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The Role of State-Dependent Memory in "Red-Outs"

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Introduction

Domestic assault is an all-too-frequent occurrence in our society. It has been estimated that violence of some sort occurs in 19 to 28% of all marriages in the United States and Canada, and severe violence in 8 to 12% of all marriages (Dutton, 1995b). The Correctional Service of Canada, Research Division (1995) reports that:

> During 1994, one in six solved homicides was a spousal homicide, with women accounting for three-quarters of the victims. Spousal killings are likely to occur between legally married couples, at all stages of the relationship and across all social and economic boundaries. . . . While alcohol is often consumed at the time of spousal killings, research on domestic homicide suggests that fatal attacks on spouses occur irrespective of sobriety or level of intoxication. (p. 4)

It has also been observed that husbands do not always remember assaulting their wives. Estimates of the frequency of the occurrence of amnesia for crime vary from study to study. Examples include 26% of criminal offenders (Taylor & Kopelman, 1984), 22% of a group of accused murderers (Parwatikar, Holcomb, Menninger, 1985), 40% of a group of murderers (O'Connell, 1960), 60% of a group of murderers (Bradford & Smith,1979). However, none of these studies looked specifically at amnesia for the assault of a spouse, al-

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though it can be assumed that there were some cases of it nested within these estimates. Dutton (1995a) observed that:

> These most severe cases of wife assault generally involve, on the part of the batterer, an inability to recall the actual assaultive incident, even after shame and embarrassment about reporting it have subsided. Reconstruction of the assaultive incident from interviews with the wife and from police and medical testimony depict the male as being in a highly aroused state of rage, unresponsive to begging or pleading, and, in some cases, beating her until he was too exhausted to continue. The men usually remember the events leading up to the actual battering as well as its aftermath (some were shocked and sickened by what they had done) but not the intervening battering. (p. 91)

In an anecdote about a former client under the pseudonym "Robert," Dutton (1995a) described a man who could not find his wife at a party for 10 to 15 minutes and presumed she was having sex with a male colleague, when, in fact, she was on the balcony talking to two women. Later that night, while his wife lay sleeping, he brutally attacked her. He said he felt like he was "drowning in a red tide," and called such incidents "red outs" (p. 8). Tanay (1965) gave other anecdotal evidence of these red-outs, noting that most murderers he dealt with murdered those they loved the most, did not know why they did it, and often learned of their crime or realized what they had done only after the fact. Bradford and Smith (1979) found that of 30 homicides they studied, 60% of the perpetrators showed amnesia for their crime. The majority of these had patchy amnesia and the period forgotten was usually 30 minutes or less in duration. Thirty percent of all offenders had been intoxicated with alcohol, and 27% experienced extreme emotion at the time of the crime, which the authors speculated "could result in amnesia due to the failure of registration" (p. 224). Of the 24% who had highly emotional reactions at the time of the offense, 59% claimed amnesia for their crime. Apparently an individual can get so angry with his/her intimate partner that s/he can severely beat or kill that partner and then not remember doing so: that is, they can experience a red-out resulting in circumscribed dissociative amnesia. Several explanations for this phenomenon are explored here, and specifically, it is hypothesized that state-/mood-dependent memory may be one factor underlying the red-out phenomenon.

Memory and Amnesia

Most theories of memory agree that there are three main phases involved in remembering:

1. Encoding: the registration of the event. If something is not registered, it will not be remembered, and if attention is impaired it is less likely that the events will be registered (attentional difficulties may be due to many things, several of which are discussed below);

2. Storage: the retention of the memory over time. Losses may be due to normal forgetting, active forgetting, or amnesia;
3. Retrieval: the reconstruction of the event at the time of recall. Difficulties at this phase may reflect lack of cues, an unwillingness to remember (O'Connell, 1960), state-dependent effects, or the impact of problems associated with either of the previous two phases.

Amnesia is most commonly a consequence of organic disease or neural damage, although nonorganic amnesias do exist. Amnesia can be pathological or nonpathological. Nonpathological amnesias include infantile amnesia, an inability to recall events in the first 2 or 3 years of life (which is not thought to be reversible), sleep and dream amnesia (not thought to be reversible), and hypnotic amnesia (thought to be reversible). The pathological amnesias are labeled dissociative amnesias in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association, 1994). Dissociative amnesia is divided into the following types:

1. Localized amnesia—failure to recall events usually for a relatively short period of time after a disturbing event;
2. Selective amnesia—inability to recall some parts of a disturbing event;
3. Generalized amnesia—recall failure involves the person's entire life;
4. Continuous amnesia—inability to recall events from a specific time up to and including the present;
5. Systematized amnesia—loss of memory for a category of experience.

