

AN INVESTIGATION OF TRAUMA AND ITS COGNITIVE AND EMOTIONAL
CONSEQUENCES IN PROSTITUTED VICTIMS OF SEXUAL CRIMES

by

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Abstract

The present research is a field investigation of trauma and its cognitive and emotional consequences. One hundred and nineteen sex trade workers were interviewed about sexually traumatic experiences. The primary focus of this research was an examination of the quantity and quality of memory for sexual trauma. Various predisposing, precipitating, and perpetuating factors were examined regarding their influence on memory and posttraumatic stress. One objective of this study was to test certain assumptions of the biopsychosocial model of eyewitness memory (Hervé, Cooper, & Yuille, 2007), which proposes that individuals differ along a continuum of arousal sensitivity and predicts the quantity and quality of recall. Up to three types of memory narratives were elicited from each participant: (a) one positive event (b) one well-remembered sexual assault, and (c) one sexual assault for which the participant had poor recollection. Each memory was assessed for peritraumatic and posttraumatic factors. The participants also filled out a number of individual differences measures. The results indicated that the participants had extensive histories of trauma, many of which began in their childhood. It was shown that well-remembered sexual assaults contained more narrative details than memories of positive events and less-well-remembered sexual assaults. Such variability of memory for sexual violence is in line with Hervé et al.'s model as well as other field studies of traumatic memory. This was the first study to demonstrate such variability within-subjects. Various moderating factors of memory were examined, for example, dissociation and different symptoms of posttraumatic stress. Some of the findings were at odds with traditional theories, laboratory findings, and certain assumptions held by many eyewitness memory experts regarding the relationship between stress and memory. A second objective of this

dissertation was to examine predictors of post traumatic stress disorder. The findings largely confirmed the literature. Men and women did not differ in their levels of posttraumatic stress. Overall, the complexity of clinical symptoms in survivors of repeated sexual violence is highlighted. The results are discussed in terms of their implications for theory development, future research, the criminal justice system, and in terms of their relevance for treatment providers and assessors.

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Dedication

I dedicate this research to the men and women who have shared their traumas for this research. I felt privileged to be granted access to their life stories. I hope this research will help to acknowledge their trauma and to improve certain aspects of the criminal justice system in ways that will make it easier for victims of sexual violence to access and use its services.

An Investigation of Trauma and its Cognitive and Emotional Consequences in Prostituted Victims of Sexual Crimes

The emotional and cognitive consequences of trauma were investigated in a sample of sex trade workers from British Columbia. Mapping on to a similar study (Cooper, Yuille, & Kennedy, 2002), in which great memory variability was demonstrated for sexual and non-sexual traumas, this research exclusively focused on sexual violence. Based on Yuille and Daylen's (1998) memory patterns, this study attempted to differentiate factors that might determine whether traumatic events are well- or poorly-remembered. Participants were asked to provide narratives of one well-remembered sexual assault and one poorly-remembered sexual assault, as well as a positive experience, which served as a baseline memory. The cognitive and emotional qualities of each memory were linked to predisposing (e.g., personality), precipitating (e.g., dissociation), and perpetuating (e.g., posttraumatic stress) factors.

In the following sections, the literature that provided the background to this study is discussed. First, the purpose of this investigation is outlined, followed by a clarification why sex trade workers were a suitable population for the study of the psychological impact of sexual violence. Second, the literature on eyewitness memory is reviewed, including an introduction to the theoretical framework of this study (Hervé et al., 2007). Third, the literature on posttraumatic stress disorder (PTSD), a prolonged stress response to trauma, and its risk factors is reviewed. Although the research questions are introduced throughout these reviews, a systematic overview of hypotheses is provided in the fourth section of this dissertation. Fifth, the method of the study is described, including changes that were

implemented after the pilot phase. Sixth, the results of this research are presented separate for each research question. Sixth is a discussion of the findings, including a report on various challenges the research team faced during data collection. A discussion of the limitations and strengths of this research is followed by the last section, outlining the conclusions and implications of this dissertation.

Why Study Sexual Trauma?

Situations typically classified as *traumatizing* include natural disasters, motor vehicle accidents, plane crashes, combat exposure, as well as being held captive, tortured, or assaulted. It has been suggested that the impact of a trauma can be especially severe and long lasting if the stressor is human, intense, and physically close (American Psychiatric Association, [APA], 1994) and the prevalence rates for PTSD and comorbid disorders depends on the type of trauma experienced (e.g., Kessler et al., 1995). Out of all types of traumas, the experience of sexual violence – the type of trauma studied in this dissertation - is associated with one of the highest rates of posttraumatic stress. Epidemiological studies (e.g., Breslau et al., 1998; Kessler et al., 1995; Perkonig, Kessler, Storz, & Wittchen, 2000) have demonstrated that rape, torture, being kidnapped and held captive constitute traumas that lead to PTSD in approximately 50% of individuals exposed to such stressors. These rates are extremely high compared to other types of traumas, for which conditional probabilities for PTSD range between 0.4% (learning about a close relative's car crash) and 17% (being involved in serious car crash) (Breslau et al., 1998). The purpose of the present investigation was to study the cognitive and emotional consequences of sexual violence. Considering the high prevalence of PTSD after such

events, it was expected that the effects of sexual violence on eyewitness memory would be more pronounced compared to other types of traumas, which have mostly been the focus of the literature on eyewitness memory thus far.

The terms *rape* and *sexual assault* are often used interchangeably in the literature. Legally, most statutes define rape as an act “that occurs without the victim’s consent, that involves use of force or threat of force, and that involved sexual penetration of the victim’s vagina, mouth, or anus” (Resnick, Kilpatrick, & Lipovsky, 1991, p. 563). Since 1983, the term *rape* was removed from the legal jargon in Canada and replaced with the term *sexual assault*, referring to general access violations of a person’s body (Bavelas, & Coates, 2001). The changes were made to broaden the focus beyond sexual acts that involve penetration of a vagina by a penis. The terms *sexual violence* and *sexual assault* were used in this dissertation to include a broad range of sexual assault experiences, including attempted sexual assaults, and to avoid the use of legal terminology with the participants. The term *rape* was also avoided to prevent that participants had to label themselves *rape victims*, a term that has negative connotations among sex trade workers.

Why Study Sex Trade Workers?

Sex trade workers are frequently exposed to trauma, specifically interpersonal violence. Various studies suggest the prevalence rates of physical and sexual violence experienced by sex trade workers range from 40% (job related) to 99 % (lifetime) (Cooper, Kennedy, & Yuille, 2001; Farley & Barkan, 1998; Farley, Baral, Kiremire, & Sezgin, 1998; Silbert & Pines, 1982; Watts & Zimmerman, 2002). In comparison, lifetime exposure to physical and sexual violence is less than 40% in the general

population (Breslau et al., 1998). In a US-representative sample, lifetime exposure to rape was less than 10% for women and less than 1% for men (Kessler et al., 1995). Hence, prostituted individuals are notably more exposed to interpersonal violence than the general population. Not only do they experience more trauma, they also experience violence at an exceptionally high frequency. For instance, the sex trade workers in Cooper et al.'s (2001) study reported a mean of 3.3 assaults while working in prostitution. As noted above, the type of violence sex trade workers are exposed to leads to the greatest prevalence of posttraumatic stress. Hence, sex trade workers seemed a suitable population to study the cognitive and emotional consequences of sexual trauma.

Purpose of the Investigation

Studying trauma in a population of sex trade workers allowed for an investigation of two issues: eyewitness memory and the emotional consequences of trauma. The research on these topics was developed separately. Psychologists began to study eyewitness memory in the early 1900s (Muensterberg, 1908). Most of their research was analogue in nature. More recently, some eyewitness memory researchers have studied real victims, bystanders, and offenders of crime in order to make the findings applicable to the real world (e.g., Cutshall & Yuille, 1989). Stress and trauma are factors that are thought to impact the quantity and quality of details recalled from such events. Research on the psychological consequences of trauma began roughly around the same time, when industrial disasters and the First World War caused workers and soldiers to develop symptoms that are now known as posttraumatic stress. During the last few decades, PTSD researchers have identified

the crucial role of *memory* in the development of PTSD as well as the recovery thereof. Thus, eyewitness memory and PTSD researchers share an interest in similar variables. The present study combines the two perspectives. From a memory researcher's point of view, sex trade workers were chosen because they are victims of real crimes. Several factors that are thought to impact the quality of their memories for these crimes were investigated. From a trauma researcher's point of view, sexual violence is of interest because this particular type of trauma bears the greatest risk of traumatizing its survivors. Thus, the present investigation provided an opportunity to study PTSD and other emotional consequences of trauma (e.g., dissociation) in a context of a marginalized and presumably highly victimized population. Research methods and findings from the areas of eyewitness memory and trauma research are reviewed in the following two sections with a focus on sexual violence.

Cognitive Consequences of Sexual Violence

The type of memory studied in this research belongs to the category of autobiographical memory, defined as “the memory of personally experienced events that (a) can be retrieved within temporal and spatial relation toward other events and (b) are relevant for the self-concept because they form the individual’s history of life” (p. 22, de Decker, Hermans, Raes, & Eelen, 2003). The effects of negative events and emotions on memory have been researched in three different paradigms: flashbulb memory, traumatic memory, and eyewitness memory (Schooler & Eich, 2000).

Flashbulb memories refer to memories of outstanding events that were covered by the media (e.g., the explosion of the space-shuttle Challenger, the assassination attempt of President Reagan, 9/11). Brown and Kulik (1977) suggested that memories for such events were remembered with great vividness and accuracy. They claimed that flashbulb memories involved unique mechanisms¹. However, subsequent research has demonstrated that flashbulb memories are not generally accurate and do not involve special mechanisms (e.g., Christianson, 1989; Tromp, Koss, Figueredo & Tharan, 1995). This dissertation was focused on individual traumas, in which to-be-remembered events represent personal experiences. Therefore the flashbulb literature does not apply to the issues covered in this dissertation. In contrast, the literature on *eyewitness* and *traumatic memory* is highly relevant and is thus covered by the following review. The study of eyewitness memory is focused on events that might have legal implications, such as accidents and crimes, some of which can be

¹ They suggested a biological “now print!” mechanism, which preserves events that are experienced under high arousal in a photographic fashion.

traumatic (e.g., violent crimes), whereas others might not have any immediate emotional impact (e.g., fraud).

Traditional Theories of Eyewitness Memory

One of the earliest theories applied to eyewitness memory was Ebbinghaus' *forgetting curve* (Ebbinghaus, 1964). Ebbinghaus was the first to study memory scientifically. He postulated that memory declines as time passes. This theory was developed by the use of non-sense syllables to ensure that memories of these items would not be affected by content and meaning. Therefore, their applicability to eyewitness memory is questionable.

Much attention has been devoted to exploring the effects of stress on eyewitness memory. Two theories have been extensively cited in this regard: the Easterbrook's *cue utilization hypothesis* (1959) and the *Yerkes-Dodson law* (1908). The Easterbrook hypothesis suggests that individuals progressively restrict their focus of attention the more aroused they become during a stressful event. According to this theory, emotional arousal leads to poor recall of peripheral but not central details of the event (see Christianson, 1992; Loftus, 1980; Mandler, 1975).

The Yerkes-Dodson law (1908) has been used to explain how arousal during an event relates to the quantity of recall. This model was developed in the context of animal research where arousal (i.e., electric shocks) was induced independent of the performance task (i.e., recall). The relationship between arousal and memory was described as an inverted U-shaped curve. That is, both weak and strong levels of arousal led to poor memory, whereas a moderate level of arousal resulted in good memory, possibly due to the fact that cognitive resources could be best accessed at

such levels of arousal. Incidentally, the Easterbrook hypothesis has been used to explain the U-shaped relationship between arousal and memory. However, due to over-simplicity, both the Easterbrook hypothesis and the Yerkes-Dodson law are of limited use in the prediction and explanation of the quantity and quality of eyewitness memory for traumatic events (Christianson, 1992). For instance, they cannot explain the variable nature of memory demonstrated in archival and field research, with some events being recalled very vivid and accurately but others being recalled poorly and with errors. There is a need for more complex and comprehensive theories on eyewitness memory.

Analogue Eyewitness Memory Research

There is a longstanding devotion to certain theories in eyewitness memory research, however, there is also a strong tradition in terms of the research paradigms used. During the so-called *Aussage* era (the late 1800s and early 1900s), researchers typically used the *reality experiment*, in which a crime was staged in front of a group of uninformed study participants (e.g., in the context of a lecture). The findings of these studies tended to emphasize the fallibility of eyewitness memory, with omissions of insignificant and peripheral details being interpreted as errors (Yuille, Daylen, Porter, & Marxsen, 1995). After Wigmore's (1909) devastating review regarding the application of such findings in court², it was not until the 1970's that interest in eyewitness memory research was renewed (e.g., Buckhout, 1980; Loftus, Miller, & Burns, 1978). Loftus and Burns' (1982) study is a prototypical example of

² Wigmore responded to Hugo Münsterberg's (1908) claim that psychologists should provide expert testimony in court. Wigmore found this claim to be premature.

current laboratory research on eyewitness memory. Participants were shown two versions of a film of a bank robbery that ended either violently or peacefully. Whereas participants in the violent condition had less accurate recollections of the peripheral details than participants in the peaceful condition, the difference between the two groups was not significant for central details. Only small group differences were found between the groups' memories for details in the emotional (violent) vs. the neutral (peaceful) episode. This pattern holds for laboratory studies in general: Central details are better remembered in the stress condition, whereas peripheral details are better recalled in the neutral condition (e.g., Christianson, 1992; Christianson & Loftus, 1991). This pattern is in line with Easterbrook's hypothesis (1959).

Researchers have often claimed the detrimental effects of emotion on memory (e.g., Kassin, Ellsworth, & Smith, 1989). Indeed, emotions seem to impair memory, as far as peripheral details are concerned. However, emotions do not seem to impact the central details of a memory. In fact, some research suggests that emotionality *enhances* the vividness of a memory (Heuer & Reisberg, 1992). Emotions were also shown to increase the amount of central details recalled after long retention intervals. The stability of emotional memories seems better than the stability of neutral memories (Heuer & Reisberg, 1992). Heuer and Reisberg developed the idea that emotions, whether positive or negative, slow down the forgetting processes. Similarly, Reville and Loftus (1992) pointed to the effects of arousal (one aspect of emotion), which facilitates long-term retention, while impeding retrieval of information after short intervals.

Only a few researchers have attempted to approximate real life conditions in experimentally controlled studies of eyewitness memory. Three such studies involved role-play scenarios, one in a police-training center, another one in a military survival school, and a third one in a firearms training simulator. The first was conducted by Yuille, Davies, Gibling, Marxsen, and Porter (1994) and revealed that stress during the role-play (i.e., participating rather than observing the exercise) decreased the amount of recall but improved accuracy. The second was conducted by Morgan et al. (2004) and involved a simulated prisoner of war camp. The focus was on eyewitness identification (rather than recall of the entire event). Soldier participants were isolated and interrogated under high vs. low stress. Their recall of these situations was tested subsequently. Results showed that almost half the participants performed equally well under low vs. high stress in a recognition task. The other half performed better under low stress. A minority performed better in the high stress condition. Dissociation and subjective confidence did not account for these group differences. It was concluded that eyewitness memory could be subjected to substantial errors under highly stressful and personally relevant conditions. The third simulation study was conducted by Hulse and Memon (2006) and involved experienced police officers who engaged in simulations of a shooting incident vs. a domestic dispute call. The former were experienced as more stressful than the latter. Memories of shootings were less complete but more accurate than memories of the domestic dispute call. In some respects, Yuille et al.'s and Hulse and Memon's studies are difficult to compare to Morgan et al.'s investigation due to the different outcome variables (recall vs. identification). However, they reflect the variability that is typically found in field and archival research of eyewitness memory (reviewed in

more detail below). They also highlight the importance of individual differences and their effects on memory. A recent meta-analysis of studies on eyewitness identification and recall demonstrated that effect sizes were larger for staged events than for laboratory-induced stress (Deffenbacher, Bornstein, Penrod, & McGorty, 2004), with highly stressful events leading to worse performance (e.g., identification accuracy; recall) than low-stress events. This indicates that research scenarios that approximate real life conditions yield bigger effect sizes than laboratory research.

Much of the modern eyewitness research is laboratory-based, yet the results are applied and generalized to memories of real crimes. The comparability of stressors in the laboratory and the real world is questionable (Christianson, Goodman, & Loftus, 1992; Spinhoven, Nijenhuis, Van Dyck, 1999; van der Kolk, 1996). In fact, crimes can have a traumatic impact on both victims (e.g., Foa & Rothbaum, 1998) and perpetrators (e.g., Cooper, 2005; Pollock, 1999; Spitzer et al., 2001). No laboratory simulation of stress, such as films (e.g., Clifford & Hollin, 1981; Holmes, Brewin, & Hennessy, 2004; Horowitz & Becker, 1971), slides (e.g., Christianson & Loftus, 1987; Kramer, Buckhout, Fox, & Widman, 1991; Yarmey & Jones, 1983), or staged events (e.g., Hosch & Bothwell, 1990; Hosch, Leippe, Marchioni, & Cooper, 1984; Roberts, Lamb, & Sternberg, 2004,) can be equally arousing and emotionally shocking as real life traumas. The frequent use of undergraduate students as research participants further contributes to the low ecological validity³ of laboratory research (e.g., Yuille, Rodgers, & Cooper, 2004). Furthermore, the to-be-remembered event is often dissociated from the source of stress, that is, manipulated by drugs, white noise,

³ Ecological validity is an aspect of external validity. Should there be a causal relationship between construct A and construct B, the question is how this association generalizes across persons, settings, and time (Cook & Campbell, 1979).

exercise, or feared objects in the room (see Loftus, 1980). In real crimes, the stress experienced at the time stems from the to-be-remembered event itself. That is, emotions might provide clues that facilitate recall. For obvious ethical reasons, crime and its possible effects cannot be approximated in the laboratory. However, such conditions are necessary to study memory in a forensic context (Yuille, 1989, 1993; Yuille & Wells, 1991). Nevertheless, as a recent survey among a selected group of eyewitness memory experts demonstrated, the assumption that laboratory findings can be readily applied to real witnesses' memories is widely accepted among eyewitness memory experts (Kassin, Tubb, Hosch & Memon, 2001).

The present dissertation is an addition to the existing field and archival literature on forensic eyewitnesses. A modern theoretical framework of eyewitness memory is introduced in the next section. It serves to structure the review of field and archival studies of eyewitness memory as well as the variables researched in this dissertation.

Theoretical Considerations About Memory for Trauma

Eyewitness memory researchers have long assumed that stress and trauma lie on the same continuum. There is a need to reconsider this postulation. Field and archival findings suggest that trauma and memory have a complex relationship. Trauma causes variable memory patterns, some of which are better and some worse than ordinary memory (e.g., Cooper, Yuille, et al., 2002). A simple curvilinear relationship between stress and memory is insufficient to explain findings from both analogue and field research. There is a need to incorporate individual and situational differences as mediators of eyewitness memory (e.g., not every crime is equally

stressful; what is stress to some individuals might be perceived as traumatic by others). Such differences might account for the variability of memory in field studies of eyewitnesses. Hervé et al. (2007) recently developed a comprehensive biopsychosocial (BPS) model of eyewitness memory to explain variable patterns of recall for traumatic and non-traumatic crimes. It was proposed that memory depends on the interaction of biological, psychological, and social factors. Such could be predisposing, precipitating, or perpetuating factors, impacting memory at different stages (e.g., encoding, storage, or retrieval). Following up on Yuille's (1993) suggestion that only a combination of different research paradigms can account for the full range of emotional responses, the model attempts to incorporate both laboratory and field research findings (e.g., stress vs. trauma, single vs. variable effects of stress and trauma). This model served as a framework for this dissertation and is described in more detail below. It explains the variability of eyewitness memory in response to different events. Yuille and Daylen (1998) described eight distinct memory patterns. They are described in the next section, followed by an introduction to the BPS model (Hervé et al, 2007).

Yuille and Daylen's (1998) Eyewitness Memory Patterns

(1) *Normal forgetting* occurs after routine events (i.e., the kind of event involved in most laboratory studies; e.g., Brown, 2003). No focal change occurs, which allows for easy and detailed recall immediately after the event. However, if the memory is not rehearsed, forgetting will likely happen over time. At that point, recall would be easy but poor. In the forensic context, normal forgetting was demonstrated to account for poor memories in fraud victims (Tollestrup, Turtle, & Yuille, 1994).

Memories of ordinary events are susceptible to suggestion, especially if the suggested information is plausible and the person is encouraged to picture images or to provide a narrative (Hyman & Loftus, 2002). Normal forgetting was expected to account for the quantity and quality of some of the positive memories in this study.

(2) *Active forgetting* occurs after traumatic events, when individuals attempt to actively avoid (i.e., not recall) certain aspects of the event (APA, 2000). It is consistent with the neo-Freudian notion of suppression. Participants in the study were asked to indicate whether they had made active attempts to forget their memories of sexual violence they chose to talk about for the purposes of this research. Active forgetting was expected to account for the poor quantity and quality of some memories of sexual assault in this dissertation.

(3) *Dissociative amnesia* is the inability to recall (parts of) an event. This inability is too extensive to be explained by ordinary forgetting (APA, 2000). It occurs after traumatic experiences. While some trauma survivors find their memories remain detailed, accurate, stable, and even inextinguishable (see pattern 5), others have difficulty to consciously recall details from their trauma (APA, 2000). This was especially true soon after traumas happen (Harvey, Bryant, & Dang, 1998) and when the event continues to have an emotional impact on the survivor (APA, 2000). Organic reasons have to be ruled out for such memories to classify as dissociative amnesia. Not only is there a discrepancy in the *quantity* of recall, it has often been noted that traumatic memories are *qualitatively* different from ordinary memories: they might involve more sensory, emotional, and perceptual elements, rather than declarative information. Some trauma survivors with PTSD find it difficult to provide a verbal account of their story (e.g., van der Kolk, 1996). Janet observed, “that

intense arousal... seems to interfere with proper information processing and the storage of information in narrative (explicit) memory”; further “memories of the trauma tend, at least initially, to be experienced as fragments of the sensory components of the event” (in van der Kolk, 1996, p. 286-287). Peritraumatic dissociation, defined as “a special form of consciousness in which events that would ordinarily be connected are divided from one another” (Spiegel & Cardena, 1990, p. 23), might be a mechanism that prevents traumatic memories from being integrated with other autobiographical information. When dissociating, one might experience an altered sense of perception, for example, concerning time, oneself, and/or one’s surroundings (Marmar, Weiss, & Metzler, 1997). This may explain the poor initial quality of traumatic memories (e.g., Zoellner, Alvarez-Conrad, & Foa, 2002). Contrary to Easterbrook’s hypothesis, it is assumed that cognitive processes are intact (i.e., encoding at the time of the event takes place), however recall is thought to be difficult because of the separation of the processes necessary for retrieval. This theory has been referred to as the *traumatic memory argument* in the literature (e.g., Kihlstrom, 1996). The precise mechanisms regarding the onset and course of dissociative amnesia remain to be researched. Interestingly, there are tremendous differences in the acceptance of amnesia, dependent on who makes the claim (i.e., a defendant or a complainant; Porter, Birt, Yuille, & Hervé, 2001). Dissociative amnesia was one of the memory patterns targeted in this research. Participants were asked to provide a memory of a time when they were sexually violated, for which they had poor recall.

(4) *State dependent memory* and *red-outs*: Bower, Gilligan, and Monteiro (1981) established that events were remembered more easily if a person was in the

same emotional state at the time of retrieval as at the time of encoding. State-dependent memories are difficult to retrieve if the event was experienced in a stage of extreme affect (e.g., rage). It is thought that amnesia occurs until or unless this state of extreme emotion(s) is re-established (Schacter, 1986). Swihart, Yuille, and Porter (1999) suggested that individuals could experience extreme rage that alters their consciousness, a phenomenon they called *red-outs*, referring to the inability of reactively violent perpetrators to recall their crimes. An alternative explanation of such claims of amnesia is dissociative amnesia (pattern 3). Cooper's (2005) investigation of violent offenders' memories for their acts of violence provided anecdotal evidence for red-outs, as poorly-remembered acts of violence were associated with negative affect at the time of the event and some participants described seeing the colour red. The red-out phenomenon was not a focus of the present research, as it relates to offenders, not victims of violence.

(5) *Remarkable memories* emerge after events of impact. Such memories have often been rehearsed over time. Retrieval is easy. Accounts of the event are vivid and detailed, especially with regards to the core details (e.g., Cutshall & Yuille, 1989; Woolnough & MacLeod, 2001). Most field and archival studies of eyewitness memory support this pattern. Remarkable memories were targeted by this dissertation. Participants were asked to provide memories of a distinct positive event as well as a well-remembered instance of sexual victimization. This memory pattern can account for the good quality that was expected for these memories. The finding that trauma may augment memory rather than debilitate it has been referred to the *memory superiority argument* in the literature (e.g., Porter & Birt, 2001).

(6) *Script memory* is the outcome of a series of events, in which single incidents resemble one another. Several episodes are blended together in a script which describes how the events ‘used to happen.’ This memory pattern can emerge from repeated experiences of childhood abuse (e.g., Cooper, 1999; King & Yuille, 1986). Although not the primary target of this dissertation, this memory pattern could emerge if a participant was repeatedly assaulted under similar circumstances. Note that childhood abuse memories were excluded from this study to avoid a confusion of the memory patterns described in this model with infantile amnesia, which is an alternative explanation for memory loss for events that were experienced at a very young age. Also, the age of such memories would skew the memory findings in comparison to more recent incidents of violence from the participants’ lives in the sex trade.

(7) *Dissociative memories* can occur for events of great impact on the witness. If the individual’s focus is internal (i.e., the person is preoccupied with their own psychological response), only limited information from the event will be stored. Hence, recall is less detailed and with little reference to external reality. What is recalled might stem from daydreaming or fantasy life (e.g., Hellowell & Brewin, 2002). If the individual’s focus during the event is external, dissociative memories can be of unusual qualities. That is, the core details can be easily retrieved, although they might be recalled from an unusual perspective, for example, an observer perspective. As reviewed and explained in more detail below, observer and field perspectives as well as other peritraumatic dissociative phenomena were assessed with regards to the events studied in this dissertation.

(8) *Created memories* are illusory memories developed through suggestion.

Loftus (1997) used suggestive techniques to lead adult research participants to believe in false memories of complex childhood experiences. Created memories are difficult to distinguish from factual memories as some people holding false memories do not intend to deceive others deliberately (Loftus, 1992; Loftus, 1993). Porter, Yuille, and Lehman (1999) conducted the first study that demonstrated that memories of emotional events could be mistakenly fabricated. This type of ‘memory’ was not a focus of the present research because there was no means to corroborate the veracity of the events recalled by the participants.

In short, patterns 1 through 4 are concerned with memory loss, while remarkable and script memories describe the opposite, that is, well-retained memories. Pattern 7 reflects the process of dissociation at the time of encoding. Created memories (pattern 8) refer to suggestive processes. The two polar opposites in this model are patterns 3 (dissociative amnesia) and 5 (remarkable memories).

Hervé et al.’s (2007) Biopsychosocial Model

This model is the first attempt to explain and predict the complexity of eyewitness memory. Hervé et al. (2007) proposed that several predisposing (i.e., factors that occur before a to-be-remembered event), precipitating (i.e., factors that occur during a to-be-remembered event), and perpetuating (i.e., factors that occur after a to-be-remembered event) biopsychosocial variables (see Table 1) underlie the memory patterns introduced in the previous section.

Before the model is introduced in detail, several assumptions need to be clarified. First, it is assumed that narrative memory is a reconstructive process.

Depending on various biological, psychological, and social factors, memories are reconstructed rather than reproduced every time they are retrieved (e.g., Schacter, 1996). Second, emotion is viewed as a multidimensional construct, with the two dimensions of valence (positive – negative) and arousal (high – low) (e.g., Russell, 1980). Third, it is assumed that there are two systems contributing to emotional processing: The biological system determines the quantity of emotional experiences (e.g., the intensity of arousal), whereas the cognitive system provides interpretations pertinent to the quality of emotions (e.g., pleasantness; Mandler, 1992). The fourth assumption is that emotional processing is individually different, depending on one's arousal sensitivity, defined as the biological sensitivity of the autonomic nervous system (ANS) to arousal.

The BPS model proposes that affect partially determines the quantity and quality of eyewitness memory. The affective load of an event has direct consequences on memory, as it assigns emotional significance and adds informational value to the memory. Great informational value increases the number of pathways that connect the memory with others, making it easier accessible for recall (cf., Anderson & Bower, 1974). Further recall helps to consolidate the memory trace. Hence, events of emotional significance should be better recalled after longer periods of time than mundane events. Given that affect is multidimensional⁴ and experienced individually different, this model explains the variability of responses seen in eyewitnesses of crimes.

⁴ Russell (1980) described four different affective states as a result of two orthogonal dimensions (arousal and valence): (1) positive high arousal (e.g., excitement), (2) negative high arousal (e.g., anger, stress), (3) positive low arousal (e.g., relaxation), and (4) negative low arousal (e.g., depression).

The central variable in this model is *arousal sensitivity*: “With a single arousal system the individual differences must be found in the interpretation of the environment and in the differential likelihood that individuals will see the world as threatening or not” (p. 287, Mandler, 1984). According to the BPS model, individuals differ along a continuum with two extreme poles: hyposensitivity and hypersensitivity (Blascovich, 1990, 1992; Mandler, 1992). This idea was previously discussed and researched by Eysenck (e.g., 1967) who proposed that individuals inherit personality traits associated with certain characteristics of the autonomous and central nervous system. For instance, regarding the first dimension of his model of personality, extraverts are thought to be chronically under-aroused and seek to avoid boredom, which dampens the effects of environmental stimuli, whereas introverts are thought to be chronically over-aroused and need to protect themselves from overexcitation. Both groups are expected to differ in their optimal level of arousal, with introverts having a lower threshold than extraverts, at which point input from arousing stimuli is shut down. Consistent with this model, introverts were shown to be more sensitive to low and high physical stimulation than extraverts (e.g., auditory, visual, pain; review see Stelmack, 1997). On a critical note, Aron and Aron (1997) remarked that impulsivity mainly correlated with the biological differences described by Eysenck. Nevertheless, introversion/extraversion was also related to arousal sensitivity. Individual differences in emotionality (neuroticism), the second dimension in Eysenck’s model of personality, have also been theoretically related to different thresholds of arousability (see Zuckerman, 1997). Similarly, Hervé et al. (2007) proposed that hyposensitivity is associated with extraversion and psychopathy, while hypersensitivity is related to introversion and anxiety disorders. Such

dispositional factors determine the quality and quantity of physiological arousal triggered by environmental stimuli. They also determine how arousal is perceived (Blascovich, 1992). Zuckerman's work on sensation seeking, a trait of hyposensitivity, was based on Wilhelm Wundt's theory that individuals have different 'optimal levels of stimulation' (OLS), with sensation deprivation being well below most people's OLS (e.g., Zuckerman, 2004). Similarly, one can assume that trauma (as defined in the DSM-IV-TR, APA, 2000) is well above most people's OLS. Figure 1 describes the relationship between event-related levels of arousal and their impact on eyewitness memory in hypo- and hypersensitive individuals, respectively.

The impact of arousal sensitivity on eyewitness memory is threefold. First, it determines the threshold at which an event is experienced as traumatic. Hyposensitive individuals are thought to experience trauma only at very high levels of arousal and the threshold is much lower for hypersensitives. Second, it determines the point during an event at which attentional distortions are experienced. Hypersensitive people will experience them earlier than hyposensitives. Third, arousal sensitivity determines the affective focus taken during an event. Hypersensitive individuals are thought to decrease the intensity of the situation by focusing, for example, on an escape route or internal stimuli. In contrast, hyposensitive individuals are thought to seek arousal by focusing on the event itself, remaining unaware of their own bodily and psychological sensations. This idea goes back to C.G. Jung, who coined the terms intro- and extraversion (e.g., Storr, 1983). Introversion represents an "orientation of a person towards the inner, subjective world" and extroversion represents an "orientation of a person towards the external objective world" (p. 49, Eysenck, 1977).

