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Memory and clinical features in college students with high and low dissociative tendencies

Sofia Simotas
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MEMORY AND CLINICAL FEATURES IN COLLEGE STUDENTS WITH HIGH AND LOW DISSOCIATIVE TENDENCIES

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B.A., The University of Texas at Austin, 1992
M.A., The University of Montana, 1997

Presented in partial fulfillment of the requirements for the degree of Doctor of Philosophy

THE UNIVERSITY OF MONTANA
Defense, May 1999

Stuart Hall, Ph.D. Date
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High and low dissociators in a university sample were compared on various neuropsychological measures of memory functioning as well as clinical features including prior head injury, general mood, and history of trauma and abuse. Dissociator type was determined by the Dissociative Experiences Scale (DES) score. Participants were 90 students, 45 high and 45 low dissociators (40 males, 50 females). The memory test battery included the Selective Reminding Test (SRT), the Continuous Visual Memory Test (CVMT), an autobiographical memory test, the word-stem completion test, and the Test of Memory Malingering (TOMM). Information regarding general health and life experiences was obtained through use of a Health & Life Events Questionnaire. Gender was included in analysis of all measures.

Results indicated that, although dissociator type (high vs. low) did not significantly affect general memory functioning, gender may affect memory for some autobiographical information. There was no indication that high dissociators were more likely than low dissociators to produce intrusions in verbal material or to exaggerate memory impairment. High dissociators had higher rates of abuse, anxiety, depression, victimization by or witness to crime, problematic drug and alcohol use, and history of self-harm. Women endorsed more symptoms of depression than did men, whereas men had been exposed to more disasters and had more problems with alcohol and drug use than women.

Exploration of a possible Amnesia subscale in the DES suggested that individual amnesia items are well-correlated with both the average Amnesia score and with the overall DES score, but that the Amnesia score itself may not be representative of other aspects of dissociation (e.g., imaginative involvement, derealization). Amnesia scores did not correlate consistently with memory test scores; however, certainty for recall of some autobiographical memories decreased as the Amnesia score increased. Amnesia scores are strongly correlated with the Health and Life Events Questionnaire scales. Possible implications of these findings are applied to the ongoing debate regarding the reality of dissociative processes, particularly in cases of alleged "false memories" for past abuse.
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Memory in Dissociation

Memory and Clinical Features in College Students

with High and Low Dissociative Tendencies

The diagnosis of dissociative disorders has witnessed a sharp increase in recent years (APA, 1994; Horevitz, 1994). The dissociative disorders are marked by disturbances affecting identity, memory, or consciousness due to difficulties with the incorporation of personal information or experiences into one's sense of self. The reason for the recent increase in diagnoses is not quite clear. Some claim that the incidence of these disorders in the public may simply be on the rise. Others say that practitioners have become better able to detect and diagnose these disturbances. Still, others maintain that dissociation, especially of past memories, is not a viable concept, and that the increase in diagnoses is because some clinicians have planted fabricated images into the minds of highly suggestible clients to explain their maladaptive symptoms (for a review, see Horevitz, 1994).

Much of the recent interest in dissociative processes stems from the ongoing controversy surrounding the delayed recall and reporting of early childhood memories of abuse. Fundamentally, the controversy rests on the validity of the process of dissociation or forgetting of these memories, sometimes for years. This "false memory" debate revolves around whether it is, in fact, possible to forget something for years and then suddenly remember it. An entire organization, the False Memory Syndrome Foundation (FMSF), formed in the early 1990s, was founded on the belief of the members that the existence of dissociated or repressed memories is highly questionable. Instead, they argue, recovered
memories of childhood abuse are most likely the result of ideas and visualizations placed in the minds of suggestible clients by unfit psychotherapists (see McCulley, 1994). This is a serious accusation: not only does it question the credibility of therapists and the mental health profession as a whole, but perhaps more seriously, it throws into question the claims of survivors of sexual and other types of abuse, especially abuse that occurred in the earlier years of life (McCulley, 1994). The verification of this accusation would also mean that a countless number of persons prosecuted for the abuse of children have been wrongly convicted.

In light of this recent heated controversy and its implications, the concept of dissociation in general, and of dissociative amnesia in particular, warrants much more careful study. It would seem vital to determine whether dissociative phenomena can actually occur; i.e., whether such processes are physiologically possible. Of further importance, especially in forensic settings, where a number of landmark cases based on delayed remembrance of abuse have been tried, is whether there are quantifiable test differences between those who dissociate and those who do not. This may help in distinguishing true from false cases of delayed recollections of abuse by producing important empirical data that support or contradict the test profile of true dissociators from non-dissociators, malingers, or others with motives for secondary gain.

BACKGROUND AND DIAGNOSTIC CRITERIA

Dissociation is not a new concept; its first appearance in the psychological literature dates back to the late 18th and early 19th centuries. Descriptions of dissociative-
like symptoms have ranged from "artificial somnambulism," developed by followers of Mesmer's animal magnetism theories, to terms such as "conversion reaction" and "hysterical neurosis" (Loewenstein, 1991; Nemiah, 1988). The term "dissociation" was first used by Pierre Janet in 1889 (Braun, 1988), when he called it desagregazione mentale (Spiegel, 1994). His work on dissociation is still considered one of the most complete formulations on the topic and is, in fact, very similar to current theories of dissociative phenomena (Loewenstein, 1991). Others besides Janet also studied and outlined theories of dissociation. Between 1893 and 1895, Breuer and Freud also described dissociative symptoms in their case studies. The well-known cases of Anna O. and Emmy von N. include descriptions of dissociative symptoms such as blackouts, amnesia for certain behaviors, memory gaps in life history, changes in handwriting, left- and right-handedness, language, and spontaneous age regression with no subsequent memory of the regression (Loewenstein, 1991).

The dissociative disorders include dissociative amnesia (formerly psychogenic amnesia), dissociative fugue (formerly psychogenic fugue), depersonalization disorder, and dissociative identity disorder (formerly multiple personality disorder; Kluft, 1988). The dissociative disorders can be divided into two categories based on their primary features of disturbance. Those whose primary disturbance is in memory are dissociative amnesia and dissociative fugue, although in the latter case identity as well as memory is also affected. Those whose primary hallmark is a disturbance of identity are depersonalization and dissociative identity disorder.
Dissociative amnesia refers to a temporary loss of personal memory or information due to psychological factors (APA, 1994); the memory loss is too extreme to be due to ordinary forgetfulness and usually involves memory of traumatic or highly stressful situations. Dissociative fugue is a period of purposeless wandering or travel, lasting from a few hours or days to several months, during which a new identity may be temporarily adopted. Often, remission is spontaneous, with no memory for events during fugue (APA, 1994; Gallagher, 1987). In depersonalization disorder, there is a feeling of unreality about oneself, either one's body or mind, such that one may feel s/he is watching oneself from a distance, or that one's limbs or other body parts have changed size (APA, 1994; Gallagher, 1987). Dissociative identity disorder, perhaps the best known of the dissociative disorders, is characterized by the assumption of two or more different personalities. The personalities may actually display differences in galvanic skin response, heart rate, brain waves, speech, body postures, and even eye color. The individual personalities may or may not deny awareness of the others (APA, 1994; Gallagher, 1987).

In each of these disorders, the disturbance is thought to be more in the organization and integration of the relevant material, instead of with the memories or the information itself. That is, the memories themselves are not usually altered or misrepresented; they are merely separated from each other and from other contents associated with an individual's sense of self. In the case of dissociative identity disorder, for instance, it has been said that these persons 'suffer not from having more than one personality, but rather from having less than one personality' (Spiegel, 1994, p. 633),
because relevant portions of identity are present but not wholly connected or integrated. Although there appears to be considerable overlap between the suspected causes and symptoms of the different types of dissociative disorders, research of dissociative amnesia in particular has increasingly taken priority in recent years, presumably because its legal, as well as theoretical, ramifications rest on the question of memory.

The current DSM-IV recognizes five types of dissociative amnesia (American Psychiatric Association; APA, 1994). In the first type, localized amnesia, all events for a specific but limited period of time are lost, such as the first few hours or days after a traumatic event. In selective amnesia, portions of some event or time period may be recalled, but not the entire episode itself. In generalized amnesia, almost everything before a certain event or time period is lost; in some cases, this may include an individual's entire life. In continuous amnesia, a person cannot seem to remember anything after a certain time period or event; each event is forgotten as it occurs. Finally, in systematized amnesia, information about specific and related events is lost; this may include information about one particular person, or perhaps for everything relating to a particular grade in school. Basically, the DSM-IV criteria for dissociative amnesia require that an individual cannot "recall important personal information, usually of a traumatic or stressful nature, that is too extensive to be explained by ordinary forgetfulness" (APA, 1994, p. 481). Dissociative amnesia can occur at any age, and may last from a few minutes to a number of years. Typically, only one episode is reported, but occurrences of two or more episodes are common.
PRESENTATION OF SYMPTOMS

In clinical settings, dissociative symptoms in a client may first be encountered during the course of psychotherapy. For example, a client may mention that s/he cannot seem to remember anything before a certain age or time; usually, the age of reported amnesia is one for which most people have at least some memory (e.g., after the age of five), and thus cannot be accounted for by the more usual lack of recall for events in the early years of life (APA, 1994). Other times, persons may find new items in their homes and have no recollection of purchasing or otherwise obtaining the items. Some individuals may also report that they have encountered persons that they do not recognize, but who claim that they know them, and may even call them by a different name (Spiegel, 1994).