Amnesia may also be a feature of other pathologies (e.g., dissociative identity disorder). Selective amnesia, the second type of dissociative amnesia, corresponds to red-outs, although other forms of selective amnesia do occur. Thus, a red-out may be considered a particular form of dissociative selective amnesia.

All forms of pathological amnesia are thought to be reversible. It would be interesting to know if individuals who have some sort of circumscribed amnesia (i.e., limited amnesia) for a crime show implicit memory for the crime as occurs in organic amnesiacs (Schacter, 1986). Implicit memory refers to a condition in which individuals cannot recall past events even though he or she acts in response to them. The type of amnesia we are concerned with here appears to be a limited amnesia. It is restricted to a single event or episode: the severe beating or killing of one's spouse.

Theories of Selective Amnesia

Several theories of pathological amnesia have been proposed and may have some bearing on the phenomenon of red-outs. Freud and Breuer (1895/1956) initiated the modern view that hysterical patients suffered from amnesia for traumatic events. Freud changed these ideas in his later theory (e.g., Freud and Breuer, 1895/1956), but the notion of psychologically based amnesia for traumatic events had been established. Janet (1904) believed that dissociation,

a detachment or loss of integration between identity or reality and consciousness, results from a lack of ego-energy and, therefore, the stress of a traumatic event cannot be dealt with and the memories for the event are split off from the rest of consciousness. The memories continue to exist and affect the individual but they are not accessible to consciousness. Hopwood and Snell (1933), consistent with the Behaviorist theories of the time, proposed that functional amnesia might be caused by failures of association (e.g., problems with encoding). More recently, Schacter and Kihlstrom (1989) attributed functional amnesia to a failure in episodic memory and a sparing of semantic memory. In other words, the individual is not able to remember events from the past but has not lost general knowledge of the world. Supposedly, the individual loses higher order units of information (e.g., his name) and because of this is not able to access lower levels of information (e.g., what he did on a specific occasion). Another theory suggested that an individual's superego cannot accept the fact that the individual, being a good person, can do something socially unacceptable (e.g., spousal assault), and so the memory for the action may be repressed in order to cope with the resulting conflict (Parwatikar et al., 1985). Taylor and Kopelman (1984) suggested that amnesia for crime may be due to (a) the effects of alcohol, (b) a psychotic mental state, or (c) a psychological defense mechanism (e.g., suppression, repression) to protect the self from acknowledging one's abuse of a person that one has a very close emotional involvement with (similar to the proposal of Parwatikar et al., 1985).

DSM-IV and Wife Assault

Dutton (1995b) noted that the DSM-IV contained a variety of disorders that corresponded with descriptions of wife assaulters. Among these are conjugal paranoia—unfounded delusions and jealousy that one's mate is unfaithful, and intermittent explosive disorders. The diagnostic criteria in DSM-IV for intermittent explosive disorder include: "several discrete episodes of failure to resist aggressive impulses that result in serious assaultive acts or destruction of property, the degree of aggressiveness expressed during the episodes is grossly out of proportion to any precipitating psychosocial stresses" (p. 612). Further, the DSM-IV states that: "The individual may describe the aggressive episodes as 'spells' or 'attacks' in which the explosive behavior is preceded by a sense of tension or arousal and is followed immediately by a sense of relief. Later the individual may feel upset, remorseful, regretful, or embarrassed about the aggressive behavior" (p. 610). In the case of the red-out, the individual loses control, and usually feels remorseful later, but it is not known how often individuals with intermittent explosive disorders claim to have amnesia for these periods. Also, it is not known whether amnesia of this type can occur on successive occasions, although the case of Maggie MacDonald has some bearing here. She was a woman who stabbed two consecutive husbands to death in Ontario (the events were separated by a number of years). Ms. MacDonald reported amnesia for the core aspects of both homicidal events (Gould & MacDonald, 1987). She continued to claim amnesia even after she was no longer subject to any criminal action for these murders,

and, in fact, was trying to remember the events to assist in the writing of a biography of her life. This appears to be a case of amnesia for successive events.