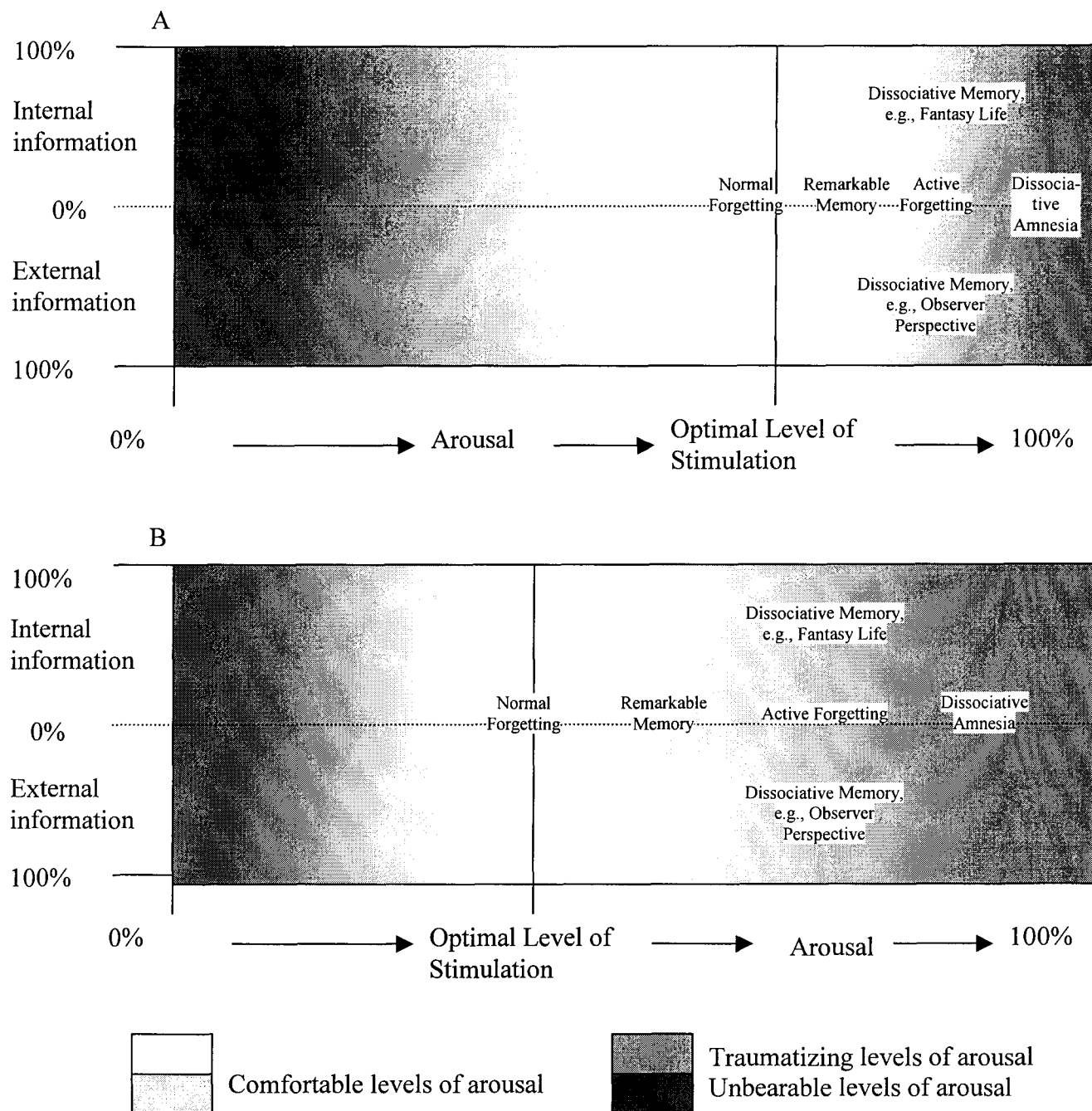


Figure 1: Relationship between Event-Related Levels of Arousal and their Impact on Memory in Hypo- (A) and Hypersensitive (B) Individuals (adopted from Hervé et al., 2007)

Attentional biases during an event determine the quantity and quality of encoding and retrieval of memory. Arousal further influences the transfer of information from short to long-term memory. Very low and high levels of arousal interfere with good transfer, whereas a moderate level of arousal enhances memory consolidation. The disruption of parallel processing at low and high levels of arousal is further dependent on the individual's affective style, resulting from predisposing, precipitating and perpetuating BPS factors. In the present study, intro- and extraversion served to operationalize hyper- and hyposensitivity, respectively. Based on the attentional biases taken by hyposensitive and hypersensitive individuals during an event, it was hypothesized that hyposensitive individuals would make better eyewitnesses than hypersensitive individuals. It was further expected that hyposensitive individuals would be less prone than hypersensitive individuals to experience observer perspectives during trauma, as a means of coping with a stressful event and the resulting memory.

Once the attentional focus has been determined, the cognitive system interprets incoming information (Mandler, 1992). This is where other BPS factors come into play, for example, mental ability, personality, emotional learning history, and a psychiatric history. These factors are thought to influence the encoding of a memory. The model postulates an interaction between arousal sensitivity and cognitive interpretations. Consequently, emotional experiences can be subjectively dampened or stimulated. While positive evaluations (e.g., safety) lead to ANS dampening effects, negative evaluations (e.g., danger) further excite ANS responses.

The model also accounts for factors (e.g., emotional cues, interviewing style) that can influence a memory account at the time of retrieval. For instance, Forgas,

Laham and Vargas (2005) have demonstrated that student witnesses of a staged event were more susceptible to the misinformation effect (e.g., Loftus, 1992) when they were in happy or neutral moods, rather than a sad mood, at the time of retrieval. Table 1 provides an overview of examples of different BPS factors and their effects on recall.

Table 1: Predisposing, Precipitating, and Perpetuating BPS Factors and their Effects on Memory

| | Biological | Psychological | Social |
|---------------|---|--|--|
| Pre-disposing | Arousal sensitivity: | Personality, psychiatric history, and pre-trauma affective state: | Arousal history: |
| | Determines the trauma threshold, the attentional focus during an event, and the threshold for attentional distortions. | Determine a person's arousal sensitivity. | Can change one's arousal sensitivity and cognitive-interpretative system. |
| Precipitating | Arousal: | Cognitive-emotional system: | Context (e.g., feeling in control, perceived source of arousal): |
| | Affects the organism's fight-or-flight response, its cognitive functioning, and its attentional focusing towards the source of arousal. | Guides focus on different aspects of emotion, valence in hypersensitives and arousal in hyposensitives. | Delineates the intensity and quality of affective responses. |
| Perpetuating | Arousal sensitivity: | Motivation, personality, and affect: | Recall context: |
| | Affects the emotional load attached to a memory, may thus lead to memory decay. | Has a direct effect on the contents, quantity, and quality of recall (e.g., as part of a coping strategy). | E.g., determines availability of mood-dependent memories. Suggestive interviewing can bias recall. |

The BPS model explains findings from both analogue and field studies of eyewitness memory. *Mock witnesses*, i.e., participants in laboratory research (Yuille et al., 2004), form their memories primarily based on the cognitive-interpretative system, with minor involvement of ANS reactions. However, witnesses to real crimes will experience ANS induced emotions of great intensity (with regards to arousal and

valence). Due to the low arousal induced by mock crimes in the laboratory, emotion-based memories will, at best, be produced in hypersensitive participants. Field studies, however, examine memories that are based on both the biological and cognitive system, resulting in greater variability of recall in witnesses. Cooper's (2005) study of offenders' autobiographical memories provided preliminary empirical support for some assumptions of the BPS model of eyewitness memory. Male violent offenders were asked to provide different memories of violent and non-violent events. Several analyses suggested that psychopaths, i.e., hyposensitive individuals, were better eyewitnesses than non-psychopaths. Valence of affect during several events was significantly related to ratings of vividness of the pertinent memories. Moreover, rehearsal facilitated recall for different types of events.

The BPS model served to structure the literature review on field and archival studies of eyewitness memory in the next sections. It also provided the overall framework for this study. That said, this dissertation is not a test of the BPS model of eyewitness memory per se, although some of the results may have implications for a refinement of the model.

Field and Archival Studies of Eyewitness Memory

Predisposing Factors of Eyewitness Memory

Personality.

The BPS model predicts certain differences in memories of hypo- and hypersensitive individuals. Personality traits reflect the predisposition to perceive, encode, and retrieve events/memories in certain ways. Indeed, analogue studies such as Bothwell, Brigham, and Pigott's (1987) indicated that arousal facilitates memory in extraverted and emotionally stable people but it has debilitating effects in neurotic individuals. Deffenbacher et al. (2004) highlighted the critical role of individual differences in arousal thresholds and perception of dangerousness. The authors concluded that differences between recall for high and low stress conditions could be increased once individual differences are taken into account. That is, the effects of stress would no longer be averaged between participants. Unfortunately, only a few field studies have examined the impact of personality characteristics on eyewitness memory. Cooper's (2005) investigation of offenders' memories demonstrated that those who claimed amnesia for one of their own acts of violence were more neurotic, less conscientious, and less agreeable than those who did not report an act of violence for which they had amnesia.

The present study was the first to examine personality variables and their association with memory in victims of sexual crimes. Neuroticism and introversion were used to operationalize hypersensitivity, while extraversion and emotional stability (i.e., low neuroticism) were used to reflect hyposensitivity.

Precipitating Factors of Eyewitness Memory

Arousal and Stress.

Arousal during an event is a precipitating factor that has been shown to impact memory for real crimes. Yuille and Cutshall (1986) pioneered the area of field memory research: Based on information from police reports, they conducted a series of field studies (Cutshall & Yuille, 1989) to research the accuracy of victims' vs. bystanders' memories of crime. The participants' role in the crime was used as a means of operationalizing high vs. low arousal. Independent case facts allowed for a reconstruction of ground truth from three crimes involving gun shootings and two other crimes that were less violent than the shootings (i.e., bank robberies). The degree of violence was used as another way to operationalize the degree of arousal presumably experienced by the witnesses. Several months after the witnesses had provided police statements they were re-interviewed by the researchers. The results showed that shootings were better remembered than robberies. Thus, arousal was associated with enhanced recall. In one shooting, Yuille and Cutshall (1986) found no difference in accuracy of peripheral and central details. The least accuracy was reported for perpetrator details (such as hair colour, age, height). Overall, the level of accuracy and the amount of details recalled during the research interviews was strikingly high. Although Yuille and Cutshall's studies were criticized for their lack of a neutral comparison event, several other field studies have been conducted since Cutshall and Yuille's case studies and there seems converging evidence that criminal events that involve high emotional involvement and stress lead to improved recall (e.g., amount of details, accuracy). This has been true, whether the type of crime

(violent vs. less violent or non-violent; e.g., Tollestrup, Turtle, & Yuille, 1994; Wagstaff et al., 2003; Woolnough & MacLeod, 2001) or the role of the witness (bystander vs. victim; e.g., Christianson & Hubinette, 1993) was used as an operationalization of the degree of emotional involvement.

Although disasters and accidents do not involve face-to-face violence and combat experiences do not involve criminal activity, such events are valuable to study the effects of extreme arousal on memory. The results from this literature are in line with other field and archival studies of autobiographical memory. For instance, the majority of survivors of the Titanic had accurate recall of the central details of the ship sinking (Riniolo, Koledin, Drakulic, & Payne, 2003). Unfortunately, this study did not control for high vs. low arousal (e.g., comparing peripheral and central witnesses). Pezdek (2003) had the opportunity to do so. Her study of the 9/11 terrorist attacks demonstrated that those who were most directly involved in this event had the most accurate event memories (measured via specific memory questions), whereas their autobiographical memories (assessed via open-ended questions regarding their personal experiences at the time of the attacks) were the least detailed. Self-rated stress did not account for the group differences.

Porter and colleagues conducted a number of studies comparing traumatic (involving high arousal) to positive (baseline) events. For instance, Porter & Birt (2001) compared memories for traumatic events and positive experiences in a sample of undergraduate students. The former contained more overall details than the latter, suggesting that traumatic stress is a memory-enhancing factor. Peace & Porter (2004) conducted a longitudinal study, in which community members recalled a positive and a traumatic experience. The participants were asked to recall these memories on two

occasions, approximately three months apart. Overall, traumatic memories were more consistent in terms of factual information than positive memories. They were also more consistent over time in terms of their vividness, clarity and overall quality than positive memories. Interestingly, memory consistency for traumatic events did not vary by trauma severity. The consistency of traumatic memories was also not predicted by symptoms of posttraumatic stress which improved from T1 to T2. Also, the type of interview used to elicit a memory did not impact memory consistency in either one of the event categories (i.e., positive and traumatic). It was concluded that the study yielded support for the *trauma superiority argument*. Thus, stress – even when it had traumatic qualities – did not impair memory. In fact, the reverse was true: trauma appeared to enhance memory compared to positive events. In a follow-up study, Peace and Porter (2007) had the opportunity to assess the same participants several years after their initial interview. The findings remained unchanged: Traumatic memories were special in the sense that they were consistent over time, whereas memories of positive events deteriorated over time. Other studies have confirmed that traumatic memories are remembered more vividly than other types of events involving less arousal (e.g., Wenzel, Pinna, & Rubin, 2004; for review see Heuer & Reisberger, 1992).

Some studies do not support the notion that high (traumatic) arousal leads to detailed and/or accurate memories. For instance, Southwick, Morgan, Nicolaou and Charney (1997) reported on a prospective study of Gulf War veterans' memories, which showed great inconsistencies between memory tests at 1 month and 2 years after return from the Gulf War. However, memory was assessed on a self-report questionnaire that checked for certain types of experiences, such as 'observed death

of a close friend', 'firefights', 'being responsible for someone's death.' Thus, the questions were rather vague and did not involve tests for specific/personal details from each veteran's memory.

Neisser et al. (1996) studied memories of the 1989 earthquake in California and demonstrated that participants who had personally experienced this event had more accurate recall than those who had only learnt about it on television. Seemingly, these results would support the arousal hypothesis, however, the authors attributed this effect to the distinctiveness of the event and the fact that better retained memories had been rehearsed more often.

Most of the studies reviewed in the above section contradict the opinion of many experts who provide testimony on eyewitness memory in court (Kassin et al., 1989; Kassin et al., 2001). The majority opinion is that extreme stress always debilitates memory. This position is consistent with traditional theories of eyewitness memory and the findings from analogue research. However, these theories are oversimplistic and fail to explain various memory patterns demonstrated in real crime witnesses. Christianson (1992) concluded it was 'time for retirement' of the Yerkes-Dodson law⁵. In the present study, arousal for each type of event was assessed on a visual one-item rating scale. The quality and quantity of each type of memory was assessed on a self-report questionnaire. In addition, the narratives from each participant were coded for certain memory details.

⁵ Christianson (1992) further noted that arousal is 'mal-defined' (see also Mandler, 1992; Revelle & Loftus, 1992). Different forms of arousal are not differentiated in the Yerkes-Dodson curve, for example, arousal of the autonomic nervous system (ANS), cortical arousal, and behavioral arousal. It is possible that different types of arousal become dissociated from one another.

The presence of a weapon.

The *weapon focus effect* was first studied in a laboratory context. Loftus, Loftus, and Messo (1987) demonstrated that stressful objects such as weapons captured the participants' attention to the point where little peripheral details were perceived or remembered. Other laboratory studies have demonstrated the debilitating effects of the presence of a weapon on recall for details other than the weapon itself (e.g., Kramer, Bouckhout, & Eugenio, 1990; Maas & Koehnken, 1989). Steblay's meta analysis (1992) demonstrated that the effect size of the weapon focus effect was small when line-up identification was the dependent variable, and moderate when feature accuracy was the dependent variable. Interestingly, a 'weapon' focus effect was also demonstrated in studies that did not involve weapons but merely unusual objects (e.g., a rubber chicken; Pickel, 1998, 1999). It was speculated that weapons might cause this debilitating effect on memories due to their unusualness rather than the threat they imply (see Heuer & Reisberg, 1992).

Evidence from field and archival research does not provide support for the validity of the weapon focus effect. Kuehn (1974) compared police reports of two homicides, 22 rapes, 15 assaults, and 61 robberies and analyzed if victims could recall certain details about the suspect and the circumstances of their crimes. Contrary to laboratory research, the threat of a weapon was not related to completeness of descriptions provided by these victims. Similarly, Cooper, Kennedy, Hervé, and Yuille (2002), as well as Wagstaff et al. (2003) did not find any differences in recall between events that did vs. did not involve weapons. Further, Hulse and Memon's (2006) study of simulated crimes revealed no differences in identification accuracy between shootings vs. other crimes not involving any weapons. In fact, Tollestrup et

al. (1994) demonstrated that eyewitnesses of crimes that involved a weapon reported significantly *more* details than those who witnessed crimes that did not involve a weapon. In summary, due to the lack of support from field research, it has been suggested that the weapon focus effect might not be a real-life phenomenon (e.g., Behrman & Davey, 2001).

In the present study, participants were asked to indicate if a weapon was involved in the events they experienced (detailed and less-detailed experiences of sexual violence, respectively).

Type of event: sexual trauma

A scant amount of research has examined eyewitness memory in victims of sexual violence, including sex trade workers. This is intriguing considering prostituted individuals are often targets of violent crimes (e.g., Farley & Barkan, 1998). Sexual trauma can be viewed as an extreme form of victimization because it is interpersonal, it involves physical and very intimate body contact, it involves an extreme violation of boundaries, and the victim is forced to directly face the perpetrator. Hence, it is thought that the levels of arousal and stress are particularly high for victims of such crimes. Compared to other forms of trauma, sexual violence might have a more extreme, perhaps even different, impact on recall. Indeed, as discussed below, the findings in this area are quite variable.

Porter and Birt's (2001) study of undergraduate students revealed that the quality (e.g., sensory components, vividness) of memories for sexual violence was better overall than such qualities in memories of other traumatic events. Other studies have shown the opposite. For instance, Kuehn (1974) established that victims of

interpersonal violence (such as rape and assault) provided less complete descriptions of the suspect than victims of robbery. He concluded that more severe violence (i.e., rape) led to poorer recall of the perpetrator than less severe violence (i.e., robberies). Tromp et al. (1995) investigated if rape memories contained more flashbulb characteristics than memories of other unpleasant events. According to the flashbulb view, conditions of high arousal lead to very vivid memory. The authors surveyed 3179 female employees, 30% of which had experienced a completed rape. Those without a rape experience were asked to provide a memory of another unpleasant experience. The data were collected after the participants of the survey had recovered from their experiences. Rapes were remembered less clearly, less vividly, were less thought and talked about, and involved less visual details than other unpleasant events. A similar study by Koss, Figueredo, Bell, Tharan, and Tromp (1999) confirmed that rape memories had less clarity and vividness, and were less thought and talked about than other unpleasant memories. These differences were related to the type of event rather than the participants' cognitive appraisal thereof (e.g., perceived threat). Neither substance abuse at the time of the events nor the ages of the memories were accounted for in either of these two surveys' analyses.

In Mechanic, Resick, and Griffin's (1998) study of 92 rape victims, 37% had (self-reported) amnesia for parts of their rape two weeks after it happened. The intensity and frequency of amnesia declined significantly over the next ten weeks. Interestingly, there were no differences in general memory deficits and psychopathology between those who did vs. those who did not previously report amnesia. Instead, memory deficits were associated with knowing the perpetrator.

Inconsistent with Koss et al.'s study, perceptions of life threat had an enhancing effect on memory for rape.

Finally, Wagstaff et al. (2003) analyzed perpetrator descriptions obtained from 42 female victims of rape, attempted rape, or indecent assault during their police interviews. These descriptions were compared to the offenders' actual appearance when they were arrested. The level of violence (e.g., the presence of a weapon) generally failed to predict memory accuracy of recall, except hair colour was more accurately recalled for perpetrators of rape as well as perpetrators of other crimes involving high levels of violence.

Most studies of sexual traumas reviewed thus far suggest that memories of sexual violence may not fit the pattern of remarkably detailed and accurate memories found for other types of traumas or criminal events. However, none of the studies reviewed above included within-subject comparisons of sexual traumas and other events. Such a study design is desirable to prevent that individual differences confound with the variables of interest (e.g., stress, memory). To address this methodological problem, Cooper, Yuille, et al. (2002) compared three types of sex trade workers' autobiographical memories - a positive experience, a sexual assault, and a physical assault - in terms of the quantity and quality of details. These analyses were within-subjects. The details were coded from memory narratives, which were obtained orally from the participants. No significant differences were found in the amount of details recalled from each type of event. Although non-significant, the trend was for the participants to recall more details about their traumatic experiences, whether sexual ($X = 44.19$ details) or non-sexual ($X = 34.29$ details), than they did about their positive experience ($X = 31.52$ details). The most important finding was

the high variability in the amount of recall *within* memory categories, which was particularly true for sexually traumatic memories. Peace, Porter, & ten Brinke (2007) conducted a very similar within-subjects comparison of memories for positive events, sexual traumas and non-sexual traumas from 44 females. They were asked to write narratives of these memories and to answer questions regarding the quality of their memories. Sexual traumas contained the greatest amount of details and were perceived as the most vivid and sensory. However, they were also associated with the highest degree of self-reported memory problems (e.g., prior forgetting). Dissociation was associated with poorer memory across memory categories.

Overall, the findings on memory for sexual violence are variable. In comparison to other types of traumas, the likelihood of PTSD is greater after the experience of sexual violence (e.g., Breslau, Davies, Andreski, & Peterson, 1991; Kilpatrick, Saunders, Amick-McMullan, & Best, 1989). PTSD includes symptoms of both amnesia and enhanced memory (e.g., flashbacks). Hence, victims of sexual violence are an interesting population for the study of eyewitness memory. In this dissertation, well- and poorly-remembered sexual assaults were compared on a number of situational variables. Memories of sexual violence were further compared to memories of positive events. The novelty of this research lies in the comparison of two sexual assaults experienced by the same person (i.e., the within-subjects design).

Peritraumatic dissociation.

Dissociation is the compartmentalization of different psychological functions, a phenomenon that is thought to occur as a defence during traumatic experiences (Spiegel, 1997), although it has also been observed during positive states (Pica &

Beere, 1995). Whereas *trait dissociation* refers to an individual's general tendency to dissociate in daily life, *state* or *peritraumatic dissociation* refers to dissociating during or immediately after situations. Trait and peritraumatic (i.e., state) dissociation are closely related, that is trait dissociation increases the likelihood of dissociating during traumatic situations (e.g., Kindt & van den Hout, 2003), and the experience of peritraumatic dissociation raises the likelihood of general dissociative tendencies (e.g., Bremner & Brett, 1997). These findings were confirmed in both victims (Cooper, 1999) and offenders (Cooper et al., 2005) of crime. Although traditionally viewed as pathological, research has demonstrated that dissociation also occurs as a normal cognitive process (Ray, 1996).

Van der Kolk (e.g., 1996) argued that memories of ordinary and traumatic events are qualitatively different from each other (the *traumatic memory argument*, see Kihlstrom, 1996): he claimed that the fragmentary nature of traumatic memories stems from dissociative processes (e.g., van der Kolk, 2002; van der Kolk & Fisler, 1995; Spiegel & Cardena, 1991). Indeed, some research has demonstrated that traumatic memories contain more perceptual (e.g., olfactory, visual, auditory, kinaesthetic) than declarative (e.g., person descriptions, actions) elements (van der Kolk & Fisler, 1995). In the latter study, some participants were unable to even provide a narrative of their trauma. Their mean score for trait dissociation was far above the mean of the general population. The traumatic memory argument has received additional support from neuroimaging studies, in which the Broca's area (the part of the brain that controls speech) decreased its activity during stimulation of traumatic memories (see review by Hull, 2002). Apparently, recovery from trauma involves an integration of formerly dissociated functions, as shown by Foa, Molnar,

and Cashman (1995) whose study participants developed more coherent trauma narratives once they recovered from PTSD.

Cooper's (2005) investigation of violent offenders' autobiographical memories showed that higher state dissociation was reported during acts of perpetrated violence and traumatic events than during positive events. Some participants claimed amnesia for an act of violence they had committed. Such events were associated with the highest rates of peritraumatic dissociation. In a different study on dissociation and amnesia in male inmates, it was shown that 34% of the sample reported amnesia for their index offence, which was significantly related to other symptoms of peritraumatic dissociation (Cooper, Cuttler, Dell, & Yuille, 2006).

With regards to being the victim of sexual violence, Mechanic et al. (1998) demonstrated that victims who had amnesia for their rape had significantly higher levels of peritraumatic dissociation than non-amnestic victims. Similarly, peritraumatic dissociation during sexual and non-sexual assaults was associated with low reading ease of the victims' trauma narratives (Zoellner et al., 2002).

Perceiving a trauma from an observer perspective is an extreme form of peritraumatic dissociation (e.g., Marmar et al., 1997). Although observer perspectives are not specific to sexual assaults, anecdotal evidence stems mostly from sexually violent events (e.g., Spiegel, 1993). Nigro and Neisser (1983) coined the terms *observer* and *field memory* as descriptions of the perspective from which past events are recalled (as spectator or participant, respectively). They demonstrated that such perspectives were related to the situation of the to-be-remembered event as well as the circumstances of recall. For instance, situations involving high self-awareness can be experienced from an observer perspective and are likely to result in observer

memories. Also, being asked to focus on feelings when recalling a certain situation produces a higher rate of field memories. Terry and Barwick's study (1998) emphasized the role of rehearsal in the production of observer memories. Robinson and Swanson (1993) demonstrated that affect at the time of recall could be decreased by recalling an event from an observer perspective. In McIsaac and Eich's studies of non-traumatic and traumatic events (2002a and 2002b, respectively), field memories included descriptions of psychological states and physical sensations, whereas recalling the same events from an observer perspective led to a focus on people and objects in the room. Originally, it was assumed that observer memories are a product of memory reconstruction since it was thought that events are always perceived from a field perspective. However, Nigro and Neisser (1983) remarked that observer memories could also be a reflection of the individual's experience at the time, outlining the possibility of observer *experiences*. Memory perspectives have rarely been empirically examined in victims of crime and trauma. However, there is anecdotal evidence that some victims of sexual violence perceive their victimization as *out-of-body-experiences*⁶, i.e., from an observer perspective (Alvarado, 2000; Marmar et al., 1997; Spiegel, 1993; Spiegel & Cardena, 1990).

How does this relate to the quantity of details recalled from traumatic events? Some of the sex workers in Cooper, Yuille, & Kennedy's (2002) study experienced their sexual traumas from an observer perspective. Such memories contained significantly more details than memories of sexual assaults that were experienced

⁶ Out-of-body-experiences have also been reported by a police officer, a marathon runner, people who were close to dying (near-death experiences), people who were held hostage, as well as people in ordinary circumstances, under hypnosis, and who had voluntarily induced an out-of-body-experience.

from a field perspective. They were also perceived as more traumatic than sexual assaults that were experienced from a field perspective. No such differences were demonstrated for memories of positive events or non-sexual traumas. This study was the first empirical investigation of observer perspectives in relation to sexual violence. It was exclusively focused on perspectives at the time of the trauma (i.e., observer *experiences*), but not on perspectives at the time of recall. Although Cooper et al.'s (2006) study of offenders' dissociative symptoms during their most recent offence did not assess for the quantity of recall, it is interesting that 10% of the sample reported having an observer perspective during the event in question. Such experiences were significantly related to the overall amount of peritraumatic dissociation. To summarize, observer experiences have been reported from victims and offenders of violence.

In this dissertation, the participants rated their memories of positive events and sexual victimizations with regards to symptoms of peritraumatic dissociation, including observer and field perspectives at the time of the event. They also rated their observer vs. field perspectives at the time of recall. It was examined whether different forms of dissociation during events were associated with the amount of recall and whether arousal sensitivity influenced the experience of dissociation in the first place.

Intoxication.

Yuille and Tollestrup (1990) conducted a laboratory study of male students' memories for a staged theft. Some participants witnessed the event under the influence of alcohol. Alcohol suppressed the amount of recall immediately after the

event happened. It also impaired the amount and accuracy of recall one week after the event. A similar study by Read, Yuille and Tollestrup (1992) focused on the effects of alcohol on perpetrators, rather than bystander witnesses, of a staged theft. Again, memory accuracy was impaired under the influence of alcohol as compared to a sober control group. This was particularly true for information about persons. Interestingly, arousal was not associated with memory performance in intoxicated or control participants. In a second experiment, in which participants in the alcohol condition received a little less alcohol than in the first experiment, intoxication was not related to memory performance with regards to what people saw but it impaired memory performance with regards to their own actions. Intoxicated participants evidenced impaired memory for peripheral details, as tested by an identification task. This effect only occurred under conditions of low arousal; under conditions of high arousal intoxicated participants overcame the detrimental effects of intoxication on memory performance.

Yuille, Tollestrup, Marxsen, Porter and Hervé (1998) studied the effects of marijuana on memory for a staged interpersonal confrontation. Marijuana had a detrimental effect on memory during recall immediately after the event (i.e., intoxicated participants recalled less than participants in a placebo control group). However, intoxication was not associated with accuracy in an identification task. When participants were re-interviewed one week after the event, recall was generally enhanced, however this effect was stronger for the marijuana than the placebo group.

Although not a main focus of the present study, intoxication at the time of the three events was assessed. It was expected that the majority of crimes studied in this

dissertation would involve habitual drug users as well as frequent intoxication during the events (see also Yuille & Tollestrup, 1990).

Summary.

The precipitating factors reviewed in the previous sections include arousal, the presence of a weapon, the type of event (e.g., type of violence, degree of trauma), peritraumatic dissociation (including observer and field perspectives), and intoxication. These factors were investigated with regards to their impact on different memory patterns (see Yuille & Daylen, 1998).

Perpetuating Factors of Eyewitness Memory

Delay of recall.

The findings on the effects of delay on memory are fairly consistent. Experimental studies have shown the detrimental effect of delayed recall on memory. For instance, Odinet and Wolters (2006) showed that delayed recall impaired memory accuracy for a videotaped motor vehicle accident unless the memory was rehearsed. Similar results were obtained by Tuckey & Brewer (2006) in a study of memory for videotaped robberies. Yuille et al.'s (1994) study of police trainees' memories for realistic role-plays (a quasiexperimental study) showed that memory declined over time for stressful but not for non-stressful events. However, accuracy was higher in the stressful condition and there was no decline in accuracy due to delayed recall. Again, memory rehearsal soon after the event increased the amount and accuracy of recall later on.

Field studies of eyewitness memory have yielded similar findings. In Cutshall and Yuille's (1989) analyses of different violent crimes, original police statements as

well as research interviews, which were conducted several months later, were transcribed and coded for details. A comparison of the two interviews revealed that the memories were detailed and highly accurate, with little loss over time. More details were produced during research interviews than during police interviews. Thus, memory for emotional events might not be negatively affected by delay.⁷

Archival studies of Holocaust survivors' memories involve extremely long retention intervals and have produced similar results as studies of eyewitnesses. For instance, Wagenaar and Groeneweg (1990) analyzed statements from 78 witnesses who testified at a trial of a Dutch concentration camp worker. Testimonies were obtained in the 1940s and then again in the 1980s. Some loss of memory occurred with regards to dates, the name of the accused, recognition of the accused, and details such as camp registration numbers. The accuracy for some details was compromised. Nevertheless, there was a remarkably high degree of overall recall and consistency of details concerning the central events. The majority of the witnesses reported these details spontaneously, with little negative effect of delay over time. Similarly, Schelach and Nachson (2001) studied memories of five Auschwitz survivors who were between six and twenty-two years old when they arrived at the camp. Accuracy of the participants' narratives was confirmed by means of independent, corroborative sources. In general, memory accuracy ranged between 53% and 69%. Their narratives were "clear, detailed, orderly, and realistic" and contained "visual and auditory modalities" (p. 129). Special occurrences and emotional events were recalled more accurately than routine events, presumably because the former had been rehearsed

⁷ This finding might have been confounded by the quality of the police vs. research interviews.

more than the latter. As in Wagenaar and Groeneweg's study, recognition of faces (e.g., Nazi personalities at the camp) was poor.

In the present study, self-reported ages of the different memories (positive, sexual violence) were assessed to examine the effects of delay of recall. It was expected that the delay in recall (i.e., the time between the events in question and recall for the purposes of this study) would involve a wide range of time spans.

Rehearsal.

Explicit rehearsal helps people integrate specific memories into their autobiographical memory and identity (Berntsen & Rubin, 2002). Memories become organized by shaping a narrative (Spinhoven et al., 1999). Scrivner and Safer (1988) found a hypermnesia effect after repeated rehearsal in a laboratory study involving a videotaped burglary and shooting. Participants were asked to recall this scene on four occasions. It was found that repeated recall increased memory accuracy. Other laboratory studies have confirmed the facilitating effects of rehearsal on the amount of recall (e.g., Bornstein, Liebel, & Scarberry, 1998; Lane, Mather, Villa, & Morita, 2001; Read, Hammersley, Cross-Calvert, & McFadzen, 1989).

Few field studies exist on the relationship of rehearsal and memory: Cooper's (2005) investigation of violent offenders' autobiographical memories demonstrated that, the more a memory had been rehearsed, the better it was recalled. In a quasiexperimental study involving a mock crime, van Oorsouw and Merckelbach (2004) found that attempts to feign amnesia, that is, to purposefully not provide memory details at time 1, led to decreased recall at time 2 compared to control participants. This implies that rehearsal facilitates the amount of recall.