Sometimes, an individual's primary complaint may not be of memory loss or gaps, but rather may take the form of somatic expression. One review by Coons and Milstein (1992) of 25 cases of psychogenic amnesia found the most common of these symptoms to be: depression, headaches, sexual dysfunction, general somatization, conversion, alcohol or drug abuse, and even visual and auditory hallucinations. There have also been reported cases of sleep disorders, such as somnambulism, stemming from dissociative disorders (Schenck, Milner, Hurwitz, Bundlie, & Mahowald, 1989). Self-mutilation has also been documented as a symptom of dissociative disturbance (Coons & Milstein, 1990).

Individuals who initially present with any of these types of symptoms may later, perhaps as the result of psychotherapeutic investigation, identify gaps in their life histories. In spite of these symptoms, most individuals with dissociative amnesia do not display the
cognitive confusion and disarray, or the significant impairment in daily functioning, that are seen in individuals with schizophrenia (Nemiah, 1989) or neurological disease.

In forensic settings, dissociative symptoms may be encountered in connection with legal action taken against an alleged perpetrator of abuse by a complainant. Usually, a person claims to have been victimized, sometimes many years ago, but has purportedly blocked out any memory for the event or events. In most of these cases, legal action is taken years after the alleged event, when the memory for an incident resurfaces. For this reason, many state legislatures (about half of the United States) have adopted the delayed discovery doctrine in cases of childhood sexual abuse. This rule specifies that any claims against perpetrators must be made within three years of the victim's discovery (in this case, delayed remembrance) of the abuse, rather than for a limited time after the abuse itself (Schneider, 1994).

PREVALENCE

Rates of occurrence for the dissociative disorders in the general population range from rare to common. Dissociative fugue appears to be uncommon, with an estimated prevalence of 0.2% of the general population. Higher incidence rates have been reported during times of war or other mass public stressors (APA, 1994). In the case of depersonalization, on the other hand, it has been estimated that nearly half of all adults may experience at least one short-lived episode of depersonalization at some point during their lives (APA, 1994). Moreover, approximately one-third of individuals subjected to life-threatening situations develop brief feelings of depersonalization; the rate is nearly
40% among in-patient populations (APA, 1994). Dissociative amnesia is also rather common compared to other psychiatric diagnoses. The prevalence of dissociative amnesia has been reported at about 7% of the general population (Loewenstein, 1994). Dissociative identity disorder, previously thought to be rare, has also witnessed an increase in the number of reported and diagnosed cases (APA, 1994). As previously discussed, there is some debate as to whether these disorders are becoming more common phenomena, whether clinicians have become better able to assess and diagnose them, or whether reported cases are being increasingly feigned for secondary gain (see Horevitz, 1994).

Overall, dissociative experiences appear to be quite common in the general population (Ray, 1996), and have even been found in college age populations. Studies using self-administered scales have reported that dissociative experiences occur frequently in college students, although at various levels of severity, and often at subclinical levels (Murphy, 1994; Ray & Faith, 1995; Ross & Joshi, 1992; Ross, Joshi, & Currie, 1990; Ross, Joshi, & Currie, 1991). One study deduced from self-report data that the prevalence of dissociative disorders may be as high as 11% among college students (Ross, Ryan, Voigt, & Eide, 1991).

One proposed reason for this relatively common occurrence of dissociative experiences is the theory that dissociation occurs on a continuum, ranging from relatively common experiences such as daydreaming during class to more severe dissociation such as that seen in dissociative identity disorder (Templer, Spencer, & Hartlage, 1993). Ross
(1989) has offered an explanation that categorizes dissociative experiences into four quadrants: normal psychosocial dissociation (e.g., daydreaming), normal biological dissociation (e.g., forgetting a mid-night trip to the bathroom), abnormal psychosocial dissociation (e.g., amnesia for incest), and abnormal biological dissociation (e.g., amnesia due to concussion).

CULTURAL FACTORS

Dissociative phenomena have been documented in the United States, Europe, and around the world, including the Netherlands (Ensink & van Otterloo, 1989), Belgium (Vanderlinden, Van Dyck, Vandereycken, & Vertommen, 1991), Australia (Febbo, Hardy, & Finlay-Jones, 1993-94), Turkey (Tutkun, Yargic, & Sar, 1995; Yargic, Tutkun, & Sar, 1995), Puerto Rico (Martinez-Taboas, 1995), and China (Wong, 1990). Some cultures witness "running" syndromes, such as amok in Western Pacific cultures, and pibloktoq in arctic and subarctic Eskimo cultures (APA, 1994). These syndromes typically include bursts of physical activity, trances, wandering or fleeing from the home environment, violence, and subsequent amnesia for these activities (APA, 1994). However, although these features qualify as symptoms of the dissociative disorders, cultural context of presentation must be taken into account in diagnosing these disorders.

AGE FACTORS

Some data suggest that dissociative experiences are somewhat related to age, with dissociation more common in young adolescents than in young adults, and decreasing with age, declining especially after the third and fourth decades of life (Coons & Milstein, 1992;
Ross et al., 1990; Ross et al., 1991; Ross, Ryan, Anderson, Ross, & Hardy, 1989). At least one study, however, has found a weaker association between age and dissociation (van IJzendoorn & Schuengel, 1996). The relationship between age and dissociation is especially relevant in diagnosing children and adolescents since, according to Putnam (1994), they "exhibit an array of dissociative behaviors that often would be considered pathological in adults" (p. 179; see also APA, 1994). These behaviors include imaginary friends and the use of make-believe.

It is not clear why dissociative processes would decrease with increasing age, but this finding may have important implications for the false memory debate. Theoretically, for instance, were the relationship between aging and dissociation verified, this could mean that one reason forgotten traumatic childhood experiences are recovered in adulthood is because the process of dissociation somehow disengages or reverses itself later in life. Perhaps this occurs when the individual is more emotionally stable, as well as cognitively developed, and thereby better able to handle or process the content and implications of such recall. Alternatively, recall may occur later in life when an individual experiences circumstances that are reminiscent of the time of the stress or trauma (Schacter, 1996). However, these are speculative explanations for the association between age and dissociation, which remains to be verified.

GENDER FACTORS

Existing data comparing dissociative experiences in males and females are less consistent than data on age factors. The majority of studies have reported no differences
between males and females on self-report measures of dissociation in non-clinical or general populations, including adolescents, college students, and other adults (Murphy, 1994; Ross et al., 1990; Ross et al., 1991; Ross et al., 1989; Sanders, McRoberts, & Tollefson, 1989). This outcome was also supported by a recent meta-analytic examination of 19 studies (van IJzendoorn & Schuengel, 1996). Confirmation of this finding was also found in a recent pilot study of self-reported dissociative experiences in a college population (Simotas & Hall, 1997, unpublished data). Approximately 24% of both the men and the women in this sample reported high levels of dissociation, based on cutoff scores used in other studies. However, a larger percentage of the men (44%) than the women (33%) in this study reported scores above those considered to be at clinical levels, although this difference was not statistically significant. These percentages also support the relative commonality of these experiences in non-clinical populations.

Sanders and Green (1994) conducted a factor analysis of the most widely used dissociation scale, the Dissociative Experiences Scale (Carlson & Putnam, 1986; DES II, Carlson & Putnam, 1993) and found that, among college students, there were small but statistically reliable differences between males and females on two factors, or subscales: the Imaginative Involvement factor and the Amnesia factor. Briefly, the differences in the Imaginative Involvement factor suggested that females may tend to have a broader range of content in their fantasy life compared to males (e.g., they are more likely to have an imaginary companion). Gender differences in the Amnesia factor suggested that females are more likely to realize that time has elapsed by suddenly finding themselves in a
different situation, whereas males are more likely to realize that they do not remember a
period of elapsed time by use of other cognitive processes (e.g., deducing amnesia based
on repeated incidents of being called by another name). Consequently, Sanders and Green
advise that "combining the data of men and women, as has been done in previous factor
analytic studies of the DES, may be inappropriate" (Sanders & Green, 1994, p. 23). In
summary, it seems there is some disagreement regarding gender differences in
dissociation.

ETIOLOGY

Psychological Factors

Dissociative symptoms are thought to develop in one of two general patterns
(Kluft, 1988; Loewenstein, 1991). The first, and most common, is a reaction to acute
trauma such as war, natural disaster, or assault; it has also been seen as a result of satanic
ritual abuse, captivity, and cult victimization (Fraser, 1990; McCulley, 1994; West &
Martin, 1994). In the second case, the amnesia develops as a result of a gradual and
prolonged build-up of internal psychological conflict, although the onset of the amnesia
itself may be sudden (Kluft, 1988; Loewenstein, 1991). This category of amnesia may
more likely occur in individuals who have a propensity to develop dissociative symptoms;
this propensity may itself be a result of prior exposure to trauma (Loewenstein, 1991).
The connection between dissociation and trauma is discussed in the next section.

Dissociative episodes are commonly triggered by one of three circumstances. In
the first, the individual confronts or is about to confront an inescapable or unconquerable
situation that involves real or perceived threat of serious injury or death (Kluft, 1988). In
the second, a person may confront a real or feared loss of an important item or object; this
can include a loved one, property, job or status, or financial standing. In the third type of
circumstance, the individual experiences an intense and often frightening urge, such as the
thought of killing oneself or another, or perhaps a sexual impulse, that is unacceptable or
incongruous with the idea of the self (Kluft, 1988). These explanations are consistent with
a conceptualization of dissociation much like Freud's description of psychological defense
mechanisms, by use of which a person is able to avoid facing highly uncomfortable or
unacceptable information about oneself (Braun, 1988; Spiegel, 1994). Dissociation, then,
appears to result in response to situations that are experienced by an individual as highly
stressful or traumatic. In fact, much recent work on dissociation, in both clinical and
research settings, has focused on the link between trauma and dissociation.