DSM-IV and Posttraumatic Stress Disorder

It has been suggested that posttraumatic stress disorder (PTSD) may be associated with amnesia for murder (Porter, Yuille, Birt, & Herve, 1997). Although PTSD has usually been discussed in relation to victims, there are characteristics that also would be applicable to some circumstances in which a person commits a murder. The criteria for PTSD listed in the DSM-IV include a person being exposed to a traumatic event where the person "experienced, witnessed, or was confronted with an event that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others . . . the person's response involved intense fear, helplessness, or horror" (pp. 427–428). Also included in the criteria is the possibility of "inability to recall an important aspect of the trauma" (p. 428). Thus, some instances of amnesia for murder may be a consequence of PTSD-induced memory disturbances (Porter et al., 1997). However, since PTSD is more often characterized by hypermnesia, including persistent reexperiencing of the traumatic event, it is unlikely that PTSD can provide a framework for the complete understanding of red-outs.

Legal Issues

Claims of amnesia in criminal cases often occur in situations that are the result of self-induced intoxication, or as the result of the defendant's actions during the criminal act, or with claims of automatism or dissociation where there is no personal history of personality disorders (Roesch & Golding, 1986). However, in order to convict an individual of a crime, both *actus reas* (the commission of a criminal act) and *mens rea* (the intent to commit the act) must be established. A claim of amnesia in a criminal case is not uncommon and may be used to attack the *mens rea* aspect of the case. Thus, it is important to try to determine whether the amnesia is real or simulated. If the amnesia is judged to be real, it may be used to raise doubts about the competency of the accused or it may be used as a basis for a defense of automatism (Gibbens & Williams, 1977). Automatism is when a person's bodily movements are not under the individual's control, for example, during sleepwalking. However, the fact that the accused does not remember all or part of the crime due to circumscribed amnesia does not prove that s/he did not know what s/he was doing at the time the crime was being committed (Hopwood & Snell, 1933). Amnesia is simply the inability to remember, and says nothing about the person's inability to distinguish right from wrong at the time of the crime (Lister v. State, cited in Rubinsky & Brandt, 1986). Alternatively, the presence of amnesia may be used to address the question of competence: whether the lack of memory compromises the ability of the person to assist in his/her defense. However, Parwatikar et al. (1985) note that "no court has found a defendant incompetent to stand trial solely because of amnesia" (p. 102). Therefore, claiming amnesia for a crime is not very useful for a defendant, whether or not the amnesia is real.

Malingering

When an individual accused of a crime claims amnesia there is a real possibility that the individual is trying to avoid taking responsibility for his or her actions. It is generally agreed that the defendant may be highly motivated to malinger, and if there is no apparent organic basis for the amnesia (e.g., if there were no memory problems before the crime occurred), there is no way to know for certain whether or not the individual is simulating amnesia or not (United States v. Sermon, cited in Rubinsky & Brandt, 1986). Hopwood and Snell (1933) addressed the issue of malingering in their examination of 100 psychiatric patients who had committed various serious offenses. They found that in those with genuine amnesia, the onset and end of amnesia periods were blurred, and the amnesia had a shorter duration before rather than after the crime. It could be argued that the commission of the crime was highly upsetting and led to a lengthening of the dissociative period postcrime.

State-Dependent Memory

State-dependent effects (state-dependent learning or state-dependent retrieval) refer to impairment in performance when there is a mismatch between physical or mental states at learning and at retrieval. Bower (1981) has researched state-dependent memory extensively and has found that a person may be better able to remember an event if s/he is in the same emotional state at the time of attempted retrieval as at encoding. Conversely, the individual will have difficulty recalling events if the affective state is very different between retrieval and encoding, especially if the intensity of the emotion is high. Information is mainly accessible to the state in which it was learned and may not be accessible in another state. The state-dependent effect assumes that mood acts as a critical context cue, no matter what the nature of the information being learned and retrieved. The state-dependent effect is similar to a dissociative effect, wherein existing memories may, under certain circumstances, be unavailable to consciousness.

