, as illustrated in table 1, participants recalled relatively more in the traumatic non-sexual (i.e., $M = 34.29; MD = 35.5; SD = 14.16$) and sexual assault narratives (i.e., $M = 44.19; MD = 36.75; SD = 27.30$) than in the positive memories (i.e., $M = 31.52; MD = 27.25; SD = 19.01$), although these differences did not reach significance. The number of details recalled in the positive narrative was significantly correlated with the quantity of details provided in both of the traumatic non-sexual (i.e., $r = .46, p<.025$) and sexual assault narratives (i.e., $r = .46, p<.05$) although there was no significant relationship between the two traumas.

**Memorial Influences and Recall**

**Impact of trait dissociation on quantity of details across memories**

Bivariate Pearson $r$ correlation’s were conducted on scores on the DES in relation to the quantity of details provided across memories. DES scores were not found to be significantly correlated with the number of details in the positive memory condition, the sexually traumatic condition, or the traumatic non-sexual condition.

Based on their scores on the DES, participants were dichotomized as “high” or “low” trait dissociators. The DES cutoff of 30 was chosen due to a median split and the fact that scores of 30 and over have been shown to be related to a clinical diagnosis of PTSD (see Berstein-Carlson & Putman, 1993). Subsequently, a 2 X 3 between-within repeated measures ANOVA was conducted with trait dissociation (i.e., high versus low) as the between subjects factor and quantity of details across the narratives (i.e., positive versus sexual versus non-sexual) as the within subject factor. The results indicated a non-significant main effect for the narratives, a non-significant interaction, and a non-significant between subject effect of trait dissociation.
Relationship between state dissociation and quantity of details across memories

Bivariate Pearson $r$ correlation’s were calculated on scores on the PDEQ and quantity of details across memories in order to illustrate the impact of state dissociation on memory across the three different events. Results indicated that dissociating during a positive event was significantly related to dissociating during a traumatic non-sexual event (i.e., $r = .48, p < .01$) but not to dissociating during a traumatic sexual experience. It was also apparent that if one dissociated during a sexually traumatic experience then they were significantly likely to dissociate during a traumatic non-sexual event (i.e., $r = .50, p < .01$). In relation to recall, one's report of state dissociation during a positive experience was not significantly related to the amount of details provided for that event. Similarly, dissociating during a traumatic non-sexual event was not significantly associated with amount of recall reported for that event. In contrast, reports of increasing state dissociation during sexual trauma was found to be significantly correlated with participant’s amount of detail recalled in those events (i.e., $r = .51, p < .05$).

T-tests were utilized to examine mean differences within memories as a function of state dissociation. Regarding the positive event, participants were dichotomized as high or low state dissociators based on a PDEQ score of equal to or above 5, and below 5, respectively. The midpoint of 5 was chosen due to a median split between the two groups and the corresponding advantage of a balanced design in statistical analyses. Consequently, as illustrated in table 2, it was revealed that the low state dissociators provided a mean of 34.70 details (SD = 24.60) concerning their positive experience, while the high state dissociators recalled a mean of 28.30 details (SD = 11.10). Since this dichotomization resulted in equal n’s in both groups, a standard two-sample t-test was employed. The results of the t-test indicated that the mean differences were not significant.
Table 2
State dissociation and quantity of details across memories

<table>
<thead>
<tr>
<th></th>
<th>“Low” Dissociators</th>
<th></th>
<th>“High” Dissociators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Positive</td>
<td>34.70</td>
<td>24.60</td>
<td>14</td>
</tr>
<tr>
<td>Sexual ass.</td>
<td>29.14</td>
<td>14.16</td>
<td>11</td>
</tr>
<tr>
<td>Trauma</td>
<td>36.00</td>
<td>18.50</td>
<td>13</td>
</tr>
</tbody>
</table>

* Significantly higher at the .01 level
Considering the sexual traumas, participants were dichotomized as high or low state dissociators based on their PDEQ scores for the sexually traumatic event. A PDEQ cut off score of 13 was implemented due to a median split between groups and the advantage of a relatively balanced design in the analysis. As illustrated in table 2, low state dissociators produced a mean PDEQ score of 8.4 (SD = 3.4) and recalled on average 29.14 (SD = 14.16) details, while the high dissociators fashioned a mean PDEQ score of 16.2 (SD = 1.8) and recalled a mean of 56.92 (SD = 29.60) details. Because this dichotomy resulted in unequal n’s, a preliminary test on the variances was performed. The homogeneity of variance test was significant (F[12,10] = 4.38, p<.025) indicating heterogeneity of variance and a consequent Behrens-Fisher problem. Subsequently, a Welch’s t’ test was performed indicating that high state dissociators indeed provided significantly more details than low state dissociators concerning their sexual traumas (t’[19] = 3.00, p<.01).

As in the above sexual trauma PDEQ dichotomy, participants were dichotomized based on their PDEQ scores for the non-sexual trauma in order to illustrate mean differences in recall. On the basis of a median PDEQ split of 12, low dissociators fashioned mean PDEQ scores of 6.8 (SD = 4.3) and provided, on average 36.0 (SD = 18.50) memorial details. In contrast, high dissociators displayed a mean PDEQ score of 16.4 (SD = 1.6) and recalled a mean of 32.91 (SD = 9.80) details. Since the dichotomy resulted in unequal n’s, a preliminary test on variances was performed which was found to be significant (F[12,15] = 3.56, p<.025). Accordingly, the Behrens-Fisher problem was evident, and a Welch’s t’ test was performed to evaluate mean differences. The results did not indicate a significant difference between the two groups in terms of memory.
Relationship between current PTSD symptoms and recall

Bivariate Pearson $r$ correlations were conducted to test the association between PTSD symptomology and recall. IES total scores for sexual assault experiences were not found to be significantly correlated with amount of recall for those events. Similarly, IES total scores for traumatic non-sexual events were not associated with the amount of recall provided concerning those events. However, by focusing on the IES sub-scales, a significant relationship was apparent. Specifically, scores on the avoidance sub-scale of the IES concerning sexual assault experiences were significantly correlated with the amount of detail provided for those events (i.e., $r = .49, p<.025$). This finding is in contrast with the fact that there was no relationship between IES avoidance scores and quantity of detail provided for traumatic non-sexual events. There were also no significant relationships found between scores on the IES intrusion sub-scale and recall for both the sexual assault experiences and the traumatic non-sexual events.

PTSD Symptomology Across Memories: Are Sexual Traumas More Traumatic?

As illustrated in table 3, participants endorsed a mean score on the IES of 50.74 (SD = 15.39) for the sexually traumatic memories and 36.17 (SD = 21.42) for the traumatic non-sexual memories. As previously noted, a total score of 28 (i.e., scores of 14 on each of the 2 sub-scales) has been shown to be highly indicative of PTSD (Rowan et al., 1994). Total scores on the IES for both the sexually traumatic and traumatic non-sexual memories were subjected to a one-way repeated measures ANOVA in order to examine mean differences in PTSD symptomology across the different types of traumas. Results indicated that scores on the IES for the sexually traumatic events were indeed significantly higher than IES scores for the non-sexually traumatic events ($F[1,33] = 13.51, p<.002$). In addition, IES sub-scale scores for both avoidance ($M = 28.44$ vs. $19.03$) and intrusion symptoms ($M = 22.39$ vs. $17.14$) were found to be significantly higher for
Table 3

IES total scores and sub-scale scores across trauma narratives

<table>
<thead>
<tr>
<th></th>
<th>Sexual Assault Memory</th>
<th></th>
<th>Traumatic-Non-Sexual Memory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
<td>Mean</td>
</tr>
<tr>
<td>Total</td>
<td>**50.74</td>
<td>15.39</td>
<td>34</td>
<td>36.17</td>
</tr>
<tr>
<td>Avoidance</td>
<td>***28.44</td>
<td>8.16</td>
<td>34</td>
<td>19.03</td>
</tr>
<tr>
<td>Intrusions</td>
<td>*22.29</td>
<td>9.30</td>
<td>34</td>
<td>17.14</td>
</tr>
</tbody>
</table>

* Significantly higher at the .05 level

** Significantly higher at .002 level

*** Significantly higher at the .001 level
the sexually traumatic events than the non-sexually traumatic events ($F[1,33] = 17.80, p<.001$; $F[1,33] = 4.95, p<.05$, respectively).