Trauma and Dissociation. Trauma has been defined as "the experience of being
made into an object or thing, the victim of someone else's rage or of nature's indifference.
It is the ultimate experience of helplessness and loss of control over one's own body"
(Spiegel, 1994, p. 635). The majority of cases of dissociative amnesia and other
dissociative disorders can be traced back to some experience or set of experiences of a
traumatic nature. Roszell, McFall, and Malas (1991), for example, found that 33% of 116
males Vietnam combat veterans with posttraumatic stress disorder (PTSD) met criteria for
psychogenic (dissociative) amnesia. Coons and Milstein (1992) conducted a review of 25
cases of psychogenic amnesia and found that 52% of the individuals reported sexual
abuse; in fact, only 28% of individuals in all of the reviewed studies reported no incidence of such trauma in childhood. In a review, Loewenstein (1994) listed a number of studies whose findings support the relationship between trauma and dissociation. For example, Coons, Bowman, Pellow, & Schneider found that 89% of a group of individuals with dissociative amnesia (based on DSM criteria) or dissociative disorder not otherwise specified had experienced childhood sexual, physical, or verbal abuse or neglect as children (see Loewenstein, 1994). Williams (as cited in Loewenstein, 1994) reported that 38% of 100 women who had experienced documented childhood sexual abuse had amnesia for these events upon inquiry as adults, even after a detailed interview. Sanders and Giolas (1991) studied disturbed (institutionalized) adolescent boys and girls and found a relationship between degree of dissociation and degree of significant stress in childhood. Stressors included self-reported physical abuse or punishment, sexual abuse, psychological abuse or neglect, and "negative home atmosphere." Interestingly, self-report stressors better correlated with dissociative symptoms than did ratings of abuse found in available hospital records (Sanders & Giolas, 1991). Another study has reported that even more minor stressors such as travel and resulting fatigue can trigger dissociative episodes in some individuals, probably those more vulnerable to dissociation (Barnes, 1980).

Although it has not been empirically established that trauma and abuse cause dissociation, there is general agreement that dissociative disorders are much more likely to develop in individuals exposed to severe and prolonged exposure to traumatic and other highly stressful experiences (Classen, Koopman, & Spiegel, 1993; Zelikovsky & Lynn,
1994). Indeed, much evidence to date suggests a "reliable connection between abuse and
dissociative phenomenology" (Spiegel & Cardena, 1991, p. 368). Other sources also
confirm this association between severe stress or trauma and dissociation (Loewenstein,
also Templer et al., 1993; van der Kolk & van der Hart, 1995). More recently, it has been
suggested that dissociation in response to stress or trauma may not only serve as a
psychological defense, but may also have adaptive value from an evolutionary perspective.

**Evolutionary Explanations.** Some theorists have claimed that dissociative
processes, besides being an individual's psychological defense mechanism, also have
evolutionary adaptive value. Ludwig argues that dissociation has survival value for a
species, comparing dissociation to the survival strategy of the "sham death reflex"
displayed by some animals (Ludwig, 1983). Others argue that the response of dissociation
allows an organism to conserve physical and emotional resources when faced with an
uncontrollable threatening situation (Ironside, 1980). Hamilton (1989) offers the view that
animals may respond to threat or danger either actively (fight-or-flight response) or
passively (freeze-or-hide response) depending on the perception of helplessness, danger,
support systems, and nearness of safety. The more passive freeze-or-hide response, which
she introduces as the General Inhibition Syndrome (GIS), allows for conservation and
recovery of resources (Hamilton, 1989). In this way, dissociation may be conceptualized
as a freeze-or-hide response that allows for a conservation of emotional and physical
resources to cope with the stress. More specifically, Freyd (1994) suggests that
dissociative amnesia for childhood abuse is an adaptive response not in that it reduces the impact of the trauma, but rather because it allows for the fundamental survival of the child. Amnesia enables the child to maintain an emotional and physical attachment to a caretaker who, although abusive, may nonetheless provide needed food and shelter for the dependent youngster. In fact, there is some evidence that amnesia may be more likely to occur in cases where there is a close relationship between victim and abuser (see Freyd, 1994). The evolutionary perspective does not explain how dissociation may also become dysfunctional, but does offer one explanation of the adaptive purpose of dissociative processes.

It is important to note that, although many cases of dissociative amnesia and other types of dissociative experiences can be linked either directly or indirectly to trauma, and perhaps the need to survive adverse conditions as a child, not everyone who experiences a traumatic event or a troublesome upbringing displays dissociative symptoms (Tillman, Nash, & Lerner, 1994). Some individuals appear to be more susceptible than others to dissociation. Mounting research evidence suggests that this tendency may be at least partially due to physiological characteristics.

Physiological Factors

Evidence suggests that the intensity of stress, accompanied by previous exposure to stress, may contribute significantly to an individual's reaction to trauma. In studies with animals other than humans, reaction to stress seems to depend on whether or not the stressor is escapable or not, and also on whether there has been previous exposure to
stress (Foa, Zinbarg, & Rothbaum, 1992). It appears that repeated or prolonged exposure to trauma or other intense stress can result in a sensitization to subsequent stress by producing a lowered tolerance threshold. This process, believed to take place in the limbic system, may then make an individual even more susceptible to future stress. This model of stress has also been related to theories of learned helplessness with animals in inescapable shock situations, in which these animals will stop responding to shock even when allowed or trained to be able to escape it (Foa, Davidson, & Rothbaum, 1996). It seems that a history of stressors, especially ones perceived as uncontrollable, may make an individual more susceptible to a dissociative reaction to intense or prolonged stress or trauma.

There also appear to be biological correlates of repeated exposure to stress or trauma. For instance, in children and adolescents who have been subjected to trauma such as physical or sexual abuse, baseline heart rates and blood pressures are higher than in control individuals; there are also some differences in certain neurochemical receptors like those seen in adults with PTSD (Perry, 1990). Women who have been sexually abused as children also show significant differences in some hormonal responses (Corrigan et al., as cited in Brown, 1994). Moreover, it has been found that extreme stress can trigger an increased release of glucocorticoids. While these help the body to respond to stressful situations more efficiently by conserving some resources and mobilizing others, high levels may lead to neuronal damage. The hippocampal regions of the brain seem to be most vulnerable to damage from glucocorticoids (Schacter, 1996).
This collective evidence of physiological, chemical, and hormonal differences in individuals exposed to severe stress or trauma has been called a "biological fingerprint of trauma," (Brown, 1994, p. 112) which has been strongly linked to dissociation. However, care must be taken in determining causality in these findings: although it is possible that prolonged and repeated exposure to stress may alter chemical levels, it is also possible that the pre-existence of these biological characteristics contributes to the development of dissociation as a response to stress. In addition, cases involving dissociative symptoms may often be complicated by the existence of neurological factors, such as a history of head injury or seizures, further emphasizing the need to interpret such data carefully in terms of causality (Schacter, 1996; see also Kopelman, 1987).

**Neuroimaging.** Despite some physiological and biochemical support for the concept of dissociation, neuroimaging evidence provided from some cases has shown no changes in electroencephalograms (EEG) or computerized axial tomography (CAT) scans during the dissociative state. However, it must be noted that information from neuroimaging sources, which detail the neurological pathways of dissociation in memory processes, is extremely limited. The presently available evidence is inconclusive at best (Nemiah, 1989), and data are lacking from other neuroimaging devices, such as magnetic resonance imaging (MRI) and positron emission tomography (PET). Thus, although the limited neuroimaging studies of dissociation suggest there are no recordable changes during dissociative states, much more neuroimaging evidence is necessary in order to prove or disprove this tentative conclusion.
Memory Factors

The central role of memory in understanding dissociative processes has long been acknowledged (Crabtree, 1992). Memory is thought to play a primary role largely because it provides the integral connecting mechanism in personal identity and consciousness, elements disrupted in dissociation. To date, research on memory has provided evidence both for and against the reality of dissociation.

Memory Factors Supporting Dissociation. In most cases, it has been found that dissociative amnesia is reversible, although there has been some disagreement about this fact or its necessity in treatment (see Bonanno, 1995). Generally, though, when dissociative amnesia reverts, the individual is able to remember the memories that were lost, and the recovery is full, not partial; the person can usually remember the whole incident or experience. This fact suggests that these disturbances in memory are problems of retrieval, not of encoding: the memories themselves are intact, but inaccessible (Kihlstrom, 1994).

However, findings from more recent studies of the effects of stress on memory formation have suggested that this retrieval hypothesis may not be entirely accurate. There is some evidence that trauma interrupts or distorts the very formation of the memories themselves (Kluft, 1996; see also Bonanno, 1995). For instance, neuropeptides and neurotransmitters released in the brain during extreme stress, such as trauma, may actually alter memory formation by affecting the hippocampus, amygdala, and other brain regions involved in memory function (Bremner, Krystal, Southwick, & Charney, 1995; Bremner,
Memory in Dissociation

Krystal, Charney, & Southwick, 1996; Siegel, 1995; see also Friedman, Charney, & Deutch, 1995). In some cases, this may lead to exceptionally clear and persistent—even intrusive—memories, such as flashbacks experienced by those with PTSD; it is believed that these types of memories are characterized by a resistance to normal extinction or habituation processes, which suggests unusual encoding.