Eich (1989) found that subjects had a greater impairment for internally generated events when the subject was in a different mood and had a different level of arousal at recall then at encoding. The combined effect of mood and arousal was greater than if they only had a different mood or different level of arousal at the time of retrieval. He also found that memory for external events is not as likely to be affected by mood state as memory for internally generated events. More recent research by Eich and Macaulay (in press) showed that experimentally induced mood events encoded in a state of high negative affect leads to more state dependence, that is, it is especially important in these situations to be in a similar mood at the time of retrieval as at encoding. It is suggested here that one possible explanation for the phenomenon of redouts is that a person who severely abuses or kills his/her spouse may be in such a unique negative affective state, with such high intensity (rage), that it is not possible to retrieve the memory of the abuse when no longer in the rage state. It would be very difficult to induce this level of anger in order to try to facilitate recall. However, Bower (1981) cited the example by Diamond (1969) of

Sirhan Sirhan who, under hypnosis, became highly agitated and did, in fact, remember details of his assassination of Robert Kennedy, but could not remember these details once he was no longer in the agitated state under hypnosis. If this difference in emotional states is so great, the individual may never again get into that state to that degree, and if s/he did, s/he may well remember, but may also be at risk to reoffend, if indeed the intensity of the rage was the precipitating factor in the previous abuse(s). An example of this would be Margaret MacDonald, referred to previously, who claims amnesia for both murders in a book she wrote after she was released from prison (Gould & MacDonald, 1987). State-dependent memory is not inconsistent with the claims of some individuals that they remember events leading up to the crime, and events after the crime when the intensity of their emotions has lowered somewhat (e.g., Maggie MacDonald, who takes full responsibility for her actions and knows she must have committed the crimes), as these states of arousal are not as drastically different from normal angry or upset states. It is only when the rage gets so intense that a person may not be able to integrate these feelings within their usual repertoire of emotions, and thus not have cues to retrieve the memories at a later time. Bower (1992) claims that certain conditions facilitate the occurrence of mood-dependent memory: the moods must be fairly intense, the moods must be different at encoding than at retrieval, free recall should be used at retrieval, subjects should internally generate retrieval cues, and subjects should try to recall autobiographical memories. In the case of red-outs, presumably the mood is very intense, very different from the mood one would be in when trying to recall the event (fear, remorse). However, even if they are asked if they can remember using recognition tasks and not only free recall (e.g., an officer telling the accused that he was seen holding a bloody knife "where did it come from" (cued recall) vs. "tell me what happened" (free recall)—in the case of a "red-out" the individual may be equally as unlikely to remember the event. But this is a memory for an autobiographical event, and so according to Bower's (1992) findings, red-outs may have the necessary ingredients to involve mood-dependent effects. A parallel can be found in research done by Eich (1997) on dissociative identity disordered (DID) individuals who exhibit interpersonality amnesia differentially for implicit (recognition and cued recall) and explicit tasks (free recall). This amnesia could be attributed to an extreme form of state/mood dependence. In a laboratory situation, it may be more difficult to find state-/mood-dependent effects, and, therefore, it would be necessary to ensure that Bower's requirements listed above are present. The laboratory situation is probably much less intense, hence, individuals may perform well on cued recall and recognition because the test is easier and there is a less intense mood change in this setting. In fact, Bower (1992) states that mood-dependent retrieval "is less reliable when subjects learn and recall artificial material in laboratory tasks in different mood states" (p. 23). In real life, the easiness of the test may not compensate for state-/mood-dependent memory when there is a very intense mood involved. Obviously, this would not be possible to test in a laboratory, as it would not be ethical to induce this level of mood, especially a negative mood, which would be required here to ensure generalizability. Bower (1992) states that "(I)f subjects causally attribute their emotional reaction to the material—if they perceive the two as

'causally belonging' together—then we hypothesize that they will form a strong association in memory between the stimulus event and the emotion it evoked" (p. 24). He further suggests that if an individual perceives an emotion and an event as occurring together without causality, these are less likely to be associated with each other, and as a result, more difficult to retrieve. For example, if "I was mad" and therefore "I killed my wife" does not seem like a plausible association to the individual, it will not be as easy to retrieve the memory for this occurrence because it has not been properly associated in memory. Bower (1992) also believes that this can explain why there are often weak effects of mood-dependent retrieval in laboratory experiment—because the mood is often induced before learning and retrieval tasks occur, with the mood being the background and the learning/retrieval being the foreground. Also, the onset of each occurs at different times and participants are not told to associate mood and learning in any way. This almost certainly is not the case in real-life situations. In the case of the red-out, the onset of mood and the items to be remembered would occur simultaneously, and the rage would be in the foreground, and the items to be remembered in the background, and they would be strongly associated with each other, although not causally associated in memory.