PTSD Symptomology for Sexual Assaults Across 2 Victim-offender Relationships

Participants were dichotomized based on their relationships to the perpetrators for the memories of sexual assaults which they provided. Those who were sexually assaulted by sibling’s, cousins, uncles, fathers, boyfriends, husbands, or close friends formed the first group, labeled “family/close friends”. It was reasoned that this group was similar in such that these relationships, in theory, encompass some degree of trust and intimacy between the victims and the offenders. The victim’s relationships to the offenders in the second group, labeled “non-family/acquaintances”, which included acquaintances, strangers and “tricks/johns” (i.e., people that frequent the services of prostitutes) were thought not to sustain such levels of trust and intimacy. Accordingly, as shown in table 4, the dichotomization revealed that those participants who were sexually assaulted by family members/close friends reported a mean IES score of 55.92 (SD = 7.31) with mean scores on the sub-scales of avoidance and intrusions of 29.86 (SD = 2.88) and 26.07 (SD = 5.77), respectively. In contrast, participants who were sexually assaulted by non-family/acquaintances endorsed a mean IES score of 52.00 (SD = 12.39) with mean scores on the sub-scales of avoidance and intrusions of 31.29 (SD = 5.94) and 20.71 (SD = 9.31), respectively. A t-test examining mean differences between both total and sub-scale scores across the two groups did not reveal significant difference in terms of total IES scores, avoidance sub-scale scores, or intrusion sub-scale scores.
Table 4

IES scores and quantity of details across 2 victim-offender relationships

<table>
<thead>
<tr>
<th></th>
<th>Family/Close Friends</th>
<th>Non-family/Acquaintances</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Total (IES)</td>
<td>55.92</td>
<td>7.31</td>
</tr>
<tr>
<td>Avoidance</td>
<td>29.86</td>
<td>2.88</td>
</tr>
<tr>
<td>Intrusions</td>
<td>26.07</td>
<td>5.77</td>
</tr>
<tr>
<td>Details</td>
<td>37.95</td>
<td>24.01</td>
</tr>
</tbody>
</table>

n.s.
Memory for Sexual Assaults Across 2 Victim-offender Relationships

As shown in table 4, participants who were sexually assaulted by family/close friends provided on average 37.95 (MD = 28.00; SD = 24.01) memorial details concerning their traumas. In contrast, those who were assaulted by non-family/acquaintances recalled a mean of 50.75 (MD = 39.00; SD = 30.63) details. Considering the dichotomy resulted in a slightly unbalanced design, a preliminary test on variances was performed which indicated homogeneity of variance. Consequently, a pooled variance t-test was executed which indicated a lack of a significant difference between groups.

"Weapon Focus" in Sexual Assault Memories

The participants were dichotomized into one of two groups on the basis of the presence or absence of a weapon in their sexual assault memories that they provided. During the interviews, if it was not clear if there was a weapon involved, the interviewers were instructed to ask if a weapon was used. Consequently, it was revealed that 16 women were sexually assaulted without the use of a weapon, while 7 women reported the use of either a beer bottle (or some other object), knife or gun in their sexually traumatic memories. As illustrated in table 5, those in the "non-weapon" group provided, on average, 38.44 memorial details (MD = 33.25; SD = 23.88) while participants in the "weapon" group recalled a mean of 58.79 details (MD = 52.00; SD = 32.82). Because the dichotomy resulted in an unbalanced design, a preliminary test on variances was conducted. The results indicated homogeneity of variance. Thus, a pooled variance t-test was employed which turned out to be non-significant.
Table 5
"Weapon focus" for sexual assault memories

<table>
<thead>
<tr>
<th></th>
<th>Weapon Absent</th>
<th>Weapon Present</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean  SD   n</td>
<td>Mean  SD   n</td>
</tr>
<tr>
<td>Details</td>
<td>38.44 23.88 16</td>
<td>58.79 32.82 7</td>
</tr>
</tbody>
</table>

n.s.
Dissociation and Prior Traumas/Memory for a Specific Assault

As previously noted, participants were queried as to how many times they were sexually assaulted both prior to and while working in the sex trade. For the purposes of the following analyses, participant’s responses to both questions were combined to produce a composite number of prior sexual assault victimizations. Accordingly, it was revealed that the participants had been sexually assaulted, on average, 19.63 \( \pm 32.97 \) times prior to taking part in the present study. In order to illustrate the impact of prior sexual abuse on subsequent dissociative tendencies, a bivariate Pearson \( r \) was conducted on this composite assault score and on participant’s DES scores. Consequently, a modest significant relationship was apparent (\( r = .41, p < .025 \)).

On the basis of their abuse history, participants were dichotomized as having either a low sexual assault history or a high sexual assault history. A cut-off of 5 (i.e., assaulted <5 or \( \geq 5 \) times) was chosen due to a median split. Subsequently, as illustrated in table 6, it was apparent that participants with a low sexual assault history (mean # of assaults = 1.57; SD = .98) endorsed a mean DES score of 31.67 (SD = 20.10) and provided, on average, 36.25 (SD = 15.34) memorial details concerning their sexual narrative. Those with a high sexual assault history (mean # of assaults = 36.56; SD = 39.26) had a mean DES score of 31.96 (SD = 21.42) and recalled, on average, 42.29 (SD = 28.98) details regarding their sexual assault memory. There were no significant differences in terms of DES scores or memory between groups.

\(^{21}\) Note: two participants who had reported to have been sexually assaulted >1000 times were removed from these analyses because this high rate was deemed to be non-representable of the sample as a whole (i.e., these participants were outliers).
Table 6

DES scores and amount recall for sexual assaults across abuse history

<table>
<thead>
<tr>
<th></th>
<th>Low sexual abuse history</th>
<th>High sexual abuse history</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>DES</td>
<td>31.67</td>
<td>20.10</td>
</tr>
<tr>
<td>Details</td>
<td>36.25</td>
<td>15.34</td>
</tr>
</tbody>
</table>

n.s.
Relationship Between State Dissociation and Type of Event

As illustrated in table 1, the mean PDEQ score for the participant's positive memories was 6.44 (SD = 5.53), 12.32 (SD = 4.78) for the sexually traumatic episodes, and 11.29 (SD = 5.85) for the non-sexually traumatic events. A one-way repeated measures ANOVA was conducted on the participant's PDEQ scores across these three different types of events whereby a significant main effect for the type of event was revealed ($W = .97$, $X^2[2] = .78$, $p > .50$; $F[2,48] = 12.64$, $p < .001$). Because the PDEQ n's across the 3 types of events were unbalanced but approximately equal (i.e., max. n/min. n = 1.5), Spjotvoll and Stoline (1973) multiple comparisons were conducted to examine the exact source and magnitude of the mean difference(s). Consequently, it was apparent that participant's levels of state dissociation were significantly higher in both the sexually traumatic and non-sexually traumatic events than in the positive events ($q'[48] = 7.69$, $p < .01$; $q'[48] = 6.35$, $p < .01$, respectively) although there was not a significant difference between the two traumas.