In other cases, such as in dissociation, memories are abnormally coded or fragmented from the context of individual identity or experience. This is thought to occur because of inadequate "laying down" of memory traces due to interference by the neuropeptides and neurotransmitters released in the brain during intense stress (Bremner et al., 1995; 1996). It has been suggested that dissociation of memories may result from failure of the hippocampal localizing system to fix memories in the appropriate context of place and time; that is, to create a narrative for the memories, thus creating "context-free fearful associations." These result in amnesia for certain events, but not necessarily for feelings related to them (see van der Kolk & van der Hart, 1995, p. 172). In essence, an affective memory may be produced without a context or narrative. Furthermore, Kopelman (1987) argues that psychologically-induced amnesia may sometimes be confused with organic amnesia because it may occur from "impaired acquisition of information at initial input" (p. 442). These formulations support the idea that dysfunction in dissociation occurs in the encoding, not retrieval, of memories.

Studies in general traumatic stress such as PTSD, in which dissociative states may be a central element (Krystal, Bennett, Bremner, Southwick, & Charney, 1996), have
found evidence of impaired memory performance compared with controls who have not experienced traumatic stress (for a review, see Bremner et al., 1996). Studies with concentration camp survivors, war veterans, adult survivors of childhood abuse, and others exposed to severe trauma have found significantly poorer explicit memory on such tests as the Wechsler Memory Scale, the Auditory Verbal Learning Test, the Selective Reminding Test, and the California Verbal Learning Test (Bremner et al., 1993, 1995, 1996). Deficits have also been found in individuals with PTSD on the Selective Reminding Test and on the Stroop Test. On the other hand, some studies have found that these individuals may actually have better explicit as well as implicit memory (see definitions below) for trauma-related words versus more neutral words when compared to controls (see Bremner et al., 1995, 1996). This effect is consistent with the abnormally intrusive nature of memories in PTSD (see Bremner et al., 1995).

Based on these research findings, it is likely that intense stress may affect memory formation in a number of ways: by interrupting the initial encoding of some memories, making some exempt from extinction (e.g., flashbacks), and interfering with the retrieval of others (van der Kolk & Fisler, 1996). Therefore, dissociative processes may occur in some cases because of inadequate initial encoding of memories while, in other cases, dissociation reflects insufficient retrieval of adequately encoded memories. In addition to these issues of memory encoding and retrieval, it has also been questioned whether the types of symptoms seen in dissociative amnesia, whose primary disturbances are in memory functioning, are neurologically possible based on what is known about memory.
functioning. That is, is it feasible for an individual to block out certain memories while retaining others?

Some researchers have suggested that dissociation of memories can be at least partially explained by the distinction between explicit and implicit memory (Kihlstrom, 1994). Explicit memory generally refers to simple recall and recognition, and involves the conscious effort of the individual in recalling the requested information (Schacter, 1987). Implicit memory, on the other hand, is indirect memory in that it does not require that the individual be aware that anything is being recalled, yet facilitated performance is nonetheless demonstrated by the individual on a subsequent task after exposure to an initial priming task (Schacter, 1987). In implicit memory, the individual being tested may not even be aware that the given task is intended to tap memory. An example of an implicit memory task is provided shortly.

Studies of people with normal memory have demonstrated that implicit memory can operate independently of explicit memory (Graf, Mandler, & Haden, 1982). The implicit memory phenomenon provides strong evidence that one can be influenced by information or experiences without being aware of this influence. For example, in one of the most widely-employed implicit memory tasks, the word-stem completion test, a person may be asked to rate a list of words on some trait such as likability. Later, the person is asked to complete a list of incomplete words, for which the first few letters are provided, with "the first word that comes to mind." Most individuals complete the word stems with more words from the previous task than from a control list, even though they were not
asked to remember those words, and may not consciously remember that they were on the first list. However, their performance on the subsequent task provides evidence of the influence of the first (Schacter, 1987).

Effects similar to those seen on implicit memory tasks have likewise been demonstrated in persons with dissociative amnesia and fugue (Kihlstrom, 1994). For instance, a person who was assaulted in a particular location but who cannot remember this incident may nonetheless show a psychological or physiological reaction to the location, but without realizing the reason for the reaction. In one documented case, "Jane Doe" had lost her memory for her own identity, as well as that of her family and residence. However, when asked to "randomly" choose a telephone number to dial, she consistently chose her mother's number (Lyon, 1985).

As one explanation of such phenomena, it has been suggested that the amygdala play a central role in implicit memory functioning, whereas the hippocampus is involved in explicit memory (Schacter, 1996). Since the amygdala are believed to be critically involved in fear conditioning, as well as in memory for trauma (Friedman et al., 1995), an individual may experience fear, aversion, or physiological reaction in response to a situation regardless of explicit recall or awareness for why this may be. The function of explicit memory seems to lie within the hippocampus, which appears to be more adversely influenced by high levels of stress or trauma (Schacter, 1996). This may also explain why individuals with dissociative amnesia and other dissociative disorders are able to perform daily, procedural functions (e.g., performing work duties, holding conversations) which,
although certainly require some level of explicit memory, are more automatic than tasks requiring direct recall of information.

Evidence from explicit and implicit memory functions alone has been taken as sufficient to validate the physiological possibility of dissociation in memory processes. Additional support for the neurological reality of memory dissociation comes from the fact that dissociative amnesia can be induced by medications, drugs of abuse, and neurological disease (Good, 1993). Dissociative amnesia has also been chemically produced and reversed in mice by pharmacologically altering the memory trace for a passive avoidance conditioned reflex (Il'yuchenok, Dubrovina, & Parkhomenko, 1990).

Memory Factors Refuting Dissociation. On the other hand, a number of factors raise questions regarding the reality of dissociation. Some studies have shown that human memory is alterable and subject to distortions over time (see McCulley, 1994). Loftus and colleagues have conducted memory experiments in which people have claimed seeing, and even describe in detail, items that were never present at a crime or accident scene. Her studies have also demonstrated that people are influenced by the choice of words used in questions that are asked of eyewitnesses (Belli & Loftus, 1994; Loftus, 1993). Loftus and her associates, as well as other researchers, have demonstrated that memory is not as reliable as may have once been believed (Belli & Loftus, 1994; Loftus, 1993). Furthermore, these researchers have applied their findings to the controversy involving the recovery of memories claimed to be previously hindered by dissociative amnesia.
The primary argument from the skeptical members in the false memory debate is based on the risk associated with the visualization of memories. Part of the therapeutic strategy for recovery of lost memories may involve helping clients visualize the abusive scenes in order to facilitate the recovery of these memories, including hypnotic techniques, to aid in their integration into self-awareness and identity. Loftus and others maintain that the mere suggestion by a therapist of abuse causes a visualization of this trauma. Over time, this visualization may become separated from the fact that it was only a suggestion. The action of picturing a scene—even if imaginary—may then implant that image in the mind in such a way as to create a recallable incident: thus, the birth of a "false memory" (Belli & Loftus, 1994). This may be one reason why many people seem to be able to "remember" visiting or living in places, especially as children, where they have never been, most likely because of the detailed and repeated descriptions of the locations by friends or relatives. Furthermore, it is not clear that memory information produced through hypnosis or other clinical techniques is accurate, even if the individual who underwent hypnosis strongly believes it to be actual (Farthing, 1992; see also Loewenstein, 1996).

Although memory does seem to have potential for distortion, some criticisms have been raised against the use of this argument for the formation of "false memories." McCulley (1994), for instance, has argued that the work of Loftus and other False Memory Syndrome Foundation supporters deals only with normal, explicit memory, and not with trauma. Child abuse, he says, is in no way "normal," and neither are the memories for such incidents. The fact that, in some cases, memory for traumatic events may remain
exceptionally clear in itself suggests that there is something unusual about memory functioning in trauma (McCulley, 1994). Furthermore, Christianson (1992) argues that, although memory is malleable, the distortion of detail over time appears to be much less extensive for memories of real-life episodes than that seen in the pattern of the normal forgetting curve that occurs for other, more mundane, material like that used in memory research studies. However, Christianson (1992) also cautions that memory for stressful incidents is complicated, and likely depends on an interplay of factors, including the type of event, the type of detail, the time of test for recall of the event, and the type of retrieval information requested. Still, Horevitz (1994) concludes that "there is actually little support for the level of doubt expressed by some critics" regarding the validity of memories of childhood abuse reported by clients in psychotherapy (p. 441). The many arguments for and against the dissociation of memories clearly exemplify the complexity of this issue.

**Maladaptive Consequences of Dissociation**

As arguments concerning the reality of dissociation continue to abound, other researchers have directed attention to the long-term disadvantages of dissociation. While dissociation may be useful as a temporary coping response to stress or trauma, prolonged used of this strategy may lead to maladjustment (Sandberg, Lynn, & Green, 1994). In situations of abuse or assault, the primary risk seems to be subsequent revictimization (Sandberg et al., 1994). In the past, psychodynamic theory has largely dominated possible explanations in this area, proposing the hypothesis that an abused or victimized individual may unconsciously seek out similar situations in order to gain mastery over the event or
the abuser; that is, to "get it right" or correct the experience for oneself. For example, an assault victim who froze during the attack and did not attempt to fight the aggressor may feel that s/he would fight back next time. Unfortunately, when a similar situation subsequently arises, the corrective action does not always take place, leading many victims to repetitively seek some kind of corrective experience, a pattern sometimes referred to as "repetition compulsion."