Occasionally, an individual who gives a statement shortly after committing a crime will acknowledge memory for the offense and yet subsequently develop amnesia for the crime (the same pattern is also found in some victims who develop amnesia; Yuille & Daylen, 1998). This also can be seen as consistent with the state dependence proposal, that is, that once the individual resumes a more normal affective state, items that were encoded in the "rage" state are presumably inaccessible in the normal state (as there are no associative ties between the two) and, therefore, there is no memory for what occurred in the altered state.

Role of Alcohol

Alcohol is often a factor in commission of crimes, and this holds true for perpetrators of domestic violence (Dutton, 1995a, 1995b). During 1994, two thirds of all homicide offenders in Canada had an alcohol disorder, and "more recent data indicates that one half of homicide offenders reported that they were under the influence of alcohol, drugs or both on the day they committed the offense(s)" (Correctional Service of Canada, Research Division, 1995, p. 10). Hopwood and Snell (1933) found that 38% cases they examined of amnesia for crime involved alcohol use. Lynch and Bradford (1980) studied 22 patients charged with various offenses, and all claimed alcohol-/drug-induced amnesia for the events in question. Taylor and Kopelman (1984) found that amnesic men who were in custodial remand for offenses all had some major psychiatric disturbance, alcoholism being the most common, but also found that some individuals suffered from schizophrenia or depression. Alcohol alters an individual's "state," and Goodwin, Crane, and Guze (1969) have found that individuals remember more if they are in the same drug-induced state at retrieval as they were at encoding. Goodwin et al. (1969) suggest that severe alcohol abusers may not be able to recover lost memories because of anterograde memory failure (e.g., in the extreme, Korsakoff's syndrome), and these

people may have more severe amnesia than others. They may be more likely to have a completely blank memory for the time in question, rather than the usual situation in which the individual has patchy memories. The authors conclude that "fragmentary memory loss may be a state-dependent effect of alcohol, whereas the more discrete en bloc blackout may originate from a physiological disturbance in the brain for which alcohol may be a necessary but not sufficient cause" (p. 1037). Wolf (1980) tested the state-dependent theory of alcohol-induced amnesia for homicides in a sample of Alaskan natives, and found that when intoxication was induced in the amnesic subjects, they did experience violent feelings but could not remember killing anyone. Wolf (1980) concluded that the amnesia was due to alcoholic blackout, not state-dependent memory. He notes, however, that the ethnicity and age of his sample are important because of the differences in genetic and biochemical processes of alcohol metabolism in Alaskan natives. Therefore, his conclusions are not necessarily generalizable to other populations.

The presence of alcohol or other substances may provide an explanation for some of the instances of amnesia for a crime. However, the pattern of the amnesia is likely to be different from that of the red-out. Alcohol- or substance-induced amnesia is more likely to involve a blackout: an inability to recall anything that occurred once a certain level of intoxication has occurred. The red-out is more likely to involve the following: amnesia for the most violent part of the crime with some memory for events both before and after the violent event.

Other Organic Contributions

There are other organic problems that may be implicated in amnesia besides drugs or alcohol. These include epilepsy, head injury, and hypoglycemia, which may result in clouded consciousness or memory loss. The amnesia in such cases would be clearly associated with the seizure, head trauma, etc. and should not be confused with the occurrence of a red-out.