State Dissociative Perspectives: Field vs. Observer

As stated previously, question #5 on the PDEQ asked participants to think back to the time of the event in question and to respond to the following: "were there moments when you felt as though you were a spectator watching what was happening to you—for example, did you feel as if you were floating above the scene or observing as an outsider"? On the basis of participant’s responses to this question, they were dichotomized as having a field or observer memory for each of the three memories provided. In order to have a field memory, participants had to respond negatively to question #5, while an observer memory was delineated to those who responded affirmatively to this question. By focusing on the positive memories, those participants who
reported field memories endorsed a mean PDEQ score of 2.63 (SD = 2.48) and recalled on average, 34.27 (MD = 27.00; SD = 23.78) memorial details. These results are illustrated in tables 7 and 8, respectively. Those participants who had an observer memory had a mean PDEQ score of 11.27 (SD = 4.43) and provided on average 28.35 (MD = 30.5; SD = 11.53) details. Due to an unbalanced design and heterogeneity of variance (i.e., the Behrens-Fisher problem), a Welch's t' test was used to examine mean differences in recall. This test was found to be non-significant, thus there were no significant memorial differences in terms of field vs. observer perspectives for the positive memories. However, it was clear that observer memories contained significantly higher PDEQ scores than field memories (t'[22] = 6.77, p<.01) although there were no differences in terms of trait dissociation. This latter result is shown in table 9.

Those participants who had field memories for their sexual assault experiences reported a mean PDEQ score of 9.60 (SD = 4.34) and recalled on average, 29.96 details (MD = 29.25; SD = 13.91). In contrast, those with observer perspectives endorsed a mean PDEQ score of 15.46 (SD = 3.07) and provided on average, 58.42 (MD = 50.75; SD = 30.37) details. A t-test on the narratives indicated that the observer memories indeed contained a significantly higher amount of memorial details (t[22] = 2.95, p<.01). A separate t-test on the PDEQ scores also revealed significantly higher scores for the observer memories (t[26] = 3.72, p<.001). As in the positive narratives, there were no significant differences in terms of trait dissociation for the field and observer memories of sexual assaults. However, as illustrated in table 10, it was clear that the observer memories were significantly more traumatic (as measured by total IES scores) than field memories (M = 58.50 [SD = 8.49] vs. 44.47 [SD = 17.31], respectively; t' [25] = 2.98, p<.01).

For the traumatic non-sexual memories, those participants with field memories had a mean PDEQ score of 5.92 (SD = 4.55) and produced on average, 33.40 (MD = 35.50; SD = 17.48) memorial details. Those participants with an observer perspective endorsed a mean
Table 7
State dissociation levels for field vs. observer perspectives across memories

<table>
<thead>
<tr>
<th></th>
<th>Field perspective</th>
<th>Observer perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Positive</td>
<td>2.63</td>
<td>2.48</td>
</tr>
<tr>
<td>Sexual ass.</td>
<td>9.60</td>
<td>4.34</td>
</tr>
<tr>
<td>Trauma</td>
<td>5.92</td>
<td>4.55</td>
</tr>
</tbody>
</table>

* Significantly higher at the .01 level

** Significantly higher at the .001 level
Table 8

Quantity of details for field vs. observer perspectives across memories

<table>
<thead>
<tr>
<th></th>
<th>Field perspective</th>
<th>Observer perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Positive</td>
<td>34.27</td>
<td>23.78</td>
</tr>
<tr>
<td>Sexual ass.</td>
<td>29.96</td>
<td>13.91</td>
</tr>
<tr>
<td>Trauma</td>
<td>33.40</td>
<td>17.48</td>
</tr>
</tbody>
</table>

* Significantly higher at the .01 level
### Table 9
Trait dissociation levels for field vs. observer perspectives across memories

<table>
<thead>
<tr>
<th></th>
<th>Field perspective</th>
<th>Observer perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Positive</td>
<td>31.84</td>
<td>20.97</td>
</tr>
<tr>
<td>Sexual ass.</td>
<td>27.37</td>
<td>19.20</td>
</tr>
<tr>
<td>Trauma</td>
<td>27.45</td>
<td>19.15</td>
</tr>
</tbody>
</table>

n.s.
Table 10
PTSD levels for field vs. observer perspectives across traumas

<table>
<thead>
<tr>
<th>Field perspective</th>
<th>Observer perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
</tr>
<tr>
<td>Sexual ass.</td>
<td>44.47</td>
</tr>
<tr>
<td>Trauma</td>
<td>31.43</td>
</tr>
</tbody>
</table>

* Significantly higher at the .01 level
PDEQ score of 14.62 (SD = 3.69), and recalled an average of 34.76 (MD = 35.5; SD = 12.59) details. T-tests revealed significantly higher PDEQ scores for the observer memories (t[32] = 6.10, p<.001), but a non-significant difference in terms of amount of recall. Separate analyses did not reveal significant differences in terms of either trait dissociation or PTSD symptomology, although it should be noted that there was a pattern for participants with observer memories to have higher levels of trait dissociation and PTSD symptoms than those with field memories (M = 35.88 [SD = 22.25] vs. M = 27.45 [SD = 19.15]; M = 39.18 [SD = 20.47] vs. M = 31.43 [SD = 22.77], respectively).

Discussion

The Effects of Trauma on Memory

The primary focus of the present study concerned the differential effects of trauma on memory. In contrast to the plethora of laboratory based studies reporting on the debilitating effects of trauma on memory (e.g., Brigham et al., 1983; Christianson et al., 1984,1986; Hosch et al., 1984; Loftus et al., 1982;) no such robust finding was borne out in this experiment. Actually, as proposed in the thesis objectives, the data suggested the opposite pattern. There was a numerical trend for the traumatic experiences, more so of traumas of a sexual nature, to contain a higher quantity of memorial details than less negatively emotionally valenced events. Although others have shown that sexually traumatic experiences are less well remembered than other unpleasant types of events (e.g., Tromp et al., 1995), the present results suggest otherwise, at least in terms of amount of recall. These finding are more congruent with the increasingly common results from field studies which have reported on the “remarkable” nature of traumatic
memories (e.g., Cutshall & Yuille, 1989; Thompson et al., 1997; Wagenaar & Groeneweg, 1990; Yuille & Cutshall, 1986). For instance, as reviewed earlier, Thompson et al., demonstrated that traumatic memories were better remembered than more mundane memories. Similar results were also reported by Christianson (1989).

Although, because of obvious ethical and practical concerns, no attempts were made to judge the veracity of the present participant’s accounts, high levels of accuracy have been reported in other field studies with both witnesses and victims to highly traumatic events (e.g., Cutshall & Yuille, 1989; Thompson et al., 1997; Yuille & Cutshall, 1986). Memories for “distinctive events” have been shown to be “relatively resistant to change over time” (Wynn & Logie, 1998, p.17). Even Loftus and colleagues (e.g., Hyman & Loftus, 1998), notable false memory advocates, have noted that "most memories will be generally accurate" (p.945).

Essentially, remembering the details of traumatic events has tremendous survival consequences in so much that the consolidation of meaningful memories is thought to be favored by evolution (van der Kolk, 1996). As pointed out by Christianson and Engelberg (1997), “from an evolutionary perspective, it is essential to recognize and remember emotional events and, in particular, unpleasant situations in order to ensure appropriate responses in maintaining protective, withdrawing, or defensive behavior” (pp.230-231). Thus, relatively more recall for traumatic experiences than for positive experiences makes evolutionary sense. From this line of reasoning, is it not more important for a person to remember the physical description of their rapist which may ultimately aid in their identification and apprehension of the offender, or simply to avoid any future conduct, than the details of their last birthday party?22

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22 It should be highlighted that considering the present memories were self-selected and since the events seen in the majority of laboratory based studies are chosen by the experimenter, this comparison between the two types of studies is tentative.