Regarding memories for sexual violence, Tromp et al.'s (1995) as well as Koss et al.'s (1999) surveys showed that rape memories were less well-remembered than other unpleasant experiences. Rape memories had been less rehearsed than memories of other unpleasant events. Thus, a lack of rehearsal seemed to debilitate memory.

In the present study, each participant was asked to provide a 'ballpark' estimate of how many times they had talked about each memory. They were also asked if they had ever written their memories down (e.g., in a journal, police statement).

Summary.

The above review of perpetuating factors that are associated with the quality of autobiographical memory shows that rehearsal has a memory-enhancing effect, but the picture is less clear when it comes to the effects of delayed recall: Some studies have shown a detrimental effect of delayed recall on memory performance, others have found a memory enhancing effect. It seems that the type of event (traumatic vs. neutral) might have a bigger impact on memory than delayed recall. Both rehearsal and the age of each memory were controlled for in this investigation of sex trade workers' memories for positive events and sexual violence.

The Emotional Consequences of Sexual Violence

The study of sex workers' traumatic memories provided an opportunity to investigate the emotional consequences of sexual violence. Little research has focused on phenomena such as dissociation and PTSD in prostitute populations. This dissertation maps onto Cooper's (1999) investigation of prostitutes' autobiographical memories, however the assessment of PTSD symptoms was more thorough, the sample size of the present study was much larger, and two sexual assaults (rather than one sexual assault and one physical assault) were compared to each other.

The following sections provide an introduction to the concept of PTSD, followed by a review of the literature about factors that enhance the risk of adverse emotional reactions following trauma.

The Concept of PTSD

Various forms of reactions to trauma have been conceptualized, for example, the stress response syndrome (Horowitz, Wilner, & Alvarez, 1979), in which intrusion and denial occur as oscillating reactions to traumatic stress. The DSM includes two diagnoses that describe such reactions. Acute Stress Disorder (ASD; APA, 1994, 2000) is a diagnosis that may apply in the immediate aftermath of a trauma. The symptoms include mostly dissociation (e.g., detachment, numbing, lack of emotional expressiveness, decreased awareness of surroundings). PTSD (APA, 1994, 2000) is a similar diagnosis, however, it describes chronic problems and includes a greater range of symptoms. Although the concept of PTSD has existed for more than 100 years (e.g., labelled *shell shock*, *battle fatigue* during the two world

wars; see Peebles, 1989), PTSD was first introduced to the DSM in 1980 (DSM-III, APA, 1980). It emerged from the research on Vietnam veterans; in fact, at that time, the full PTSD syndrome had not yet been demonstrated in civilian populations (e.g., Helzer, Robins, & McEvoy, 1987). The concept included the assumption that experiencing trauma is different from experiencing stress. It required that a trauma is “outside the range of usual human experience” and that it “evoke[s] significant symptoms of distress in most people” (DSM-III; APA; p. 236). This definition was problematic because of its circularity: Events after which people develop PTSD must have been traumatic.

The concept of PTSD has changed considerably over the years. The DSM-III-R (APA, 1987) described traumas as experiences outside the range of usual human experience. This definition was also problematic, given that epidemiological studies (e.g., Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995) have demonstrated that the majority of the US population has experienced some type of trauma in their lifetime. The idea of trauma being an extraordinary event was further criticized for implying a stronger connection between stress and PTSD than justified (Paris, 2000).

Another assumption of the early PTSD concept was that it is a distinct disorder regarding its cause, symptoms, and course. PTSD was thought to be the only response to trauma. Clearly, this assumption does not hold in the face of epidemiological studies showing that traumatized people are at higher risk for depression, panic disorder, generalized anxiety disorder, and substance abuse (Kessler et al., 1995). Further, it was implied that PTSD is rooted in the experience of trauma, without the contribution of predisposing and perpetuating factors occurring before and after the trauma, respectively. Also, exposure to trauma was thought to

occur at random. These assumptions are unsubstantiated in the light of modern findings. Research shows that some people have greater vulnerability for PTSD than others (e.g., Shalev, 2001) and that some traumatic events do not occur at random (e.g., emergency personnel are at higher risk of trauma exposure than the general population).

Finally, another assumption of the DSM-III was that the same set of PTSD symptoms would be developed after any given type of trauma (e.g., combat, natural disaster, interpersonal violence). There is no mention that PTSD might be distinctly shaped after distinct types of traumas (cf., Brewin, 2004). The DSM-IV (APA, 1994) took into account that different events and event characteristics (e.g., controllability, perceived threat, predictability; cf. Foa, Zinbarg, & Rothbaum, 1992) could lead to symptoms of varying onset and duration (Saigh & Bremner, 1999).

The present study adopts the current trauma definition of the DSM (DSM-IV-Test Revision [TR], APA, 2000), which is twofold and in line with modern research and theory: The first part of this definition requires that trauma involves experiencing, witnessing, or being confronted “with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others” (p. 427). The second part of this definition requires that the event evoke fear, horror, or helplessness. Whereas the characteristics defining the first part can be objectively determined, the characteristics of the second part depend on the subjective experience. Thus, in line with the recent stress literature, the current definition of trauma incorporates a person-environment interaction (e.g., Keane, 1985). Besides the trauma criterion (A), the DSM-IV-TR describes the following symptom criteria that are required for a diagnosis of PTSD. The first symptom cluster (B) describes

intrusion and re-experiencing, for example, having unwanted memories, nightmares or flashbacks of the original trauma. The second cluster (C) describes avoidance and numbing symptoms, for example, giving up activities associated with a trauma or feeling detached and estranged from others. The third symptom cluster (D) describes hyperarousal, such as difficulties sleeping or concentrating. PTSD is diagnosed if a certain accumulation of these symptoms⁸ occurs for one month or longer (criterion E) and if it impairs the person in important areas of functioning (criterion F).

Etiology of PTSD

There is increasing empirical evidence showing that exposure to trauma on its own is insufficient to explain the development of PTSD (Brewin, Andrews, & Valentine, 2000). Although there is a dose-effect relationship between trauma severity and PTSD, it is remarkable that at least 50% of trauma survivors (the percentage differs by type of trauma) do *not* develop PTSD (Kessler et al., 1995). Hence, there must be individual differences that determine the degree to which one is vulnerable to suffer PTSD. According to the diathesis-stress model, people who have certain predispositions are more likely than those without such predispositions to develop PTSD upon exposure to extreme stress. However, the possibility that diathesis and stress are not independent of each other is an important consideration. That is, certain types of stress might depend on certain predispositions (e.g., Monroe & Simons, 1991). Similar to the BPS approach introduced above, Creamer (2000)

⁸ A PTSD diagnosis requires at least 1 symptom of re-experiencing, 3 symptoms of avoidance/numbing, and 2 symptoms of hyperarousal (DSM-IV-TR, 2000).

suggested that three classes of etiological factors influence traumatic stress reactions after violence: pretraumatic, peritraumatic, and posttraumatic factors. The following sections are structured according to this notion. Peritraumatic predictors of PTSD are reviewed first, as they have been shown to have a stronger impact on PTSD than pretraumatic and posttraumatic risk factors (Brewin et al., 2000).

Peritraumatic Factors that Predict⁹ PTSD

Type of trauma.

The type of trauma is associated with the likelihood of PTSD development, with sexual violence leading to the highest prevalence of PTSD (Breslau et al., 1991; Kilpatrick et al., 1989; Rothbaum, Foa, Riggs, & Murdock, 1992). The rate of PTSD after accidents and natural disasters is much lower (Foa, 1997; Kessler et al., 1995). Not only does the prevalence of PTSD differ by type of trauma, there are also qualitative differences in the psychological problems that emerge after different types of traumas. For instance, substance abuse is more strongly associated with combat experiences than other traumas; panic disorder and phobias are more prevalent in women than men; the rate of somatization disorders is higher after traumas that involve physical suffering; as well, antisocial personality disorder is more prevalent in Vietnam veterans with PTSD than survivors of other traumas (Deering, Glover, Ready, Eddleman, & Alarcon, 1996).

Many different problems have been observed in victims of sexual violence, for example substance abuse, poor health behaviors, depression, sleeping difficulties,

⁹ *Correlates, risk factors, and markers* can be distinguished as variables that contribute to the prediction of a certain construct (Kraemer et al., 1997). The present review includes all three types of 'predictors.' The term *risk factor* is used interchangeably for all three.

fatigue, suicide attempts, intrusive memories, somatic complaints, poor concentration, obsessive-compulsive symptoms, and difficulties in social and sexual functioning (Foa & Riggs, 1994; Lang et al., 2003; Steketee & Foa, 1987). However, the most persistent symptoms are intense fear and anxiety. Burgess and Holstrom (1974) first coined the term *rape trauma syndrome* to describe the psychological reactions seen in many rape victims. Since 1980, they have been conceptualized within the framework of PTSD (APA, 1980; Foa & Riggs, 1994). Due to its high prevalence (e.g., Kilpatrick, Saunders, Veronen, Best, & Von, 1987), sexual violence is the best-studied trigger of PTSD in women.

Studies on PTSD in prostituted individuals are rare, although their exposure to sexual violence is greater than in the general population. The notion that sexual violence is followed by the highest rate of PTSD mostly stems from *between*-subject comparisons (e.g., Kessler et al., 1995). Cooper, Kennedy, and Yuille (2004) examined sex workers' memories of sexual vs. non-sexual traumas for posttraumatic stress symptoms. This was the first *within*-subject comparison of different types of traumas. Cooper et al. (2004) found a significant mean difference of scores on the Impact of Event (IES) scale between sexual ($M = 50.74$) and non-sexual assaults ($M = 36.17$). Thus, the notion that sexual violence leads to higher rates of PTSD symptoms holds within-subjects. Unfortunately, no hyperarousal symptoms were assessed. Hence, no PTSD diagnoses could be derived. Based on IES cut off scores reported in the literature, the authors estimated that 94% of the women in their sample might have had PTSD from sexual traumas, and 67% from non-sexual traumas.

In this dissertation, two memories for sexual assault were elicited from each participant to allow for within-subjects analyses of PTSD risk factors (i.e., other than the type of trauma and individual difference variables).

Severity of trauma.

Although the severity of a trauma does not predict PTSD as well as the type of trauma, it is nevertheless proportional to posttraumatic maladjustment. Several studies have established that a high degree of brutality during sexual assaults led to more psychopathology than less severe violence (Foa & Riggs, 1994). Similarly, suffering physical injury during a crime has been shown to be directly related to the likelihood of PTSD development. The same has been shown for the duration of the assault and the perception of life threat (Foa & Riggs, 1994; Kilpatrick et al., 1989). With regards to sexual traumas, a history of completed rape has been shown to predict PTSD better than attempted rape (Kilpatrick et al., 1987). However, the mere presence of a weapon, another indicator of the severity of violence, has not been shown to be a reliable predictor of PTSD, which emphasizes the crucial role of the victim's perception of threat rather than actual threat (Foa, Steketee, & Rothbaum, 1989)¹⁰. Ambiguous results have been obtained for the number of perpetrators as an indicator of rape severity (see Foa & Riggs, 1994). Foa and Riggs (1994) proposed that a history of victimization facilitates the development of schemas of a dangerous world and a vulnerable self. Upon exposure to yet another victim experience, these schemas would be activated once again and become chronic. In a sense, previous victimizations increase the severity of subsequent traumas. Incidentally, the severity

¹⁰ Variables such as perceived life threat and the severity of a trauma are mostly assessed in retrospect. Thus, current symptoms might impact the measurement of trauma severity.

of a trauma has also been shown to be important in violent offenders' reactions to their own crimes. In one study, PTSD symptoms seemed to be better predicted by the severity of violence committed than the motivation (i.e., instrumental vs. reactive violence) for committing crimes (Griesel, Cooper, & Yuille, 2004).

In this dissertation, the severity of trauma was rated for both sexual assaults, once by the participants, and once by the interviewers based on the information provided by the participants.

Peritraumatic dissociation.

The concepts of state and trait dissociation as well as their association are explained above. The focus of this section is on dissociative phenomena at the time of the trauma and how they predict PTSD. The tendency to dissociate in daily life (trait dissociation) predisposes people to develop higher levels of posttraumatic stress (Gershuny & Thayer, 1999). During and immediately after trauma, dissociation serves as a defense to escape intolerable stress and emotional helplessness and fear (e.g., van der Kolk & Fisler, 1995). Examples of such experiences are: an altered time sense, feelings of unreality, altered body images, feelings of being disconnected from one's body, and tunnel vision (Marmar et al., 1997). Out-of-body experiences are a form of dissociation that might be particularly prevalent in victims of sexual violence (e.g., Cooper, Yuille, Kennedy, 2002; Marmar et al., 1997; Spiegel & Cardena, 1990). Although helpful at the time of trauma, dissociation seems to impair the processing of a traumatic experience in the long run (Spiegel, 1993). Following trauma, dissociation is thought to produce numbing, affect-laden memories, and

flashbacks as reflections of insufficiently integrated trauma knowledge (Spiegel & Cardena, 1990).

Research has shown that peritraumatic dissociation is a strong predictor of PTSD in Vietnam veterans (e.g., Bremner, Southwick, Brett, & Fontana, 1992; Bremner, & Brett, 1997; Marmar et al., 1994), survivors of road traffic accident (e.g., Murray, Ehlers, & Mayou, 2002; Ursano et al., 1999), Pentagon employees after 9/11 (Grieger, Fullerton, & Ursano, 2004), survivors of natural disaster (e.g., Koopman, Classen, & Spiegel, 1994; Cardena & Spiegel, 1993), survivors of physical civilian trauma (e.g., Shalev, Peri, Canetti, & Schreiber, 1996), and women after pregnancy loss (Engelhard, van den Hout, Kindt, Arntz, & Schouten, 2003). A meta-analysis of 68 studies on predictors of PTSD (Ozer, Best, Lipsey, & Weiss, 2003) revealed that, in a subset of 16 studies, peritraumatic dissociation had a significant effect size ($ES = .35$) that did not vary by type of event. It should be noted that the relationship between peritraumatic dissociation and PTSD might be overestimated due to the cross sectional and retrospective design of most studies (Candel & Merckelbach, 2004). Indeed, in one study, memory for peritraumatic dissociation that was reported retrospectively was not consistent with reports of peritraumatic dissociation soon after the trauma (Marshall & Schell, 2002).

Only a few studies have not demonstrated support for the link between peritraumatic dissociation and acute or chronic stress unequivocally. For instance, in one study, emergency room personnel's experience of peritraumatic dissociation was not related to overall PTSD, although there was a correlation with the intrusion cluster (Laposa & Alden, 2003). In a sample of non-treatment seeking university women, Gershuny, Cloitre, and Otto (2003) demonstrated that the relationship

between peritraumatic dissociation and PTSD was entirely explained by event-related fears about death and losing control.

With respect to violent crimes, peritraumatic dissociation and acute stress explained 33% of the variance in PTSD symptoms in a study of victims of assault (Birmes et al., 2003). Jaycox, Marshall and Orlando (2003) examined over 250 individuals who had been severely injured through community violence. Besides injury severity and neuroticism, peritraumatic dissociation was independently related to acute PTSD symptoms. Other studies have demonstrated less stable relationships between peritraumatic dissociation and PTSD in victims of violence. For instance, in Marshall and Schell's (2002) longitudinal study of survivors of community violence, peritraumatic dissociation did not independently predict PTSD three and six months after a trauma. Similarly, Zoellner et al. (2002) failed to find a significant difference between high and low 'dissociaters' in terms of subsequent PTSD symptoms after sexual and non-sexual assault. Although a diagnosis of ASD, a diagnosis that is heavily based on dissociative symptoms, was a strong predictor of PTSD in Brewin, Andrews, Rose and Kirk's (1999) study of victims of violent crime, there was no evidence that dissociation was a better predictor than the other symptoms of ASD. Similar results were obtained in a study of mixed crime victims (60.8% of which were sexual assault victims; Zoellner, Jaycox, Watlington, & Foa, 2003). Dancu, Riggs, Hearst-Ikeda, Shoyer, and Foa (1996) demonstrated a relationship between initial dissociation and PTSD in victims of physical but not sexual assaults.

The relationship between peritraumatic dissociation and PTSD has rarely been studied in prostitute populations. Ross, Anderson, Heber, and Norton (1990) explored the link between dissociative symptoms and prostitution. They found that

psychogenic amnesia, a possible result of peritraumatic dissociation (see Yuille & Daylen, 1998), was relatively common among sex trade workers (7 out of 20). Cooper's research (e.g., Cooper, 1999; Cooper, Kennedy, & Yuille, 1999; Cooper et al., 2001) indicated that peritraumatic dissociation was highly related to PTSD symptoms after sexual and non-sexual trauma.

As the above review suggests, dissociation is neither a necessary nor a sufficient predictor of PTSD. Nevertheless, it seems one of the strongest predictors of PTSD after various types of traumas, including sexual violence. In the present study, state dissociation was assessed for all three types of events on a self-report questionnaire.

Summary.

Although the type of trauma researched in the present study was limited to sexual violence, the severity of such experiences can be inferred from certain variables (e.g., use of weapon). State dissociation was assessed on a questionnaire for all three memories: the well-remembered sexual assault, the poorly-remembered sexual assault, and the positive experience. Another peritraumatic factor examined regarding its association with PTSD was affect during the trauma.

Pretraumatic Factors that Predict PTSD

Gender.

Gender might have an influence on trauma exposure as well as PTSD development. In one study, men were shown to be at higher risk of being exposed to trauma, although gender failed to make a significant prediction of trauma exposure when it was researched prospectively (Breslau, Davis, & Andreski, 1995). In other

studies, being female predicted maladjustment after trauma (Kessler et al., 1995; Creamer, 2000; Rind, Tromovitch, & Bauserman, 1998) but this was not true for certain populations (Brewin et al., 2000). According to Tolin and Foa (2006), women are less likely to be exposed to trauma but more likely to meet PTSD criteria.

The impact of gender on PTSD might be a function of the type of trauma. In fact, one study revealed that women were at a higher risk for PTSD after physical violence but not after non-assaultive traumas (Stein, Walker, & Forde, 2000). Sexual assault is followed by the highest rates of PTSD compared to other traumas but women are more likely than men to have had such experiences (e.g., Elliott, Mok & Briere, 2004). It has also been shown that men are less likely to report sexual violence than women (e.g., Kimerling, Rellini, Kelly, Judson, & Learman, 2002). For those who do report sexual violence, gender stereotypes might prevent them from admitting to the full extent of its psychological impact. Kessler et al. (1995) showed that PTSD rates after rape were comparable for men and women (see also Tolin & Foa, 2006). In contrast, Elliott et al.'s (2004) survey revealed that sexually assaulted men reported greater maladjustment than sexually assaulted women, presumably due to the violation of their sex-role. Fullerton et al. (2001) demonstrated that women had more PTSD symptoms than men after motor vehicle accidents. Interestingly, peritraumatic dissociation mediated the relationship between gender and PTSD, that is, peritraumatic dissociation was a better predictor of PTSD in women than men. In summary, women have a higher lifetime prevalence of PTSD, however, it remains unclear if trauma is experienced and processed differently by the two genders (Yehuda, 2002).

Sex trade workers of all genders (male, female, and transgendered) were interviewed in this study, allowing for gender group comparisons regarding posttraumatic stress symptoms.

Personality.

Personality is another predisposing factor of trauma exposure and of PTSD. Extraverted individuals have been shown to be at higher risk of being exposed to trauma (Breslau et al., 1995). The same has been demonstrated to be true for individuals with antisocial tendencies (Breslau et al., 1991). Neuroticism and introversion have been shown to predict chronic PTSD in firefighters (McFarlane, 1987, 1989), college students (Lauterbach & Vrana, 2001), the general population (Cox, MacPherson, Enns, & McWilliams, 2004; Fauerbach, Lawrence, Schmidt, Munster, & Costa, 2000), survivors of road traffic accidents (Holeva & Tarrier, 2001), and war veterans (Hyer et al., 2003; review see Schnurr & Vielhauer, 1999). These findings fit with Hervé et al.'s (2007) biopsychosocial model, in which individuals who are hypersensitive to arousal are more easily traumatized than hyposensitive individuals. This notion was also supported by Lauterbach and Vrana's (2001) finding of an interaction effect between neuroticism and trauma intensity: For individuals who scored low on neuroticism, the relationship between trauma intensity and PTSD severity was marginal, whereas the same relationship was very strong for individuals who scored high on neuroticism. This indicates that traumatic events are experienced differently depending on an individual's personality structure. In turn, posttraumatic stress symptoms are dependent on such events being experienced as traumatic.

In the present study, a brief self-report measure was used to assess the participants' personality. The same measure was used to operationalize arousal sensitivity.

Trait dissociation.

Trait dissociation is defined as a tendency to dissociate independent of the occurrence of any particular type of event (Bernstein-Carlson & Putnam, 1993). The literature suggests there is a strong link between trait dissociation and PTSD, with symptoms of numbing (e.g., feeling detached) distinguishing best between trauma survivors with and without PTSD (e.g., Gershuny & Thayer, 1999; Putman, 1995). Trait dissociation is often seen as an outcome of traumatic experiences, particularly childhood sexual abuse (Dancu et al., 1996; Lipschitz, Kaplan, Sorkenn & Chorney, 1996) and as a marker of long-term psychopathology (e.g., Bremner & Brett, 1997). According to this theory, dissociation “helps victims separate themselves from the full impact of physical trauma ... and, by the same token, may delay the necessary working through” (Spiegel, 1993). Foa and Kozak's (1986) emotional processing model suggests that, in order to reduce PTSD symptoms, the traumatic memory has to be activated and incompatible information has to be introduced. In this view, dissociation prevents that a traumatic memory become fully activated, thus preventing trauma processing and recovery¹¹.

¹¹ Other theories suggest trait dissociation represents a continuum from normal/everyday-life processes to pathological forms (e.g., Bernstein & Putnam, 1986). Indeed, Ray's (1996) literature review concludes that dissociation is often found in the general population and, rather than being psychopathological, it might a normal cognitive process related to young age, absentmindedness, and hypnotic susceptibility.

With regards to sexual violence, Dancu et al. (1996) showed that dissociation was strongly related to PTSD in victims of nonsexual assault but not in victims of sexual assault. In attempting to explain such findings, the authors suggested that very severe traumas (such as sexual violence) override typically effective coping strategies. This would lead to pathological reactions in almost everyone, thus washing out the unique relationship between trait dissociation and PTSD after severely violent events. In contrast, Cooper et al.'s (2002) comparison revealed that posttraumatic stress symptoms from sexual traumas, but not from non-sexual traumas, were significantly related to trait dissociation. This study differs from Dancu et al.'s because the comparisons were within-subjects. Interestingly, in Cooper et al.'s (2001) study, there was no association between a history of previous traumas and trait dissociation.

In the present study, trait dissociation was assessed on a self-report measure.

History of trauma.

A history of childhood abuse has been found to be stable predictor of PTSD (Brewin et al., 2000). This relationship applies to survivors of sexual as well as other types of childhood traumas. More generally, there is empirical evidence showing that women with a history of any prior sexual victimization are at greater risk of being victimized again (Hanson & Gidycz, 1993). A history of child sexual abuse has also been shown to increase the risk for PTSD development (Nishith, Mechanic, & Resick, 2000). Winkel, Blaauw, Sheridan, and Baldry (2003) showed that repeated victimization differed from single victimization in terms of subsequent fear of crime, well-being, type of future exposure to crime (i.e., threats and sexual crimes vs.

property crimes), pre-crime perception of vulnerability, prior life stress, and social support. All of these variables supported the “vulnerability perspective”, in which repeated experiencing of traumatic events increases the risk for PTSD.

The measures in the present study included the Life Events Checklist, which provided a rough assessment of lifetime exposure to different types of traumas. Furthermore, different forms of childhood abuse (sexual, physical, emotional, and neglect) were assessed as part of the demographic survey.

Summary.

This investigation allowed for a gender comparison with regards to PTSD after sexual violence in prostituted individuals. Various other variables (e.g., personality, trait dissociation) were examined as factors that might predispose individuals for PTSD development.

Although culture is another pretraumatic factor that might be related to eyewitness memory (e.g., Heine & Norenzayan, 2006), the exploration of the influence of culture was beyond the scope of this dissertation.

Posttraumatic Factors that Predict PTSD

Recovery and treatment.

Research has shown that PTSD after sexual violence is not a transient phenomenon but can persist for a considerable amount of time, a finding that contradicts crisis theory, according to which individuals will overcome the initial psychological unbalance and return to their pretraumatic state (Nadelson, Notman, Zackson, & Gornick, 1999). Rothbaum et al. (1992) observed that rape victims who showed symptom improvement during the first three months after an assault did not

develop chronic PTSD and had lower initial symptom severity than those who met PTSD diagnostic criteria at three months after the assault. Both groups had shown similar recovery rates up until one month after their assaults. Thus, chronic PTSD was predicted by the course of symptom development soon after violence was experienced.

Both prolonged exposure and stress inoculation training were found to be effective treatments for PTSD (Foa, 1997; Foa, Rothbaum, & Steketee, 1993; Foa & Zoellner, 1998; Resick, Nishith, Weaver, Astin, & Feuer, 2002). The former involves reliving of the traumatic memory as well as in vivo exposure to feared objects (e.g., Foa & Kozak, 1986). The latter involves techniques of anxiety management, for example controlled breathing, thought stopping, and progressive relaxation (Resick, Jordan, Girelli, Hutter, Marhoefer-Dvorak, 1988). Assertion training, involving conditioning of assertive responses that are incompatible with fear, and cognitive processing therapy, involving an exploration of faulty thinking patterns are other techniques that have helped individuals who had to cope with sexual violence (Resick et al., 1988; Resick & Schnicke, 1992; Resick et al., 2002). All of these treatments use a cognitive-behavioral approach. Their combination seems particularly effective (for review see Steketee & Foa, 1987). Eye Movement Desensitization and Reprocessing (EMDR) is another promising approach of PTSD treatment, although its mechanisms are poorly understood (van Etten & Taylor, 1998). Comparing exposure, relaxation and EMDR treatment approaches, Taylor et al. (2003) demonstrated that exposure was the most effective treatment to reduce PTSD symptoms.

In terms of mechanisms that come into play during treatment, defragmentizing a sexual assault memory has been shown to be associated with recovery from PTSD. In some studies, whether treatment was provided or not, recovery coincided with the development of a cohesive trauma narrative (Amir et al., 1998; Foa & Zoellner, 1998). Foa et al. (1995) also demonstrated that trauma narratives increased in length from pre- to post-treatment. In particular, they found an increase in organizing thoughts.

Another less researched but promising approaches in working through traumatic experiences, especially assaults, is Therapeutic Enactment (e.g., Westwood, Keits, & Wilensky, 2003), an action based approach that offers a holistic, multimodal solution by emphasizing experiencing and acting besides talking and thinking. For instance, this approach makes use of group dynamics.

In the present study, all participants were asked how long ago the two sexual assaults they were interviewed about had happened. Furthermore, an attempt was made to gather treatment-related information, however, these data were often missing or lacking important details (e.g., type of treatment) and were thus not examined in this dissertation.

Traumatic memory.

Some theorists view PTSD as a disorder of autobiographical memory because trauma narratives are often dissociated from the rest of the person's memories about themselves and their life history. According to Foa and Riggs (1994; see also Foa & Kozak, 1986), some sexual assault memories are characterized by disorganization and intense emotions. That is, they often differ from other fear-related memory

structures¹² in terms of their low activation threshold, the broad range of fear stimuli, and more intense fear responses. They generally differ from other memory structures in terms of their fragmented nature, incomprehension, and their emotional intensity (cf., Foa & Riggs, 1994). As mentioned above, memory fragmentation is a predictor of PTSD and recovery involves building a more coherent trauma narrative (Foa et al., 1995). The view that PTSD is a result of disintegrated memories has received empirical support (e.g., Brewin, Dalgleish, & Joseph, 1996, Ehlers & Clark, 2000; Foa & Kozak, 1986; Horowitz, 1986; van der Kolk, 1999). Indirect support of this theory comes from phenomena such as involuntary memories, sensory reliving, and out-of-body-experiences (for review see Berntsen, Willert & Rubin, 2003), all of which suggest that the timing and nature of trauma memories are related to PTSD. Interestingly, in one study, the self-reported quality of sexual assault memories did not predict post-assault distress (Koss, Figueredo, & Prince, 2002). Foa and Riggs (1994) proposed that excessive avoidance of trauma reminders perpetuates PTSD symptoms by hindering emotional processing. Such avoidance might have accounted for Koss et al.'s (2002) observation that self-reported qualities of traumatic memories were unrelated to PTSD, whereas objectively coded features of trauma narratives were related to PTSD (e.g., Foa et al., 1995).

A different view of the relationship between memory and posttraumatic stress was proposed by Berntsen and Rubin (2007). They argued that traumatic experiences, being schema-incongruent, would lead to enhanced memory. In this view, traumatic

¹² Foa and Kozak (1986) based their model of emotional processing of fear on the propositional representation model by Anderson and Bower (1974). A fear representation, or *structure*, includes information regarding the fear stimulus, interpretive information about its meaning, and behavioral responses.

memories are so central to a person's identity (e.g., being a trauma survivor) that they become a reference point for autobiographical knowledge. Indeed, Berntsen and Rubin demonstrated that traumatic experiences were well integrated into their participants' understanding of him- or herself. The overestimated likelihood of the reoccurrence of trauma underlies PTSD.

In the present study, the cognitive qualities of all memories elicited from the participants were assessed on a self-report questionnaire. In addition, detailed memory narratives were obtained for all three memories.

Summary.

Treatment and the mere passage of time seem to enhance recovery from PTSD. An important mechanism that promotes recovery is the development of a cohesive trauma narrative. In addition, the tendency to dissociate in daily life might be a mediator of the relationship between memory and PTSD. The assessment of these variables in the present study allowed for an evaluation of the dissociation view (e.g., Foa & Kozak, 1986; van der Kolk, 1999).

Research Questions

Each participant in the present study was asked to provide three memory narratives. A memory of a well-remembered sexual assault was included to elicit remarkable memories (pattern 5; Yuille & Daylen, 1998), a poorly-remembered sexual assault was included to study dissociative memories and dissociative amnesia (patterns 3 and 7 in Yuille & Daylen, 1998). Positive memories served as a baseline comparison, which has become standard in autobiographical research¹³.

As outlined in the above review, some research questions and hypotheses in this study arose from the literature, others were based on theoretical considerations (e.g., the BPS model [Hervé et al., 2007]; the *traumatic memory argument* [van der Kolk, 1996]; the *trauma superiority argument*, [e.g., Porter & Birt, 2001]). The following sections provide a systematic overview of the research questions examined in this dissertation.

Core Hypothesis 1: Recall Across The Three Types of Events

Based on previous research on traumatic memory, it was hypothesized that memories of sexual violence would be at least equally, if not more detailed than memories of positive experiences. Factors such as self-reported rehearsal, intoxication from drugs at the time of the event, duration of the event, and the ages of the memories were controlled in the present study.

¹³ The reasoning behind this is as follows: A neutral event is likely to be forgotten soon after it happens (see *normal forgetting*; Yuille & Daylen, 1998). Therefore, positive events are usually chosen as comparison events to contrast traumatic experiences. Distinct positive events are by definition *remarkable* (Yuille & Daylen, 1998), a feature that likely leads to detailed memories. A positive event is emotionally loaded (i.e., affect valence) but generally not stressful or traumatic.

Another comparison was conducted between well- vs. poorly-recalled sexual assaults to explore factors that might have impacted the expected memory differences. Variables such as self-reported rehearsal, intoxication from drugs at the time of the event, duration of the event, and the ages of the memories, perpetrator characteristics, and the presence of a weapon were controlled. Hypotheses 1a and 1b (see below) served to further understand the differences between well- and poorly recalled events of sexual violence. The novelty of these research questions lies in their within-subjects design.

Hypothesis 1a: PTSD and Recall of Sexual Violence

Based on the literature on posttraumatic stress, it was hypothesized that current symptoms of PTSD resulting from the two incidents of sexual violence would be associated with the amount of details remembered from these events. To address this hypothesis, between-subjects linear regression analyses were conducted and the ages of the memories were statistically controlled. A second set of analyses compared within-subjects differences. PTSD associated with well- vs. poorly-remembered sexual assaults was examined. Again, the ages of the memories were statistically controlled.

Hypothesis 1b: Vantage Point and Recall of Sexual Violence

The literature is unclear whether taking an observer vs. field perspective during an event leads to enhanced or debilitated recall. It was expected that sexually traumatic events would be associated with more (or more extreme) observer perspectives than positive experiences. No prediction was made as to whether well- or poorly-remembered sexual assaults would be associated with more observer

experiences. Comparisons were conducted within-subjects (positive event vs. well- vs. poorly-remembered sexual assault). As well, between-subjects comparisons were conducted on the memory ratings between those who did vs. did not have an observer perspective at the time of the three events, respectively.