Personality Factors

Lynch and Bradford (1980) studied 22 patients who had all been charged with various offenses and claimed some drug- or alcohol-induced amnesia. Thirty-six percent of these were diagnosed as having personality disorders and 63% of these individuals were found to be deceptive, which is notable because the researchers claim that "personality disordered patients exhibit psychopathic behaviors" (p. 295). It is also known that psychopaths are likely to malinger to escape punishment: "Memory loss, amnesia, blackouts, multiple personality, and temporary insanity crop up constantly in interrogations of psychopaths" (Hare, 1993, p. 43). In fact, psychopaths would be expected not to have amnesia for crimes, and would be more likely to remember the details of the crime, as they appear to have a type of orienting response when involved in conflict. In a study of 60 severely violent men and their wives tested during heated arguments, Jacobson (1993) found that most men were highly aroused, both behaviorally and anatomically, during conflicts. However, 20%

appeared to be extremely angry and aggressive, but showed heart-rate deceleration, that is, they were actually calm even though they were behaving in an angry manner (it is assumed that these 20% are psychopaths). Presumably, psychopaths would not have a problem with retrieval due to state-dependent factors because they have shallow emotions and they have a restricted range of affect (Hare, 1993), and, therefore, would not encode in a very different state from their normal affective state. Also, they are not as likely to be as upset by the crime as a nonpsychopath would be.

Correlates of Amnesia and Major Crimes

O'Connell (1960) did a study of 50 murderers and found that people who were less intelligent were more likely to have amnesia for their crime. He also found that people who had a hysterical personality were also more likely to have amnesia for their crime, which is notable because hysteria is associated with the ability to put unwanted thought out of one's mind. Other findings included the fact that alcohol intoxication, sexual excitement, and gross rage reaction were at least twice as likely to have occurred in amnesic cases as in nonamnesic cases. All of these correlates complement the hypothesis that many instances of amnesia are due to state-dependent memory, as each of the above may in some way hamper the storage of highly emotional information, and also may hamper the retrieval process, that is, make it more difficult to find appropriate or effective retrieval cues. However, a problem with the O'Connell study is that it does not describe how intelligence and hysterical personality were assessed.

Emotions and Intimate Relationships

Attending the scene of a domestic dispute is a dreaded duty for police officers, as domestic disputes are known to be dangerous and highly volatile situations (Dutton, 1995b). Taylor and Kopelman (1984) found that of 203 men who were in custodial remand for offenses, none of those who committed nonviolent offenses claimed amnesia for their crime. If one engages in a crime that does not involve violence, one may not be in an emotional state that differs greatly from the individuals "normal" range of affect, and this may be why none of these individuals have difficulty remembering their crimes. This is unlike what may occur in violent crimes, where the emotional volatility that is present leads to "crimes of passion." In this same study, it was found that the more violent offenses were more often accompanied by amnesia than the less violent offenses. This could be due to a higher state of emotional arousal, which may lead to a discrepancy between this and "normal" states, but it could also be argued that those who are involved in the more violent crimes are faced with more serious charges and, therefore, are more highly motivated to simulate forgetting. Another important finding in the Taylor and Kopelman (1984) study was that men in the amnesic group were more likely than nonamnesiacs to have attacked other people, and these were more likely to be people they know (70% were close friends, relatives, or lovers). Interestingly, these attacks were not premeditated, whereas some of the attacks by the nonamnesiacs

were. Presumably, the attacks that were not premeditated occurred in the "heat of the moment" which is characteristic of spousal assaults.

Emotions and Memory

There has been much research on the effects of emotions on memory. Findings are not always in agreement, but include the following: emotion-arousing-events are more likely to be remembered than neutral events, central details are more likely to be remembered than peripheral details, and emotions can impair or enhance memory (see Yuille & Daylen, 1998). Christianson (1992) has suggested that specific details of an event and emotional details of an event may be retained separately, and that emotional experiences may use different mechanisms (not necessarily conscious) to process and store information. Therefore, it may be possible to remember only the specific details or only the emotional details of the event. This is consistent with the hypothesis that state-dependent memory may be playing a role. The individual may be able to remember that s/he was very angry with the victim, and realize that s/he must have committed the crime, but cannot remember the exact details because of an unusual emotional state at the time the crime was committed. Because the central details were processed separately from the emotional details and one or both of these may have been processed preconsciously, it is difficult, if not impossible, to find cues to retrieve this precariously stored information.