23 This example was chosen because recollections of birthday parties were common for the positive memories elicited in the present study.
This pattern aside, the null finding may represent the true state of affairs concerning traumatic memory, i.e., variability, echoing Kluft’s (1997) conclusion and adding support to the model of recall outlined by Yuille and Daylen (1998). It is quite evident that extreme variability was paramount for the quantity of recall across all types of events. In fact, the standard deviations within each type of event were larger than the mean differences in recall across each type of event. This may be by virtue of the fact that within each type of memory, there were participants that recalled an extraordinary amount of detail (i.e., a remarkable memory; pattern 1 from Yuille & Daylen’s, 1998 model), and participants that recalled very little (i.e., conceivable dissociative amnesia; pattern 6 from Yuille and Daylen’s, 1998 model). This has tremendous forensic implications in terms of eyewitness testimony for criminal events. For example, referring to the man who raped her approximately 8 year ago, one participant stated “I’ll probably never, in reality, I’ll probably never really forget his face, you know. That kind of sticks in your head”. In contrast, another participant who was sexually assaulted some 20 years ago could only recall that her offender “looked like the same age as her grandparents”. Clearly, the former participant would make a more useful witness in the apprehension and identification of her offender, although both were victimized by the same type of event. Thus, in actuality, variability in recall may represent the norm, not the exception. As noted by Kluft (1997),

both relatively accurate and relatively inaccurate recollections are familiar visitors to the consulting room of the clinician and the laboratory of the scientific investigator … there is no a priori reason to assume or assert that all forms of memory will handle a given stimulus in a similar manner (p.51-52).

Accordingly, researchers making gross conclusions as to the debilitating (e.g., Clifford, & Scott, 1978; Kramer et al., 1991) or facilitating (e.g., Brown & Kulik, 1977) effects of trauma on memory may be utilizing an unduly simplistic way of looking at what appears to be more of a
complex, arguably idiosyncratic process. For instance, referring to their robust finding on the deleterious memorial effect of witnessing laboratory based violence, Clifford et al. (1978) stated, "practically, the present finding suggest that a testimony about an emotionally loaded incident should be treated with much greater caution than one concerning a less emotionally toned incident" (p.356). Making general statements about the memorial consequences of "emotionally loaded" events arguably grossly simplifies personological variations in response to extreme stress. Although, it may well be that "for scientific psychology the individual is a fundamental problem", it is astonishing that individual memorial differences in response to actual traumas is an area that has yet to be thoroughly investigated (Conway, 1997, p.19). As stated by Yapko (1997) “our focus must be on the individual” (p.27).

**Individual Differences**

In the present study, individual differences in a number of facets (i.e., state dissociative characteristics, PTSD symptomology) appear to have exerted a mediating effect on memory within similar types of traumas. For instance, high state dissociators were found to recall significantly more details concerning their sexual assault experiences than low state dissociators. Similarly, PTSD avoidance symptoms were significantly and positively correlated with the quantity of ones accounts for sexual traumas. Further, an observer perspective at the time of sexual trauma was related to an increased amount of details provided. An assessment of such factors subsequent to a trauma should thus be a necessity in order to determine potential recall influences.

But how does one account for the above findings which are seemingly in contrast to both the clinical literature (see Brewin & Andrews, 1998; Speigal & Cardena, 1991) and to recent empirical reports indicating a detrimental influence of state dissociation and stress on memory
for sexual traumas (e.g., Mechanic et al., 1998)? In classic dissociation theory, if one dissociated
during an event, the resultant memory may be fragmented, incoherent and contain relatively little
meaningful representations (van der Kolk & Fisler, 1995), reminiscent of
psychogenic/dissociative amnesia (APA, 1987, 1994). One possibility is that the design of the
present study was biased against eliciting memories that were associated with dissociative
amnesia. While Mechanic et al. focused on one recent sexual assault for each of their
participants, in the present study, participants could have chosen any sexual assault from any
point in their lives. It is suggested that the present participants may have recalled events that they
could remember well, as opposed to those which they had difficulty recalling. Another possible
explanation could be the latency since the assault and the subsequent empirically based recall
period. Differential recall periods across studies employing divergent methodologies makes
comparisons a precarious enterprise. For instance, while Mechanic et al. assessed rape victim’s
memory and dissociative qualities approximately 2 weeks after the events, the present latency
between the assaults and subsequent recall was on average, 16 years. Clearly, the present
sample’s memories were relatively old; in fact many were from the participant’s childhood. This
latter point is blurred because of the large standard deviation evident in the age of the sexual
assault memories (i.e., SD = 12.15). Nevertheless, there are obviously more opportunities for
rehearsals in a 16 year period than within a time frame of 2 weeks. This could possibly have lead
to a “hypernesia” (i.e., increased recall after repeated tellings) effect (Scrivner & Safer, 1988).
Although this hypernesia effect is intuitively appealing, by virtue of its' simplicity (i.e., the more
rehearsals, the better the memory), this could not be the sole basis for such a memorial
divergence since, as shown earlier, the number of reported rehearsals across types of events were
not found to be significantly different from each other. Further, even if there were such
differences, the pattern is in the opposite direction. As illustrated in table 1, there was a trend for
traumatic experiences to be rehearsed less so than positively valenced events, but the quantity of memory was shown to be relatively higher in the traumatic conditions. Thus, the present interaction between state dissociation, the number of rehearsals, and memory for events is a complex, seemingly contradictory facet and should be the subject of future research.

Dissociation, PTSD, and Memory

There is a wealth of literature implicating dissociative processes as a mechanism that spurs the subsequent development of PTSD (e.g., Bernat, Ronfeldt, Calhoun, & Arias, 1998; Koopman et al., 1994; Marmar et al., 1994; see van der Kolk, van der Hart & Marmar, 1996, for review). The present results appear to support these empirical findings. It is apparent that there was a modest significant relationship between total PTSD symptomology and state dissociative reactions for both sexual and non-sexual traumas. Since state dissociation pertains to symptoms that were experienced at the time of the trauma, and PTSD symptoms reflect current distress, this finding thus supports the proposition that state dissociation is a predictor of later posttraumatic stress. This is in line with Dunmore et al.'s (1999) finding that feelings of detachment during assaults were related to PTSD severity. How exactly does this work? van der Kolk et al., (1996) posit that high levels of anxiety during trauma play a mediating role, and according to Putman, (1995), there is much neurobiological overlap between the two constructs, both involving deficits in regulatory psychophysiology.

The finding that the impact of trait dissociation did not, in any consistent way, influence recall is intriguing given the abundance of literature emphasizing amnesia for dissociative states (e.g., Kihlstrom, Glisky, & Angiulo, 1994). One would expect relatively less recall for traumatic events in high trait dissociators than in low trait dissociators, although this was not empirically
borne out in the present study. In fact, as discussed above, the opposite pattern was observed concerning state dissociative characteristics during sexual traumas. Possible explanations include the fact that there was a relative trait dissociative ceiling effect, in view of the fact that the mean DES score was over 30. Given Steinberg et al.'s (1991) suggestion of a DES cut off of between 15-20 to screen for dissociative disorders and the fact that those inflicted with PTSD routinely exhibit DES scores between 27 and 41 (Bernstein-Carlson & Putman, 1993), it is clear that the present sample is, as a whole, extremely traumatized and highly dissociative. Also, as previously highlighted, the majority of the memories in the current study were relatively old, i.e., from the participant's childhood. Although dissociative symptomology has been shown to influence memory in the short term (Mechanic et al., 1998) many researchers have highlighted the "reconstructive" nature of traumatic memories over time, often through the course of therapy (van der Kolk & Kadish, 1987). As noted by van der Kolk, van der Hart, and Marmar (1996), through acute dissociation "memories' of trauma are initially experienced as fragments of the sensory components of the event- as visual images; olfactory, auditory, or kinesthetic sensations; or intense waves of feelings that patients usually claim to be representations of elements of the original traumatic event" (p.312). Accordingly, only with time, will a "personal" narrative emerge (van der Kolk et al., 1996). Mechanic et al.'s (1998) study of rape victims adds support to this supposition in so much that while 37% of the participants reported amnesia when assessed two weeks post rape, only 16% attested to significant amnesia at three months post rape.