More recently, Chu (1992) has proposed another possible explanation that involves more physiological processes. In his research with women who had been revictimized, Chu (1992) found that those who experience dissociative symptoms in response to childhood sexual abuse may "frequently lack the anticipatory anxiety that would normally signal the presence of danger" in other situations (p. 237). This factor then places these individuals at risk of revictimization because they are unable to avoid or escape dangerous situations.

One problem with this hypothesis is that it is appears to be at odds with data from implicit memory studies of dissociation, which indicate that there does seem to be awareness at some level of aversive or dangerous situations or locations, even though an individual may not be conscious of this. However, it is possible that this information, while intact at some implicit level as evident by such factors as physiological or even psychological arousal, is too unavailable or disorganized to be correctly interpreted and utilized by the individual in order to prevent or avoid further danger. Admittedly, this is only one possible explanation for the apparent discrepancy between implicit memory data.
and Chu's (1992) suggestion of the lack of anticipatory anxiety in revictimization of abuse and trauma survivors. Additional work is certainly necessary to more satisfactorily reconcile the inconsistency between these two positions.

What remain unchanged are data from research documenting the frequent revictimization associated with the dissociative disorders. A study by Kluft, for example, found that of the 18 victims of incest with dissociative disorders who were studied, 78% of these had been raped as adults and even sexually exploited by one or more therapists. Kluft reported that these individuals could not seem to effectively discriminate the situations which would place them at high risk for revictimization, and so could not act accordingly (Kluft, 1990). In addition, Ross et al. (1990) found a high percentage of dissociative symptoms among prostitutes and exotic dancers, and a large percentage also reported prior physical or sexual abuse. Thus, although dissociative processes may have in some ways protected these women during their past traumas (or helped them cope afterwards), the same women nevertheless became involved in situations with high potential for subsequent victimization. Possibly, then, the failure to integrate information from previous traumatic or stressful situations into conscious awareness may lead to the inaccessibility of that information for protection from subsequent victimization. However, this is only one explanation for these findings in this highly specific population. Undoubtedly, this area needs further research before more firm conclusions can be drawn.
ASSESSMENT TECHNIQUES

Psychological Assessment

Beyond more typically used assessment tools such as DSM-IV criteria and the Structured Clinical Interview for DSM (SCID), a variety of techniques and measures have been devised and used to assess dissociative symptoms. It has generally been found that individuals who experience dissociative symptoms are extremely hypnotizable (Nemiah, 1989), and thus more likely to successfully undergo this procedure. These individuals are also likely to endorse a variety of symptoms, ranging from everyday occurrences to those that are rare and can seem somewhat bizarre (see examples below). Persons who experience frequent such episodes can be expected to score high on self-report measures of dissociation.

Dissociative Experiences Scale (DES) and DES-II. The DES, developed in 1986 by Carlson and Putnam and revised in 1993 (DES-II), is by far the most widely used of the self-report dissociative scales, although others have been developed (e.g., Riley, 1988; Phillips, 1994; & Sanders, 1986). The DES-II is a 28-item scale whose items span the spectrum of dissociative experiences, ranging from not remembering all or part of a car trip, for example, to not recognizing one's own image in the mirror. The directions to the DES-II stress that answers are to reflect the frequency of these experiences when the test-taker is not under the influence of alcohol or other drugs (Carlson & Putnam, 1993).

Further empirical work with the DES has suggested that it may contain several component factors, or subscales. Ray and Faith (1995) found four factors in the DES
using a college population. These were, in order of variance significance:

1) Absorption/Derealization; 2) Depersonalization; 3) Segment Amnesia (amnesia for an aspect of one's life, like forgetting people or purchased items); and 4) In Situ Amnesia (suddenly awakening or "coming to" in a current situation). An earlier study by Ray and other colleagues found seven factors using a computer scored version of the DES, also in college students (Ray, June, Turaj, & Lundy, 1992). These factors, in order of variance, were: 1) Fantasy/Absorption; 2) Segment Amnesia; 3) Depersonalization; 4) In Situ Amnesia; 5) Different Selves; 6) Denial; and 7) Critical Events (Ray et al., 1992). Ross et al. (1991), using the DES in a general population, found three factors: 1) Absorption-Imaginative Involvement; 2) Activities of Dissociated States; and 3) Depersonalization-Derealization. Sanders and Green (1994) also found three factors, but slightly different ones, using the DES in college students. These factors were: 1) Imaginative Involvement; 2) Depersonalization/Derealization; and 3) Amnesia. Other studies have found similar factors using the DES in both clinical and non-clinical populations (for a review, see Carlson & Putnam, 1993).

However, the authors of the DES themselves warn that caution should be taken by researchers and clinicians in using these factors as subscales (Carlson & Putnam, 1993). Apparently, the DES items may be skewed and thereby confounded by the frequency or, conversely, the rarity, of dissociative experiences. It seems that what appear to be subscales may actually be sets of items tapping the frequency of self-reported occurrence of dissociative experiences. Thus, Carlson and Putnam conclude, "It appears that the scale
will reliably measure only the general dissociation factor" (1993, p. 21). Still, it seems possible that there is some usefulness in these subscales, even if based only on the frequency of endorsement of symptoms, if applied and interpreted with caution. Further work is needed to clarify the validity and utility of the DES subscales or factors.

In summary, the DES appears to be highly effective in screening for symptoms of the dissociative disorders in a variety of populations. However, it is typically necessary to further assess symptoms using other diagnostic criteria or clinical interviewing to confirm a suspected dissociative diagnosis (Carlson & Putnam, 1993; Draijer & Boon, 1993; Steinberg, Rounsaville, & Cicchetti, 1991).

Mental Status Examination (MSE). The standard MSE can also be fairly easily modified to include questions helpful in detecting dissociative tendencies in an individual. An initial Mental Status Examination (MSE) with someone who is experiencing dissociative symptoms, especially dissociative amnesia, may produce positive answers to questions regarding confusion about time and identity. Some examples of these questions include: "Do you lose time?" "Are you told of things you have said and done for which you have no memory?" "Are you missing memories for important events in your life?" and "Are you ever approached by people you don't know, but who insist they know you?" (Loewenstein, 1991). Affirmative answers to any of these questions are not diagnostic in and of themselves, but rather signal that further investigation into these experiences is warranted so as to better establish the nature of the amnesia. Loewenstein (1991) presents a more comprehensive listing of MSE questions for this purpose.
Minnesota Multiphasic Personality Inventory--2 (MMPI-2). Elevations on certain MMPI-2 scales have been associated with the experience of dissociative symptoms. Generally, a high 3-4 (the Hysteria-Psychopathic Deviate scales) or 4-3 pattern, but especially the 3-4 pattern, indicates strong potential for the development of dissociative symptoms. This pattern is characterized by poor coping styles, including emotional immaturity, and avoidance and denial of problems. The elevated scale 4 is more a reflection of poor social knowledge and skills rather than of psychopathy (Meyer & Deitsch, 1995).

Other scales on the MMPI-2 may also be elevated, depending on the individual's symptoms. In those whose symptoms take a more somatic form of expression, scale 1 (Hypochondriasis) and sometimes 8 (Schizophrenia) may be elevated (Meyer & Deitsch, 1995). Scale 2 (Depression) may also be elevated if the individual has depressive symptoms. Additionally, validity scales K and L may be high in these individual’s profiles, especially if unexpressed anger and hostility exist, and scale F may be low. Persons with dissociative amnesia are particularly likely to have a raised L scale score due to their social and intellectual naïveté (Meyer & Deitsch, 1995). These test findings may prove useful in identifying clients with dissociative disorders and in differentiating these symptoms from those of other diagnoses.

Pharmacological Assessment

Traditionally, short-term sedatives such as sodium amobarbital and thiopental (Pentothal) have been used to facilitate the reversal of dissociative amnesia or fugue...
(Kluft, 1988; Riether & Stoudemire, 1988; Ruedrich, Chu, Wadle, 1985; & Spiegel, 1994). However, these drugs are also occasionally used to aid in the determination of whether the amnesia is psychogenic or organic in nature, and have also been used in cases of suspected simulation of amnesia for secondary gain. The intravenous administration of these chemical compounds seems to mobilize lost memories, and makes the individual more talkative, presumably by producing a relaxing or disinhibiting effect.

Generally, the sodium amobarbital (or sodium amytal) interview consists of the intravenous injection of a 5% solution of sodium amobarbital at a rate of 50 mg per min. The desired effect can be achieved with anywhere from 75 mg to 350 mg, and is maintained by delivering .5 to 1.0 cc approximately every 5 min. The client may be asked to count backwards from 100 during the administration, and will show errors of repetition or stumbling in reciting the numbers when sufficiently sedated. Drowsiness should also be anticipated (Kluft, 1988). This technique is not to be used with individuals allergic to barbiturates, and those who have any addictions, are on depressants, have liver, cardiac, or renal disease, hypo- or hypertension, or any lung problems (Kluft, 1988). It should also be kept in mind that psychopharmacological techniques do not seem to have an advantage over hypnosis (Perry & Jacobs, 1982), and are not always effective (see Sengupta, Jena, & Saxena, 1993). Additionally, some individuals find the sedation and other side effects unpleasant (Spiegel, 1994).
Neurological Assessment

One of the first considerations in the presentation of dissociative amnesia or other dissociative disorders is the presence of neurological injury or damage. A comprehensive evaluation should include the investigation of any head injury, both recent and past. Postconcussional (or posttraumatic) amnesia, especially, may present as dissociative amnesia, particularly if the concussion ensued during a traumatic incident such as a fight or assault. Typically, the retrograde amnesia that follows a concussion lasts no longer than one week, disappears gradually instead of suddenly and, unlike dissociative amnesia, may not include full restoration of the lost memory (Nemiah, 1989). The anterograde amnesia associated with head injury varies considerably in duration, lasting from a few minutes to more than four weeks in more extreme cases. In fact, the length of posttraumatic amnesia is sometimes used as an indication of the severity of the head injury, and is associated with length of coma (Lezak, 1995). These defining characteristics may be helpful in distinguishing dissociative amnesia from posttraumatic amnesia.