Core Hypothesis 2: Arousal Sensitivity and Recall of Sexual Violence

Based on theoretical considerations, hyposensitive individuals were expected to make better eyewitnesses of sexual violence (i.e., have more detailed recall) than hypersensitive individuals. To address this hypothesis, a between-subjects comparison was conducted for well- and poorly-remembered sexual assaults, respectively.

Hypothesis 2a: Arousal Sensitivity and Peritraumatic Dissociation

Based on theoretical considerations, it was hypothesized that hypersensitive individuals (i.e., low extraversion and/or high neuroticism) would dissociate more during stressful/traumatic events than hyposensitive individuals (i.e., high extraversion and/or low neuroticism). In particular, it was expected that hypersensitive individuals would report experiencing more observer (vs. field) perspectives during events than hyposensitive individuals. To address this hypothesis, a between-subjects analysis was conducted for well- and poorly-remembered sexual assaults, respectively.

Hypothesis 2b: Arousal Sensitivity and Current PTSD

Based on theoretical considerations, it was expected that hypersensitive individuals would be traumatized more easily (i.e., presumably at lower arousal

thresholds) than hyposensitive individuals. That is, the former were expected to have more PTSD symptoms and diagnoses than the latter. To address this hypothesis, a between-subjects analysis was conducted for well- and poorly-remembered sexual assaults, respectively.

Core Hypothesis 3: Predictors of PTSD

Based on theory and previous research, it was expected that participants who experienced extreme fear, helplessness, horror, high arousal, and/or dissociation while being sexually assaulted, would have more and/or more severe PTSD symptoms than individuals who were not impacted (as much) by such experiences. Regression analyses using state predictor variables were calculated for the two assault memories separately (i.e., these analyses were between-subjects). Also based on theory and previous research, it was hypothesized that a history of trauma as well as the tendency to dissociate in daily life would be associated with current PTSD symptoms. A second set of regression analyses using trait and historical predictor variables, including gender, was calculated for both assaults.

Hypothesis 3a: State and Trait Dissociation

To further explore the emotional impact of sexual violence, the present hypothesis is focused on dissociation during circumscribed events and dissociation in daily life. Based on previous research and theoretical considerations, it was predicted that individuals would dissociate more during sexual assaults than during positive events. Also, poorly-recalled sexual assaults were thought to be associated with higher levels of peritraumatic dissociation than well-recalled sexual assaults. It was further hypothesized that state and trait dissociation would be closely related.

Method

Sample

The present sample consisted of 119 former and current sex trade workers from Vancouver and Victoria, British Columbia. The sample's demographic characteristics are displayed in Table 2. The breakdown of female, male and transgendered participants was comparable to other studies of sex trade workers from British Columbia (e.g., Benoit & Millar, 2001).

Table 2: Demographic Information of the Sample.

| | | |
|---|--------------|---------------|
| Age: X in years (SD) | 38.53 (7.82) | ($N = 119$) |
| Age at Sex Trade Entry: X in years (SD) | 19.52 (7.15) | ($N = 119$) |
| Grade School Education: X in years (SD) | 10.89 (1.44) | ($N = 109$) |
| Gender: Frequency (%) | | |
| Female | 87 (73.1) | (N = 119) |
| Male | 23 (19.3) | |
| Transgendered | 9 (7.6) | |
| Marital Status: Frequency (%) | | |
| Single | 66 (55.5) | (N=119) |
| Married | 4 (3.4) | |
| Common Law/Relationship | 24 (20.2) | |
| Divorced/Separated | 19 (16.0) | |
| Widowed | 6 (5.0) | |
| Currently in the Sex Trade: Frequency (%) | | |
| No | 48 (40.3) | (N = 119) |
| Yes | 71 (59.7) | |
| Current Living Condition: Frequency (%) | | |
| Own home | 2 (1.7) | (N = 119) |
| Rent alone | 13 (10.9) | |
| Rent with roommates | 27 (22.7) | |
| Rent with family | 17 (14.3) | |
| Homeless/hotel | 36 (30.2) | |
| Other | 24 (20.2) | |
| Ethnic background: Frequency (%) | | |
| Aboriginal | 51 (50.5) | (N = 103) |
| Non-aboriginal | 52 (49.5) | |

Recruitment

Participants were recruited through a non-profit society that offered a range of programs and services to sex trade workers (e.g., outreach programs, employment skill trainings). The study was also advertised in the *Georgia Straight*, a free weekly newspaper in Vancouver. As well, handouts about the study were given to escort agencies, adult oriented stores, safe houses, transition houses, and counselling services in Vancouver. Finally, flyers were posted on lampposts along the streets where prostitution commonly occurs in Vancouver and Burnaby, British Columbia. The recruitment was not limited to any particular kind of sex trade worker¹⁴.

Inclusion and Exclusion Criteria

All participants met the following criteria for inclusion in this study: They had to be over 19 years of age in order to give informed consent. They had to have worked in the sex trade at some point in their lives. They had to have experienced at least one incident of sexual violence during their adult life (i.e., when they were older than 12 years old). They had to be able to understand, read, and write English and be sober at the time of the interview. Additional screening criteria were implemented to prevent overly adverse effects of the interview process. Participants were required to have talked about their abuse at least once before their research interview. They had to have sufficient social support at the time of the research (e.g., someone who would

¹⁴ It has been demonstrated that street walkers, homeless, and drug addicted prostitutes are psychologically worse off than 'high-end' prostitutes such as call girls (e.g., Exner, Wylie, Leura, & Parrill, 1977; Farley et al., 1998). Whether PTSD occurs similarly in outdoor and indoor settings remains unclear (Farley & Barkan, 1998). Benoit and Millar's (2001) survey indicated that sex trade workers who provide services outdoors are sometimes safer and more protected than those who work indoors.

be available to them after their interview, if necessary). Being a drug user at the time of this research did not exclude individuals from participating, although no drug use during the interview itself was permitted. However, if someone was making a serious effort to become and stay clean from drugs, they were excluded from participating unless they had already been clean for a considerable amount of time (i.e., at least one year¹⁵). Applicants who had recently experienced severely stressful events were not permitted to participate¹⁶. Although no thorough screening for psychotic symptoms was conducted, people who presented as clearly psychotic (e.g., evidencing delusions or other thought disorders) were not admitted into the study. While both current and former sex workers could participate in the research, those who had only been out of the trade for less than one year were not eligible to participate. All of these criteria were implemented to prevent extremely vulnerable people from entering the study. Their risk of re-traumatization would likely have been higher than in those who met the screening criteria. Screenings were conducted by trained volunteers, either over the phone or in person.

A total of 290 research applicants were screened. Of those, 154 were ineligible. Of those, 77 failed to meet at least one of the screening criteria; 40 failed to meet at least 2; 26 failed to meet at least 3; 6 failed to meet at least 4; and 1 person failed to meet 6 screening criteria. The ineligibility criteria endorsed the most often were: having experienced a stressful event in the recent past, being at risk to

¹⁵ This time frame was recommend to us by members of the aforementioned non-profit society, the community collaborator of this study.

¹⁶ Such events did not have to meet DSM-IV criteria for traumatic stressors. What mattered was whether or not the applicant felt subjectively disturbed by the event in question. For instance, one participant was found ineligible because a recent change of apartments had caused him to be very upset.

experience drug relapse, having experienced a negative reaction when talking about sexual violence previously, not having talked about sexual violence at all, having no social support, and being vulnerable to re-enter the sex trade while trying to stay out.

Thirty-one applicants were eligible but did not end up participating in the study. One hundred and five applicants were eligible and did participate. Together with the first 14 pilot participants, a sample size of 119 participated in the present research.

Procedure

With the exception of three interviews¹⁷, all screenings and interviews were conducted on the premises of the non-profit organization on the downtown eastside of Vancouver, where two rooms and a phone line were provided for this project.

After discussing the purpose as well as the risks of participating in the present research, each participant was provided with aftercare contacts by the screener so that they could make arrangements before their interview. They were guided through a scenario of “what to do” in case discomforting symptoms would be experienced after the interview. Participants were then asked to give their informed consent (see *Participant Information* and the *Consent Form* in Appendix A and B). The research began by asking the participants for information regarding their prostitution background and demographic information. A history of substance abuse, treatment, and traumatic experiences was assessed. The participants were then asked to provide free narratives of two sexual assaults and one positive experience (detailed

¹⁷ These interviews were conducted in a hotel in Victoria, BC.

instructions are described in the next section). Each memory statement was followed by a number of state questionnaires and, at the end of the interview, each participant filled out a number of trait questionnaires. The questionnaire package included a critical intervention form with guidelines for a self-report suicide assessment, which could be used, if indicated. The first 14 participants received a \$40 honorarium for their participation in the study. After additional funding became available, following the advice of the community collaborator, the rest of the participants received \$60 for their participation in the study. The interview duration ranged from 2 to 6 hours. The participants were provided with the option of ending the interview at any time without suffering financial disadvantages. The first 14 participants had the opportunity to have a private meeting with a former sex trade worker in order to debrief their interview (i.e., such had been requested by the community collaborator). The revised protocol required that the interviewers conduct the debriefings themselves (i.e., trained undergraduate and graduate students in psychology). A list with professional counsellors' contacts was provided to all participants for self-referral.

Memory Categories

The study exclusively focused on sexual traumas and their consequences on memory and posttraumatic stress. Each participant was asked to provide three different memories:

- (1) one positive experience (POS), which served as baseline (control) event;
- (2) one sexual victimization that was well-remembered (WELL);

- (3) and one sexual victimization for which the participant had poor memory (AMN).

The memories of victimization were compared to each other as well as to the control memory. For both sexual assaults, the preference was to obtain a memory of an event that happened in the context of prostitution (e.g., being assaulted by a ‘john’). If the participants did not have such a memory or chose not to share it with the interviewer, second priority was given to memories of sexual assaults committed by people in their personal lives (e.g., boyfriend, relative) or by strangers outside of the sex trade. Although many participants were expected to have experienced childhood sexual abuse (e.g., Cooper et al., 2001) such experiences¹⁸ were excluded for a number of reasons: First, childhood memories would have been considerably older than the comparison events, thus the ages of such memories would have been a confounding variable in the comparison of details across memories. Second, some childhood abuse experiences, especially sexual abuse, are remembered as script memories (King & Yuille, 1986; Yuille, 1988), which makes it difficult to assess the exact amount of details remembered from a specific incident. Third, infantile amnesia (e.g., Peterson, 2002) can account for amnesia-type memories of childhood events and the current research was concerned with other memory disturbances such as dissociative amnesia. A distinction between the different types of amnesia would have been difficult to tease apart. The only way to rule out infantile amnesia as an explanation for the poor quality of older memories was to exclude childhood memories from the study.

¹⁸ A cut off age of 12 years old and below was used to define *childhood memories*.

The legal definition of *sexual assault* is provided in the introduction of this dissertation. Participants were asked to provide an event of *sexual violence* or a “*bad date*” in order to elicit a wide range of sexual violence. Therefore not all memories might have met the legal definition of sexual assault. Most experiences that were reported in this study involved vaginal or anal penetration, although these particular aspects were not always the reasons for which the participants felt violated¹⁹.

Screeners and Interviewers

Twenty senior undergraduate students and BA level research assistants were trained in the interview procedures, with particular emphasis on interviewing and memory issues (i.e., the Step Wise Interview Protocol, Yuille, 1990; Yuille, Marxsen, & Cooper, 1999) and PTSD assessment (i.e., *Clinician Administered PTSD Scale* [CAPS]; Blake et al., 1998). The training sessions were conducted by Dr. John Yuille, Dr. Barry Cooper, and the author of this dissertation. The interviewing/memory and the CAPS workshops lasted a day each, followed by a number of individual training sessions (i.e., until interrater reliability was established). The CAPS workshop included viewing and discussing video clips from a CD (Blake et al., 1998). Eight students passed the training criteria and became interviewers in the project. All interviewers received a 2-hour training in the critical intervention procedure (suicide assessments). Another 4 students who received the same initial training workshops became screeners for the research applicants.

¹⁹ The interviewers' experiences suggested that psychologically degrading aspects of such events were sometimes reported as more traumatic than physical violations. Some participants felt that the mere act of prostitution should itself be considered violence.

Measures

Memory Narratives

After each of the three memory categories were explained to the participants, they were asked to choose a memory of a specific event that lasted up to a maximum of one day. Exceptions were made if a participant had no other experience that fit the category (e.g., an event that lasted longer than one day). However, every memory had to be specific (i.e., no script memories were elicited). The following instruction was then given for each of the three memory narratives: “Please think back to the day when this event took place. Tell me everything that you can remember about this day, no matter how insignificant the details may seem. Please start with your earliest recollection” (see Step Wise Interview Protocol, Yuille, 1990; Yuille et al., 1999). The full Step Wise Interview was used for the first 14 participants. That is, after the free narrative was obtained, the participants were asked if they “remembered anything else”, followed by open-ended and specific questions, until the memory was exhausted for details. According to the organization through which these participants had been recruited, some participants were adversely affected by the length of the Step Wise Interview. Apparently one person came short of relapsing on heroin; another one dropped out of a re-integration program offered by the organization; a third person was said to have abandoned her four children for almost one week after the research interview. The author witnessed one participant dissociating during the interview. Another participant volunteered to speak to the author after her interview and reported that she had not expected to be taken so deeply back into a memory of being sexually assaulted as a call girl; she had deemed this memory as “safe” to talk

about since it was over 15 years old and she had managed to quit prostitution for quite some time. Due to these adverse effects, a modified version was used for the remainder of the interviews. After each free narrative, the interviewers only asked the participants once if they remembered anything else. They also asked if they remembered anything that happened before and after the event. The number of specific questions was limited compared to the questions asked during the pilot phase (see Appendix C): Information such as the duration of the event, the presence of a weapon, the level intoxication at the time (later coded on a 3-point scale, with 0 = ‘no intoxication at all’, 1 = ‘somewhat intoxicated’, and 2 = ‘intoxicated to the point of losing consciousness’), the traumatic extent of the event (on a 10-point scale, with 1 = ‘not traumatic at all’ and 10 = ‘the worst trauma ever experienced’), the amount of rehearsal, and the participants vantage points (i.e., observer vs. field) at the time of the event and at the time of recall were assessed.

State Measures

Assessment of posttraumatic stress.

The two memories of sexual victimization (WELL and AMN) were followed up with the CAPS (Blake et al., 1998). The CAPS is the gold standard clinical interview to assess for PTSD. The CAPS was designed according to DSM-IV. It contained (a) an assessment of the event in question and its impact (DSM-IV-TR criterion A), (b) an assessment of the core PTSD symptoms (DSM-IV-TR symptom clusters B, C, and D), (c) an assessment of the duration of the symptoms (criterion E), and (d) an assessment of impairments in social, occupational, or other functioning (criterion F). The CAPS distinguishes itself from other PTSD measures because it

allows separate assessments of each symptom's frequency and intensity. Each scale ranges from 0 ('absent') to 4 ('very frequent/severe'). Anchor descriptions were provided for each symptom to ensure inter-rater reliability. The CAPS can be administered by appropriately trained paraprofessionals as well as experienced clinicians (Blake et al., 1995). A scoring rule was applied, according to which a symptom that was rated '1' or higher on frequency and '2' or higher on intensity was counted towards a PTSD diagnosis (see Weathers, Ruscio, & Keane, 1999). Based on these ratings, diagnoses were derived according to DSM-IV-TR. Thus, the CAPS provided both a continuous and a dichotomous indication of PTSD symptoms and diagnoses, respectively. The CAPS' reliability and validity have been established in many studies (Blake et al., 1995; Griesel, 2001; Foa & Tolin, 2000; King, King, Leskin, & Weathers, 1998; Mueser et al., 2001; Schnyder & Moergeli, 2002; Shalev, Freedman, Peri, Brandes, & Sahar, 1997; Weathers & Litz, 1994). In these studies, sensitivity ranged between .71 and .95 and specificity ranged between .84 und .95; test-retest reliabilities were as high as $r = .99$. An analysis of interrater reliability revealed a $\kappa = .63$; internal consistency values ranged between $\alpha = .86$ and $\alpha = .94$ at the total scale level; the CAPS correlated between $r = .42$ and $.91$ with other measures of PTSD; its correlation with PTSD diagnoses (e.g., SCID) was $r = .83$. In order to keep the interview procedure short, only current symptoms were assessed in the present study, which provided a more conservative estimate of PTSD diagnoses than lifetime assessments. Also, no associated features were assessed.

Assessment of affect.

The *Affect Grid* (Russell, Weiss, & Mendelsohn, 1989) is a single-item visual scale to measure arousal and valence. The arousal dimension ranges from 1 ('sleepiness') to 9 ('high arousal'), and the valence dimension ranges from 1 ('pleasant') to 9 ('unpleasant'). The Affect Grid's reliability was established by administering it to students who rated the meaning of emotion-related words. Split-half reliabilities were $> .97$ (Russell et al., 1998). Regarding the scale's validity, Russell et al. (1989) applied the Affect Grid to assess current mood and obtained satisfactory convergent and discriminant validity values when the subjects' scores were correlated to other scales of pleasure and arousal. Cooper (2005) used the Affect Grid as a self-report measure of arousal and valence referring to various autobiographical memories of violent offenders. It was demonstrated that the offenders' positive memories were rated as more pleasurable than disturbing memories.

In the present study, instructions for the Affect Grid were provided orally: First, the grid with its two dimensions was explained and examples were provided to illustrate how it can be used to rate one's affect during a certain situation. Second, the participants were asked to indicate which part of their memory they considered the 'main part.' Third, three ratings were obtained referring to the time 'before the main part', 'during the main part' and 'after the main part' of each event (i.e., POS, AMN, WELL).

Assessment of the quantity and quality of memory details.

Each memory was assessed with the *Memory Characteristics Questionnaire* (MCQ; Johnson, Foley, Sunegas, & Raye, 1988), which allowed participants to rate their memories with regards to their cognitive quality (e.g., amount of detail, vividness, overall quality). The MCQ consists of 39 items, each of which was answered on a 7-point Likert scale, 1 indicating ‘poor or vague memory’ and 7 indicating ‘clear or detailed memory.’ The MCQ is not a unifactorial scale. Thus, the items are usually analyzed individually (e.g., Tromp et al., 1995). Research has demonstrated that false (i.e., imagined) and true memories of recent and childhood events can be differentiated by several MCQ items (e.g., taste, realism, contextual embedding; Johnson, 1988; Johnson et al., 1988; Mather, Henkel, & Johnson, 1997). Koss et al. (1999) applied parts of the MCQ to memories of rape and other unpleasant experiences and extracted four distinct but related factors: re-experiencing, non-visual sensory, clarity, and affect. The present study used a sum score of items 8 (vividness), 9 (details), and 33 (overall memory) as the main index of recall for each of the three memories in this study (i.e., POS, WELL, AMN). Cooper (2005) used the same index in his investigation of autobiographical memories of male violent offenders.

Another, more objective measure of memory²⁰ was applied to each narrative. A coding procedure originally introduced by Yuille, Daylen, Porter, Cooper & Ghani (1999) was utilized. Only specific (e.g., no script memory) and unique memory details were coded. Six different types of details were distinguished: Person-related details (e.g., descriptors of a person), object-related details (e.g., naming or describing

²⁰This procedure was an additional measure that was not required by the proposal committee of this dissertation.

objects), action details, relational details (i.e., referring to time and place of the event), subjective details (i.e., referring to feelings or thoughts of the participants in an event), and conversation details (i.e., verbatim conversation that occurred during an event). Five trained senior undergraduate and graduate students completed the coding of memory details in all narratives. Their performance across the six categories of details was tested on five narratives, for which a master key had been produced by the author and two other graduate students with similar research expertise. Each coder's correlations with these master keys were above $r = .79$.

Assessment of state dissociation.

The *Peritraumatic Dissociative Experiences Questionnaire* (PDEQ self report version; Marmar et al., 1997) is a 10-item scale that was used to measure each participant's retrospective accounts of peritraumatic dissociation with regards to the three memories. The items are endorsed on a 5-point scale to indicate the degree to which one experiences various symptoms of dissociation during or after a defined event. One indicates 'not at all true' and 5 indicates 'extremely true.' The PDEQ was shown to strongly relate to PTSD in male combat veterans ($r = .51$ with the Mississippi Scale for Combat Related PTSD; $r = .53$ with the intrusion scale of the IES; $r = .60$ with the avoidance scale of the IES; Marmar et al., 1994), female combat veterans ($r = .41$ with the intrusion scale of the IES; $r = .40$ with the avoidance scale of the IES; Tichenor, Marmar, Weiss, Metzler, & Ronfeldt, 1996), as well as emergency services personnel and survivors of an earth quake (review see Marmar et al., 1997). Marshall, Orlando, Jaycox, Foy and Belzberg (2002) demonstrated that the PDEQ had satisfactory reliability and construct validity in victims of violent and

sexual crimes across different ethnic groups. Cooper (1999) used the PDEQ rating version to assess prostitutes' experiences of peritraumatic dissociation during sexual and non-sexual violence as well as positive events. Both types of violent events were associated with significantly higher levels of dissociation than positive events. Cooper (2005) used the same scale to assess symptoms of peritraumatic dissociation regarding various types of autobiographical memories of violent offenders. Again, it was demonstrated that subjectively disturbing (e.g., traumatic) events were rated significantly higher than positive experiences.

Trait and Other Measures

Assessment of demographic information and prostitution background.

The *Prostitution Background and Demographic Survey* (see Appendix D) assessed for the participants' history of childhood abuse and neglect, factors associated with their involvement in the sex trade (e.g., venues worked in), their social support system at present, demographic information, and treatment history. The *Life Events Checklist* (see CAPS; Blake et al., 1998) was filled out by each participant to indicate which types of traumas and stressful life events they had experienced in their lifetime.

Assessment of personality traits.

The *Big Five Inventory* (BFI; John & Srivastava, 1999) is a brief measure of personality characteristics based on the Big Five factor model, which has consistently been replicated by different factor extraction and rotation methods. The BFI was developed via expert ratings, based on prototype definitions of the factors *Extraversion*, *Agreeableness*, *Conscientiousness*, *Neuroticism*, and *Openness*. The

inventory used in the present investigation consists of 44 items phrased as short descriptions of trait adjectives. In previous studies of North American samples, consistency scores ranged between .75 and .90 and retest reliabilities were between .80 and .90. Further, convergent and discriminant validity could be established with other Big Five measures and peer ratings (John & Srivastava, 1999). In the present investigation, Extraversion/Introversion and Neuroticism were used to operationalize hypo- and hypersensitivity to arousal (see Hervé et al., 2007).

Assessment of trait dissociation.

The *Dissociative Experiences Scale* (DES; Bernstein & Putnam, 1986; Bernstein-Carlson & Putnam, 1993) was used to assess for a tendency to dissociate in daily life. This questionnaire consists of 28 items assessing symptoms of derealization/depersonalization, absorption, memory disturbances, and distractibility. Participants were asked to indicate how much they experienced the described phenomena. The scale for each item ranged from 0% ('never') to 100% ('always') in intervals of 10. A number of studies reviewed by Bernstein-Carlson and Putnam (1993) showed that the mean DES scores of the general population ranged between 3.7 and 7.8; PTSD patients' mean scores ranged between 27 and 41.1; Dissociative Identity Disorder patients scored between 40.7 and 57.1. Hence, a reliable distinction between normal adults and those with a disorder involving dissociative symptoms is possible by means of the DES. Holtgraves and Stockdale (1997) attested that the DES represents an important dimension of normal personality with regards to memory impairment and imaginary involvement. A mean cut off score of 30 has been recommended to identify individuals with disorders that involve dissociation

(Bernstein-Carlson & Putnam, 1993). Cooper et al.'s (2001) of prostituted individuals' memories for sexual and non-sexual violence revealed a mean DES score of $X = 32.6$. Another study by Ross et al. (1990) demonstrated mean DES scores of $X = 13.2$ for prostituted individuals and $X = 17.6$ for exotic dancers. Bernstein-Carlson and Putnam (1993) reported reliability coefficients of .85 and higher. The DES also evidenced convergent and discriminant validity (e.g., $r = .82$ with the Perceptual Alteration Scale; no difference across sex, income level, employment status, education, religious affiliation). Factor analyses have repeatedly revealed three factors: amnesic dissociation, absorption and imaginative involvement, and depersonalization and derealization (Bernstein-Carlson & Putnam, 1993).

Statistical Analyses

All statistical analyses were conducted with SPSS for Windows 11.5.

Results

General Statistics Regarding the Participants' Histories of Trauma

The mean number of different *types* of traumatic events that the participants reported experiencing was $X = 8.08$ ($SD = 2.65$). The overall number of actual traumatic *events* that the participants reported experiencing was probably much higher. The participants further reported a mean of $X = 11.15$ ($SD = 19.51$) sexual assaults besides the ones that they discussed during the interviews (this count excluded incidents of sexual abuse before the age of 14). They were also asked about four types of childhood abuse they had experienced: The mean number was $X = 2.84$ ($SD = 1.14$). Of the 119 participants, 114 reported that they had experienced at least one type of childhood abuse. Specifically, 93 participants (78.2%) reported emotional child abuse; 79 (66.4%) reported physical child abuse; 80 (67.2%) reported sexual child abuse; and 90 (75.6%) reported neglect during childhood. The mean age when entering the sex trade was $X = 19.52$ years ($SD = 7.15$). Regarding illicit drugs and alcohol, 47 (40.5%) participants reported that they were currently abusing one or several substances; 108 (93.9) reported past abuse of one or several substances. These data were missing for 3 and 5 participants, respectively.

Frequency and Basic Characteristics of POS, WELL and AMN

Of the 119 participants, 112 reported a POS experience, 114 reported a WELL experience, and 83 reported an AMN experience. Examples of POS events provided by the participants were first dates, giving birth, “starting over”, birthdays and graduations. Examples of WELL and AMN events were being sexually attacked by

one or several sex trade consumer(s), being sexually attacked by a relative or acquaintance, and being held captive and sexually assaulted by a stranger. *Attempted* sexual assaults were also reported on occasion and were included in the analyses. Many of the events in the WELL and AMN categories included acts of physical violence in addition to sexual violence. The mean age of POS events was $X = 10.74$ ($SD = 10.33$) years, the mean of the WELL events was $X = 13.38$ ($SD = 10.21$) years and the mean of the AMN events was $X = 14.09$ ($SD = 9.32$) years. Most participants reported that they had been sober during POS events (67.2%); about half the participants reported soberness during WELL events (47.1%); and about one fifth (20.1%) of participants reported that they had not consumed any drugs or alcohol during AMN events²¹.

Comparison of Memories Elicited by Step Wise Interview vs. Free Narrative

Independent samples t-tests revealed that the first 14 participants of the study (i.e., for whom the full Step Wise Interview Protocol was used) provided significantly more details than the rest of the sample (i.e., who were asked to provide a free narrative of their memories, followed up by a limited and defined number of specific questions) for all three types of events.

²¹ There was a substantial amount of missing information in the statistics on intoxication during the three events (9.2% for POS events, 12.6% for WELL events, and 32.8% for AMN events) because the participants were unable to recall these aspects of their memories.

Re: Core Hypothesis 1: Recall Across The Three Types of Events

POS vs. WELL

The following reliability indices (Cronbach's α) were obtained for the sum scores of MCQ items 8 (vividness), 9 (detail), and 33 (overall memory): The WELL ratings yielded an $\alpha = .88$ ($N = 109$), the POS ratings yielded an $\alpha = .86$ ($N = 111$), and the AMN ratings yielded an $\alpha = .90$ ($N = 78$).

Contrary to core hypothesis 1, a paired samples t-test revealed that POS and WELL events differed significantly in their MCQ sum scores, with POS being rated as higher than WELL events (see Table 3). In line with core hypothesis 1, a second paired samples t-test based on the details coded from the narratives revealed that WELL events contained significantly more details than POS events. Further paired samples t-tests demonstrated that POS and WELL memories also differed in terms of their ages, levels of intoxication from drugs and/or alcohol at the time of the event, and memory rehearsal. No differences were found between the two events regarding their durations, the arousal experienced at the time as measured by the Affect Grid²², and number of similar events (see Table 3).

²² Reliability could not be established for this measure in the present study: Test-retest reliability is not a suitable measure of reliability due to the scale's use as a state measure. Internal consistency cannot be established for a single-item scale.

Table 3: Differences between POS and WELL on Various Precipitating and Perpetuating Variables.

| | WELL event: <i>X (SD)</i> | POS event: <i>X (SD)</i> | Paired samples t-test |
|---------------------------------------|------------------------------|-----------------------------|--------------------------|
| MCQ sum score | 16.36 (4.24) | 18.75 (3.22) | $t(105) = 5.28; p = .00$ |
| Details in narratives | 88.78 (59.56) | 61.85 (75.39) | $t(104) = 4.16; p = .00$ |
| Age of memory | 13.60 (10.14) | 10.84 (10.47) | $t(92) = 2.16; p = .03$ |
| Intoxication during event | .45 (.52) | .28 (.45) | $t(96) = 2.74; p = .01$ |
| Duration of event in hours | 4.90 (13.79) | 6.95 (10.65) | $t(90) = 1.07; p = .29$ |
| Affect Grid arousal | 6.82 (2.54) | 7.33 (2.36) | $t(107) = 1.62; p = .11$ |
| Times talked about event ⁺ | 15.01 (34.62) | 31.98 (45.53) | $t(89) = 3.19; p = .00$ |
| Number of similar events | 11.52 (20.67) | 41.98 (157.67) | $t(87) = 1.88; p = .06$ |

⁺ Outliers excluded (e.g., on occasion participants indicated they had talked about an event “thousands of times”).

A repeated-measures ANCOVA was conducted to determine the difference in MCQ sum scores between POS and WELL, controlling for the age of the memories, rehearsal, as well as intoxication at the time of each event. All relevant assumptions were met for this analysis²³. The results of the ANVOCA indicated that the difference in MCQ ratings remained significant when these covariates were controlled ($F[1; 66] = 4.05; p = .05$)²⁴.

MCQ sum scores were also compared in terms of the frequencies of POS scores being higher, equal or lower than WELL scores. The results indicate that 61.3% of all participants rated their POS events higher than their WELL events, 21.7%

²³ An important assumption of repeated measures designs is sphericity (i.e., the variance of the difference between the estimated means for any pair of groups is the same as for any other pair). Since only two levels were involved in the present analysis, there was only one covariance, i.e., there was no issue of homogeneity of variances of differences.

²⁴ Originally, there was also a significant interaction effect between the memory ratings and ages of the events ($F[1; 66] = 4.85; p = .03$). However, further analyses indicated that this interaction was caused by two participants who had rated their POS events as extremely high on the MCQ and their WELL events as extremely low on the MCQ. When these two outlier cases were excluded from the analysis, the interaction effect was no longer significant.

rated them the same, and 17.0 % rated their POS events lower than their WELL events. These results point in the same direction, and thus confirm the results of the t-test and the ANCOVA involving the MCQ.

Another repeated-measures ANCOVA was conducted to determine the difference in coded details from the narratives between POS and WELL. Again, the ages of the memories, rehearsal, and intoxication were entered as covariates. All relevant assumptions were met for this analysis. The results of the ANCOVA indicated that the difference in narrative details remained significant ($F [1; 64] = 5.34; p = .03$).

WELL vs. AMN

Due to the instructions given to the participants, it was expected that AMN memories would be rated lower on the MCQ than WELL memories. These ratings were compared as a manipulation check. A paired samples t-test showed that AMN and WELL events differed significantly in their MCQ sum scores, with AMN memories rated lower than WELL memories (see Table 4). The same result was obtained in a second paired samples t-test based on the details coded from the memory narratives. Further paired samples t-tests were conducted to explore how the following variables influenced the difference in MCQ ratings between AMN and WELL: traumatic extent, the age of each memory, event durations (in hours), levels of intoxication at the time, arousal during the event, and rehearsal. The results indicated that the two events differed significantly in terms of their traumatic extents, levels of intoxication, arousal, and rehearsal. All other comparisons were not significant (see Table 4).

Chi-square tests were calculated to examine potential differences between AMN and WELL regarding the presence of a weapon (yes vs. no) and perpetrator characteristics (stranger vs. known person). They did not reveal any significant differences.

Table 4: Differences Between AMN and WELL on Various Event and Post-Event Characteristics.

| | WELL event: <i>X (SD)</i> | AMN event: <i>X (SD)</i> | Paired samples t-test |
|---------------------------------------|------------------------------|-----------------------------|--------------------------|
| MCQ sum score | 15.91 (4.17) | 7.91 (4.90) | $t(76) = 11.23; p = .00$ |
| Details in narratives | 90.96 (59.54) | 52.70 (40.68) | $t(73) = 6.92; p = .00$ |
| Traumatic extent | 7.90 (2.21) | 6.07 (2.71) | $t(75) = 4.71; p = .00$ |
| Intoxication during event | .48 (.53) | .88 (.67) | $t(72) = 3.94; p = .00$ |
| Affect Grid arousal | 6.86 (3.67) | 5.62 (2.65) | $t(70) = 3.08; p = .00$ |
| Age of the memory | 14.72 (10.48) | 14.31 (9.43) | $t(71) = .35; p = .73$ |
| Duration of the event | 7.18 (17.33) | 3.46 (6.20) | $t(54) = 1.60; p = .12$ |
| Times talked about event ⁺ | 14.30 (36.17) | 4.18 (7.61) | $t(68) = 2.44; p = .02$ |

⁺ Outliers excluded (e.g., on occasion participants indicated they had talked about an event “thousands of times”).