Many participants in the present study, especially those with high PDEQ scores, reported to have "blocked out" many of their traumas for a number of years before reintegrating them into their lives. It is reasoned that once dissociated memories can be reconstituted over time through gradual integration into ones cognitive schemata. The fact that in some circumstances (i.e.,

24 Note: Feelings of detachment is a symptom of dissociation
sexual trauma), high levels of peri-traumatic dissociation were related to a quantitative increase in memory thus makes sense. It is conjectured, in line with van der Kolk et al. (1996), that the once dissociative memories, possibly initially available only at a perceptual level, became accessible at a narrative level over time.

Although the retrospective nature of the participant’s responses to the PDEQ are a concern, similar results have been seen in prospective studies (e.g., Shalev, Peri, Caneti, & Schreiber, 1996, as reported in van der Kolk, et al., 1996). Furthermore, while memorial ground truth is a pressing issue, particularly in a criminal justice context when previously "repressed" or "dissociated" memories have been "recovered" (i.e., the return of the repressed), many prominent researchers and clinicians have held that through non-suggestive interviewing/therapy, these sorts of memories should not be thought of as any less truthful, than memories that have always been accessible (e.g., Kluft, 1997). Of course, certain criteria such as plausibility and corroboration (see Brewin & Andrews, 1998) would need to be met in order to assume the veracity of memories. The fact that the majority of the present sample endorsed high levels of PTSD symptoms may add support to the accuracy of the participant’s memories, particularly the traumatic memories. This is due to the intrusive quality of many memories of trauma that have been reported to recur without alteration over intervals extending 15 years (van der Kolk, Blitz, Burr, & Hartmann, 1984, as cited in van der Kolk, 1996). As stated by van der Kolk, (1996), a notable expert on trauma, "as early as 1995, I could find no published accounts in the scientific literature of intrusive traumatic recollections of traumatic events in patients suffering from PTSD that had become distorted over time, either in an experimental or clinical setting" (p.282). Of

25 For an empirical, although not a particularly statistically convincing rebuttal, see Merckelbach, Muris, Horselenberg, & Rassin (1998).
course, corroborating evidence would be essential in a forensic context where the differences between narrative and historical truth are paramount.

The Uniqueness of Sexual Trauma

Returning to the issue of dissociation and memory, it is interesting to note that the only significant memorial differences between high and low state dissociators pertained to memory for events of a sexually traumatic nature. High and low state dissociators did not differ in terms of the quantity of recall for either positive experiences or traumatic experiences of a non-sexual nature. Other peculiar findings restricted to traumas of a sexual nature were also apparent. In particular, trait dissociative tendencies were only significantly related to state dissociative reactions for sexual traumas. Similarly, DES scores were found to be significantly related to both total IES scores and avoidance sub-scale scores for sexual, but not for non-sexual traumas. Furthermore, PTSD avoidance symptoms\(^{26}\) were significantly associated with memory for sexual traumas, but not for memories of non-sexual traumas.

What can be the explanation for such curious discrepancies? Quite possibly, there is something unique and especially debilitating about being sexually violated, as was alluded to over a century ago by Freud (see Ellenberger, 1970; Sulloway, 1992). From this line of reasoning, the present relationships between sexual trauma and dissociative processes makes intuitive sense. It suggests that both Janet and Freud were correct in their respective classic theories. Sexual trauma, as Freud had hypothesized, appears to be especially debilitating. The fact that, in the present sample, participant’s total IES and sub-scale scores were significantly higher for memories of sexual assaults than non-sexual traumas adds credence to this unique

\(^{26}\) Note: avoidance symptoms have been found to be more predictive of PTSD than intrusive symptoms (Difede & Barocas, 1999).
“traumatizing” effect of sexual violation. Moreover, it also attests to the extraordinarily elevated rate of traumatic stress found in prostitutes, as has been shown in other studies (e.g., Farley & Barkan, 1998; Farley et al., 1998). The present results also suggest Janet (1920) was correct in his formulations of the etiology of hysteria (i.e., being the victim of traumatic events). Although the participants in the present study did not demonstrate classic “hysterical” symptomology per se, the vast majority of participants self-reported both pathological PTSD and dissociative symptoms in response to different types of traumatic victimizations. High levels of PTSD symptomology were evident in the participant’s responses to IES questions concerning both sexual and non-sexual traumas and the mean DES score of 32.6 is equivalent to other studies with PTSD samples (see Bernstein-Carlson et al., 1993, for review). From the latter review, it is evident that across 5 studies, PTSD samples attained DES scores ranging from 26.1 to 41.1. Given Steinberg et al.’s (1990) suggestion of a DES cutoff of between 15 and 20 to screen for dissociative disorders, it may be possible to construe PTSD as a dissociative disorder in so much that elevated DES scores in PTSD samples are consistently a reliable result (also see Darves-Bornoz, 1997; Reynolds & Brewin, 1999 for a discussion on the relationship between dissociation and PTSD).

Divergent Victim/perpetrator Relationships

In the present study it was apparent that being sexually victimized by a family member or a close friend resulted in relatively higher PTSD symptoms than victimizations by non-family members and acquaintances. This pattern is in line with Darves-Bornoz’s (1997) finding that rape victims whose offenders were somehow related to them were significantly more likely to receive a diagnoses of PTSD that those raped by strangers. As noted earlier, it is intuitively argued that the former types of relationships contain higher levels of trust and intimacy than the
latter. Since guilt and shame felt by the victim are common responses to repeated instances of incest (Terr, 1991; Christianson & Engelberg, 1997), and guilt is a common symptom of PTSD in general (Reynolds & Brewin, 1999), it is therefore not surprising that the former types of situations led to relatively higher degrees of PTSD symptoms, especially in terms of their intrusive quality. Irwin (1998) has reported that feelings of guilt and shame are significant predictors of subsequent dissociative tendencies which, in the present study, have been shown to be related to PTSD symptomology. There are a few possible explanations for why this occurs. For instance, it has been suggested that if someone is victimized by a protective/authority figure, such as a father/step-father or uncle, it is possible for the victim's whole system of meaning to become fundamentally disrupted (Hermann, 1992, as reported in Darves-Bornoz, 1997). From this line of reasoning, stranger rapes are relatively less traumatic in the sense that although horrific and traumatizing in nature, these events are relatively “easier” to integrate into one's cognitive schema of how the world works compared to an incestuous event(s). If one’s whole system of meaning is disrupted by virtue of a incestuous relationship, according to the attachment literature, this may carry on to many other aspects of the persons life (for example, see Bartholomew, 1997; Bowlby, 1980, as cited in Bartholomew, 1990). In contrast, if someone was assaulted by a stranger, they may be able to rationalize the victimization with statements or thoughts such as “that man was evil” or “I was in the wrong place at the wrong time”. More support for this line of reasoning was apparent in the present participant’s sexual assault narratives. For instance, while many of the women reported carrying heavy emotional baggage stemming from their prior incestuous relationships, a few noted that being raped as a prostitute was, unfortunately, “just part of the job”.

According to Terr (1991), it is primarily repeated instances of incest (i.e., Type II traumas), that lead to the repression or dissociation of memories. The fact that participants
assaulted by family members and close friends recalled relatively less concerning their traumas than those assaulted by non-family members and acquaintances are in line with Terr's clinical experiences. An alternative explanation is that the former participants may not have provided as detailed of a description (e.g., hair color) of their perpetrators (e.g., family members) because, since there is an ongoing relationship from early on, such a description would have been superfluous, as compared to participants describing a stranger as in the latter category.