Another neurological consideration is the possibility of temporal lobe epilepsy. There is some evidence that individuals with this type of epilepsy may display dissociative symptoms in some phases of their seizure disorder (Nemiah, 1989). Thus, temporal lobe epilepsy must first be ruled out in considering the diagnosis of dissociative amnesia. Other considerations include memory loss due to electroconvulsive ("shock") therapy (ECT), memory problems due to drug use, and alcohol-induced “blackouts” or symptoms of Korsakoff's syndrome (APA, 1994; Loewenstein, 1991). In older persons, changes in
memory associated with age-related cognitive decline should be taken into account (APA, 1994). A comparison of symptoms compiled by Kluft (1988) may be helpful in distinguishing psychogenic amnesia from various other diagnoses.

**Neuropsychological Assessment**

There has been relatively little neuropsychological investigation of dissociation. Particularly troublesome are assessments in which psychologically-induced amnesia presents in individuals who also have underlying organic amnesia (e.g., Kopelman, Green, Guinan, Lewis, & Stanhope, 1994) or evidence of other neurological impairments (e.g., Persinger, 1992). Moreover, data from neuropsychological testing are limited, and often contradictory. Kopelman (1995) presents a brief list of studies that have found, for example: contradictory reports of intact and diminished semantic knowledge; performance on verbal-learning tests ranging from unimpaired to mildly impaired to more severely impaired; and variable success in memory retrieval as a result of cues—some memories may be regained by inadvertent environmental cues, whereas purposeful cueing is typically unsuccessful. Other results seem to be more consistent; for instance, it is believed that skill or procedural memory is unaffected in dissociative and even organic amnesia (see Kopelman, 1995). Nevertheless, although the few existing neuropsychological studies of dissociative phenomena highlight the complexities of evaluating these cases, they do provide some useful findings and guidelines.

**Studies With Dissociative Identity Disorder.** Nissen, Ross, Willingham, Mackenzie, and Schacter (1994) tested the amnesia of an individual who met diagnostic
criteria for dissociative identity disorder to determine whether performance of separate identities influences each other. The goal of this case study was to explore the memory functioning of separate personalities who claimed to have no awareness of each other to assess whether or not, at some level, their performance was facilitated by prior learning of other personalities on the same tasks. Nissen et al. (1994) prudently used both explicit and implicit methods to assess memory functioning.

A note must be made here regarding the use of the terminology "indirect" and "implicit." Although these words are used interchangeably by some authors, they have different implications in memory research. The term "implicit" has a very specific definition: it refers to a type of memory in which there may be no conscious awareness that recall of information from a previous task is required, but the influence of the first (priming) task is evident by improved performance on a subsequent task (Schacter, 1987). In this way, implicit memory is a type of indirect memory. However, some authors may use memory tests in such a manner that is "indirect" largely in that the individual was not expecting a memory test. For example, a portion of a test, such as the Wechsler Memory Scale, may first be given without the initial instruction that the information presented is to be memorized for recall later in the test session. When the individual is later asked directly, and thus "explicitly" or consciously, to recall previous information, this is labeled by some researchers as an "indirect" memory test because recall from the previous task was not expected by the test-taker. The fact that the individual is consciously attempting to recall earlier information, however, distinguishes this type of memory test from "implicit"
memory tests. In addition, there is some discussion about whether or not implicit memory is a subclass of procedural memory or vice versa (see Schacter, 1987). Therefore, the terms “implicit memory” and “procedural memory” are also used separately. These points should be kept in mind when reviewing the studies presented below.

In Nissen et al.’s (1994) study of interpersonality memory, the authors found no indication of interpersonality memory on an explicit paired-associate test (cued recall). However, on two indirect memory tasks, using the Wechsler Memory Scale and a forced-choice face recognition task, they did find interpersonality memory access. In addition, they found proactive interference from one personality to the next on a paired-associate learning task. As further tests of indirect memory, Nissen et al. employed implicit tasks (i.e., no direct request for recall; the influence of previous learning was assessed by performance on later tasks). On both of the implicit tasks used (a perceptual identification task and a reaction time test of repeated visual sequences), there was evidence of interpersonality memory access. However, this result was not produced on a third implicit test, interpretation of an ambiguous paragraph presented to different personalities with and without the accompanying drawing (Nissen et al., 1994).

Malingering was not directly assessed in this case study, but the authors gathered from the pattern of memory performance that this was unlikely. Primarily, if the participating personalities were malingering, they would have had to perform better than their abilities on tests devised to test interference effects (Nissen et al., 1994). In summary, the results of this study suggest that it is necessary to assess dissociative amnesia using
indirect methods in order to reduce the possibility of feigned or exaggerated memory problems. Moreover, results were inconsistent both across direct and indirect tests and within indirect tests, implying that memory accessibility may vary depending on the nature of the material to be recalled (e.g., complexity, ambiguity, affective components). It has been suggested that this varied memory accessibility is reminiscent of state-dependent learning (see Nissen et al., 1994).

Another study of dissociative identity disorders (see Flor-Henry, 1994) found some evidence of deficits on verbal learning, progressive matrices, the Purdue Pegboard and the Tactual Performance Test in one patient. These results were taken to indicate a pattern of left (in this case dominant) temporal and bilateral frontal dysfunction. A second patient with dissociative identity disorder showed impairment on the Aphasia Screening test, Williams' Verbal Learning, the Purdue Pegboard, the Halstead Category test, and the Dynamometric test. These results were also interpreted to mean bilateral frontal dysfunction in this patient (see Flor-Henry, 1994).

A more recent neuropsychological study of nine individuals meeting criteria for dissociative identity disorder was conducted by Eich, Macaulay, Loewenstein, and Dihle (1997). These researchers also employed both explicit and implicit memory tests. On explicit memory tests, impaired performance was found between the multiple personalities in this study. Using two implicit memory tests, a word-stem completion test and a picture-fragment completion, Eich and colleagues found mixed results. Although there priming took place between personalities on the picture-fragment test, this was not the case on
word-stem completion. The authors conclude that interpersonality memory varies depending on encoding and retrieval processes that may be affected by personality factors specific to each identity. Therefore, implicit memory testing appears to be a necessary but not sufficient condition for testing interpersonality memory (Eich et al., 1997).

Studies With Dissociative Amnesia. Persinger (1992) conducted a neuropsychological study of six adults who claimed to have “sudden recall” of previous preschool sexual abuse or alien abduction or visitation. These individuals were evaluated using the complete Halstead-Reitan Battery, along with other measures assessing personality, capacity to undergo hypnosis, and childhood memories. Overall test results indicated mild impairment on the Category test and both the left-hand tactual performance time (TPT) and either localization or memory scores for the TPT. Also mildly impaired was performance on either the Design Fluency or the Conditioned Spatial Association Task. In addition, all individuals tested in this study showed significant evidence of complex partial epileptic-like signs on the Personal Philosophy Inventory. In two of the six individuals, bipolar EEG measurements revealed some abnormal theta activity, mainly over the right temporal lobes. Persinger concluded that, taken together, these test results indicated right frontotemporal abnormalities and impaired accessibility to the right parietal lobe in these individuals (Persinger, 1992).

Kopelman, Christensen, Puffett, and Stanhope (1994) conducted a neuropsychological case study of a patient believed to have psychogenic amnesia and a 7-day fugue episode, what they term functional retrograde amnesia. In this case, simulation
or malingering was a possible, but not a clear factor. These authors also used both direct and indirect memory tests, including implicit memory tests, and tested both anterograde and retrograde amnesia. Anterograde memory tests included the Wechsler Memory Scale, the Kendrick Object Learning Test, and the Recognition Memory Test for words and faces. The retrograde memory tests were the Autobiographical Memory Interview and the Famous News Events test. Other tasks included a word-stem completion test for both neutral and autobiographical information; free recall tasks; a modified version of the Crovitz test (tests recall of incidents relating to each presented cue-word); and rating scales for indication of confidence of answers, as well as feelings-of-knowing.

The findings of this study were somewhat complex, as results varied on different sets of tests. There was no impairment on a number of anterograde memory tests devised to detect malingering, including: recognition, word-stem completion priming for neutral words and post-onset autobiographical material, and some aspects of semantic memory. However, performance on tests for autobiographical information and news events showed extreme memory loss and recency effects, a pattern different from that seen in organic amnesia. On the word-stem completion task (implicit test) for pre-onset autobiographical material, this individual showed no priming effects, although performance on this task improved after administration of amytal. Additionally, ratings for feelings-of-knowing on items for autobiographical memory were no greater than for more neutral material. This indicated some attempt at simulation, as it is similar to the pattern typically seen in
laboratory settings in which participants have been coached in faking (Kopelman et al., 1994).

Kopelman et al. (1994) suggest that memory, even in dissociative amnesia, may be recovered at different rates, and that individuals may have differing levels of awareness of the memories, depending on the nature and affective components of the dissociated information. This hierarchical model of awareness implies that knowledge of such memories can range from total unawareness of memories, to some implicit awareness (or feelings-of-knowing without conscious recall), to intentional simulation of amnesia.