A repeated-measures ANCOVA was calculated to determine the difference in MCQ sum scores between WELL and AMN, controlling for the traumatic extent of these events, arousal during the events, rehearsal of the memories, and the levels of intoxication. All relevant assumptions were met for this analysis. The results indicated that the difference in MCQ ratings remained significant when the above-listed variables were entered as covariates ($F[1; 47] = 27.53; p = .00$). There was also a significant interaction effect between the memory ratings and arousal ($F[1; 47] = 4.27; p = .04$). Both, participants who had rated their WELL events as more arousing than their AMN events and participants who had rated their AMN events as more arousing than their WELL events, rated their AMN events lower on the MCQ than their WELL events. However, when these two groups' ratings on the MCQ were

compared to each other, the group who experienced their AMN events as relatively more arousing rated the AMN event significantly higher on the MCQ than the group who experienced the WELL event as relatively more arousing (i.e., higher arousal at the time of the AMN was associated with better memory ratings).

Another repeated-measures ANCOVA was calculated to determine the difference in narrative details between WELL and AMN, controlling for the traumatic extent of these events, arousal during the events, rehearsal of the memories, and the levels of intoxication. All relevant assumptions were met for this analysis. The results indicated that the difference in narrative details remained significant when the above-listed variables were entered as covariates ($F [1; 44] = 10.44; p = .00$).

Additional Analysis: AMN vs. POS

In order to analyze exactly how ‘poorly’ remembered AMN events were relative to baseline (i.e., POS) events, a repeated measures ANOVA was conducted to compare all three types of events in terms of their memory ratings on the MCQ. Bonferroni adjustments were made to the significance levels of each pairwise comparison. There was a significant main effect ($F [1.67; 125.32] = 167.92; p = .00$)²⁵ and the pairwise comparisons indicated that all three events had significantly different ratings from each other (WELL: $X = 15.90, SD = 4.20$; POS: $X = 19.04, SD = 2.98$; AMN: $X = 7.96, SD = 4.91$).

²⁵ The sphericity assumption was violated in this analysis. Therefore, the corrected Greenhouse-Geisser value is reported.

When the same analysis was repeated based on the narrative details, there was also a significant main effect ($F [1.57; 111.51] = 12.51; p = .00$)²⁶ but the pairwise comparisons showed that the POS ($M = 60.17; SD = 82.16$) and the AMN ($M = 52.65; SD = 40.53$) were not significantly different in terms of their amount of details in their narratives. The difference between POS and WELL ($M = 89.81; SD = 56.56$) as well as the difference between WELL and AMN remained significant (as demonstrated in the analyses above).

Re: Hypothesis 1a: PTSD and Recall of Sexual Violence

Between-subjects Analyses

CAPS total scores were calculated for WELL and AMN, consisting of the frequency and intensity ratings of the 17 PTSD symptoms. Since each symptom was rated on a scale from 0 to 4, the possible range of these total scores was 0 to 136. CAPS sum scores were also obtained for the three symptom clusters (i.e., criterion B: items 1-5; criterion C: items 6-12; and criterion D: items 13-17). Table 5 presents Cronbach's α values obtained for each of these scores for WELL and AMN.

Table 5: Cronbach's α Values for the CAPS' Subscales and Total Score Referring to WELL and AMN.

| | WELL | AMN |
|----------------------------|---------------|--------------|
| CAPS total score | .92 (N = 103) | .91 (N = 65) |
| CAPS criterion B sum score | .83 (N = 110) | .92 (N = 78) |
| CAPS criterion C sum score | .86 (N = 110) | .84 (N = 76) |
| CAPS criterion D sum score | .84 (N = 109) | .86 (N = 72) |

Linear regression analyses were conducted to explore the relationships between CAPS total scores and MCQ sum scores. These analyses were conducted

²⁶ The sphericity assumption was violated in this analysis, too. Therefore, the corrected Greenhouse-Geisser value is reported.

separately for WELL and AMN. The age of each memory was entered as an additional predictor variable in each analysis. The results are presented in Table 6. Partially in line with hypothesis 1a, CAPS criterion B and C had significant contributions to the prediction of MCQ sum scores of WELL events. Contrary to hypothesis 1a, none of the CAPS variables contributed to the prediction of MCQ sum scores of the AMN. When participants who had described their intoxication during the AMN as a level 2 ('intoxicated to the point of losing consciousness') were excluded from the latter regression analysis - the idea being that cases of possible organic (rather than psychological) amnesia would not be considered - neither the beta weights nor the R Square (including statistical significance values) changed in meaningful ways.

A second set of regression analyses was conducted to explore the relationships between CAPS total scores and the number of details coded from the narratives of WELL and AMN. The results are presented in Table 7. Contrary to hypothesis 1a, none of the predictor variables contributed to the prediction of narrative details in memories of WELL and AMN events, respectively.

Table 6: Regression Analyses of MCQ Sum Scores on CAPS Subscale Scores for WELL and AMN.

| | Predictor variables | <i>B</i> | <i>Std.-Error</i> | <i>Beta</i> | <i>t</i> | <i>p</i> | <i>R square</i> | <i>F (df)</i> | <i>p</i> |
|------|----------------------------|----------|-------------------|-------------|----------|----------|-----------------|------------------|----------|
| WELL | Constant | 16.71 | 1.06 | | 15.77 | .00 | .08 | 2.07 (4; 101) | .09 |
| | CAPS criterion B sum score | .17 | .07 | .30 | 2.32 | .02 | | | |
| | CAPS criterion C sum score | -.14 | .06 | -.37 | -2.38 | .02 | | | |
| | CAPS criterion D sum score | .04 | .06 | .08 | .59 | .55 | | | |
| | Age of memory | -.02 | .04 | -.06 | -.58 | .56 | | | |
| AMN | Constant | 7.39 | 1.4 | | 5.1 | .00 | .02 | .37 (4; 70) | .83 |
| | CAPS criterion B sum score | -.09 | .10 | -.13 | -.90 | .37 | | | |
| | CAPS criterion C sum score | -.01 | .08 | -.02 | -.11 | .92 | | | |
| | CAPS criterion D sum score | .08 | .08 | .16 | .94 | .35 | | | |
| | Age of memory | -.02 | .06 | -.03 | -.24 | .81 | | | |

Table 7: Regression Analyses of Narrative Details on CAPS Subscale Scores for WELL and AMN

| | Predictor variables | <i>B</i> | <i>Std.-Error</i> | <i>Beta</i> | <i>t</i> | <i>p</i> | <i>R square</i> | <i>F (df)</i> | <i>p</i> |
|------|----------------------------|----------|-------------------|-------------|----------|----------|-----------------|----------------|----------|
| WELL | Constant | 101.07 | 15.86 | | 6.37 | .00 | .01 | .33 (4;100) | .86 |
| | CAPS criterion B sum score | .50 | 1.08 | .06 | .46 | .64 | | | |
| | CAPS criterion C sum score | -.50 | .85 | -.09 | -.59 | .56 | | | |
| | CAPS criterion D sum score | -.36 | .91 | -.06 | -.40 | .69 | | | |
| | Age of memory | -.10 | .62 | -.02 | -.17 | .87 | | | |
| AMN | Constant | 73.85 | 12.39 | | 5.96 | .00 | .06 | .98 (4; 65) | .43 |
| | CAPS criterion B sum score | .80 | .84 | .14 | .95 | .35 | | | |
| | CAPS criterion C sum score | -.35 | .67 | -.09 | -.52 | .60 | | | |
| | CAPS criterion D sum score | -.41 | .75 | -.10 | -.55 | .58 | | | |
| | Age of memory | -.67 | .55 | -.15 | -1.21 | .23 | | | |

Within-subjects Analyses

The range of CAPS total scores for the WELL was 0 – 98; the range of CAPS total scores for the AMN was 0 – 100. For WELL events, 27 participants (22.7%) met

criteria for a PTSD diagnosis, whereas 72 participants (60.5%) did not. For 20 participants (16.8%) missing data precluded a diagnosis from being made. Of those, 5 participants (4.2%) did not report a WELL, and, for the remaining 15 participants (12.6%), insufficient information was available to render a diagnosis. Essentially (i.e., for cases whose diagnostic information was available), 27.3% had PTSD diagnoses and 72.7% did not.

For AMN events, 11 participants (9.2 %) met criteria for a PTSD diagnosis, whereas 56 participants (47.1%) did not. For 52 participants (43.7%) insufficient data precluded a diagnosis from being made. This number included 36 participants (30.3%) who did not report an AMN, and 16 participants (13.4%) with insufficient information to render a diagnosis. Essentially (i.e., for cases whose diagnostic information was available), 16.4% had PTSD and 83.6% did not.

A Chi-square test on $N = 61$ participants, for which diagnostic information from both events was available, showed a significant difference in the frequency of PTSD diagnoses (*Chi Square* [1] = 13.31; $p = .00$).

In order to examine the relationship between memory and CAPS scores within-subjects, repeated-measures ANCOVAs were conducted to compare the CAPS scores from WELL vs. AMN, controlling for the age of each memory. The results are displayed in Table 8. All relevant assumptions were met for these analyses. Partially in line with hypothesis 1a, there were significant differences between AMN and WELL events in terms of CAPS criterion B, CAPS criterion D, and the CAPS total score. WELL events were associated with higher PTSD symptom levels than AMN events. There were also significant interaction effects between the ages of the memories and the CAPS total scores, (F [1;61] = 14.52; $p = .00$), CAPS criterion B

($F [1;70] = 12.53; p = .00$), and CAPS criterion C ($F [1;70] = 10.31; p = .00$), respectively. When the same analyses were repeated without the participants who had described their intoxication during the AMN event as a level 2 ('intoxicated to the point of losing consciousness'), only the findings for the CAPS criterion D sum scores changed, that is, the difference between WELL and AMN on this measure was no longer significant. However, there was a significant interaction effect between the ages of the memories and the difference in CAPS criterion D sum scores between WELL and AMN ($F [1;56] = 4.42; p = .04$).

Table 8: Repeated Measures ANCOVAs for CAPS Ratings from WELL vs. AMN, with Age of the Memories as a Covariate.

| | WELL: <i>X (SD)</i> | AMN: <i>X (SD)</i> | <i>F (df)</i> | <i>p</i> | <i>Eta squared</i> |
|----------------------------|------------------------|-----------------------|---------------|----------|--------------------|
| CAPS criterion B sum score | 7.37 (7.32) | 3.58 (5.68) | 28.31 (1; 70) | .00 | .29 |
| CAPS criterion C sum score | 15.37 (11.62) | 16.28 (11.39) | 1.11 (1; 70) | .30 | .02 |
| CAPS criterion D sum score | 17.37 (9.74) | 15.75 (9.74) | 5.80 (1; 70) | .02 | .08 |
| CAPS total scores | 40.05 (25.56) | 36.24 (23.56) | 6.52 (1; 61) | .01 | .10 |

Re: Hypothesis 1b: Vantage Point and Recall of Sexual Violence

Between-subjects Analyses

To explore the relationship between vantage points (based on PDEQ Item 5 and the percentage ratings obtained during the interviews) and memory ratings (MCQ sum scores), Pearson correlations were calculated between these variables for each event. The results are displayed in Table 9. Only the MCQ sum score referring to the POS was significantly correlated with observer experiences. None of the correlations referring to the WELL and the AMN were significant. The latter (null-) result did not

change when participants who had described their intoxication during the AMN as a level 2 (intoxicated to the point of unconsciousness) were excluded.

Table 9: Correlations Between MCQ Sum Score and Ratings on Observer Experience as well as Observer Memories for POS, WELL and AMN.

| | MCQ sum score | | |
|-----------------------------|---------------------|---------------------|---------------------|
| | POS | WELL | AMN |
| PDEQ Item 5 | $r = -.19; p = .05$ | $r = .03; p = .75$ | $r = .13; p = .24$ |
| Percent Observer Experience | $r = -.21; p = .05$ | $r = -.10; p = .37$ | $r = .03; p = .85$ |
| Percent Observer Memory | $r = -.18; p = .08$ | $r = -.09; p = .36$ | $r = -.10; p = .43$ |

A second set of Pearson correlations was calculated between vantage points and the details coded from the narratives of each type of event. The results are displayed in Table 10. None of the correlations were significant.

Table 10: Correlations Between Narrative Details and Ratings on Observer Experience as well as Observer Memories for POS, WELL, and AMN.

| | Narrative Details | | |
|-----------------------------|---------------------|---------------------|--------------------|
| | POS | WELL | AMN |
| PDEQ Item 5 | $r = -.09; p = .34$ | $r = -.11; p = .25$ | $r = .13; p = .26$ |
| Percent Observer Experience | $r = -.07; p = .54$ | $r = .07; p = .52$ | $r = .07; p = .59$ |
| Percent Observer Memory | $r = -.04; p = .74$ | $r = .02; p = .85$ | $r = .03; p = .81$ |

To compare participants who had a field vs. an observer experience, the sample was split into two groups for each event, based on the participants' responses to PDEQ Item 5 ("I felt as though I were a spectator watching what was happening to me, as if I were floating above the scene or observing it as an outsider"): The item was rated on a 5-point scale, with 1 indicating a clear spectator/field perspective and 5 indicating a clear observer perspective. This item was converted into a grouping variable that indicated the type of perspective experienced at the time of each event: Those who scored below the median were assigned to the group who had a field

perspective, whereas those who scored above the median were assigned to the group who had an observer perspective.

Table 11 displays the item characteristics of PDEQ Items 5. To provide information on PDEQ Item 5's construct validity, its correlations with the PDEQ total scores and MCQ item 24 ("In this event I was a spectator [= 1].... a participant [= 7]") are displayed. The ratings on this item are also compared between events (i.e., POS vs. WELL and WELL vs. AMN).

Table 11: Characteristics PDEQ Item 5 with Regards to POS, WELL and AMN.

| A) | PDEQ Item 5 \bar{X} (SD) | Paired samples t -test | Median | Frequency (%) of observer perspectives based on median split | Frequency (%) of field perspectives based on median split |
|-------------------|-------------------------------------|--------------------------------|--------|--|---|
| POS (N = 112) | 1.99 (1.32) | $t(106) = 5.29$; $p = .00$ | 1 | 50 (44.6) | 62 (55.4) |
| WELL (N = 112) | 2.89 (1.46) | | 1 | 43 (38.4) | 69 (61.6) |
| AMN (N = 81) | 2.79 (1.56) | $t(78) = 1.04$; $p = .30$ | 3 | 29 (25.8) | 52 (64.2) |

| B) | Pearson correlation with MCQ Item 24 | Pearson correlation with PDEQ total score |
|------|---|--|
| POS | $r = -.19$; $p = .05$ | $r = .76$; $p = .00$ |
| WELL | $r = -.47$; $p = .00$ | $r = .67$; $p = .00$ |
| AMN | $r = -.28$; $p = .01$ | $r = .67$; $p = .00$ |

Independent samples t -tests were conducted to compare the two groups (i.e., participants who experienced observer vs. field perspectives) on each memory for their MCQ ratings of the pertinent event. The results are presented in Table 12. For all three events, the groups did not differ significantly in terms of their memory

ratings²⁷. When participants who had described their intoxication during the AMN as a level 2 (intoxicated to the point of unconsciousness) were excluded, this finding did not change.

Table 12: Comparison of Participants Who Had a Field vs. an Observer Experience during WELL, AMN and POS in Terms of MCQ Sum Scores.

| | WELL MCQ sum score: <i>X (SD)</i> | AMN MCQ sum score: <i>X (SD)</i> | POS MCQ sum score: <i>X (SD)</i> |
|-------------------------------|---|--|--|
| Observer Experience | 16.93 (4.41) | 9.31 (5.78) | 17.86 (4.08) |
| Field Experience | 15.96 (4.18) | 7.18 (4.06) | 19.06 (2.73) |
| Independent samples t-test | $t(108) = 1.15$; $p = .25$ | $t^+(44) = 1.75$; $p = .09$ | $t^+(82) = 1.79$; $p = .08$ |

⁺ Equal variances not assumed

An equivalent set of independent samples t-tests was conducted to repeat the aforementioned group comparisons using the details coded from the narratives. The results are presented in Table 13. The two groups did not differ significantly in terms of the details they provided in each of the narratives²⁸.

Table 13: Comparison of Participants Who Had a Field vs. an Observer Experience during WELL, AMN, and POS in Terms of Narrative Details.

| | WELL Narrative Details: <i>X (SD)</i> | AMN Narrative Details: <i>X (SD)</i> | POS Narrative Details: <i>X (SD)</i> |
|-------------------------------|---|--|--|
| Observer Experience | 85.68 (48.16) | 62.12 (42.54) | 66.81 (98.87) |
| Field Experience | 91.12 (69.03) | 49.75 (40.56) | 60.33 (56.04) |
| Independent samples t-test | $t(105) = .44$; $p = .66$ | $t(72) = 1.23$; $p = .22$ | $t(106) = .43$; $p = .67$ |

²⁷ The same results were obtained when the group split on PDEQ Item 5 was defined as follows: Participants with a score of 1 ("not at all true") were placed in the field perspective group, whereas participants with a score between 2 ("slightly true") and 5 ("extremely true") were placed in the observer perspective group.

²⁸ The same results were obtained when the group split on PDEQ Item 5 was defined as follows: Participants with a score of 1 ("not at all true") were placed in the field perspective group, whereas participants with a score between 2 ("slightly true") and 5 ("extremely true") were placed in the observer perspective group.

Within-subjects Analyses

A repeated-measures ANOVA with pairwise comparisons was conducted to explore within-subjects difference between POS, WELL and AMN in terms of the participants' vantage points at the time of these events. PDEQ Item 5 was used to define the participants' vantage points during the three events. Bonferroni adjustments were made to the significance levels of each comparison. The results are displayed in Table 14²⁹. There was a significant main effect ($F [2; 154] = 14.75; p = .00$). In line with Hypothesis 1b, the results indicated that both victimization events were rated significantly higher on this item than the positive event. There was no significant difference on this rating between WELL and AMN. These findings did not change substantially when all cases that had rated their intoxication during the AMN as a level 2 ('intoxicated to the point of unconsciousness') were excluded.

Table 14: Differences Between POS vs. WELL, POS vs. AMN, and WELL vs. AMN in Terms of PDEQ Item 5.

| (N = 78) | PDEQ Item 5 <i>X (SD)</i> | | Repeated measures ANOVA: Pairwise Comparisons | |
|----------|------------------------------|--------------|--|----------|
| | | | Mean difference | <i>p</i> |
| POS | 1.90 (1.29) | POS vs. WELL | -1.06 | .00 |
| WELL | 2.96 (1.52) | POS vs. AMN | -.86 | .00 |
| AMN | 2.78 (1.53) | WELL vs. AMN | .21 | .30 |

The aforementioned tests were repeated using the data on observer perspective ratings that were assessed during the interview (i.e., percent observer *experiences*; percent observer *memories*). Bonferroni adjustments were made to the significance levels of each pairwise comparison. The results are displayed in Table 15. There were no significant main effects in either of the ANOVAs. Contrary to

²⁹ The same pattern of results emerged when individual paired samples t-tests were conducted instead of pairwise comparisons within a repeated measures ANOVA.

hypothesis 1b, none of the comparisons between POS, WELL and AMN yielded a statistically significant difference. In line with hypothesis 1b, there was a trend for POS being rated as lower on observer perspectives than the two sexual victimization events³⁰. When cases that had described their intoxication during the AMN as a level 2 ('intoxicated to the point of unconsciousness') were excluded, the comparison of POS and AMN on observer memories reached statistical significance.

Table 15: Differences Between POS vs. WELL and AMN in Terms of Participants' Observer Experiences and Observer Memories.

| A) (N = 46) | Percent Observer Experiences: <i>X (SD)</i> | | Repeated measures ANOVA: Pairwise Comparisons | |
|----------------|---|--------------|--|----------|
| | | | Mean difference | <i>p</i> |
| POS | 19.13 (37.89) | POS vs. WELL | -14.54 | .34 |
| WELL | 33.67 (45.59) | POS vs. AMN | -12.17 | .46 |
| AMN | 31.30 (45.69) | WELL vs. AMN | 2.37 | 1.00 |

| B) (N = 60) | Percent Observer Memories <i>X (SD)</i> | | Repeated measures ANOVA: Pairwise Comparisons | |
|----------------|---|--------------|--|----------|
| | | | Mean difference | <i>p</i> |
| POS | 21.75 (37.47) | POS vs. WELL | -16.83 | .14 |
| WELL | 38.58 (44.76) | POS vs. AMN | -16.58 | .09 |
| AMN | 38.33 (47.27) | WELL vs. AMN | .25 | 1.00 |

Additional Analysis: Shift in Perspective and Memory

It was examined if a shift in perspectives from the *time of the event* to the *time of recall* might have contributed to the fact that the three events were recalled in different degrees of detail. Three paired-samples t-tests were conducted to compare the observer experiences at the time of an event with observer perspectives at the time of recall for POS, WELL and AMN, in order to examine whether a shift in

³⁰ When individual paired samples t-test were conducted instead of pairwise comparisons within a repeated measures ANOVA, the comparison of observer perspectives during POS vs. WELL yielded a statistically significant difference.

perspectives has taken place. The results are displayed in Table 16. A significant shift in perspectives had taken place for WELL and POS events but not for AMN events. The latter finding did not change when all participants who had described their intoxication during the AMN event as a level 2 ('intoxicated to the point of unconsciousness') were excluded.

Table 16: Difference Between Observer Perspectives at the Time of the Event and at the Time of Recall for POS, WELL and AMN.

| | Percent Observer Experience: <i>X (SD)</i> | Percent Observer Perspective at time of recall: <i>X (SD)</i> | Paired samples t-test |
|------|---|--|-------------------------|
| POS | 17.13 (34.32) | 29.55 (40.82) | $t(88) = 2.63; p = .01$ |
| WELL | 30.73 (42.09) | 44.15 (46.38) | $t(87) = 2.53; p = .01$ |
| AMN | 27.89 (43.74) | 32.98 (44.60) | $t(56) = .78; p = .44$ |

Re: Core Hypothesis 2: Arousal Sensitivity and Recall of Sexual Violence

As discussed above, the BFI neuroticism and extraversion scales were used to operationalize arousal sensitivity, with extraversion theoretically related to low arousal sensitivity and neuroticism theoretically related to high arousal sensitivity. A Cronbach's $\alpha = .75$ ($N = 111$) was obtained for the extraversion subscale of the BFI-44. The neuroticism subscale yielded a Cronbach's $\alpha = .76$ ($N = 108$). Extreme groups were defined for both subscales based on median splits.

Independent samples t-tests were performed to compare the extreme groups in terms of the MCQ sum scores for WELL and AMN, respectively. All relevant assumptions were met for these analyses. The results are displayed in Table 17. Partially in line with core hypothesis 2, only the comparison of individuals scoring high vs. low on extraversion yielded a significant group difference for the AMN memory ratings. These findings did not change substantially when participants who

had described their levels of intoxication during the AMN as 2 ('intoxicated to the point of losing consciousness') were excluded from the analyses.

Table 17: Independent Samples t-Tests Between High and Low Neuroticism and High and Low Extraversion on MCQ Ratings for WELL and AMN.

| | Extraversion | Neuroticism |
|-------------------------|---|---|
| MCQ sum scores for WELL | $X_{\text{BFI extraversion-high}} = 16.98; SD = 4.39$ $X_{\text{BFI extraversion-low}} = 15.91; SD = 4.03$ $t(106) = 1.32; p = .10$ | $X_{\text{BFI neuroticism-high}} = 15.83; SD = 4.52$ $X_{\text{BFI neuroticism-low}} = 16.83; SD = 3.92$ $t(106) = 1.22; p = .12$ |
| MCQ sum scores for AMN | $X_{\text{BFI extraversion-high}} = 9.14; SD = 4.77$ $X_{\text{BFI extraversion-low}} = 6.86; SD = 4.75$ $t(77) = 2.12; p = .02$ | $X_{\text{BFI neuroticism-high}} = 8.66; SD = 4.98$ $X_{\text{BFI neuroticism-low}} = 7.14; SD = 4.69$ $t(77) = 1.39; p = .09$ |

Note: All t-tests were one-tailed.

The same tests were repeated with the narratives details as the independent variable. The results are displayed in Table 18. Again, only the comparison of individuals scoring high vs. low on extraversion yielded a significant group difference for the AMN memory details in the expected direction.

Table 18: Independent Samples t-Tests Between High and Low Neuroticism as well as High and Low Extraversion on Narrative Details in WELL and AMN.

| | Extraversion | Neuroticism |
|---------------------------|--|--|
| Narrative details in WELL | $X_{\text{BFI extraversion-high}} = 94.94; SD = 59.57$ $X_{\text{BFI extraversion-low}} = 84.79; SD = 64.35$ $t(103) = .83; p = .21$ | $X_{\text{BFI neuroticism-high}} = 95.15; SD = 61.29$ $X_{\text{BFI neuroticism-low}} = 84.77; SD = 62.88$ $t(103) = .85; p = .20$ |
| Narrative details in AMN | $X_{\text{BFI extraversion-high}} = 69.76; SD = 47.49$ $X_{\text{BFI extraversion-low}} = 40.34; SD = 29.83$ $t(53.4) = 3.14; p = .00^+$ | $X_{\text{BFI neuroticism-high}} = 51.03; SD = 38.91$ $X_{\text{BFI neuroticism-low}} = 56.13; SD = 43.72$ $t(73) = .18; p = .30$ |

⁺ equal variances not assumed

Note: All t-tests were one-tailed.

The extreme groups from the extraversion and neuroticism subscales of the BFI-44 were also combined into two categories of (a) low extraversion *and* high neuroticism and (b) high extraversion *and* low neuroticism. Independent samples t-

tests were performed to compare these two groups in terms of their memory ratings (MCQ sum scores) for WELL and AMN. All relevant assumptions were met for these analyses. The results are displayed in Table 19. Partially in line with core hypothesis 2, only the test for the WELL yielded a significant difference between the two groups. These findings did not change substantially when cases who scored their level of intoxication during the AMN event a 2 ('intoxicated to the point of losing consciousness') were excluded from the analysis for the AMN.

Table 19: Independent Samples t-Tests Between Combined Extreme Groups of Neuroticism and Extraversion on MCQ Ratings for WELL and AMN.

| | Combined extreme groups |
|-------------------------|---|
| MCQ sum scores for WELL | $X_{\text{BFI extraversion -high / neuroticism -low}} = 17.16; SD = 3.92$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 15.43; SD = 4.10$ $t(62) = 1.72; p = .05$ |
| MCQ sum scores for AMN | $X_{\text{BFI extraversion -high / neuroticism -low}} = 8.81; SD = 4.63$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 8.12; SD = 4.92$ $t(45) = .50; p = .31$ |

Note: All t-tests were one-tailed.

The same tests were repeated with the narratives' details as the independent variable. The results are displayed in Table 20. Contrary to core hypothesis 2, the number of details in AMN narratives was higher for highly neurotic and introverted (i.e., presumably hypersensitive) individuals, as compared to non-neurotic and extraverted (i.e., presumably hyposensitive) individuals.

Table 20: Independent Samples t-Tests Between Combined Extreme Groups of Neuroticism and Extraversion on Narrative Details in WELL and AMN.

| | Combined extreme groups |
|---------------------------|--|
| Narrative details in WELL | $X_{\text{BFI extraversion -high / neuroticism -low}} = 89.53; SD = 54.35$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 89.71; SD = 57.12$ $t(61) = .01; p = .50$ |
| Narrative details in AMN | $X_{\text{BFI extraversion -high / neuroticism -low}} = 43.96; SD = 31.92$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 73.62; SD = 48.07$ $t(34.29) = 2.43; p = .01^+$ |

⁺ Equal variances not assumed

Note: All t-tests were one-tailed.

Additional Analyses: State Affect and Arousal Sensitivity

In order to explore if the BFI scales of neuroticism and extraversion were related to the arousal experienced during the experience of sexual violence, the BFI scores were correlated to the Affect Grid arousal ratings during WELL and AMN, respectively. According to theoretical considerations, it was expected that extraversion be negatively correlated with arousal, whereas neuroticism be positively correlated with arousal. Pearson correlation analyses revealed patterns inconsistent with this model: The BFI extraversion scores were not related to the Affect Grid arousal ratings of the WELL ($r = .05; p = .60$) and were positively correlated to the Affect Grid arousal ratings of the AMN ($r = .27; p = .02$). The BFI neuroticism scores were not related to the Affect Grid ratings of the AMN ($r = -.03; p = .89$) and were negatively correlated with the Affect Grid arousal ratings of the WELL ($r = -.31; p = .00$). Similar results were obtained when cases who rated their levels of intoxication during the AMN a 2 ('intoxicated to the point of losing consciousness') were excluded.

Re: Hypothesis 2a: Arousal Sensitivity and Peritraumatic Dissociation

Cronbach's α coefficients were calculated for the PDEQ sum scores for each memory: The PDEQ items related to WELL events yielded an $\alpha = .88$ ($N = 108$), the PDEQ items concerning AMN events yielded an $\alpha = .86$ ($N = 79$), and the PDEQ items associated with POS events yielded an $\alpha = .91$ ($N = 111$).

Independent samples t-tests were performed to compare extreme groups of the BFI-44 extraversion and neuroticism subscales in terms of the PDEQ sum scores for WELL and AMN, respectively. All relevant assumptions were met for these analyses. The results are displayed in Table 21. Partially in line with hypothesis 2a, three tests did not yield any significant group differences but one test did. These findings did not change when participants who had rated their level of intoxication during the AMN event as 2 ('intoxicated to the point of losing consciousness') were excluded from the analyses for the AMN.

Table 21: Independent Samples t-Tests Between High and Low Neuroticism as well as High and Low Extraversion on PDEQ Ratings for WELL and AMN.

| | Extraversion | Neuroticism |
|--------------------------|--|--|
| PDEQ sum scores for WELL | $X_{\text{BFI extraversion -high}} = 30.51; SD = 9.86$ $X_{\text{BFI extraversion -low}} = 31.74; SD = 9.47$ $t(107) = .66; p = .26$ | $X_{\text{BFI neuroticism -high}} = 32.89; SD = 8.86$ $X_{\text{BFI neuroticism -low}} = 29.80; SD = 10.60$ $t(107) = 1.68; p = .05$ |
| PDEQ sum scores for AMN | $X_{\text{BFI extraversion -high}} = 32.33; SD = 9.58$ $X_{\text{BFI extraversion -low}} = 30.57; SD = 9.51$ $t(78) = .84; p = .20$ | $X_{\text{BFI neuroticism -high}} = 32.63; SD = 8.97$ $X_{\text{BFI neuroticism -low}} = 30.21; SD = 9.61$ $t(78) = 1.16; p = .13$ |

Note: All t-tests were one-tailed.

Independent samples t-tests were performed to compare the combined extreme groups from the extraversion *and* neuroticism subscales of the BFI-44 on PDEQ sum scores for WELL and AMN. All relevant assumptions were met for these analyses. The results are displayed in Table 22. Contrary to hypothesis 2a, neither of

these tests yielded significant results. This finding did not change when participants who had described their level of intoxication during the AMN event as 2 ('intoxicated to the point of losing consciousness') were excluded from the analysis for the AMN.

Table 22: Independent Samples t-Tests Between Combined Extreme Groups of Neuroticism and Extraversion on PDEQ Ratings for WELL and AMN.

| | Combined extreme groups |
|--------------------------|--|
| PDEQ sum scores for WELL | $X_{\text{BFI extraversion -high / neuroticism -low}} = 28.16; SD = 10.50$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 31.80; SD = 9.71$ $t(62) = 1.44; p = .08$ |
| PDEQ sum scores for AMN | $X_{\text{BFI extraversion -high / neuroticism -low}} = 31.48; SD = 9.18$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 32.00; SD = 8.26$ $t(46) = .21; p = .42$ |

Note: All t-tests were one-tailed.