"Weapon Focus"

In contrast to many laboratory studies which have shown a "weapon focus" effect (e.g., Kramer et al., 1990; Loftus et al., 1987; Maass & Kohnken, 1989) the present results not only failed to show a significant effect, but it should be highlighted that the pattern of recall was in the opposite direction (i.e., relatively more recall in the weapon condition). Although the present study did not assess lineup identification accuracy or feature accuracy as has been routinely rendered in past studies, the fact that there was relatively more recall in the weapon condition is counter-intuitive to the weapon focus hypothesis. Quite possibly, this null result and corresponding pattern may be a function of the fact that the complexity of actual crime scenes (in terms of both arousal levels and attention) cannot be approximated in the laboratory. Someone who is being raped at gun point arguably has an array of focal points to choose from as opposed to the typical laboratory participant who is directed to focus his/her attention on a slide sequence or video projector. Even after reporting on the overall significance of the weapon focus effect in a meta-analysis, Steblay (1992) noted that "it may be argued that real-life crime events include so many stimuli that the hypothesized weapon focus effect becomes irrelevant or insignificant in

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27 Note: Gaps in offender's memories are also more common when the victim is closely related (Gudjonsson, Hannesdottir, & Petursson, 1999).
magnitude" (p.422). Although Maass and Kohnken (1989) raised the level of realism in their study by involving their participants with a syringe injection threat, they stated that "at the same time, it is quite obvious that the external validity of the syringe manipulation should be subjected to further empirical testing" (p.407). In the one previous archival study in which real crime victims and witnesses were studied, Tollestrup, Turtle and Yuille, (1994) reported that eyewitnesses to robberies involving weapons recalled significantly more total details than those eyewitnesses involved in weaponless crimes. The present results are more in line with this finding than the laboratory studies discussed above, and are in agreement with the conclusion by Tollestrup et al. that "the presence of a weapon does not appear to have a detrimental influence on the amount of descriptive information or accuracy of that information provided by actual eyewitnesses" (p.33). Obviously, more field research is needed before any consensus conclusion can be drawn. However, caution is suggested in applying the results of laboratory weapon focus studies to the real world.

Dissociation and Prior Traumas

In the present study, participant's DES scores were significantly related (i.e., \( r = .41 \)) to the magnitude of their reported sexual abuse histories. This finding supports a recent study reporting a significant relationship (i.e., \( r = .40 \)) between prior negative experiences (including both physical and sexual abuse) and dissociative experiences, as assessed by the DES (Johnson, Edman, & Danko, 1995). It also adds credence to Terr's (1991) proposition that with repeated instances of abuse, dissociation is utilized as a coping response. Although apparently robust, it has been suggested that this link is mediated by other factors. Specifically, it has been argued that the connection between childhood traumas (e.g., physical and sexual abuse) and subsequent dissociative tendencies is mediated by the level of perceived emotional support given to the child.
(see Irwin, 1996; Rind, Tromovitch, & Bauserman, 1998). In a recent meta-analysis, Rind et al. demonstrated that the nature of the family environment was a stronger predictor of various types of maladjustment (including dissociation) than child sexual abuse. Irwin has demonstrated that, if a child has strong levels of perceived emotional support, the association between abuse and dissociation is somewhat reduced. However, even after controlling for emotional support, it was clear that intrafamilial physical abuse, a loss related to the family, intrafamilial sexual abuse and extrafamilial assaults were still significant orthogonal predictors of subsequent dissociative tendencies (Irwin, 1996). Thus, it appears as if emotional support is a mediating, but not an alleviating factor against the development of dissociative tendencies in the context of coping with traumatic events. Nevertheless, as suggested by Irwin, traumas in childhood do not invariably lead to chronic dissociative coping styles. For instance, in the present study, two participants with horrific histories of abuse in their childhood's exhibited grossly divergent dissociative tendencies (both trait and state). One participant who claimed to be sexually assaulted by her stepfather everyday from the ages of 8-12 received a DES score of 18. Meanwhile, another participant who was sexually assaulted by her brother 3-4 times a week for many years, self-reported a DES score of 80, the highest score given in the present study. Further, regarding the specific accounts of sexual assaults provided, the former participant barely dissociated during her trauma (i.e., received a PDEQ score of 2), while the latter participant reported the highest state dissociative score possible (i.e., received a PDEQ score of 18). Thus, it is clear that the association between abuse and consequent dissociation is robust, although individual differences are indisputably apparent.

The fact that those with high sexual assault histories recalled relatively more about the specific assault episodes that they provided than those participants with low sexual assault histories is counter intuitive to Terr's (1991) formulation of Type II traumas. If repeated
instances of assault are more likely to lead to dissociative memories, one would expect relatively
less recall for a particular event. However, this was not the case. In fact, the opposite pattern
was observed. Nevertheless, it should be highlighted again that there was extreme variability in
the number of details provided for the sexual assault memories with many conceivable instances
of dissociative amnesia. Thus, it is likely that many did dissociate under stress, and remember
little about what happened, supporting Terr's clinical experiences.

Dissociative Perspectives

In line with Nigro and Neisser, (1983), the present results indicate that people can
experience events from either a field or observer perspective. This also supports Yuille and
Daylen's (1998) pattern 2a (i.e., a dissociative observer perspective) in their model of recall.
Consequently, it appears as if this distinction has consequences in terms of dissociative
tendencies, PTSD levels, and amount of recall. Although the original formulation of the field vs.
observer distinction pertained to how the events were remembered, the authors (i.e., Nigro &
Neisser) also argued that the original event could be perceived from either perspective, much like
question #5 on the PDEQ (Marmar & Weiss, 1994). In a series of four empirical studies, Nigro
and Neisser found that observer memories contained higher degrees of "emotional self-
awareness" than field memories (p.476; also see Terry & Barwick, 1995). More specifically,
memories such as running away from a threatening situation were found to recur significantly
more frequently as observer memories than less emotionally laden experiences such as running
for exercise. Intuitively, by depicting experiences that have led to symptoms of PTSD as more
emotional than experiences that have not, the present results add support to Nigro and Neisser's
findings. In the present study, it was quite apparent that observer perspectives of being sexually
assaulted led to significantly higher levels of PTSD symptoms (i.e., $M = 58.50$ vs. 44.47) than
did field memories. Further, a similar, but non-significant trend was observed for the non-sexual traumatic experiences.

The fact that all three types of memories, but more specifically the traumatic memories, that were perceived from an observer perspective, contained significantly higher levels of state dissociation supports Terry and Barwick's (1995, p.164) proposition that observer memories are a way of "depersonalizing" a memory in so much that depersonalization is a symptom of dissociation. In addition, the result adds credence to Terr’s (1991) clinical observations of children using dissociation as a coping response to overwhelming traumas. Furthermore, the non-significant trend for participants with observer memories to have relatively higher dissociative dispositions lends support to Terr’s supposition that such coping responses are likely to be used in future threatening situations. By focusing solely on the sexual assault memories, it seems clear that if one dissociated during the victimization, and took an observer perspective, the amount of recall concerning their experience would be significantly higher than if one took a field perspective. Although this finding is counter-intuitive to both theory (Janet, 1889; see Speigal & Cardena, 1991) and research (e.g., Mechanic et al., 1998) concerning dissociation, as discussed above, it is inline with the reconstructive nature of traumatic memories (van der Kolk & Kadish, 1987; van der Kolk et al., 1996) in so much that while the memories were once dissociated, it is very much possible that they have been “recovered” and reintegrated over time.