More recently, Campodonico and Rediess (1996) investigated a case of psychogenic retrograde amnesia using implicit and explicit memory tests. The neuropsychological battery included largely explicit, anterograde memory tests, such as the Wechsler Memory Scale - Revised, the Hopkins Verbal Learning Test, the California Verbal Learning Test, the Wide Range Achievement Test - Revised, Trailmaking A and B, and others (for a complete list, see Campodonico & Rediess, 1996). Retrograde memory tasks included an autobiographical inventory, a public and factual knowledge inventory, and a version of the famous faces test. In addition, an indirect remote knowledge task was employed to test for implicit memory (Campodonico & Rediess, 1996).

Results indicated intact anterograde memory, language functioning, visuospatial and constructional skills, and mental speed and flexibility. In contrast, there was impaired performance on the retrograde memory tasks. Moreover, implicit memory was found to be intact despite impaired explicit recall for the same material. Interestingly, however, this
individual had some loss for procedural memory. This pattern is different from organic retrograde amnesia, in which there is almost always some impairment on anterograde memory tasks and other mild cognitive impairments, but intact autobiographical memory and information regarding personal identity, and procedural memory, although in some cases there are problems with episodic memory. Because of this pattern, it has been suggested that memory for autobiographical details and personal identity may be diagnostic in distinguishing psychogenic, or dissociative, amnesia from organic amnesia (Campodonico & Rediess, 1996), since loss of autobiographical memory is not typical in organic retrograde amnesia but may occur in dissociative amnesia. Malingering was not directly assessed in this case study, but although the authors do not deny this possibility, they argue there was no clear financial or legal incentive for simulation.

The rather complicated results of these studies underscore the typical difficulty of evaluating such cases. They also emphasize the importance of administering both direct and indirect memory tests (including but not limited to implicit tests), as well as tests that provide some indication of the attempt to simulate amnesia.

**Assessment of Malingering**

At present, there is no absolute way to distinguish dissociative amnesia from malingering. However, the possibility of malingering is always present, and therefore should be considered by the clinician as part of the evaluation in cases of claimed dissociative amnesia. There have been documented cases of persons feigning dissociative disorders for escape from criminal, financial, legal, and other personal motives, such as
dismissal from military duty (APA, 1994; Kluft, 1988; Loewenstein, 1991). One study, for instance, found that dissociative amnesia was claimed by alleged criminals in 30 to 40 percent of the homicide cases investigated in that report; there were also reports of lesser percentages in other cases of violence (Kopelman, 1987). Malingerers have been known to maintain their deception even while under hypnosis or barbiturate-facilitated interviews (Kluft, 1988). Perhaps the most publicized case of malingering dissociative disorder for escape from criminal prosecution was that of serial killer Kenneth Bianchi, the "Hillside Strangler" (Meyer & Deitsch, 1995), who claimed he had an alter personality that had committed and accepted responsibility for the brutal murders. Upon extensive evaluation, however, it was concluded that Bianchi was feigning dissociative identity (multiple personality) disorder.

In relation to memory functioning, there are some specific test characteristics that are generally considered by memory researchers to be indicative of malingering or simulation. Typically, malingerers will fail relatively easy items on specific memory tests compared to those with organic or true dissociative amnesia. They also tend to show poorer performance on recognition measures relative to recall measures; recognition tasks usually produce better memory performance than either free or cued recall. Malingerers also tend to show fewer "feelings-of-knowing" than controls, and may fail to demonstrate priming effects or memory for procedures or skills (see Kopelman, 1995). More recently, tests such as the Test of Memory Malingering (Tombaugh, 1997) have been devised to more directly assess malingering or simulation of memory loss.
It is not enough to merely assume that an individual test-taker is not feigning dissociative phenomena based on no apparent incentive for secondary gain. Consideration of malingering should be part of any comprehensive assessment of dissociation, but this is especially true in cases of individuals presenting with extreme or dramatic symptoms. Kluft (1988) provided a comparative list of symptoms commonly presented by those with psychologically-induced dissociation, those with organically-induced memory disturbance, and those attempting to simulate memory dysfunction that may prove useful in evaluating the possibility of malingering.

THE PRESENT STUDY

Memory Performance

Given the known effects of stress on biological functions, in general, and on memory specifically, it is reasonable to expect that individuals who dissociate will demonstrate some deficits in memory performance on testing. To date, however, there is very little neuropsychological test data on dissociation, aside from a few case studies on specific dissociative disorders and those on PTSD. Such studies have presented somewhat complex results that reflect, in part, the difficulty of evaluating such cases. The few studies that have examined individual cases of dissociative disorders have found that, in general, memories for some events appear to be preserved while others are inaccessible to the individual. Although it is difficult to generalize from only a few case studies, the characteristic pattern in these cases has been a variety of levels of deficit in explicit (direct) recall and intact recall on implicit memory tasks (Campodonico & Rediess, 1996;
Kopelman et al., 1994; Nissen et al., 1994). In studies of individuals with PTSD, who also display some dissociative symptoms, deficits have been found in explicit free verbal and visual recall, yet in some cases enhanced memory for trauma-related material (see Bremner et al., 1993, 1995, 1996). Findings such as these suggest that extreme stress and trauma such as that correlated with dissociation affect the encoding, consolidation, and retrieval of, at the least, some memories.

As of the date of this study, no large-scale neuropsychological research has been conducted with individuals who dissociate. The first goal of this study was therefore to conduct a neuropsychological examination of memory functioning in both high and low dissociators in a non-clinical, college population; that is, a comparison of individuals who report high levels of dissociative symptoms with those who report exceptionally low levels, according to scores on the Dissociative Experiences Scale. Based on previous results and suggestions from other studies, a variety of tests were selected to include verbal and nonverbal explicit memory, autobiographical (retrograde) memory, and implicit memory.

Implicit memory tests, due to their indirect nature, have sometimes been used as tests of memory malingering, especially to detect more sophisticated malingerers (e.g., Hilsabeck, LeCompte, & Zuppardo, 1997). On implicit memory tests, most individuals—even malingerers or those unintentionally exaggerating memory dysfunction—typically demonstrate normal performance because they usually do not readily judge them to be tests of memory. Intact implicit memory performance may also suggest that, although
explicit memory is impaired, there is storage of memory at some other cognitive level. For these reasons, some researchers (e.g., Nissen et al., 1994) have strongly recommended the inclusion of measures with a less detectable purpose, such as implicit memory tests, to assess memory in the dissociative disorders. A widely-used implicit memory test was therefore included in the test battery for this study.

In addition, the question of exaggeration, or outright malingering, is considered a possibility in many studies of dissociation. However, very few of these studies employ specific tests of malingering. Another goal of this study was to compare the performance of high and low dissociators on a test designed specifically to tap simulation of memory loss, the Test of Memory Malingering (Tombaugh, 1997). Since the experimental population consisted of college age students in a non-clinical university setting, there was little reason to suspect much motivation for malingering. However, there has been some suggestion that self-report scales of dissociative experiences may be prone to malingering (Gilbertson et al., 1992). Therefore, it was of considerable interest to compare high and low dissociators in an attempt to determine whether, in the absence of reasonable cause for purposeful simulation, there were nonetheless significant differences in responses to a test of malingering. Such a finding may imply that there are factors other than secondary gain at play in dissociators (e.g., unintentional exaggeration of symptoms).

Other Goals

There were two additional, exploratory goals of this study. One was an examination of neurological and other health and life experiences of high and low
dissociators, based on a self-report questionnaire. The question of interest was whether high dissociators differ from low dissociators in their histories of head injury, alcohol and drug use, emotional functioning, and trauma and abuse histories. Other studies, especially single case studies involving assessment in dissociative cases, have been complicated by the possibility of underlying organic amnesia. This is always a possibility since the precipitating trauma could have involved an automobile accident or a physical attack, in which head injury is likely. However, no previous studies of dissociation in the general or college populations have reported any neurological data on their participants, who have certainly not been screened based on general health history. In accordance with these studies, potential participants for this study were not eliminated based on health factors or life events, but such information from the two groups was compared with interest in any neurological differences between them, as well as a comparison of other health factors and life experiences. Although it was of interest to compare data from normal (neurologically intact) individuals with data from those indicating a significant neurological history (e.g., loss of consciousness for more than 15 minutes), not enough students indicated serious enough neurological histories to warrant a division of the data into two groups (normal and significant neurological history) for further analysis with respect to scores on other measures (see Results). Findings from such a health and life events survey do not, of course, imply causality, and must always be interpreted with caution.

The other secondary goal of this study involved an examination of the possible Amnesia subscale or factor in the Dissociative Experiences Scale. Although there is some
question as to the validity of the Amnesia subscale (Ray & Faith, 1995; Ray et al., 1992; Sanders & Green, 1994; see also Carlson & Putnam, 1993), corrected-item correlations were conducted to determine the relative contribution, as well as correlation, of each item tapping amnesia to the overall dissociation score. The specific items under consideration as part of this Amnesia subscale were items: 3, 4, 5, 6, 8, 10, 25, and 26 (see the DES in Appendix A). The selection of these items was based on the outcome of several studies that have identified various sets of items as belonging to the Amnesia subscale (see Carlson & Putnam, 1993). Because this subscale is still of questionable validity in the literature, the largest set of items believed to contribute to the amnesia factor, based on the findings of a large-scale study (1574 participants) of clinical and non-clinical individuals conducted by Carlson and colleagues in 1991, were selected for testing in this study. This was done in order to better evaluate the relative contribution of as many individual items as possible believed to represent dissociative amnesia components to the average Amnesia subscale score, as well as to the overall DES (dissociation) score.