Additional Analyses: Vantage Point and Arousal Sensitivity

To analyze the difference between hyper- and hyposensitive individuals in terms of observer vs. field perspectives experienced during WELL and AMN events, participants' responses to PDEQ Item 5 ("I felt as though I were a spectator watching what was happening to me, as if I were floating above the scene or observing it as an outsider") were examined. The median of PDEQ Item 5 was used as the cut off score for observer experiences (see also hypothesis 1b). Chi square tests were conducted to assess the difference in frequency of observer vs. field perspectives in hyposensitive and hypersensitive individuals. The results are presented in Tables 23 and 24. Only one of these six tests revealed a statistically significant result. Specifically, more field perspectives were reported by introverted than extraverted individuals, and more observer perspectives were reported by extraverted than introverted individuals in the AMN events. When participants who had described their intoxication during the

AMN as a level 2 ('intoxicated to the point of losing consciousness') were excluded from the analysis, this test did not yield a significant result (*Chi square* = 2.94; $p = .09$). None of the results of the other analyses referring to the AMN event changed when such cases were excluded. These results are not in line with hypothesis 2a, according to which hyposensitive individuals (i.e., extraverted and/or not neurotic) were expected to have reported fewer observer than field perspectives compared to hypersensitive individuals (i.e., introverted and/or highly neurotic).

Table 23: Chi Square Tests Between High and Low Neuroticism as well as High and Low Extraversion in Terms of Observer and Field Experiences at the Time of WELL and AMN.

| | Extraversion | Neuroticism |
|---------------------------------|--|---|
| Perspective at the time of WELL | Extraversion high: 16 observer; 33 field Extraversion low: 25 observer; 35 field <i>Chi square</i> = .93; $p = .33$ | Neuroticism high: 19 observer; 30 field Neuroticism low: 22 observer; 38 field <i>Chi square</i> = .05; $p = .82$ |
| Perspective at the time of AMN | Extraversion high: 17 observer; 19 field Extraversion low: 11 observer; 33 field <i>Chi square</i> = 4.30; $p = .04$ | Neuroticism high: 13 observer; 25 field Neuroticism low: 15 observer; 25 field <i>Chi square</i> = .02; $p = .89$ |

Table 24: Chi Square Tests Between Combined Extreme Groups of Neuroticism and Extraversion in Terms of Observer and Field Experiences at the Time of WELL and AMN.

| | Combined extreme groups |
|---------------------------------|---|
| Perspective at the time of WELL | Extraversion high, neuroticism low: 11 observer; 21 field Extraversion low, neuroticism high: 14 observer; 18 field $\chi^2 = .59; p = .44$ |
| Perspective at the time of AMN | Extraversion high, neuroticism low: 10 observer; 13 field Extraversion low, neuroticism high: 6 observer; 19 field $\chi^2 = 2.05; p = .15$ |

All tests regarding vantage points were repeated using information that was assessed from the participants during the interview (i.e., they had been asked to indicate how much percent of an event they *experienced* from an observer vs. field perspective and how much percent of an event they *recalled* from an observer vs. field perspective). Table 25 displays the item characteristics of these data. To provide information regarding these ratings' construct validities, each rating was correlated with PDEQ Item 5 and MCQ Item 24 referring to the pertinent event.

Table 25: Item Characteristics of Data Referring to Observer* Experiences and Observer Perspectives at Recall for POS, AMN and WELL.

| | Percent Observer Experience | Percent Observer Memory |
|---|-----------------------------|-------------------------|
| POS | | |
| N | 91 | 94 |
| <i>X (SD)</i> | 16.98 (33.98) | 29.04 (40.83) |
| Pearson <i>correlation</i> with PDEQ Item 5 | $r = .33 ; p = .00$ | $r = .26 ; p = .01$ |
| Pearson <i>correlation</i> with MCQ Item 24 | $r = -.04 ; p = .71$ | $r = -.08 ; p = .48$ |
| WELL | | |
| N | 90 | 99 |
| <i>X (SD)</i> | 31.16 (42.38) | 44.49 (45.74) |
| Pearson <i>correlation</i> with PDEQ Item 5 | $r = .27 ; p = .01$ | $r = .06 ; p = .58$ |
| Pearson <i>correlation</i> with MCQ Item 24 | $r = -.25 ; p = .02$ | $r = -.11 ; p = .28$ |
| AMN | | |
| N | 57 | 70 |
| <i>X (SD)</i> | 27.89 (43.74) | 39.00 (46.54) |
| Pearson <i>correlation</i> with PDEQ Item 5 | $r = .37 ; p = .01$ | $r = .27 ; p = .03$ |
| Pearson <i>correlation</i> with MCQ Item 24 | $r = -.31 ; p = .02$ | $r = .27 ; p = .03$ |

* Since these data were assessed as percentages (e.g., “How much of this event did you experience from an observer perspective?”), the relative share of field experiences / field perspectives at recall can be inferred by subtracting the means of the observer data from 100.

In order to compare hyposensitive and hypersensitive individuals in terms of their perspectives at the time of each event and at the time of recall, the ratings described in Table 25 were compared for the two groups using independent samples t-tests. The results are shown in Tables 26 and 27. The results are all non significant, except the group that scored low on neuroticism (i.e., thought to be hyposensitive to arousal) recalled their AMN events to a significant lesser degree from observer perspectives than the group that scored high on neuroticism (i.e., thought to be hypersensitive to arousal). The same was true for the combined extreme groups: Those who scored low on neuroticism *and* high on extraversion (i.e., hyposensitive) recalled their AMN events to a significant lower degree from observer perspectives than those who scored high on neuroticism *and* low on extraversion (i.e.,

hypersensitive). Both these results support hypothesis 2a. When participants who had described their intoxication during the AMN as a level 2 ('intoxicated to the point of losing consciousness') were excluded, the same pattern of results was obtained, except the comparison of the combined extreme groups for AMN events was no longer significant.

Table 26: Independent Samples t-Tests Between High and Low Extraversion as well as High and Low Neuroticism on Ratings for Observer Experiences and Observer Perspectives at Recall for WELL and AMN.

| | Extraversion | Neuroticism |
|---|--|--|
| Percent Observer Experience during WELL | $X_{\text{BFI extraversion -high}} = 33.62; SD = 42.81$ $X_{\text{BFI extraversion -low}} = 27.41; SD = 41.89$ $t(86) = .68; p = .25$ | $X_{\text{BFI neuroticism -high}} = 33.75; SD = 44.18$ $X_{\text{BFI neuroticism -low}} = 27.17; SD = 40.64$ $t(86) = .73; p = .24$ |
| Percent Observer Memory of WELL | $X_{\text{BFI extraversion -high}} = 43.45; SD = 44.92$ $X_{\text{BFI extraversion -low}} = 44.07; SD = 46.40$ $t(94) = .07; p = .48$ | $X_{\text{BFI neuroticism -high}} = 44.14; SD = 46.27$ $X_{\text{BFI neuroticism -low}} = 46.06; SD = 45.21$ $t(94) = .53; p = .30$ |
| Percent Observer Experience during AMN | $X_{\text{BFI extraversion -high}} = 21.82; SD = 41.36$ $X_{\text{BFI extraversion -low}} = 30.61; SD = 44.79$ $t(53) = .74; p = .24$ | $X_{\text{BFI neuroticism -high}} = 41.07; SD = 49.17$ $X_{\text{BFI neuroticism -low}} = 12.59; SD = 30.83$ $t^{\dagger}(46) = 2.58; p = .00$ |
| Percent Observer Memory of AMN | $X_{\text{BFI extraversion -high}} = 47.50; SD = 50.08$ $X_{\text{BFI extraversion -low}} = 33.75; SD = 44.42$ $t^{\dagger}(54) = 1.17; p = .12$ | $X_{\text{BFI neuroticism -high}} = 47.06; SD = 49.15$ $X_{\text{BFI neuroticism -low}} = 31.76; SD = 44.07$ $t(66) = 1.35; p = .09$ |

[†] equal variances not assumed.

Note: All t-tests were one-tailed.

Table 27: Independent Samples t-Tests Between Combined Extreme Groups of Neuroticism and Extraversion on Ratings for Observer Experiences and Observer Perspectives at Recall for WELL and AMN.

| | Combined extreme groups |
|---|---|
| Percent Observer Experience during WELL | $X_{\text{BFI extraversion -high / neuroticism -low}} = 28.04; SD = 40.28$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 28.46; SD = 42.68$ $t(49) = .04; p = .49$ |
| Percent Observer Memory of WELL | $X_{\text{BFI extraversion -high / neuroticism -low}} = 38.70; SD = 42.33$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 35.52; SD = 44.29$ $t(54) = .28; p = .39$ |
| Percent Observer Experience during AMN | $X_{\text{BFI extraversion -high / neuroticism -low}} = 12.86; SD = 32.92$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 42.50; SD = 49.40$ $t(32) = 2.10; p = .02^+$ |
| Percent Observer Memory of AMN | $X_{\text{BFI extraversion -high / neuroticism -low}} = 37.06; SD = 48.45$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 39.13; SD = 47.57$ $t(38) = .14; p = .45$ |

⁺ equal variances not assumed.

Note: All t-tests were one-tailed.

Re: Hypothesis 2b: Arousal Sensitivity and PTSD

Analyses based on PTSD Total Scores

Independent samples t-tests were performed to analyse group difference in PTSD symptoms between hyposensitive and hypersensitive individuals. The BFI-44 extreme groups for extraversion and neuroticism were used to define high vs. low arousal sensitivity. CAPS total scores were used as indicators of PTSD symptom levels and severity. The results are displayed in Tables 28 and 29. In line with hypothesis 2b, participants who scored high on neuroticism had significantly more PTSD symptoms and more severe PTSD symptoms than participant who scored low on neuroticism. This was true for both WELL and AMN events. However, such group differences were not demonstrated for participants high vs. low on extraversion. When extraversion and neuroticism were combined to form two extreme groups (i.e., high extraversion *and* low neuroticism vs. low extraversion *and*

high neuroticism), there was a significant group difference in the expected direction for PTSD symptoms related to WELL events. That is, participants who scored high on neuroticism and low on extraversion had more PTSD symptoms and more severe PTSD symptoms than participants who scored low on neuroticism and high on extraversion. Such a pattern was also shown for AMN-related PTSD. This pattern of results did not change when cases who had described their intoxication during the AMN as a level 2 ('intoxicated to the point of losing consciousness') were excluded.

Table 28: Independent Samples t-Tests Between High and Low Neuroticism as well as High and Low Extraversion on CAPS Total Scores for WELL and AMN.

| | Extraversion | Neuroticism |
|----------------------------|--|---|
| CAPS total scores for WELL | $X_{\text{BFI extraversion -high}} = 38.44; SD = 24.83$ $X_{\text{BFI extraversion -low}} = 43.23; SD = 25.42$ $t(103) = .97; p = .17$ | $X_{\text{BFI neuroticism -high}} = 49.23; SD = 24.47$ $X_{\text{BFI neuroticism -low}} = 34.14; SD = 23.79$ $t(103) = 3.20; p = .00$ |
| CAPS total scores for AMN | $X_{\text{BFI extraversion -high}} = 35.79; SD = 23.08$ $X_{\text{BFI extraversion -low}} = 37.79; SD = 22.54$ $t(69) = .37; p = .36$ | $X_{\text{BFI neuroticism -high}} = 44.23; SD = 20.69$ $X_{\text{BFI neuroticism -low}} = 29.69; SD = 22.43$ $t(69) = 2.84; p = .01$ |

Note: All t-tests were one-sided.

Table 29: Independent Samples t-Tests Between Combined Extreme Groups of Neuroticism and Extraversion on CAPS Total Scores for WELL and AMN.

| | Combined extreme groups |
|----------------------------|---|
| CAPS total scores for WELL | $X_{\text{BFI extraversion -high / neuroticism -low}} = 30.84; SD = 25.55$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 47.55; SD = 28.02$ $t(60) = 2.45; p = .01$ |
| CAPS total scores for AMN | $X_{\text{BFI extraversion -high / neuroticism -low}} = 27.95; SD = 25.10$ $X_{\text{BFI extraversion -low / neuroticism -high}} = 41.48; SD = 24.46$ $t(42) = 1.81; p = .04$ |

Note: All t-tests were one-sided.

Analyses based on PTSD Diagnoses

Chi square tests were conducted to analyze if the frequency of PTSD diagnoses (yes/no) was different for participants with high vs. low arousal sensitivity. The results are displayed in Tables 30 and 31. Only partially in line with hypothesis 2b, individuals with high vs. low extraversion and/or high vs. low neuroticism did not differ in terms of CAPS diagnoses after WELL and AMN events, except extraverted individuals received significantly less PTSD diagnoses from the WELL event than introverted individuals. Although the majority of analyses did not reach statistical significance, all but one group comparison regarding the frequency of PTSD diagnoses were in the expected direction. This pattern of results did not change when cases had described their intoxication during the AMN as a level 2 ('intoxicated to the point of losing consciousness') were excluded.

Table 30: Chi Square Tests Between High and Low Neuroticism as well as High and Low Extraversion on CAPS Diagnoses for WELL and AMN.

| | Extraversion | Neuroticism |
|-------------------------|--|--|
| CAPS diagnoses for WELL | Extraversion high: 7 PTSD; 37 no PTSD | Neuroticism high: 14 PTSD; 33 no PTSD |
| | Extraversion low: 20 PTSD; 33 no PTSD | Neuroticism low: 13 PTSD; 37 no PTSD |
| | <i>Chi square = 5.70; p = .02</i> | <i>Chi square = .17; p = .68</i> |
| CAPS diagnoses for AMN | Extraversion high: 4 PTSD; 29 no PTSD | Neuroticism high: 5 PTSD; 29 no PTSD |
| | Extraversion low: 6 PTSD; 27 no PTSD | Neuroticism low: 5 PTSD; 27 no PTSD |
| | <i>Chi square = .47; p = .49</i> | <i>Chi square = .01; p = .92</i> |

Table 31: Chi Square Tests Between Combined Extreme Groups of Neuroticism and Extraversion on CAPS Diagnoses for WELL and AMN.

| | Combined extreme groups |
|-------------------------|---|
| CAPS diagnoses for WELL | Extraversion high, neuroticism low: 4 PTSD; 23 no PTSD Extraversion low, neuroticism high: 11 PTSD; 19 no PTSD <i>Chi square</i> = 3.50; <i>p</i> = .06 |
| CAPS diagnoses for AMN | Extraversion high, neuroticism low: 3 PTSD; 17 no PTSD Extraversion low, neuroticism high: 4 PTSD; 17 no PTSD <i>Chi square</i> = .12; <i>p</i> = .73 |

Re: Core Hypothesis 3: Predictors of PTSD

Traumatic Extent of WELL vs. AMN

One hundred and five out of 119 participants (93%) rated their WELL events as traumatic (as per the A2 diagnostic criterion of the DSM-IV-TR) and 66 out of 79 participants (84%) indicated their AMN events had traumatic qualities. This difference in frequency was not statistically significant (*Chi square* = 1.21; *p* = .27). The traumatic extent of the events was also rated on a scale from 1 to 10. The mean rating for the WELL was $X(SD) = 7.90(2.21)$, whereas the equivalent rating for the AMN was $X(SD) = 6.07(2.71)$. This difference was statistically significant ($t[75] = 4.71$; *p* = .00).

Explanation of Variance in CAPS Total Scores based on Event-Related

Variables

Linear regression analyses were conducted to explain the variance in CAPS total scores for WELL and AMN events from three variables: (1) the traumatic extent of the event (orally rated by the participant on a scale from 1-10), (2) the arousal rating of the Affect Grid, (3) the PDEQ total score, and (4) the time passed since the event happened. None of these predictor variables were significantly related to each

other for WELL and AMN, respectively. The results are displayed in Table 32.

Partially in line with core hypothesis 3, the Affect Grid arousal rating and the PDEQ total score, but not the traumatic extent and the time since the event, contributed significantly to the explanation of CAPS total scores referring to the WELL event. Overall, 21% of the variance of CAPS total scores was explained by the predictor variables in this equation. For AMN events, only the PDEQ total score, but not the Affect Grid arousal rating, the traumatic extent, or the time since the event predicted CAPS total scores. Overall, 17% of the variance of CAPS total scores was explained by the predictor variables in this equation. The outcome of the regression analysis for the AMN did not change meaningfully when all cases who had rated their levels of intoxication during the AMN event a 2 (intoxicated to the point of unconsciousness) were excluded.

Table 32: Regression Analyses Explaining CAPS Total Scores for WELL and AMN from State Predictor Variables.

| | Predictor variables | <i>B</i> | <i>Std.-Error</i> | <i>Beta</i> | <i>t</i> | <i>p</i> | <i>R square</i> | <i>F (df)</i> | <i>p</i> |
|------|---------------------|----------|-------------------|-------------|----------|----------|-----------------|-----------------|----------|
| WELL | Constant | 47.44 | 13.44 | | 3.53 | .00 | .21 | 6.55 (4; 97) | .00 |
| | Traumatic extent | .33 | 1.12 | .03 | .29 | .77 | | | |
| | Affect Grid arousal | -3.61 | .91 | -.37 | -3.95 | .00 | | | |
| | PDEQ total score | .53 | .24 | .20 | 2.19 | .03 | | | |
| | Time since event | -.10 | .22 | -.04 | -.43 | .67 | | | |
| AMN | Constant | -13.73 | 17.82 | | -.77 | .45 | .17 | 2.65 (4;52) | .00 |
| | Traumatic extent | .73 | 1.22 | .08 | .60 | .55 | | | |
| | Affect Grid arousal | 1.07 | 1.20 | .12 | .89 | .38 | | | |
| | PDEQ total score | 1.15 | .39 | .42 | 2.97 | .00 | | | |
| | Time since event | .23 | .33 | .09 | .70 | .49 | | | |

Since the Affect Grid arousal rating was negatively associated with PTSD symptoms after WELL events, separate correlations were calculated for those who did and did not meet the criteria for a diagnosis of PTSD for this event. For participants with PTSD, the correlation between arousal ratings and overall PTSD

was $r = -.45$ ($p = .02$); the correlation between arousal ratings and avoidance/numbing symptoms was $r = -.51$ ($p = .01$); the correlations between arousal ratings and the other two symptom clusters were not significant. For participants without PTSD, none of these correlations (i.e., arousal correlated with overall PTSD and the three symptom clusters) were significant.

Additional analyses of event-related predictor variables.

In order to explore the validity of the ratings of the two events' traumatic extent ratings, correlation analyses were conducted between the oral ratings (scale from 1-10) and the DSM A2 diagnostic criterion for trauma. For the WELL, the correlation between these two variables was significant ($r = .30$; $p = .00$), however, for the AMN event, this correlation was not significant ($r = .16$; $p = .17$).

In order to explore the validity of the Affect Grid arousal ratings, their means were compared between the three types of events (POS, WELL, and AMN) in a repeated-measures ANOVA. These analyses are displayed in Table 33. Note that the mean for all three types of events is above 5, which indicates that all three events were rated above the neutral point on the arousal scale. There was a significant main effect ($F [2; 140] = 10.66$; $p = .00$). Pairwise comparisons revealed that the POS and WELL events were significantly more arousing than the AMN but there was no difference in arousal between POS and WELL³¹.

³¹ When individual paired samples t-test were conducted instead of pairwise comparisons within a repeated measures ANOVA, the same pattern of results was obtained.

Table 33: Comparison of Affect Grid Arousal Ratings Between POS, WELL and AMN.

| (N = 71) | Affect Grid arousal \bar{X} (SD) | | Repeated measures ANOVA: Pairwise Comparisons | |
|----------|---------------------------------------|--------------|--|-----|
| | | | Mean difference | p |
| POS | 7.42 (2.31) | POS vs. WELL | .56 | .50 |
| WELL | 6.86 (2.67) | POS vs. AMN | 1.80 | .00 |
| AMN | 5.62 (2.65) | WELL vs. AMN | 1.24 | .01 |

Considering the unexpected negative *beta* weight of arousal in the prediction of CAPS total scores, the above regression analyses were repeated with the Affect Grid valence ratings as a predictor variable. The PDEQ scores remained a significant predictor and the traumatic extent ratings remained a non-significant predictor in both equations. For the WELL, the Affect Grid valence ratings were not a significant predictor (other than the arousal ratings); also, the total variance of CAPS total scores explained was reduced to 7% ($R^2 = .07$). For the AMN, the Affect Grid valence ratings were not a significant predictor either and the total variance of CAPS total scores explained remained the same (15%).

Pearson correlations were calculated between Affect Grid arousal and the three CAPS sum scores for criterion B, C, and D. For the WELL, all three correlations were negative and highly significant, ranging from $r = -.25$ to $r = -.36$. For the AMN, the equivalent correlations were all non-significant.

Explanation of Variance in CAPS Total Scores based on Trait and Historic Variables

A second set of linear regression analyses was calculated for WELL and AMN events in order to explain the variance in CAPS total scores from the following predictor variables: (1) the number of types of childhood abuse (ranging between 1

and 4), (2) the number of types of traumas reported experienced, (3) the number of sexual assaults reported experienced (excluding childhood events), and (4) DES total scores. None of these predictor variables were significantly correlated with each other. The results are displayed in Table 34. Overall, 28% and 27% of the variance in CAPS total scores were explained for WELL and AMN, respectively. Partially in line with core hypothesis 3, the number of types of traumas experienced was a significant predictor of PTSD symptoms from WELL and AMN events. For WELL events, the DES total scores were an additional predictor that was highly significant, whereas this was not the case for AMN events. Instead, the number of sexual assaults was a significant predictor of AMN-CAPS total scores. The number of types of childhood abuse was not a significant predictor in either one of the analyses.

Table 34: Regression Analyses Explaining CAPS Total Scores for WELL and AMN from Trait/Historical Predictor Variables.

| | Predictor variables | <i>B</i> | <i>Std.-Error</i> | <i>Beta</i> | <i>t</i> | <i>p</i> | <i>R square</i> | <i>F (df)</i> | <i>p</i> |
|------|------------------------------------|----------|-------------------|-------------|----------|----------|-----------------|----------------|----------|
| WELL | Constant | -3.80 | 9.21 | | -.41 | .68 | .28 | 7.82 (4;79) | .00 |
| | Number of types of childhood abuse | 3.69 | 2.12 | .17 | 1.74 | .09 | | | |
| | Number of types of traumas | 2.89 | .98 | .31 | 2.94 | .00 | | | |
| | Number of sexual assaults | .19 | .14 | .14 | 1.35 | .18 | | | |
| | DES total score | .14 | .05 | .27 | 2.79 | .01 | | | |
| AMN | Constant | 3.06 | 11.41 | | .27 | .79 | .27 | 4.76 (4;52) | .00 |
| | Number of types of childhood abuse | 2.18 | 2.48 | .11 | .88 | .39 | | | |
| | Number of types of traumas | 2.65 | 1.06 | .32 | 2.51 | .02 | | | |
| | Number of sexual assaults | .33 | .15 | .28 | 2.23 | .03 | | | |
| | DES total score | .03 | .06 | .06 | .50 | .62 | | | |

Additional analysis: gender and PTSD.

Two independent samples t-tests were conducted to examine if there were any gender differences in PTSD symptoms referring to WELL and AMN. Only participants who clearly identified themselves as either male or female were included in the analyses. Neither comparisons yielded a significant difference in CAPS total scores between male and female participants (WELL: $t [97] = 1.26$; $p = .21$; AMN: $t [66] = .52$; $p = .60$).

Re: Hypothesis 3a: State and Trait Dissociation

PDEQ Total Scores

Pairwise comparisons were conducted via a repeated measures ANOVA to examine potential differences in PDEQ total scores between POS, WELL, and AMN. Bonferroni adjustments were made to the significance levels of each pairwise comparison. The results are displayed in Table 35. There was a significant main effect ($F [2;154] = 60.47$; $p = .00$). As hypothesized, the PDEQ ratings for POS events were significantly lower than PDEQ ratings for WELL and AMN events, respectively. There was no difference in PDEQ ratings between WELL and AMN³².

Table 35: Comparison of POS, WELL and AMN on PDEQ Total Scores.

| (N = 78) | PDEQ total scores \bar{X} (SD) | | Repeated measures ANOVA: Pairwise Comparisons | |
|----------|-------------------------------------|--------------|--|------|
| | | | Mean difference | p |
| POS | 18.85 (16.63) | POS vs. WELL | -16.82 | .00 |
| WELL | 32.14 (30.04) | POS vs. AMN | -16.29 | .00 |
| AMN | 31.53 (29.45) | WELL vs. AMN | -2.22 | 1.00 |

³² The same results were obtained when individual paired-samples t-tests were calculated.

DES Scale Characteristics

The Cronbach alpha coefficient based on all 28 items of the DES was $\alpha = .96$. The mean DES mean score in this sample was $X = 23.85$ ($SD = 17.37$), with 30% of 110 participants (for which DES data were available) scoring above 30³³. Surprisingly, the DES total score was not significantly correlated with any of the variables related to the participants' histories of trauma (i.e., number of types of childhood abuse; number of types of traumas ever experienced; number of sexual assaults as an adult).

Relationship between State and Trait Dissociation

To explore the association between trait dissociation and peritraumatic dissociation during the three types of events, Pearson correlations were calculated between DES total scores and the three PDEQ total scores. The results are displayed in Table 36. As expected, the DES total score was significantly correlated to all PDEQ total scores. The correlation coefficient related to the AMN did not change substantially when cases who had described their intoxication during the AMN as a level 2 ('intoxicated to the point of losing consciousness') were excluded from the analysis.

³³ This is the cut off score for dissociative disorders and disorders with a dissociative component (Carlson & Putnam, 1993).

Table 36: Correlation Coefficients Between DES Total Scores and PDEQ Total Scores from POS, WELL and AMN.

| | POS PDEQ total score | WELL PDEQ total score | AMN PDEQ total score |
|-----------------|-------------------------|--------------------------|-------------------------|
| DES total score | $r = .48; p = .00$ | $r = .36; p = .00$ | $r = .29 ; p = .01$ |

Summary of Results

Re: Core Hypothesis 1

As expected, poorly-remembered sexual assaults were less detailed and vivid than well-remembered sexual assaults. This was true, when both the MCQ items and the narrative details were used as measures of memory. First of all, this finding indicate that the participants understood the interviewers' instructions and that AMN events contained indeed less details than WELL events. More importantly, this finding was maintained when a number of variables on which the two assaults differed (i.e., WELL events were perceived as more traumatic, more arousing, had been more rehearsed and were associated with lower levels of intoxication than AMN events) were statistically controlled.

Poorly-recalled sexual assaults and positive events were not significantly different in terms of their narrative details, although there was a significant difference in their MCQ ratings (the positive events being higher than the poorly-remembered sexual assaults).

Other than hypothesized, memories of well-remembered sexual assaults were not as detailed and vivid as positive memories when items 8 (vividness), 9 (details), and 33 (overall memory) of the MCQ (i.e., a self-report questionnaire) were used as a measure of memory. But the opposite pattern was found when the details coded from

the memory narratives, arguably a more objective measure of memory, were used. That is, memories of well-remembered sexual assaults contained more details than positive memories. This finding is in line with hypothesis 1. These latter finding was maintained when several covariates (e.g., more time had passed since the WELL event, WELL events had been less rehearsed and were associated with higher levels of intoxication) were statistically controlled. Overall, hypothesis 1 was supported.

Re: Hypothesis 1a

All CAPS sum scores were found to be highly reliable in terms of their internal consistency values. Four sets of linear regression analyses were conducted to predict memory from PTSD symptoms. The analyses were conducted separately for the two sexual assaults. The first set of analyses used the participants' self report on memory (i.e., the MCQ), whereas the second set of analyses used the coded details from the narratives as a measure of memory. No significant amount of variance of the criterion variable (i.e., memory) was explained by any of the regression analyses. Only one analysis (i.e., predicting MCQ ratings referring to well-remembered assaults) yielded individually significant predictor variables, namely re-experiencing and avoidance symptoms. Interestingly, re-experiencing had a positive *beta* weight and avoidance had a negative *beta* weight. Overall, these results provided partial support for hypothesis 1a according to which PTSD should have predicted the quantity and quality of memory for sexual victimization.

Within-subjects analyses comparing the two sexual assaults in terms of their PTSD symptoms revealed significant differences on overall PTSD symptoms, symptoms of re-experiencing, symptoms of hyperarousal, and PTSD diagnoses.

Poorly-remembered sexual assaults were associated with less PTSD symptoms than well-remembered sexual assaults. This result is in line with hypothesis 4. PTSD seemed to be a memory-enhancing (rather than a memory-debilitating) factor.

Re: Hypothesis 1b

Neither of the memory measures (i.e., MCQ and narrative details) was significantly related to observer experiences or observer memories, with one exception: Observer experiences during positive events were negatively related to the memory ratings (i.e., MCQ). When the participants were split into two groups according to their perspective at the time of each event (i.e., field experience vs. observer experience), no significant differences were found between them in terms of the resulting memories. This was true whether questionnaire ratings or narrative details were used as dependent variables. These analyses show that the quantity and quality of memories for sexual violence was unaffected (i.e., neither enhanced nor debilitated) by the perspective experienced at the time of an event or by the perspective in one's memory. For positive events, there was some evidence that suggests that observer experiences debilitate memory for such events.

One within-subjects analysis (i.e., based on PDEQ item 5) showed that fewer observer perspectives were experienced during positive events than during sexual assaults. Another analysis (i.e., based on oral ratings of observer experiences) only partially corroborated this finding.

Interestingly, evidence of a shift in perspectives (i.e., field perspectives at the time of the event shifting towards observer perspectives at the time of recall) was found for positive events and well-remembered assault, but not for poorly-

remembered assaults. Note that, out of the three memories, the latter was also associated with the least amount of details coded from the narratives.

Re: Core Hypothesis 2

It was hypothesized that hyposensitive individuals would have better memory than hypersensitive individuals. The results of the analyses regarding hypothesis 2 were inconclusive, some being significant in the expected direction, some being non-significant, and some being significant in the unexpected direction. This was true whether the MCQ questionnaire or the coded details from the memory narratives were used as independent variables.

The two BFI scales had good internal consistency values but they were not related to the arousal ratings from the Affect Grid in any meaningful way, as it would have been expected based on theoretical considerations.

Re: Hypothesis 2a

The results of the analyses regarding peritraumatic dissociation and arousal sensitivity partially supported hypothesis 2a. One group comparison revealed a significant difference and another one revealed a trend on peritraumatic dissociation (as assessed by the PDEQ) in the expected direction between participants who were thought to be hyposensitive vs. hypersensitive. Another four comparisons revealed no significant results between these groups. The pattern of results was less clear when observer perspectives (one symptom of peritraumatic dissociation) was used as the independent variable. Most analyses revealed no significant group differences. Of the comparisons that revealed significant results or trends, three were in the expected and two in the unexpected direction.

Re: Hypothesis 2b

Several analyses suggested that neuroticism, and to a lesser extent, extraversion – both theoretically related to arousal sensitivity – were personality traits that increased participants' risk for PTSD (symptom and diagnoses) with regards to both assaults. However, no firm conclusions are possible since the analyses did not reveal unanimously significant results. Hypothesis 2b, according to which hypersensitive individuals should have more PTSD than hyposensitive individuals, was partially supported.

Re: Core Hypothesis 3

Participants who had a history of trauma, a general tendency to dissociate in daily life and who experienced more fear, helplessness, horror, dissociation and/or arousal while being sexually assaulted were expected to have greater PTSD. This core hypothesis 3 was partially supported. In terms of event-related factors, dissociation was a significant predictor of PTSD symptoms for both assaults. In addition, arousal during an assault was another significant predictor of PTSD symptoms but only for the well-remembered assault and, unexpectedly, it was negatively associated with posttraumatic stress. The trauma severity ratings did not predict PTSD symptoms in either one of the equations. Overall 21% and 17% of the variance of PTSD symptoms from well- and poorly remembered assaults were accounted for by event-related predictor variables, respectively.

With regards to trait and historical variables, a history of trauma predicted PTSD symptoms for both assaults. In addition, the tendency to dissociate was another significant predictor for PTSD symptoms from the well-remembered but not poorly-

remembered assaults. Overall 28% and 27% of the variance of PTSD symptoms from well- and poorly remembered assaults were explained by such historical predictor variables, respectively. Interestingly, there was no gender difference in PTSD symptoms from either one of the assaults.

Re: Hypothesis 3a

Participants reported that they had experienced more dissociative symptoms during sexual assaults than during positive events. The tendency to dissociate in daily life was significantly related to the experience of state dissociation during all three types of events. These results confirm hypothesis 3a.

Discussion

Relatively little research has explored memory for crimes in actual eyewitnesses. The vast majority of eyewitness memory research was conducted in a laboratory context and involved mock bystanders or mock perpetrators of crime (e.g., Loftus & Burns, 1982; Read et al., 1992). This dissertation involved victims of sexual crimes and it was the first to examine memory for such events in a within-subjects design. Generally speaking, the present findings are in line with previous field research on traumatic memory and modern theories of eyewitness memory (e.g., Hervé et al., 2007), as they confirm the great variability of memory for traumatic events. A second objective of this dissertation was to examine the emotional difficulties faced by sex trade workers in British Columbia. Their extensive history of traumas, the complexity of their emotional difficulties, and a few specific risk factors are highlighted in the discussion below.