Two Case Examples

We offer two actual cases as examples of the red-out phenomenon. The first was a homicide case in which the third author was involved. An elderly man (in his 70s) strangled his wife in the midst of an argument over a household bill. This couple had been living together for decades and had only one previous instance of domestic violence (many years before this event). During the argument about the bill, the wife threatened to call the police. As she was dialing the police, her husband began to get angry and he grabbed the telephone and started choking her. Up to this point in recalling the event the husband's memory was intact. He remembered all the events leading up to the start of his attack vividly and in detail. However, the next thing that he remembered was "waking up" beside his wife's body on the floor. He "knew" he had killed her but he had no memory for the attack itself (his amnesia continued many months later when he was interviewed, although he continued to acknowledge his guilt—"I must have done it"). After he "came to" his memory was again intact and he could recall the actions he took after the murder. This case has the key elements of a red-out: (a) intact memory for events before and after the violent attack; (b) an unusual level of anger associated with the attack; (c) amnesia for the most violent part of the event; (d) the absence of any alcohol, drugs, or organic basis for the amnesia.

The second case involved both sexual assault and murder. A man who had been insulted by a business associate took her to a park area. He stabbed her (not lethally) and then sexually assaulted her. His memory for this attack was detailed and vivid. He then stabbed her 43 times—he has no memory for this

part of his attack. He left her body only to return some hours later. He was surprised when he returned at the number of stab wounds he saw on her body. He then had sex with the corpse. His memory for the necrophilic act is detailed. Like the previous example, this case has the features of intact memory for the events both before and after the most violent part of the attack, amnesia for the most violent part of the attack, no indication of any other basis for the amnesia. This case also addresses the issue of malingering: if the attacker was feigning amnesia for self-serving reasons it seems more likely that he would not claim memory for the act of necrophilia rather than the stabbing.

Conclusions

It has been hypothesized that the phenomenon of red-outs, amnesia for a violent crime carried out in a state of rage, does exist and cannot be explained solely by malingering, alcohol intoxication/blackouts, or organic dysfunction. Although it can never be absolutely proven what another individual does or does not remember, the fact that some individuals take responsibility for their crime and say they "know" they must have done it even though they cannot remember, lends credibility to their claim. Also lending credibility to the phenomenon of amnesia for violent crimes is the fact that it has been reported in a similar way for decades (at least since the 1930s, Hopwood & Snell, 1933 reported 100 cases), by a variety of offenders, and by the law enforcement and mental health personnel who deal with these individuals. It is hypothesized that state-/mood-dependent memory is a possible explanation for red-outs.

There seems to be agreement among many that amnesia is due to problems with encoding (associations) and retrieval (repression, suppression, inadequate cues). If one's state/mood is very different at encoding from the state at retrieval, it will be more difficult to retrieve the encoded information (especially poorly encoded information, as may be the case in an intensely emotional or violent situation) without the cues that were available in the encoding state (e.g., rage). As rage is an unusual state (at least in intensity), it may not be possible to reinstate the mood/state in the individual to overcome his faulty memory. If this is the case, there are implications regarding therapy, such as: Do we want to spend time and money trying to help the individual recover their memory in therapy, a memory that may not be recoverable, or would it be more prudent to involve the individual in an anger management and possibly substance abuse programs, in an attempt to prevent future violent outbursts? Obviously, if the individual is diagnosed as a psychopath using a reliable instrument such as the Psychopathy Check List Revised (PCL-R; Hare, 1993), treatment may not be the best option, as psychopaths may get worse with treatment and hamper the progress of other individuals in the group (Hare, 1993). However, it is unlikely that a psychopath would be amnesic for their crimes for reasons previously stated. Although there are probably many factors involved, and these will almost certainly differ in many ways between individuals, the possibility of state-dependent memory failures may prove to provide useful information on the elusive phenomenon of red-outs. A number of questions remain unanswered about red-outs. First, it would be useful to discover the basic phenomenology of the red-out: How often does it occur?

Does it only occur in very violent offenses, such as severe beating or killing? Second, what is the usual time course of a red-out, how long is the period of amnesia before, during, and after the crime? Is there any memory during the red-out period, that is, complete versus patchy amnesia? Third, is the fact that an individual can recount the events that occurred during the rage state immediately after (e.g., in a full confession, see Gould & MacDonald, 1987—and later be amnesic for the offense and the confession) further support for the state/mood dependence hypothesis put forward here? Fourth, are individuals who have red-outs more likely to remember peripheral than central details, that is, the reverse of what has been found for normal memory? Empirical studies on these and related questions should improve our understanding of the phenomenon of the red-out.

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