Positive Dissociation

The fact that many participants retrospectively endorsed state dissociative symptoms in regards to their positive memories, albeit less so than in their traumatic experiences, is interesting in and of itself. Virtually without exception, discussions of dissociative experiences have converged in response to witnessing or being the victim of a traumatic event (e.g., Herman, 1996;
Koopman, et al., 1994; Marmar et al., 1994; Mechanic et al., 1998; Putman, 1995; Spiegel & Cardena, 1991; see Foa & Hearst-Ikeda, 1996 for review). Accordingly, except for a recent exception (i.e., Pica & Beere, 1995) dissociation during positive events is a relatively neoteric, unexplored phenomenon. Why would symptoms of a construct that, in both theory (Janet, 1920; Putman, 1995; Terr, 1991) and research (Bernat et al., 1998; see van der Kolk, van der Hart, & Marmar, 1996 for review) have been attributed to responses to trauma, manifest in regards to positively valenced experiences? Pica and Beere, (1995) posit that an event does not necessarily need to be traumatic per se to invoke dissociative characteristics, but it is required to be "intense" and perceived as sufficiently "subjectively meaningful". Progressing from Beere's (1995) perceptual theory of dissociation, it is thought that in such circumstances, because perception becomes "captivated by a particular aspect of the lived situation" consequently, "different components of the perceptual background become lost, resulting in the dissociative reaction" (p.243). By surveying undergraduates about positive dissociative experiences, Pica and Beere, (1995) demonstrated that this is not only assuredly possible, but relatively common. In fact, in their study, it was reported that 36.7% of the participants endorsed dissociative symptomology in regards to positive experiences, most commonly in experiences involving sports, sex, prayer, nature, favorable news, acting, hobbies, and music. Interestingly, this effect was exhibited for both high and low dissociators, as measured by the DES, indicating that a highly dissociative disposition is not a necessity for positive dissociative experiences. In the present study, although at a significantly less pathological level than in traumatic memories, 85% of the sample endorsed at least one state dissociative symptom, as measured by the PDEQ, pertaining to their positive memories. Further, approximately 20% of the participants reported a higher level of state dissociative symptomology than the mean PDEQ level found for traumatic non-sexual memories. These memories largely concerns themes pertaining to giving birth, vacationing, religious
experiences, attending parties, and being proposed to. Thus it can be safely concluded that
dissociating during positive events is fairly common, albeit less so in terms of both frequency and
severity in comparison to dissociating during traumatic events.

Limitations

There are some obvious limitations of the present study that deserve discussion. First,
there are inherent difficulties in interviewing women about their sexual assault experiences.
Selecting an appropriate representative sample is difficult owing to the fact that most rape relief
and shelter groups have a fundamental disinclination to have research conducted with their
clients, let alone research that involves male investigators. Further, university undergraduates,
who make up approximately 70% of the participants in published psychological research (Sears,
1986, as reported in Cosby, 1996), given the choice to volunteer for such research over less
emotionally distressing experiments would clearly, intuitively speaking, choose the latter.
Essentially, people would rather not talk about being raped if they are given the choice, which
they obviously are. Zero response from a laboratory web page containing a participant
recruitment message for the present study further attests to this. Consequently, one may
rightfully question possible differences between those that have been sexually assaulted and
those that have been sexually assaulted and are willing to talk about their experiences for
research purposes.

Second, interviewing prostitutes is a difficult enterprise in and of itself. The present
sample contained many women who are illiterate, addicted to drugs, have a lay person’s view of
psychological research, and thus, do not make ideal research participants. Some participants

28 Not to say that male assault victims are in any way easy to interview, but the present sample, although not by any
gender exclusionary criteria, contained only women.
were excluded from participation owing to the fact that they came to the interviews under the influence of drugs and/or alcohol. Considering this was not a study on the influence of substances on memory, and further, that many of the scales are not valid if influenced by drugs, an acute drug influence was deemed to be a valid exclusionary criteria. Also excluded were individual memories that were drug or alcohol laden. Thus, a small sample size, and fluctuating degrees of freedom because of incomplete data were a problem.

Because many of the women (i.e., >80%) habitually utilized physiologically addictive drugs such as heroin and crack cocaine, other problems were unfortunately introduced. Although there is a lack of literature focusing on the chronic memorial effects of cocaine and heroin in human samples there may be some long term influence (Phillips, T., personal communication, April, 31, 1999). Furthermore, these types of drugs require continued intake to reduce unwanted withdrawal symptoms. As an example, a few participants reported having to "fix" almost every hour in order to function. Thus, a one and one-half hour interview harvests the likelihood that drug "cravings" are a possibility, and thus participant's attention and motivation to be completely forthright is cause for concern. On the other hand, considering that the majority of the participants use such drugs, and the order of the narratives was counterbalanced, these effects should have been random.

Third, interviewing prostitutes in one of the most notorious drug infected and disease-ridden areas of North America (i.e., the eastside of downtown Vancouver) is fraught with problems. The interviews were conducted in a safe-house that was at times noisy, disruptive, and in many respects, immensely distinct from the controlled circumstances of the laboratory. Nevertheless, the fact that all the women were interviewed under the same circumstances arguably negates problems with the context.
The retrospective nature of the present study is a methodological flaw that arguably haunts all studies that are not, essentially, prospective and tightly controlled. In past eyewitness field studies, the crime/disaster scenes had to be reconstructed from forensic evidence or from corroborative statement by survivors (Yuille & Cutshall, 1986; Thompson et al., 1997). In the present study, because of obvious practical and ethical concerns, no corroborative attempts were made. By default, the participant’s memories were taken to be, at face value, of existent past events, although not necessarily 100% accurate. It is widely accepted that memory is not reproductive, but reconstructive (Schacter, 1996; van der Kolk, 1996). As such, one's present memory for an event will be somewhat different from what actually happened, i.e., narrative truth versus historical truth (see Nash, 1994; Hyman & Loftus, 1998). According to Nash, "...a literal reliving of a historical event is not humanly possible. Memories do no literally return in pristine form..." (p.357). Across multiple rehearsals, the details of the same account are thought to fluctuate so much that only approximately 60% of the content is equivalent from one telling to another (Conway, 1997). According to Conway, this is thought to occur because "memory construction is mediated by control processes which vary from one recall to the next and use different cues to probe autobiographical knowledge on different occasions of retrieval" (p.4-5). Referring to Roediger's finding that repeated recall facilitates the increase of both accurate and inaccurate details, Conway (1997) suggests that "extreme caution should be exercised in eliciting both specific memories and details from memories" (p.14). In the present study, such caution was taken. All interviewers were thoroughly trained in the interviewing protocol, and were consistent in the number of questions asked across memories. Furthermore, there was a focus on eliciting an uninterrupted free narrative, and leading/suggestive questions29 were avoided.

29 See Fisher and Geiselman (1992), for a discussion of the disadvantages of using asking leading questions.
Nevertheless, considering the sampling bias (i.e., the self-selection of the memories), the present results should be viewed with caution.

As mentioned above, the small sample size of the present study is also of concern. Limited statistical power may have played a role in some of the null findings. Similar field studies with divergent populations (i.e., clinical vs. non-clinical samples) should be conducted in order to assess both the validity and reliability of the present findings. An ideal situation would be one in which the veracity of the participants' memories could be assessed. Such a study could be carried out in certain crime laden localities in North America where in some areas there exists video cameras that record the day-to-day activities of the community. In such situations, if a crime is committed, there exists an objective record of the event. If both the victims' and offenders' memories for the crimes are investigated, individual differences could be assessed and new insights into memories for traumas could be borne out. Of course, if such a study were to be conducted, there would need to be much cooperation within agencies, such as victim service foundations, lawyers, the police, universities, witnesses, and the associated parties involved.

Implications for Interviewing, Eyewitness Testimony and Credibility Assessment

Despite the limitations outlined above, the present study has many forensic implications, although tentative, concerning investigative interviewing, expert testimony, and credibility assessment pertaining to memory for traumatic events. Regarding the former, in certain interviewing protocols (e.g., the “Step-wise” interview; Yuille, 1990), there exists a rapport developing stage intended to put the interviewee at relative ease. When the interviewee is a child, this stage of the interview serves another cardinal function: the interviewer, if properly trained, has the opportunity to assess the developmental, verbal and cognitive abilities of the child. One avenue of doing such is to ask the child to recall an autobiographical memory, for
example, the details of a past birthday party or family outing. In this manner, the interviewer has an opportunity to assess not only how detailed an account the child is able to provide, but the manner in which their account(s) is recalled. In the present study, there were moderate significant relationships between the quantity of details provided in the positive memory condition and the amount of details recalled in the two traumatic conditions. Accordingly, it appears as if the amount of detail someone is able to recall from a positive autobiographical experience, serves as a functional gauge as to the amount that should be able to be provided for a traumatic experience, for instance, a sexual assault. Although the original “Step-wise” interview was developed for use with child interviewees, the semi-structured protocol has been adapted for use with adults with allegations of domestic violence and sexual assaults (see Yuille et al., 1999). The present results suggest that not only is the “Step-wise” protocol suitable for these purposes, but eliciting positive memories before the event(s) in question is discussed is advantageous for all parties involved, and thus, is warranted for future use in such circumstances. Nevertheless, more field research on this subject should be conducted to assess the reliability of this result.