The first section of this discussion provides general remarks on the population studied in this dissertation as well as the research team's experience in collecting the data. Second, measurement problems and certain restrictions in the interpretation of results are discussed, followed by a step by step interpretation of the main findings: the third section provides a discussion of the memory-related findings, and the fourth section refers to evidence of the emotional difficulties faced by the participants of this study. A summary of the limitations and strengths of this study is provided before the implications of this research are highlighted at the end. Some suggestions for future research are provided throughout the discussion.

General Remarks on Several Challenges Faced by the Research Team

Before the specific findings of this study are discussed, a few remarks are made about various experiences of the research team during data collection. The emotionally straining effects of the Step Wise Interview Protocol on the participants during the pilot phase of this study are mentioned first. According to the organization through which these participants had been recruited, some participants had been adversely affected by the interviews. Little information was made available to the research team to corroborate these claims, although the team's own experiences confirmed some of their concerns. As a result, the research team refrained from using the Step Wise Interview in its entire length and a screening procedure (described in the Method section) was implemented to ensure sufficient emotional stability of all subsequent participants.

Another experience illustrates the difficulties of field research on eyewitness memory: after the aforementioned screening procedure was established, many research applicants could not be accepted because they did not meet the screening criteria. It was often difficult to communicate this to the applicants because they felt entitled to participate or because they were disappointed that they did not get to share their experiences. Some applicants who were ineligible for the study became quite angry and agitated because they perceived that the research team refused to validate their experiences of victimization.

The progress of this research was delayed on multiple occasions due to some participants' 'unreliability' (e.g., not attending interview appointments; unavailability of phone access to cancel appointments; incomplete interviews due to intoxication or sleepiness) or special requests (e.g., for a female interviewer). The recruitment of

participants was difficult because massage parlours and escort agencies were reluctant to display advertisements for the study, possibly due to fear of loss of income, reputation, or prosecution.

Various ethical challenges were encountered during data collection: For instance, the community collaborator insisted on a comparatively high honorarium for research participants (i.e., initially \$40, subsequently \$60) and advertised this research as a means of income for sex trade workers. This created some delicate ethical challenges. On the one hand, the author felt that the participants should receive some kind of compensation for their participation in the study. On the other hand, some applicants' ability to consent to participate in a research procedure that had the potential to be stressful (which was acknowledged repeatedly during recruitment) was doubted due to their desperation for money. The concern was that some applicants might have been financially desperate and the honorarium functioned as a 'bribe' for them to sign up for the research. This dilemma concerned the research team's duty to protect subjects from being harmed, while granting them autonomy and allowing for society to benefit from the knowledge that would be gained from the study (e.g., Canadian Psychological Association, 2000).

Another challenge arose when the participants reported crimes, many of which were of a very serious nature, which had not been reported to the authorities. Similar concerns emerged when participants disclosed their HIV-positive status to an interviewer and it became clear that future sexual partners might get infected with the disease. After considerable thought and discussion, the research team did not report such cases to the authorities because insufficient information was available (e.g., about perpetrators of past sexual crimes or possible partners of future sexual activity).

Overall, the process of balancing the benefits of the research against possible discomforts to participants was ongoing throughout data collection. It became particularly salient in negotiations with the community collaborator, who acted as an advocate for current and former sex trade workers. The staff's concerns were invaluable to the research team in revising the research protocol and in maintaining an ethically responsible procedure.

Measurement Problems

This dissertation aimed to explore within- and between-subjects differences in memory, dissociation and posttraumatic stress across different types of events (i.e., a well-remembered and a poorly-remembered sexual assault as well as a positive event). With regards to individual differences (i.e., between-subjects), a central variable was arousal sensitivity, defined as a person's sensitivity to autonomic arousal (Hervé et al., 2007). This construct is thought to explain individual differences in the thresholds at which arousal is perceived as traumatic, i.e., points at which certain physical, emotional and cognitive processes – such as dissociative experiences - are likely set off. In consequence, hyposensitive individuals are thought to make better eyewitnesses than hypersensitive individuals. According to theoretical considerations, the present study used two scales of the Big Five Inventory (BFI-44) to operationalize arousal sensitivity. Participants who scored high on extraversion and/or low on neuroticism were thought to be hyposensitive to arousal, whereas those who scored low on extraversion and/or high on neuroticism were thought to be hypersensitive to arousal. Although the reliability for both BFI subscales was satisfactory, several analyses suggested that they did not capture the construct of arousal sensitivity

adequately. That is, when the two BFI subscales were correlated with the arousal ratings from the Affect Grid, no theoretically meaningful pattern emerged. It was expected that extraversion (i.e., theoretically related to hyposensitivity) and would have had a low positive or negative correlation with arousal during negatively-valenced (e.g., traumatic) events, whereas neuroticism (i.e., theoretically related to hypersensitivity) would have had a high positive correlation with arousal during negatively valenced (e.g., traumatic) events. Such was not the case. Most analyses for hypotheses 2 and 2a (concerning arousal sensitivity in relation to memory and peritraumatic dissociation, respectively) did not yield significant results. Of the analyses that did produce significant results, some were in the expected direction and some were in unexpected direction. Thus, the personality traits extraversion/introversion and neuroticism were not as clearly related to memory and dissociation as it was predicted by theoretical considerations. This inconclusive pattern of results is attributed to the fact that the BFI had poor construct validity as a measure of arousal sensitivity. Thus, regrettably, no firm conclusions can be offered with regards to Hervé et al.'s (2007) construct of arousal sensitivity in relation to individual differences in the ability to recall traumatic events or vantage points experienced during trauma.

Discrepancy of Self-Reported Memory from Memory Details in the Narratives

The analyses for core hypothesis 1 (comparing memory characteristics between the three types of events) produced inconsistent results when the MCQ vs. the details from the narratives were used as the dependent variable. Although the MCQ index used in all analyses was based on only three items (representing

vividness, amount of details, and overall memory), its internal consistency was excellent for all three events. The interrater reliability of the details counted from the memory narratives was also satisfactory. Thus, the inconsistency of findings could not be attributed to a lack of reliability of either one of the two memory measures. Since the MCQ relied on self-report ratings, the participants' current emotional state and/or possible demand characteristics of the study (e.g., wanting to please the interviewer) might have biased these ratings. Considering the participants were victims of violence, it is possible that they might have minimized or exaggerated the quality of their memories in order to cope with their impact. In contrast, the details coded from the narratives were based on the participants' recall and are thus considered a more objective and valid measure of memory than the MCQ. Thus, the following interpretations are primarily based on the narrative details, not the MCQ.

Interestingly, Peace et al. (2007) reported a similar discrepancy of self-rated memory characteristics and narratives details in their study of female survivors of sexual violence: Although narratives of sexual traumas contained the most details and more sensory information compared to non-traumatic memories and positive memories, the participants' self-report indicated that sexual traumas were associated with greater memory problems than the other two memories. This suggests that meta-memory (e.g., judgement of one's memory, awareness of the memory process) might be distorted for sexually traumatic memories. In the present study, the participants produced a narrative of their assault before they filled out the MCQ. Perhaps they found the process of providing a narrative subjectively difficult, and this experience might have triggered them to rate their memory as relatively low on the MCQ.

Amount of Details Recalled Across Memory Categories

The High Amount of Details in Well-Remembered Sexual Assaults

When the amount of details in memory narratives of well-remembered sexual assaults was compared to the amount of details in memory narratives of positive events, the former contained more details than the latter (i.e., on average 89 vs. 62). It was concluded that extreme stress – as presumably experienced during sexual violence – does *not necessarily* debilitate the quantity of recall, as suggested by traditional theories of eyewitness memory (e.g., Easterbrook, 1959; Yerkes & Dodson, 1908) and by the majority of laboratory-based memory research (e.g., see review by Deffenbacher et al., 2004). The present finding replicates Peace and Porter's (2007) results obtained in a similar study of sexually traumatic vs. positive memories.

The well-remembered sexual assaults and the positive (i.e., baseline) memories also differed in terms of their age: The former were older than the latter. This finding is remarkable in the sense that the amount of memory details is expected to decrease over time. In this study, assaults were recalled in more detail than positive events despite the fact that such memories were older than memories of positive events. Both events were emotional, by definition. This finding is not in line with the *traumatic equivalency argument* (cf. Porter et al., 1999), according to which memories of trauma decay over time just as ordinary memories do (e.g., Laney & Loftus, 2005). Although the present study did not examine the development and consistency of memory over time, the data demonstrate that it is possible for

traumatic memories to be recalled in great detail relative to a baseline event that happened more recently than the traumatic experiences.

Previous research has shown that rehearsal increases the amount and accuracy of recall (e.g., Scrivner & Safer, 1988; van Oorsouw & Merckelbach, 2004). The well-remembered sexual assault memories in this study had been rehearsed 15 times on average. Memories of positive events had been rehearsed even more: 31 times on average. It seems that both well-remembered sexual assaults and positive events led to remarkable memories (Yuille & Daylen, 1998), that is, both events had often been ‘remarked on’ since they occurred. If rehearsal were the only factor that determines the amount of recall, positive events should have been better recalled than sexual assaults. But the opposite was the case.

Another differentiating factor was the level of intoxication experienced at the time of the two events. It was higher during assaults than during positive events. Again, this finding is noteworthy because intoxication usually debilitates encoding of details and subsequent recall of an event (e.g., Yuille & Tollestrup, 1990). In this study, assaults were recalled in more detail than positive events despite higher levels of intoxication. This corroborates Read et al.’s (1992) finding that memory performance of intoxicated subjects was only compromised under conditions of low, not high arousal. The victims of sexual crimes in the present study reported high levels of arousal.

It seems that the assaults were so remarkable that despite their recent age (relative to baseline events), less rehearsal (relative to baseline events) and more intoxication (relative to baseline events) they were better recalled. When these factors (i.e., intoxication, passage of time, rehearsal) were statistically controlled, the

difference in memory details between positive and sexual assault memories remained significant. That is, despite the presence of two factors that usually impair recall (i.e., intoxication during event, passage of time) and one factor that should have led to relatively better recall of positive events (i.e., more rehearsal), the assaults were so remarkable that they were better recalled than positive events. The type of event (i.e., sexual violence) per se seems to be the crucial factor that determined the difference in memory details between positive events and well-remembered sexual assaults. This is especially true, considering a sizable number (i.e., 19) of the comparison events were births, which may have been stressful or traumatic too (besides their positive qualities). Thus, even within different types of traumas, sexual violence seems to have particular qualities that facilitated recall at a later point in time.

Van der Kolk (e.g., 2002) suggested that traumatic memories differ from non-traumatic memories in terms of their fragmentary nature, their higher percentage of sensory details, and memory gaps. Such characteristics of traumatic memories are thought to occur due to dissociative processes that buffer the unbearable emotional consequences of trauma. The present study showed that well-remembered assaults were associated with more peritraumatic dissociation than positive experiences. However, contrary to van der Kolk's prediction, these assaults were recalled in more – rather than less - detail than positive events. Qualitative differences (e.g., reading ease, sensory details) have yet to be analysed in the memory narratives of this dissertation.

The data of the present research generally support the *trauma superiority argument* (e.g., Alexander, 2005; Porter et al., 1999; Peace & Porter, 2007), which

posits that traumatic memories *can be* highly detailed and consistent over time.

The present study can only speak to the amount of details in traumatic memories relative to baseline (i.e., positive) events but not their accuracy and consistency over time.

The Variability of Recall in Detailed vs. Less Detailed Memories of Sexual Violence

One hundred and fourteen participants reported a well-remembered sexual assault and 83 reported a poorly-remembered sexual assault. When these two memories were compared, it was demonstrated that the former contained more details than the latter (i.e., on average 91 vs. 53). This analysis served as a manipulation check but it also showed that memories of traumatic events such as sexual assaults can be well remembered (i.e., in more detail than remarkable positive events) but they can also be poorly remembered. Note that ‘poor’ may not be a fair term to label the amount of details in AMN narratives, considering that they did not differ significantly from the details in the baseline narratives. Detailed sexual assault memories (WELL) were more common than less-detailed memories of sexual assault (AMN). This reflects the variability of eyewitness memory that has been demonstrated in other studies of sexual violence (e.g., Cooper, 1999; Mechanic et al., 1998; Porter & Birt, 2001), although the present study is the first to demonstrate this variability within-subjects. That is, the same person reported one detailed and one less-detailed memory of traumas that fall into the same category (i.e., sexual violence). The present findings are also in line with Hervé et al.’s (2007) biopsychosocial model of eyewitness memory, which predicts that memory is variable depending on a number of

precipitating and perpetuating factors that affect encoding, storage and retrieval of memory. Some of these factors were examined in this study and are discussed in the next section. It is noteworthy that the memories of sexual violence were not more poorly remembered than baseline experiences, thus, sexual violence seems to be associated with good recall, even after several years.

Interestingly, there was no difference between the well- and the less well-recalled assault in terms of the frequency of weapons being present. This finding is at odds with laboratory-based research, according to which the quantity of recall as well as its accuracy is diminished when a weapon is present in the to-be-remembered event (e.g., Steblay, 1992). Field research – including the results of the present study – does not support this conclusion. That is, witnesses of real (e.g., Cooper, Kennedy et al., 2002) or simulated violence (e.g., Hulse & Memon, 2006) do not suffer from memory impairments when a weapon was involved in the violent situations that were investigated. Some field studies have even shown improved memory for violence in *weapon-present* conditions (e.g., Tollestrup et al., 1994). These findings cast doubt on the validity of the weapon focus effect when it comes to violence in the real world.

In the present study, well-remembered sexual assaults were perceived as more traumatic than less-well remembered sexual assaults. Thus, the traumatic extent of a sexual assault – a precipitating factor – was a memory-enhancing factor. The same was true for the arousal ratings (Affect Grid), which were significantly higher for well-remembered assaults than for less-well-remembered assaults. Well-remembered assaults were also associated with less intoxication than less-well-remembered assaults. This might explain why the latter were perceived as less traumatic than well-remembered assaults: Perhaps intoxication from drugs and

alcohol had a buffering effect. The fact that extreme intoxication during less-well-remembered assaults (compared to moderate levels of intoxication during well-remembered assaults) diminished recall confirms findings from experimental studies on the effects of alcohol and marijuana (e.g., Tollestrup & Yuille, 1990; Yuille et al., 1998). Also in line with previous research (e.g., Bornstein et al., 1998; Cooper, 2005) and theoretical considerations (Hervé et al., 2007), detailed accounts of sexual violence had been rehearsed more than less detailed accounts.

When all these factors (i.e., traumatic extent, arousal, intoxication, and rehearsal) were statistically controlled, the difference in memory details still remained significant between well- and less-well-remembered sexual assaults. This indicates that other factors besides these covariates contributed to the variability of memory for sexual violence. In this case, the type of event as well as individual differences are excluded as explanatory factors since both events were sexual assaults and the comparison was within-subjects. PTSD and dissociative symptoms were examined as factors that might further explain the variability in memories of sexual violence. They are discussed in the following two sections.

PTSD symptoms associated with well- vs. poorly-remembered sexual assaults.

Between-subjects analyses showed that the three PTSD symptom clusters (i.e., re-experiencing, avoidance/numbing, and hyperarousal) did not explain much of the variance in the amount of details recalled from either one of the assaults. Interestingly, one of the regression analyses showed that hyperarousal symptoms contributed positively but that avoidance symptoms contributed negatively to the explanation of variance in MCQ ratings. These predictors might have formed a

suppressor effect, which could explain why there was no substantial association of memory and PTSD symptoms overall.

When the two assaults were directly compared in terms of PTSD symptoms (i.e., within-subjects), well-remembered assaults were associated with higher PTSD symptom levels than less-well-remembered assaults. Specifically, well-remembered assaults were associated with more or more intense symptoms of re-experiencing and hyperarousal than less-well-remembered assaults.

It was not surprising that avoidance symptoms did not differ between the two events: other than re-experiencing and hyperarousal symptoms (e.g., nightmares or flashbacks, which contain memory fragments from a specific event), avoidance symptoms are not generally defined by features of any specific event. The only way to determine if symptoms of avoidance and numbing (e.g., loss of interests, feeling emotionally detached) might have been 'caused' by a specific event is to examine their time of onset (i.e., if avoidance was experienced before the traumatic event, one is safe to conclude that the symptoms did not result from the event in question). Such examinations were often difficult for the interviewers because of the extensive histories of trauma experienced by most participants: On average, they reported 11 other sexual assaults as adults and the mean number of types of traumas in their lifetime was 8. Each one of these events could have contributed to the onset of the reported avoidance symptoms.

It makes theoretical sense that more re-experiencing symptoms were experienced for well-remembered assaults than for less-well-remembered assaults. Re-experiencing symptoms (e.g., involuntary memories, flashbacks, nightmares) might function as memory rehearsal, which is known to enhance the amount of

details recalled (e.g., Bornstein et al., 1998; Cooper, 2005). Therefore, re-experiencing symptoms might have directly contributed to the high amount of details recalled from well-remembered sexual assaults.

It is less clear why more hyperarousal symptoms were experienced in relation to well-remembered assaults compared to less-well-remembered assaults. Perhaps some of these symptoms were linked to re-experiencing; for example, sleeping difficulties (i.e., a symptom of hyperarousal) might be caused by nightmares (i.e., a symptom of re-experiencing); similarly, concentration difficulties might be caused by flashbacks; and hypervigilance might be linked to ongoing reminders of the assault. Another explanation for the link between detailed recall for sexual violence and symptoms of hyperarousal is state-dependent memory effects. That is, an event is more easily recalled if the state of retrieval resembles the state of encoding (Bower et al., 1981). Indeed, more arousal was experienced during well-remembered assaults than during less-well-remembered assaults. Similarly, more hyperarousal was experienced at the time of the research interview in relation to well-remembered than less-well-remembered assaults. This phenomenon was described by Yuille and Daylen (1998; pattern 4) and it seems to apply to the highly detailed memories of sexual violence in the present study. This was not the case for less-detailed memories of sexual violence since arousal at the time of the event and hyperarousal at the time of the interview were congruent, rather than incongruent, as it would have been expected for poor memories according to the state-dependent memory effect. Therefore, it does not appear that similar emotional states guarantee a state dependent memory effect. The emotional state experienced during less-well-remembered assaults was not as distinctive as the emotional state experienced during well-

remembered sexual assaults. It seems that normal forgetting (pattern 1; Yuille & Daylen, 1998), which is thought to apply to ordinary or routine events, might be a plausible explanation for their relatively poor quality (along with the factors such as intoxication and lack of rehearsal) discussed in the previous section. Possibly a lack of encoding (e.g., due to intoxication) was responsible for the less detailed nature of these memories.

Dissociation experienced at the time of well- vs. poorly-remembered sexual assaults.

When symptoms of peritraumatic dissociation (e.g., derealization, depersonalisation, feeling confused or disoriented) were compared between the two sexual assaults, there was no significant difference. The mean sum score on the PDEQ was about 30 for both assaults, the possible maximum being 50. The mean sum score on the PDEQ for positive events was 19, a score that was significantly lower than both sexual assault scores. Thus, considerable levels of dissociation were reported for the two incidents of sexual violence. However, the fact that the amount was comparable excludes dissociation as a factor that can account for the difference in recall between the two assault memories. This finding is not in line with the *traumatic memory argument* promoted by van der Kolk (e.g., 1996; cf. Porter et al., 1999). According to this theory, memories of traumatic events are so unbearable that they are dissociated and repressed (i.e., leading to poor verbal recall). The present data show that detailed memories of sexual violence were rated as more traumatic than less detailed memories of sexual violence, thus the former should have led to poorer verbal recall than the latter. However, the opposite was true.

When one particular dissociative symptom, the participants' vantage points *at the time* of the assaults, was compared between the two assaults, there was no significant difference. This was also true for observer perspectives *at the time of recall*. The amount of recall was unaffected by the participants' vantage points at the time of the events or at the time of recall. This finding is not in line with Cooper et al.'s (2002) finding that sex trade workers who had an observer experience while they were being sexually assaulted had more detailed recall than those who experienced a field perspective. Perhaps this discrepancy can be attributed to the larger sample size of the current study or the fact that the full Step Wise Interview was used in Cooper's study but not for the majority of interviews in the present study.

Further analyses of the narratives will be necessary to determine if dissociation affected the *quality* of the memories differently between the two events. For instance, McIsaac and Eich (2004) reported that traumatic events that are spontaneously recalled from an observer perspective contained less emotional information but more information about descriptive details and actions. Such analyses on the present data are planned for the future.

Interestingly, a shift from field to observer perspectives was observed for detailed but not for less-detailed traumas. That is, only 31% of the well-remembered sexual assaults were originally experienced from an observer perspective (i.e., out of body experience), whereas about 44% of the details in such memories were presently recalled from an observer perspective. This was a significant difference in percentages, which was not found for less detailed assault memories. Thus, it seems that enhanced recall might be associated with the ability to distance oneself from the memory of the event. To the author's knowledge, no other such comparison exists in

the literature. Unfortunately, both assessments of vantage points (i.e., referring to the time of the event and to the present) were completed at the same time. Thus, memory biases might have affected the retrospective ratings of vantage points at the time of the assaults. For instance, the participants' current emotional state might have caused them to endorse certain symptoms of peritraumatic dissociation related to a past traumatic event (see Merckelbach & Muris [2001] on a related measurement problem in dissociation research). Although dissociation is not objectively measurable, it would be desirable to obtain such ratings closer in time to the traumatic event in order to investigate shifts in vantage points over time.

Regarding Yuille and Daylen's memory patterns (1998), dissociative amnesia (pattern 3) did not seem to apply to AMN memories in the present study. Firstly, they were not poorly recalled relative to the baseline event. And secondly, the quantity of recall was unaffected by dissociative symptoms experienced at the time of such events. Whether or not the pattern of dissociative memories (pattern 7 in Yuille & Daylen's model) applies to either one of the assault memories remains to be explored. This memory pattern refers to the quality rather than the quantity of recall. The analyses in this dissertation have shown that there was no difference in vantage points (one aspect of the quality of recall) between these memories. However, further analyses of the narratives are required to examine the quality of recall more closely (e.g., types of details recalled; vocabulary used in narratives) and to offer conclusions regarding the applicability of pattern 7 to the memories in this study.

The Complexity of Emotional Difficulties after Repeated Exposure to Trauma

Event-Related Predictors of PTSD

Overall, 21% and 17% of the variance in PTSD symptoms were explained by event-related variables after well-recalled and less-well-recalled sexual assaults, respectively. The symptom level of PTSD after well-remembered assaults was higher than after less-well remembered assaults, which suggests that a very detailed traumatic memory contributes to the development and/or maintenance of PTSD. The literature showed that the integration and de-fragmentation of trauma narratives coincides with recovery (e.g., Amir et al., 1998), one aspect of which is that their length (i.e., amount of details) increases (Foa et al., 1995). Although the time that has passed since the traumatic events in this study did not predict PTSD symptoms, there was evidence that well-remembered traumas had been emotionally or cognitively processed. That is, a shift in perspectives towards detachment had occurred for well-remembered assaults but not for less-well-remembered assaults. However, this shift was only associated with the quantity of recall, it did not contribute to a reduction of PTSD symptoms because detailed memories of sexual violence were associated with more, rather than less PTSD. More detailed analyses of the trauma narratives (e.g., *quality* of details, presence of organizing thoughts) will be necessary to examine the exact nature of the relationship between recall and PTSD. Due to the cross sectional nature of this study, no conclusions can be drawn about symptom development or recovery processes (i.e., PTSD was only assessed once).

Peritraumatic dissociation was unanimously found to be a significant and strong predictor of PTSD symptoms: The *beta* weight was .23 for well-remembered assaults, and .40 for less-well-remembered assaults. These numbers are in line with the literature (e.g., Ozer et al., 2003) where a mean effect size of .35 has been reported. Similar results were also obtained in Cooper's studies of prostituted individuals' (1999) and offenders' (2005) autobiographical memories. The relatively stronger effect size of peritraumatic dissociation in the prediction of PTSD symptoms associated with less-detailed assault memories in the present study might explain the lower quantity of recall. Although it was concluded above that dissociative processes did not explain the quantity of recall, dissociative experiences during trauma seem to play a crucial a role in the development of PTSD. Thus, PTSD might mediate the relationship between dissociation and recall.

Interestingly, participants also reported experiences of state dissociation during positive events. Since positive events do not lead to posttraumatic stress, this finding suggests that dissociation might serve various functions. During traumatic events, it might serve as an initial buffer of the emotionally devastating impact, which contributes to the development of PTSD in the long run (e.g., van der Kolk et al., 1996). This theory does not fit for dissociation experienced during emotionally positive events. Thus, during positive events, dissociation likely occurs for different reasons. Given that the participants reported high levels of dissociation in their daily lives, it seems intuitive that dissociation also occurred during positive events. In fact, the correlations between trait and state dissociation was higher for positive events than for sexual assaults. Pica and Beere (1995) argued that dissociation "occurs when perception becomes captivated by a subjectively meaningful stimulus" (p. 241).

During meaningful events, a sudden, intense stimulus becomes the focus of perception, which leads to a loss of context (e.g., the self, the world, time; Beere, 1995). The findings of the present research suggest that dissociation might serve various functions, possibly dependent on the circumstances. Dissociation might have been a defensive response during trauma. However, since trauma was not a necessary condition for the experience of dissociation in the present study, dissociation might have also been a mere sign of narrowed perception during meaningful (including non-traumatic) events.

Another predictor variable examined in the present study was the traumatic extent of an assault, however it did not explain the variance of PTSD symptoms for either one of the assaults. This finding was surprising, considering the severity of trauma has frequently been linked to the severity of PTSD (e.g., Foa & Riggs, 1994; Kilpatrick et al., 1989). However, given the extensive history of other traumas experienced by most participants, the events studied in this research may have contributed minimally to the development of PTSD. Indeed, some of the participants' other traumas were experienced as more traumatic than the events examined in this study since neither one of the two sexual assaults were rated as 10 (i.e., indicating the participants' most traumatic experience). Alternatively, a ceiling effect in terms of traumatic experiencing might have occurred before the participants experienced the traumas that were the subjects of this research. McNally (2003) suggested that once a certain level of traumatic severity is reached, further exposure might not contribute to greater impairment.

The arousal rating referring to the time of the assault only contributed to the prediction of PTSD symptoms after well-remembered traumas. Unexpectedly, they

were *negatively* related to PTSD. Participants with PTSD evidenced a particularly high negative correlation between avoidance/numbing symptoms and their arousal ratings, which was not the case for participants without PTSD. This finding is at odds with the literature, which has demonstrated a positive relationship between peritraumatic arousal and PTSD (e.g., APA, 2000). Perhaps the retrospective nature of this study (i.e., about 13 years after the traumas happened) can account for this result because in previous studies, arousal was rated immediately after trauma exposure (e.g., Brewin et al., 1999 [sample of crime victims]; Lawyer et al., 2006 [sample of 9/11 survivors in New York City]). Another alternative explanation of this finding concerns the participants' extensive history of trauma, especially sexual trauma. Perhaps their arousal during such events was relatively low as they had already habituated to experiences of sexual violence and did thus not experience extreme arousal. Considering the intimate and delicate nature of the traumas studied in this investigation, it is also feasible that shame, rather than fear or stress, were a (partial) source of PTSD symptoms at present. In support of this idea, Cunningham and Cunningham (1997) discovered that the best predictor of PTSD in torture victims was humiliation. Further research is needed concerning this alternative theory on the etiology of PTSD after repeated or chronic traumas that involve sham. The present data do not provide the pertinent evidence, only speculation. Nevertheless, several anecdotes were extracted from the participants' narratives to support this notion: One participant reported that her sexual assault involved a threat that certain objects in the room would be inserted into her body; another participant was drugged and sexually assaulted while she had passed out – later she found out that her assault had been made part of a porn video; a third participant reported that her assailants let her

escape after they sexually assaulted her, however they did not allow her to put her clothes back on; another participant told us the story of losing her virginity when she was raped by an older brother; finally, several narratives involved sexual ‘services’ that were performed without receiving monetary compensation afterwards, as it had been previously agreed on. These stories are selective examples that illustrate the humiliation that was experienced by the participants in the present study. The participants either implicitly or explicitly stated that these aspects were the most upsetting elements in their experiences.

Historical Predictors and other Risk Factors for PTSD

Historical and trait variables (e.g., trait dissociation, traumatic history) contributed to the development and/or maintenance of PTSD symptoms. Overall, they explained 28% and 27% of variance in PTSD symptoms after well- and less-well-remembered sexual assaults, respectively. Notably, this proportion was greater than the portion of PTSD symptoms explained by event-related factors (discussed in the previous section). It seems plausible that single events add little to the variability of posttraumatic stress, considering the extensive history of other traumas that the participants had experienced besides the events targeted in this study.

The number of types of lifetime traumatic events was the strongest predictor of PTSD associated with both well- and less-well-remembered sexual violence (i.e., the *beta* weights were .31 and .32, respectively). The number of sexual assaults in adulthood was another predictor of PTSD associated with less-detailed traumatic memories (i.e., *beta* = .27). This finding is in line with the literature (e.g., Brewin et al., 2000; Nishith et al., 2000). It confirms the notion that repeated traumas,

particularly those of an interpersonal and sexual nature, increase the vulnerability for PTSD development, rather than predisposing the survivor to coping with subsequent traumatization more effectively, as inoculation theory would suggest (e.g., Park & Lechner, 2006).

As expected, the tendency to dissociate in daily life was a strong predictor of PTSD following well-remembered sexual violence (i.e., $\beta = .27$). However, unexpectedly, trait dissociation was not a predictor of PTSD associated with less-detailed traumatic memories. The latter finding is difficult to explain. Although the mean PTSD score was significantly lower for less-detailed assault memories, the range of PTSD scores was comparable to the range of PTSD scores for well-remembered sexual violence. Thus, no restriction of range problem could have caused this result. Also, the DES score was not correlated to any of the other predictor variables (i.e., the various indices of the participants' history of trauma), which is noteworthy because some research suggests a strong relationship between trait dissociation and childhood abuse (e.g., Sar et al., 2007; Twaite & Rodriguez-Srednicki, 2004). The lack of such a relationship in the present sample might be accounted for by a ceiling effect because nearly all participants had been abused as children and had since experienced a host of other traumas.

The present results indicated that highly neurotic and introverted individuals tended to report more PTSD symptoms and received more PTSD diagnoses than less neurotic and extraverted participants. This finding is well in line with the literature on personality risk factors for PTSD (e.g., Cox et al., 2004; Lauterbach & Vrana, 2001; McFarlane, 1987, 1989). Neurotic individuals are thought to have a low threshold of traumatization (i.e., a high sensitivity to arousal). Although it is concluded above that

the present personality measure was inadequate as an operationalization of arousal sensitivity, this finding suggests that it might have had utility with regards to the emotional consequences of trauma (i.e., PTSD). Thus, the present study provides preliminary empirical support for the biopsychosocial model (Hervé et al., 2007) as an explanation of PTSD.

An interesting result was that PTSD symptoms did not differ by gender. This dissertation provided the rare opportunity to study male individuals' reactions to sexual violence. Most other studies have studied this type of trauma in women only (e.g., Foa et al., 1995; Nishit et al., 2000). Being female has been demonstrated to be a risk factor for posttraumatic maladjustment after various types of traumas (e.g., Creamer, 2000), in particular traumas that involved physical violence (Stein et al., 2000). However, at least one study found the opposite, that is, men were more negatively impacted by sexual traumas than women (Elliott et al., 2004). Thus, it has been unclear if gender, or the type of trauma, or an interaction of both increases the risk for PTSD. The present finding suggests that experiences of dissociation during sexual violence as well as a history of other traumas raise individuals' risk for PTSD irrespective of gender. Nevertheless, one should keep in mind that the rate of PTSD in men might have been underestimated in the present study due to a possible sampling bias. It is known that men report sexual violence less than women (Kimerling et al., 2002). Perhaps more males than females chose *not* to participate in this investigation even though they might have been eligible. Or perhaps the males who *did* participate minimized the impact of their assaults. It has been shown that society has different views of males and females who have been sexually abused and/or involved in the sex trade. Males are typically viewed less favourably than

females when they label themselves as *victims* (Silverstein, 2006). The author's communication with the community collaborator of this dissertation project indicated that male sex trade workers often struggle with their sexual identity, as they are often perceived as being homosexual, when this is only true for some but not all male sex trade workers. Benoit and Millar (2001) reported that far more *current* sex trade workers labelled themselves as homosexual than *retired* sex trade workers, which was particularly true for men. In their survey, men were more uncomfortable to discuss their occupation than women. Benoit and Miller also found a higher rate of attempted suicides in male than female sex trade workers. It becomes clear that male sex trade workers face a particular set of psychological challenges that they do not share with their female counterparts, or perhaps not to the same degree. Some of these struggles might occur in lieu of PTSD symptoms, which would clarify the relatively low overall rate of PTSD in the present study. More generally, it underlines the complexity of the emotional consequences experienced by sex trade workers, and particularly male sex trade workers. It has been suggested that participating in the sex trade *per se* might be a consequence of childhood sexual abuse in males (Braitstein et al., 2006). Knowing of such challenges, it is possible that the rate of PTSD in male sex trade workers was higher than the data of the present study suggested. If there were any gender-related vulnerabilities at all, being male – rather than female – might be a risk factor for PTSD after sexual violence. However, this conclusion is based on speculation and evidence from other studies, not the present data. Future analyses will focus on possible gender differences on other factors that characterized the mental health of the participants in this study (e.g., various forms of dissociation, types and extent of substance abuse).

Complex PTSD

Unexpectedly, the rate of PTSD diagnoses (27% for well-remembered assaults and 16% for poorly-remembered assaults) was considerably below the prevalence of PTSD after sexual traumas reported in the literature (e.g., Kessler et al., 1995). These numbers might have been low for several reasons. First, participants who did not provide sufficient information to render a diagnosis were excluded from these statistics ($n = 15$ for the well-remembered assault; $n = 16$ for the poorly remembered assault). This number of missing data concerning PTSD diagnoses was relatively high. The interviewers' experience was that ratings of the PTSD symptoms were often difficult to make, due to the participants' extensive histories of trauma, their impatience and frustration with the questions, and possibly substance withdrawal experienced towards the end of the interviews. Thus, it is plausible that some of missing cases actually had PTSD even though no evidence was available to confirm such. Second, many sex trade workers struggle not to be viewed as victims (see Benoit & Millar, 2001). For this reason, some participants might have underreported the impact of their experiences involving sexual violence. Third, it seemed that symptoms other than PTSD characterized most participants in the sample. This finding is in line with the literature on child sexual abuse (e.g., Finkelhor, 1990; Kendall-Tackett, Williams, & Finkelhor, 1993; Rind et al., 1998), according to which the impact of such events is variable, with some individuals not experiencing any maladjustment, others suffering from variable short and long term psychological conditions (e.g., depression, self-destructive behaviours, anxiety, substance abuse, or difficulty in trusting others). In this sample, the concept of *Complex PTSD* (CP) seems particularly fitting: Herman (1992) introduced it as “a

syndrome in survivors of prolonged and repeated trauma” (p. 377) because she could not explain the symptoms in survivors of repeated trauma involving coercive control (e.g., political oppression, repeated family violence) by simple PTSD. Although the DSM-IV-TR (APA, 2000) acknowledges the symptoms of CP under “associated features and disorders” in the PTSD section (p. 465), some feel that the full range of symptoms (i.e., beyond re-experiencing, avoidance/numbing, and hyperarousal) is not accounted for and that no adequate understanding of their etiology is provided (e.g., Classen, Pain, Field & Woods, 2006). CP includes symptoms that are more diffuse and more complex than PTSD, for example: dissociation, drug addiction, somatization, self-mutilation, or suicidality. CP also accounts for personality changes resulting from repeated victimization as well as the risk for repeated harm by self or others (Herman, 1992). Zlotnick et al. (1996) confirmed the validity of this syndrome in a sample of female psychiatric inpatients with and without experiences of child sexual abuse. Similarly, Roth, Newman, Pelcovitz, van der Kolk, and Mandel (1997) demonstrated evidence of CP in survivors of sexual and physical abuse, with participants who had experienced both being at particular risk for CP.

The need to look beyond symptoms of simple PTSD was supported by certain findings as well as the research team’s experiences during data collection. For instance, the mean DES score (measuring the tendency to dissociate in daily life) was almost 24, which is considerably above the scores that have been found in the general population (see Bernstein-Carlson & Putnam, 1993). This scores falls in the middle of the range of DES mean scores that have been reported by sex trade workers in two other Canadian studies (i.e., $X = 32$, Cooper et al., 2002; $X = 13$, Ross et al., 1990).

Also, the problems experienced by the participants were much broader than mere PTSD symptoms (e.g., extensive substance abuse, high rate of re-victimization). Furthermore, in line with CP, most participants had experienced some form of childhood abuse (i.e., 67% who experienced child sexual abuse and 66% who experienced child physical abuse). These rates were comparable to data obtained in a survey of sex trade workers in Victoria, British Columbia (Benoit & Millar, 2001). Benoit and Millar (2001) also reported a rate of attempted suicide of 13.9% and 9.4% in males and females, respectively. Such data were not assessed in the present study but they fit the concept of CP. A discussion of the particular challenges faced by male victims of sexual violence is provided in the previous section.

Some participants' attempts to deceive and manipulate were a great concern to the research team. For example, a few participants 'confessed' during their interviews that they were under the influence of drugs even though they had agreed to attend sober. One participant applied for a second interview without acknowledging that she had previously completed the research: She introduced herself under a different name when she approached the research team the second time. One time, money was stolen from the cash box for participant honorariums when the interviewer turned her back on a participant for a few moments. It was assumed that the majority of such deception occurred to gain access to the research, presumably because it 'paid well', which highlights the disadvantaged and marginalized status of this sample. Deception is an inherent element of a criminal lifestyle, as practiced by many of the participants in the present study. However, for some, deception might also be indicative of symptoms and personality changes in line with the concept of CP.

Limitations and Strengths of this Research

There are a number of limitations that deserve attention. As mentioned throughout the discussion, the retrospective design of this study, which relied heavily on self-report, restricts the conclusions that can be drawn from the data. For instance, current emotional states might have influenced ratings referring to experiences in the past (e.g., affect, dissociation). Another restriction is the cross-sectional and correlational nature of the study. Cause and effect could not be differentiated. This affected, for example, the relationship between previously experienced sexual violence and PTSD symptoms: Did the experience of violence cause PTSD or did the symptoms evidenced by the participants pose them at risk of being re-victimized? The cross-sectional nature also limits the conclusions that can be drawn about vantage points shifting over time: More firm conclusions would be possible had the vantage points been assessed closer in time to the events in question. Such limitations affect the study's internal validity as well as conclusions about the development of certain psychological phenomena over time.

Another limitation is the lack of ground truth for the assaults. Therefore, no conclusions are possible regarding the accuracy of the participants' memories. The present study focused on the quantity of details. That said, plans exist to analyse the participants' reports using Criteria Based Content Analysis (CBCA; e.g., Horowitz, 1991) in order to assess the credibility of their statements. Credibility is defined as the likelihood of a memory being based on a genuine (as opposed to a fabricated) experience. Based on his clinical expertise, Undeutsch (1989) collected a number of verbal features in witness statements that have been shown to relate to ground truth (e.g., Vrij, 2005). This concept is different from memory accuracy, defined as the

similarity of a memory with the case facts (e.g., Woolnough & McLeod, 2001). Thus, CBCA will only provide an indication whether the narratives in the present study were likely based on genuine experiences. It does not inform about memory accuracy. In a clinical or forensic context, CBCA should never be used in isolation but always be used in conjunction with other techniques that are known to differentiate deception from truth (e.g., Griesel & Yuille, 2007).

Although the analyses presented in this dissertation included more than solely questionnaire data (e.g., details coded from the narratives), certain analyses have yet to be conducted. In particular, the breakdown of different types of details (e.g., action, descriptive, subjective) and their classification into central and peripheral details have yet to be examined. The latter might prove to be complicated, perhaps even impossible, considering the changing environments of the crimes examined by this research. While a distinction of central and peripheral details might be clear in a laboratory context, such an analysis is far more complex in field research (Brown, 2003).

With the exception of the first 14 participants, the information obtained in the narratives was limited by the fact that the Step Wise Interview Protocol could not be applied in its full depth. That is, the memories were not fully exhausted for details. In order to keep the amount of information obtained from each participant and in reference to each event balanced throughout the study, a standardized set of questions was assessed for each memory.

The present investigation was also limited by the absence of physical examinations to rule out organic reasons for amnesia, other than self-reported intoxication at the time of an event. Such examinations were not feasible within the

time frame and budget of this dissertation. However, if conditions such as brain damage had caused the participants to experience any memory impairments, this should have been true for all three memories. Thus, the within-subjects design of the present investigation is thought to have balanced out organically-based memory impairments between different types of memories to a certain degree³⁴. In contrast, between-subjects studies (e.g., Tromp et al., 1995) have confounded memory differences with other individual differences (such as brain damage). Clearly, an analysis of organic reasons for amnesia related to experiences of interpersonal violence would be desirable in future research.

Although not a limitation per se, the present investigation was restricted by various ceiling effects. For instance, the high rates of childhood abuse, past and current substance abuse problems, as well as traumatic histories as adults have caused restrictions of variance, which might have affected the regression analyses. Similarly, some variable evidenced high rates of missing values, due to the assessment problems discussed above. Restrictions in statistical power might have occurred in some analyses.

Finally, the type I error rate needs to be addressed, considering the number of analyses in this study. It is argued that type I errors are not a concern for the following reasons: First, all analyses were hypothesized a priori. Second, most findings were either *not* significant or *highly* significant ($\alpha < .01$), with few barely significant findings ($\alpha < .05$). This suggests that the power of these analyses was

³⁴ However, this reasoning does not apply to participants who received brain damage from an event that occurred in between the experiences they discussed for the purposes of the present investigation.

sufficient to detect the effects that were found. Finally, Bonferroni corrections were made to the α level of pairwise comparisons in all repeated measures ANOVAS.

A strength of this research is its field approach. For ethical and practical reasons, the effects of trauma can simply not be studied in the laboratory. Simulations and videos of crimes can only approximate the impact of real crimes, especially those involving violence. Thus, the ecological validity of this study is much stronger than that of laboratory studies. That is, the findings are readily applicable to the real world. There is only a small but growing body of field and archival studies of eyewitness memory, starting with Kuehn's (1974) archival analysis of police files as well as Yuille and Cutshall's (1986) case study of a robbery. This dissertation provides a contribution to this line of research.

Another advantage was the fact that the measures used in this study involved interviews in addition to self-report questionnaires. The use of questionnaires had the advantage that many data could be collected within a short period of time. The use of interviews made it possible for the researchers to get a direct 'feel' for the problems and challenges the participants were faced with. Therefore, the above discussion of the statistical findings could be corroborated by the interviewers' interactions with the participants (see also Griesel, Buchanan, Lo, Tomfohr, & Yuille, 2005). This effect was promoted by the close collaboration of the research team with a community collaborator, which made it possible that sex trade workers had an influence on the design of certain questions and the overall procedure of the interviews. Such information was precious since it provided the author with knowledge on how to adjust the study protocol (e.g., the screenings) and it ensured that the ethics of the study were critically monitored throughout the entire duration of data collection.

Conclusion

Implications for Theory Development and Future Research

As mentioned at several points throughout this discussion, the *traumatic memory argument* (e.g., van der Kolk, 1996) is called into question by the findings of this dissertation. That is, both the idea that trauma leads to quantitative memory impairments and the idea that dissociation is the mechanism behind such impairments were not supported by the present findings. The present findings support a growing body of field research on eyewitness memory for potentially traumatic events, specifically sexual violence (e.g., Cooper, Yuille et al., 2002; Peace & Porter, 2007). Such studies have shown enhanced quality and quantity of memories for such events. They contradict the general notion of laboratory-based research, according to which eyewitness memory is impaired by stress (e.g., Deffenbacher et al., 2004). The difference in findings between these two research paradigms are exemplified by studies of the *weapon focus effect*, with laboratory studies being the only paradigm that can demonstrate it. Hervé et al.'s (2007) model incorporates laboratory and field research findings, the former being focused on the effects of mild stress, the latter being focused on the effects of extreme stress. The model also highlights the complexity and variability of eyewitness memory. Considering, for example, the finding that different PTSD symptoms have different effects on memory, such theories seem highly appropriate and desirable in explaining and predicting the effects of stress on memory.

The biopsychosocial model of eyewitness memory (Hervé et al., 2007) also predicts that different individuals react differently to trauma. The present study used a

measure with limited utility for the analysis of such individual differences (i.e., arousal sensitivity). This limitation was not faced in previous tests of the model (i.e., Cooper, 2005). Future research should focus on other ways to operationalize this construct. For example, personality measures that are based on neurobiological considerations (e.g., Heath, Cloninger, & Martin, 1994), rather than a lexical approach (such as the BFI used in the present study) might be better suited to serve this purpose.

Other suggestions for future research can be found throughout this discussion. One other issue deserves particular attention: The findings of one analysis suggest that PTSD symptoms of re-experiencing are associated with enhanced recall, whereas symptoms of avoidance/numbing are associated with impaired event memory. Further research is needed to confirm these results. If this turned out to be a robust finding, it could shed further light on a longstanding debate in the eyewitness literature, that is, whether stress leads to enhanced or debilitated recall. Furthermore, the recent PTSD literature suggests that the PTSD symptom cluster C (i.e., avoidance/numbing) outlined in the DSM-IV might be better represented by two separate factors: avoidance of trauma-related reminders and emotional numbing (e.g., Asmundson et al., 2000; DuHamel et al., 2004). This re-definition of posttraumatic stress symptom clusters should be considered in future studies on the association of PTSD and memory.

Another issue that seems vital to be further researched is the discrepancy of self-reported memory vs. objectively measured memory. This discrepancy seems particularly important for the assessment of eyewitness statements for the courts, discussed in the next section.

Implications for Clinical Assessment

The present study has three implications for clinical assessors. First, clinical evaluators should be aware that memories for sexual violence *can* be very detailed. That is, memories of sexual violence in the present study were characterized by a large variability, although none of the assault memories were outspokenly poor. That is, some assaults were recalled at a level of detail similar to non-traumatic events; however, other assaults were recalled at an extraordinary level of detail.

Second, clinical assessors should be aware of the complexity of traumatic memory. Several moderating factors of memory were investigated in the present study (e.g., the age of a memory; memory rehearsal; intoxication at the time of an event; the traumatic extent of an event). Considering the literature on traumatic memory, it was surprising that the experience of dissociation during sexual violence did not account for quantitative differences in the memories. Symptoms of posttraumatic stress – overall – seemed to enhance recall. The results of one particular analysis in the present study suggested that symptoms of intrusion might lead to enhanced memory, whereas symptoms of avoidance/numbing might debilitate memory. Such moderating factors (e.g., the history of a memory; peritraumatic experiences; current stress symptoms) should be investigated as part of psychological evaluations. The biopsychosocial model (Hervé et al., 2007) could be used to systematically guide the assessor in this endeavor.

Third, as mentioned in the previous section, they should not rely solely on self-report in their assessment of witness statements. A witness might underestimate the quantity of their memory for sexual violence, as evidenced in this study when well-recalled assaults were compared to memories of baseline events, or they might

overestimate the impairment of less-detailed memories for sexual violence, as evidenced in this study when poorly-recalled assaults were compared to memories of baseline events. Thus, it is recommended that assessors ask the witness to produce a narrative of their memory, and possibly also a narrative of a baseline event, which allows for a more objective evaluation of the quality and quantity of memory.

Implications for Clinical Treatment

Emotional difficulties other than PTSD (e.g., personality disorders, dissociation) should be considered in treatment or other interventions (e.g., re-employment workshops) with victims of multiple interpersonal traumas such as sex trade workers. The complexity of symptoms evidenced by the sample of this study was not adequately captured by the PTSD measure alone. Despite extensive histories of childhood abuse and a high rate of re-victimization as adults, the participants evidenced a relatively low rate of PTSD. Most participants were extensive substance abusers (past or present), which may have clouded the picture when PTSD symptoms were assessed. They further demonstrated a tendency to dissociate in daily life that was significantly higher than the degree of dissociative symptoms found in the general population. The research team's experience was also marked by the applicants' attempts to "fool" the screeners. In terms of specific risk factors for PTSD, the absence of a gender difference in PTSD symptoms associated with sexual violence stood out. All of this suggests that sex trade workers' emotional difficulties are very complex and require highly specialized treatment. Interventions with traumatized individuals often involve several phases, beginning with stabilization (e.g., ensuring physical safety). For chronically traumatized people, this phase

includes treatment of substance abuse issues, which might perpetuate other symptoms and prevent recovery. The core of treatment involves processing and integrating the traumatic memory into the patient's autobiography and identity. During the last phase of treatment, individuals typically re-enter their lives (e.g., Classen et al., 2006). The need to approach treatment gradually is supported by the results of this study. The unstable and marginalized position of many participants (e.g., homelessness, poverty, drug addictions, involvement in the sex trade) underlines the need to target safety and substance abuse issues before any other interventions can occur. Any subsequent treatment should target more than just PTSD symptoms, given that their prevalence was relatively low in this sample and the participants' mental health was complicated by other factors. For instance, an assessment of CP symptoms will ensure that behaviours that could potentially undermine the therapeutic alliance between patient and therapist are anticipated and targeted (e.g., Roth et al., 1997). It is further recommended that rehabilitation of chronically abused individuals involve professionals from various fields (e.g., psychological counsellors, physicians, nurses, employment counsellors, law enforcement) who work collaboratively with each other. This would increase the quality of treatment and ensure that the patients' progress is monitored closely and from different angles. Benoit and Millar (2001) highlighted the perceived judgmental attitude of regular health care providers as a major barrier for sex trade workers in accessing health services. Notwithstanding, treatment providers must be aware of the criminal lifestyle practiced by some sex trade workers, which might involve deception (e.g., in order to obtain drugs or money for drugs). Hence, again, the need

to tackle interventions collaboratively to detect, monitor, and address such behaviours is highlighted.

The findings of the present study suggest that men are no less vulnerable to suffer posttraumatic stress from the experience of sexual violence than women. Treatment providers, and especially organizations that offer services to sex trade workers, are advised not to focus their services exclusively on female survivors of sexual abuse.

Considering the discrepancy between the high degree of detail in memories of sexual violence on the one hand and the self-reported memory problems (i.e., their meta-memory) on the other hand, it might be helpful to educate survivors of sexual violence about such to empower them to speak up about their experiences (e.g., feeling more confident to report them to authorities).

Although this last recommendation cannot be concluded from the results of this research, clinicians are urged not to contaminate their patients' memories by use of suggestive techniques in therapy. This is especially true for victims of violence, who might testify about their experiences in court at some later point in time.

Implications for the Criminal Justice System

The present findings underline that eyewitness memory should be examined within a comprehensive biopsychosocial framework (e.g., considering predisposing, precipitating and perpetuating factors). Overall, the findings support the *trauma superiority argument*. That is, traumatic events can be remembered in great detail, irrespective of dissociative processes. The findings do not support the *trauma equivalency argument* because detailed memories of trauma were differently affected

by factors that enhance (e.g., rehearsal) or debilitate (e.g., passage of time; intoxication) non-traumatic memories. These findings are relevant to eyewitness memory experts who offer their testimony in court. Kassin et al.'s (2001) survey of eyewitness memory experts revealed that most of them believed that the presence of a weapon and stress impair memory accuracy. They also believed that the rate of memory loss is great immediately after the event and that intoxication impairs memory. Granted, the present study did not examine memory accuracy, only the quantity of recall. Nevertheless, some of the statements that Kassin et al.'s experts endorsed are not in line with the present findings. For example, it remains unclear what level of intoxication, in combination with certain event characteristics, is necessary to impair memory. In the present study, some degree of intoxication was involved in all events, yet some were recalled in great detail. Also, traumatic stress did not invariably impair recall and there was no difference between detailed and less detailed memories of sexual violence in terms of a weapon being present at the time. More research on these issues in a real life context is needed before solid expert testimony can be offered in court.

Another implication concerns forensic interviewers (e.g., lawyers, law enforcement, psychologists, psychiatrists). The research team's experience during data collection speaks to the detrimental effects that can emerge for victims when they are interviewed about their crimes. Not all witnesses might be ready to talk about the events that happened to them. Investigators should be aware of the intense effects their interviews can have on witnesses. Asking interviewees to recall a traumatic event in detail is equivalent to a technique known as imaginal exposure. In a therapeutic context, careful efforts are made to conduct such exposure gradually and

systematically to avoid symptom exacerbation. Foa, Zoellner, Feeny, Hembree, and Alvarez-Conrad (2002) acknowledged that a minority of patients do experience symptom exacerbation during such treatment. It seems intuitive that this number could easily increase in an investigative context, where witnesses do not receive the education and support provided in a therapeutic context. Thus, efforts should be made to minimize re-traumatizing effects, while ensuring that the necessary information is obtained, for example, by avoidance of multiple interviews (see Daylen, vanTongeren Harvey & O'Toole, 2006). Benoit and Millar (2001) highlight the reluctance of many sex trade workers from British Columbia to turn to their local police force for help (e.g., to request protection; to report crimes they have experienced). More sensitive interviewing techniques might help them to overcome their mistrust and apprehension of law enforcement.

It is also highlighted that forensic interviewers should be aware of sex trade workers' extensive histories of trauma. It is recommended that they assess for such, for example, to examine the possibility of script memories (see Yuille & Daylen, 1998). It is further recommended that forensic interviewers use a positive memory as a baseline event, such as it was done in the present study, to assess for the linguistic and cognitive capacities of their interviewees (e.g., Yuille et al., 1999). Based on the present findings as well as other field studies of eyewitness memory (e.g., Cooper, 1999), one would expect that a traumatic memory contains at least a comparable amount of details as a positive memory, possibly even more.

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Appendix

- A) Participant Information Letter
- B) Participant Consent Form
- C) Memory Interview (after Yuille, 1990)
- D) Prostitution Background and Demographics Survey
- E) Ethics Approval from UBC Research Ethics Board

A) Participant Information Letter

Title of the Project: Psychological Consequences of Sexual Violence in Prostituted Individuals
Principal Investigator: Dr. John C. Yuille
Co-Investigator: Dipl.-Psych. Dorothee Griesel
Funding Agency: Social Sciences and Humanities Research Council Vancouver Foundation

Dear reader,

Dr. John Yuille and his student Dorothee Griesel³⁵ (Dipl.-Psych.) from the Forensic Psychology Lab at UBC are requesting your participation in a research project concerning memories. We wish to interview you about some of your past experiences. Specifically, we are interested in sexual assaults and the way survivors of such experiences cope with it.

Background:

Memory has been found to work differently for traumatic (= very disturbing) than for less emotional events. The present study will add to our knowledge of how memory works under different situations (e.g., comparing memories of disturbing events to commonplace experiences). After experiencing a traumatic situation, such as natural disasters, accidents or crimes, some people develop Posttraumatic Stress Disorder (PTSD). That is, they might suffer anxiety, sleeping problems, experience flashbacks or feel extremely jumpy. We believe that the information you will provide will help us better understand the mechanisms underlying this disorder after experiences of sexual violence. The results of this study will help to design better treatment programs for individuals who have been sexually exploited.

Eligibility:

In order to take part in our study you must have worked in the sex exploitation trade and have experienced sexual violence (for example, a bad date). Also, you must be over 19 years in age and be able to understand, read, and write English. You will obtain a \$60 honorarium for your participation in the study. The complete interview will take approximately 4 hours.

Procedure:

If you choose to participate in this study, you will fill out a number of questionnaires regarding your individual background, your personality, and symptoms (= behaviors) you might have in consequence of past traumatic experience(s). Involvement in our study will further entail providing memories for three different types of experiences: One emotionally positive event, one sexual assault that you remember well and one experience of sexual assault that you remember only poorly. Specific questions may be asked in order to clarify possible uncertainties. The interviews will be audio-taped. Trained research assistants (students) with interviewing experience will conduct the interviews.

Rights / Benefits / Risks:

You may ask clarifying questions at any point during the session. Filling out the questionnaires might help you to find a way of coping with the experiences you have made. Copies of our findings will be available at PEERS Vancouver a few months after this study is completed. The study might also bring up bad memories about the pertinent event(s). Please feel free to contact the Crisis Center Distress Line (telephone number 604-872-3311) if you would like to discuss possible discomforts or contact Shelley at PEERS Vancouver. You may decline to enter or withdraw from the study at any time without any consequences to treatment, medical care, or the receipt of the remuneration. If you have questions about the procedures of this study please contact our laboratory at 604-822-6130. If you have concerns about your rights as a research participant, please call the Office of Research Services at UBC (telephone number: 604-822-8598).

³⁵ Dorothee Griesel's dissertation will be based on this study.

Confidentiality:

The information collected in this study will be used for research purposes. The interview is confidential, that is, only Dr. Yuille and the students under his supervision will have access to this information. The data of the present study might be re-analyzed in the scope of archival studies on victims of sexual violence. Your identity will be protected and all information will remain confidential. All documents will be identified only by code number and kept in a filing cabinet in a locked room in our psychology laboratory at UBC. Participants will not be identified by name in any reports of the completed study.

If you decide to participate in this study, please sign the consent and confidentiality statements on the next page. Thank you!



John Yuille (Ph.D., R.Psych.)



Dorothee Griesel (Dipl. Psych.)

B) Participant Consent Form

You understand that your participation in this study is entirely voluntary and that you may refuse to participate or withdraw from the study at any time without penalty. By signing below, you give your full informed consent to participate in this study. This will include reporting up to three different types of autobiographical memories and responding to a number of self-report questionnaires pertaining mostly to personality characteristics. You consent to having your interview audio and video taped.

I have received a copy of this consent form.

Participant signature: _____

Date: _____

Print Name: _____

Limits to Confidentiality

As the other consent form indicates, your participation in this study will remain strictly confidential. However, there are limits to confidentiality. It is our legal obligation to report any case in which a child might be in danger. Thus, we do not want to hear about possible current dangers to children. We will do our best to stop you if we feel that you are about to discuss anything related to the above. However, if you do state anything related to the above, we are both legally and ethically obligated to break the confidential nature of this interview and report the information in question to the designated authorities.

I fully understand the limits to confidentiality.

Participant signature: _____

Date: _____

D) Prostitution Background and Demographics Survey

Age: _____ years

Gender: ☐ female ☐ male ☐ transgender ☐ other
(specify) _____

Marital status: ☐ Single
☐ Married
☐ Common law/seeing someone
☐ Divorced
☐ Widowed

Kids/dependents: ☐ No ☐ Yes: How many? ____
 Do you have custody of your kids? ☐ No ☐ Yes

What is your living situation?

☐ Rent - family
☐ Homeless / street
☐ Rent - roommates
☐ Own home
☐ Hotel
☐ Other _____

Prostitution background:

How old were you when you entered the sex trade? _____

How did you first get involved with prostitution? _____

Do you currently still work in the sex trade? ☐ No ☐ Yes

If applicable: How old were you when you exited the sex trade? _____

What prostitution settings (venues) have you ever work in?

☐ Survival trade ☐ High track
☐ Massage parlor ☐ Escorting agency
☐ Own boss ☐ Pimp? ☐ No ☐ Yes
☐ Other _____

If applicable: What percentage of the money you make (made) goes (went) to your pimp? _____

If applicable: Have you ever left prostitution or made an attempt to do so? ☐ No ☐ Yes

If applicable: Do you currently have the desire to quit prostitution? ☐ No ☐ Yes

What helps (would help) you to stay out of the trade?

How much do (did) you charge for the services you offer(ed)?

Do (did) you suffer any health problems due to your job in the sex trade?

- ☐ HIV ☐ other STD
☐ Abortion ☐ Miscarriage
☐ Menstruation problems ☐ Serious injuries (requiring hospitalization)
☐ Other _____

What is your education? ☐ (High) school grade: _____

☐ Some college/university

Family background / abuse history:

You grew up with:

- ☐ Either mother or father ☐ Both parents
☐ Other family member ☐ Foster home
☐ Jail / youth detention ☐ Street
☐ Other _____

Did any of your caregivers ever have criminal charges?

- ☐ No ☐ Yes: ☐ Property offence
☐ Violent offence
☐ Drug offence
☐ Sexual offence
☐ Other _____

Did any of your caregivers consume drugs or alcohol on a regular basis?

- ☐ No ☐ Yes:
☐ Alcohol
☐ Pot
☐ He, Co, etc
☐ Other _____

Was there a time when you were aged 14 or younger and a guardian ridiculed, and/or belittled you and/or engaged in inconsistent parenting (e.g., gave negative responses when positive responses were expected)?

☐ No ☐ Yes; If yes, this happened from age _____ to age _____.

How frequently did this happen? ☐ Single time ☐ A few times ☐ Multiple times

Was there a time when you were aged 14 or younger and a guardian used physical force (e.g., throwing of objects, kicking punching, slapping, biting, burning, pinching, twisting, choking; threatened use of weapons, any use of weapons; any forced consumption of noxious items) to the point that it left a mark, and/or resulted in injury, and/or you missed school or activities, whether or not a doctor's care was required?

☐ No ☐ Yes; If yes, this happened from age _____ to age _____.

How frequently did this happen? ☐ Single time ☐ A few times ☐ Multiple times

Was there a time when you were aged 14 or younger and an individual at least 5 years older than you threatened and/or forced you to engage in sexual behavior?

☐ No ☐ Yes; If yes, this happened from age _____ to age _____.

How frequently did this happen? ☐ Single time ☐ A few times ☐ Multiple times

Was there a time when you were aged 14 or younger and a guardian did not provide you with affection, love, encouragement or care-giving?

☐ No ☐ Yes; If yes, this happened from age _____ to age _____.

How frequently did this happen? ☐ Single time ☐ A few times ☐ Multiple times

Social support at present:

At present, whom do you go talk to when you have problems?

☐ Family member

☐

☐ Friend

☐

☐ Relationship partner

☐ Who is most helpful?

☐ Professional help, namely _____

☐

☐ Other _____

☐

Drug abuse history:

| Drug name | Current Use | Current Abuse | Long-term Severe Abuse | Past Abuse |
|--------------|-------------|---------------|------------------------|------------|
| Alcohol | | | | |
| Marijuana | | | | |
| Cocaine | | | | |
| Heroin | | | | |
| Other: _____ | | | | |
| Other: _____ | | | | |
| Other: _____ | | | | |

Are you on anything right now? ☐ No ☐ Yes; specify (e.g., illegal substances, psychiatric medication): _____

Treatment history:

Have you ever received any treatment related to psychological problems?

☐ Yes ☐ No

If yes, what was the reason for the treatment (especially type of trauma, if applicable)? _____

☐ Psychological. Specify: _____

| When and did the treatment(s) take place? | For how long did the treatment take place? | Do you feel the treatment made a difference? |
|---|--|--|
| | | <input type="checkbox"/> it helped <input type="checkbox"/> no difference <input type="checkbox"/> got worse |
| | | <input type="checkbox"/> it helped <input type="checkbox"/> no difference <input type="checkbox"/> got worse |
| | | <input type="checkbox"/> it helped <input type="checkbox"/> no difference <input type="checkbox"/> got worse |

☐ Pharmacological/Medical. Names of the prescribed drugs? _____

| When and did the treatment(s) take place? | For how long did the treatment take place? | Do you feel the treatment made a difference? |
|---|--|--|
| | | <input type="checkbox"/> it helped <input type="checkbox"/> no difference <input type="checkbox"/> got worse |
| | | <input type="checkbox"/> it helped <input type="checkbox"/> no difference <input type="checkbox"/> got worse |
| | | <input type="checkbox"/> it helped <input type="checkbox"/> no difference <input type="checkbox"/> got worse |

☐ Other (e.g., healing circle, religious group, hobby) Specify: _____

| When and did the treatment(s) take place? | For how long did the treatment take place? | Do you feel the treatment made a difference? |
|---|--|--|
| | | <input type="checkbox"/> it helped <input type="checkbox"/> no difference <input type="checkbox"/> got worse |
| | | <input type="checkbox"/> it helped <input type="checkbox"/> no difference <input type="checkbox"/> got worse |
| | | <input type="checkbox"/> it helped <input type="checkbox"/> no difference <input type="checkbox"/> got worse |

Diagnoses obtained (psychiatric history): _____

E) Ethics Approval from UBC Research Ethics Board



The University of British Columbia
Office of Research Services and Administration
Behavioural Research Ethics Board

Certificate of Approval

| | | |
|--|---------------------------------|--|
| PRINCIPAL INVESTIGATOR Yuille, J.C. | DEPARTMENT Psychology | NUMBER B03-0726 |
| INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT UBC Campus , | | |
| CO-INVESTIGATORS: Griesel, Dorothee, Psychology | | |
| SPONSORING AGENCIES Vancouver Foundation | | |
| TITLE : Psychological Consequences of Sexual Violence in Prostituted Individuals | | |
| APPROVAL RENEWED DATE FEB -2 2005 | TERM (YEARS) 1 | AMENDMENT: Dec. 8, 2004, Consent form / April 2004, Advertisement / Reimbursement / Time required / March 4, 2004 Consent form |
| AMENDMENT APPROVED: FEB -2 2005 | | |
| CERTIFICATION: <p style="text-align: center;">The protocol describing the above-named project has been reviewed by the Committee and the experimental procedures were found to be acceptable on ethical grounds for research involving human subjects.</p> <p style="text-align: center;"><i>Approval of the Behavioural Research Ethics Board by one of the following:</i></p> <p style="text-align: center;"> Dr. James Frankish, Chair, Dr. Cay Holbrook, Associate Chair, Dr. Susan Rowley, Associate Chair Dr. Anita Hubley, Associate Chair </p> <p style="text-align: center;">This Certificate of Approval is valid for the above term provided there is no change in the experimental procedures</p> | | |