The implications of the present results for expert eyewitness testimony are multifaceted. To begin with, caution is urged to those experts who adhere to simplistic testimonial conclusions as to the “true” state of affairs regarding memory for traumas (e.g., Clifford et al., 1978). Expert testimony may influence the amount of time juries spend deliberating about a verdict (for example, see Loftus, 1980). Considering "(t)he basic purpose of any evidence, including the testimony of an expert psychologist, is to facilitate the acquisition of knowledge by the jury, or trier of fact, thus enabling them to reach a final determination" (Loftus, 1980, p.9), shallow conclusions about the detrimental influence of trauma on memory by an expert psychologist has the potential to have a serious biasing effect on jury behavior. The present results suggest that traumatic memory is a highly variable phenomenon, supporting many of the patterns of recall
(i.e., remarkable memories, dissociative observer memories, script memories, and conceivable instances of dissociative amnesia) outlined in Yuille and Daylen’s (1998) model of recall. Thus, aggregate summaries about traumatic memory, particularly those stemming from the results of laboratory “trauma” simulations, appear premature and unwarranted. As noted by Fisher (1995), “(e)xpert witnesses who have made this leap of faith, convincing jurors that because laboratory witnesses are often inaccurate we can therefore expect real eyewitnesses to be inaccurate, have done a disservice to the legal system (p.6).

As previously discussed, the present results suggest that not only is traumatic memory a highly variable phenomenon, but it is mediated by many individual difference and situational variables. For instance, dissociative processes, one’s stress response, one’s perspective, the presence of a weapon, the victim/offender relationship, and the type of event all appear to exert a practical influence on the amount of recall one is able to provide concerning traumatic events. Future research should focus on assessing the reliability of these findings in a situation where the accuracy of participants memories could be measured. Nevertheless, an assessment of such factors is suggested to be advantageous in order to determine possible recall influences.

In addition, the above variables, as they relate to the quantity of memory may help psychologists gauge the veracity and credibility of ones account. The reasons for this are clear. Psychologists are increasingly being called upon to judge the credibility of both victim’s and offender’s accounts of crimes. To date, the most valid assessment of such verbal clues to credibility is Statement Validity Assessment (SVA; see Horowitz, 1991, for review). The main facet of this assessment is Criterion Based Content Analysis (CBCA), a technique that is largely a product of German psychologist, Udo Undeutsch’s forensic experiences with child witnesses and the criminal justice system in Germany (see Vrij & Akehurst, 1998). Undeutsch had often been called upon by the courts to judge the veracity of children’s statements, usually pertaining to
allegations of child sexual abuse. According to the "Undeutch hypothesis", there exists both qualitative and quantitative differences between people's recall of extant experiences and ones which were not experienced (see Porter & Yuille, 1995). Consequently, on the basis of this, expert psychologists from both Europe and North America, formulated 19 CBCA criteria in order to distinguish credible from non-credible statements (see Stellar & Koehnken, 1989). Empirical support for the validity of CBCA has been mixed (see Horowitz, 1991; Steller & Koehnken, 1989), however, the presence of certain criteria have been shown to be relatively reliably predictive of credible accounts. One such criteria is that the person is able to provide an appropriate amount of detail concerning the event in question (i.e., criteria #3, under general characteristics of the statement; see Vrij & Akehurst, 1998). Many studies, both laboratory (e.g., Koehnken & Wegner, 1982, as reported in Steller & Koehnken, 1989; Porter & Yuille, 1996) and field (Lamb et al., 1997) have demonstrated that credible accounts indeed contain more details than non-credible accounts (see Vrij & Akehurst, 1998, for review). This has been suggested to occur because it is difficult to garnish false accounts with many details because these details are not stored in memory (Arntzen, 1983, as reported in Porter & Yuille, 1995). As previously discussed, the present results suggest that people are able to recall relatively more concerning traumatic events than regarding positive episodic experiences. Further, the quantity of details recalled across these divergent accounts have been demonstrated to be significantly related. If replicated with sufficient reliability, the forensic implications of these findings pertain to situations in which multiple memories are elicited. If a child is alleging sexual abuse for example, in certain localities the child will be interviewed by court ordered mental health professionals. If such interviews employ protocols, for instance, the "Step-wise" interview, in which multiple events (i.e., a positive event and the event(s) in question) are elicited, one should be able to roughly gauge the credibility of the event in question based upon the amount of details
offered in the positive experience. For example, if a person provided a rich account of their last birthday party, but can only recall very little about the details of the traumatic event in question, one may suspect that the latter account is non-credible. Of course, providing little detail may also be a sign of dissociative amnesia stemming from an extant experience. Alternatively, providing too much detail, particularly about trivial aspects of an experience, may suggest that a statement is non-credible. For example, it has been suggested that those with "long-winded" styles of recalling episodic experiences (i.e., setting the stage more so than necessary) often provide embellished and non-credible accounts (Yuille, J.C., personal communication, 1999).

Nevertheless, an appropriate amount of detail is only but one CBCA criteria, and thus, on its' own is insufficient to distinguish between credible and non-credible accounts (see Steller & Koehnken, 1989). Furthermore, CBCA is only but one facet of SVA. Clearly, the above examples only begin to demonstrate the complexity of credibility assessment. For forensic purposes, CBCA should never be used in isolation, but in conjunction with the case evidence at hand, as is routinely utilized in the more multifaceted technique of SVA.

Conclusion

The results of the present study suggest that traumatic memory, if not memory in general, is a highly variable phenomenon. In addition, it appears to be mediated by many personological and situational factors, supporting many of the patterns outlined in Yuille and Daylen's (1998) diverse model of traumatic recall. State dissociative processes, one's stress response, one's perspective, the presence of a weapon, the victim/offender relationship, and the type of event all appear to exert a practical influence on the amount of recall that one is able to provide about a traumatic event. Future research should focus on defining all of the seven outlined patterns in a study where the veracity of the participants' memories can be assessed. Although the results of
this study should be viewed with caution until they are replicated with sufficient reliability, they do suggest that field research is a relatively neglected but fruitful avenue in which to investigate traumatic memory.
References


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Appendix

Participant Consent Form

ETHICS#: B98-0209 (Approved 1998/08/17)

The forensic psychology laboratory at the University of British Columbia is asking you to participate in a study on personal experiences with traumatic events in your life. We realize that talking about traumatic experiences may be stressful for you. However, we believe that you will benefit from participating in our study.

If you agree to participate in our study we believe that you and other women will benefit in the following ways. It is well documented that talking about a traumatic experience to an objective non-judgmental person is therapeutic in its own right. Further, we can refer you for psychological or other counseling services. We believe that the information that you provide to us will help other women who have been similarly victimized.

Involvement in our study will entail participating in a confidential audio-taped interview. We are going to be asking about three specific memories. The three narratives or memories will include one positive event in your life, one upsetting non-sexual event and one traumatic sexual event. Specific questions may be asked about these events to clarify any uncertainties. Also we will be completing some inventories or lists of questions about how you coped with these events and questions about your childhood. Interviews will be conducted by experienced female clinicians or female research assistants with experience in interviewing victims of sexual assault. Your involvement will require approximately 2 hours of your time and you will receive a payment of $25 after taking part in the study. You may ask clarifying questions at any point during the session and are free to withdraw at any point without penalty.

All information provided by you will remain strictly confidential and will only be used for the purposes of this study. Additionally, only Dr. Yuille and students under his supervision will have access to this information. All documents will be identified only by code number and kept in a locked filing cabinet and participants will not be identified by name in any reports of the completed study.

I agree to participate in this study.

______________________________  ___________________________  ______________
Print name                        Signature                      Date