Ideally, since the primary aim of this study was memory functioning, a dissociative amnesia measure would have been used to select participants for the study. However, since no known and well-validated such scale exists, the DES was, as of the date of this study, the best measure to use to assess dissociation, one component of which is dissociative amnesia. The Amnesia subscale and average score was therefore of interest with regards to its utility as a more specific measure of dissociative amnesia when used separately from the overall DES score, which measures general dissociative tendency.
Gender Differences

The bulk of studies reports no overall gender differences in dissociative phenomena. This is surprising given the higher rate of childhood sexual abuse and other victimization experienced by more women than men (Coons & Milstein, 1992), and the well-established association between trauma and dissociation. For example, dissociative identity disorder is much more often diagnosed in women versus men; in fact, three to nine times more often (APA, 1994). Admittedly, it is possible that more women with this disorder seek professional help for their symptoms, or are otherwise brought to the attention of clinicians and are, therefore, more often diagnosed (see Sanders et al., 1989). In any case, there seems to be some question regarding gender differences on more specific dissociative factors, including amnesia (Sanders & Green, 1994). This study therefore examined gender differences on specific items of the DES, as well as in reported general health and life events. In addition, no known study prior to this one has examined gender differences among dissociators on various explicit and implicit memory tests, autobiographical memory, or on a test of memory malingering. Gender effects were therefore examined in each of the areas tested, but were secondary to the primary examination of memory differences in high versus low dissociators. Hypotheses and results regarding gender differences on the various tests and questionnaires are thus discussed under each relevant section below.
Hypotheses

Memory Performance

*Verbal and Nonverbal Explicit Memory Tests.* It was expected that high dissociators, compared to low dissociators, would show significantly worse performance on both verbal and nonverbal explicit memory tasks. This hypothesis was based on the reviewed literature, which documents the detrimental effects of prolonged stress or trauma on general physiological processes and on the formation and consolidation of memory during traumatic events. Because dissociation has been strongly linked to trauma, it was expected that the symptoms experienced by high dissociators—which include memory problems—would translate into testable deficits on explicit memory tests. Indeed, a variety of memory deficits, although admittedly with mixed results, has been found in the few available neuropsychological studies of dissociation, further supporting this hypothesis. On the other hand, low dissociators—who have very few dissociative symptoms including memory disturbance—were expected to show normal performance (i.e., scores within the average percentile range based on age- and gender-corrected norms) on both of the explicit memory tests.

Because women generally show a tendency to perform better than men on tests of verbal explicit memory, age- and gender-corrected norms were used in scoring the memory tests in order to account for these established gender differences. However, some gender differences on the verbal and nonverbal explicit memory tests were expected even after gender-corrected norms were applied to resulting scores. This prediction was based
on some suggestion in the literature of different dissociative patterns between men and women (Sanders & Green, 1994), which could certainly affect general memory functioning.

**Autobiographical Memory.** For the Autobiographical Memory Test, it was generally predicted that low dissociators would report better retrograde memory for personal information as compared to high dissociators. Nevertheless, equal degrees of certainty, or feelings-of-knowing, were expected for both groups. These expectations were based on the typical patterns characteristic of dissociative amnesia versus organic retrograde amnesia. In the latter case, individuals may have deficits on explicit and other memory tasks, but generally retain autobiographical memory and memory related to personal identity. Impaired autobiographical memory is more commonly seen in cases of dissociative amnesia, although even in such cases there is usually indication of this knowledge at some level (feelings-of-knowing). Further, although there was no data available upon which to predict directional differences for men and women, gender differences were also to be examined on the autobiographical memory test.

**Implicit Memory Test.** It was hypothesized that intact performance would be found on implicit memory tasks for both high and low dissociating groups. This result was predicted based on some, although limited, findings of impaired explicit but intact implicit memory in individuals with dissociative disorders. Moreover, because of the finding of intact implicit memory even in dissociators, implicit memory tests have sometimes been used as additional tests of memory malingering, since they are usually not immediately
perceived as tests of memory (e.g., Hilsabeck, LeCompte, & Zuppardo, 1997). For these reasons, some researchers (e.g., Nissen et al., 1994) have strongly recommended the inclusion of indirect measures such as implicit memory tests to assess memory in the dissociative disorders, and one was therefore included in this study. In addition, gender differences were not expected on the implicit memory test, in line with similar findings with a comparable age group (Simotas & Hall, 1996, unpublished master’s thesis).

**Test of Exaggerated or Feigned Memory Problems.** Specific predictions were not made regarding test performance of high and low dissociators on the test of memory malingering, as there was little reason to suspect purposeful simulation in this population. Furthermore, the literature is not clear as to this finding in dissociators, as most reported cases involve some suspicion of malingering for secondary gain but no formal testing of this possibility. For this study, differences in performance between the two groups were examined, as were gender differences, but there were no empirical findings upon which to base directional hypotheses.

**Health and Life Events Questionnaire**

One further goal of this study was an inspection of the health and life events history of high and low dissociators. Of specific interest was any history of head injury, alcohol or other drug abuse, depression and anxiety symptoms, and abuse and trauma history. A comparison was made to determine any differences between high and low dissociators in the frequency or intensity of general health factors and in history of trauma or abuse. Because of the clear link between trauma and dissociation in the literature, it was
expected that high dissociators would report higher rates of trauma and abuse, and probably more emotional and health problems, as well as more alcohol and drug abuse. Finally, some gender differences were expected on the Health and Life Events Questionnaire, since it seemed likely that men and women would report different patterns of overall health and trauma and abuse history. Findings in this area were naturally interpreted with care, since they do not imply causality.

**Amnesia Subscale of the DES**

Another exploratory goal was an examination of the possible Amnesia subscale items (#s 3, 4, 5, 6, 8, 10, 25, and 26), with analysis conducted to determine the relative contribution of amnesia-related items to the average Amnesia subscale score. Also of interest was how well the average Amnesia score correlated with the total dissociation score, as well as to scores on the memory tests. Because the Amnesia subscale of the DES has not yet achieved full validation as a factor, it was difficult to predict the outcome of this goal. However, it was generally expected that the higher an individual scores on the Amnesia subscale, the poorer memory performance would be, in a pattern similar to that predicted above for explicit and implicit memory testing (impairment on explicit but not implicit memory). In other words, an inverse relationship was expected between the score on the Amnesia subscale and scores on memory testing, with the exception of the implicit memory test. In addition, based on some suggestion of different dissociative patterns in men and women on DES amnesia items (Sanders & Green, 1994), some gender differences were expected on the Amnesia subscale of the DES.
Method

Participants

Participants were recruited from introductory psychology classes at The University of Montana. An initial screening, using the Dissociative Experiences Scale--II (DES-II), was conducted of the psychology experimental pool. In a pilot study conducted in the autumn semester of 1997 (Simotas & Hall, 1997, unpublished data), data was collected from the experimental pool, which contained approximately 340 students. Data from 11 participants could not be used because 2 students did not complete all items and 9 did not indicate their sex on the form; of these 9, 1 was a high dissociator (see definition below), 1 was a low dissociator (see below), and the other 7 fell in the intermediate range. Because the pilot study was conducted in the autumn semester and fewer students are typically enrolled for Introduction to Psychology in the spring, when the proposed study took place, approximately 300 students were expected to be available to participate in the initial screening.

Potential participants to be included in the study were selected from the initial screening group based on DES scores. Cutoff scores for high and low dissociators were based on studies using similar populations. High dissociators had scores of 20.0 (percent) or above on the DES. Although generally a score of 30 or above distinguishes clinical from non-clinical groups (Carlson & Putnam, 1993; Murphy, 1994), a cutoff score of 20 or above has been used to designate high dissociators in research studies with college populations (e.g., Ross et al., 1991; Sandberg & Lynn, 1992). This was consistent with
the purpose of the present study, which was not to classify clinical and non-clinical
groups, but rather to compare individuals with a high tendency to dissociate to individuals
who exhibit a low tendency to do so. Data from the pilot study (Simotas & Hall, 1997,
unpublished data) indicated that there were 48 women (out of 199 total women, 24.6%)
and 28 men (out of 118 total men, 23.7%) who scored a 20.0 or above on the DES. The
mean was 29.75. Of the total sample, only 12 men (10.16%) and 16 women (8.04%)
scored a 30.0 or above (mean score of 39.59). These statistics indicated that a cutoff score
of 20.0 and above would be necessary to yield sufficient participants for this study.
However, more extreme high scorers were considered separately for comparison of those
with very high dissociative tendencies to those with exceptionally low dissociative
tendencies. Therefore, participants with scores of 30.0 or above (generally considered in
the clinical range) were considered "very high" dissociators, compared to simply "high
dissociators," who had scores of 20.0 or above. The same was done with participants who
had very low dissociative tendencies (see below).

In other dissociation studies, cutoff scores ranging from 5.0 (percent) or below to
any score below the sample mean, in one case averaging 5.95 (Sandberg & Lynn, 1992),
have been used to classify individuals as low dissociators. In the pilot study described
above (Simotas & Hall, 1997, unpublished data), there were 25 women (out of 199 total
women, 17.0%) and 13 men (out of 118 total men, 11.01%) who scored a 5.0 or below.
The mean was 3.25. Using a higher cutoff of a score of 7.0 or below, these numbers
increased to 45 women (22.61%) and 24 men (20.33%), with a mean of 4.52. This pilot
data suggested that a slightly higher cutoff score of 7.0 and below would be necessary in order to accumulate enough participants for the experiment. As was done with the high dissociating group, extremely low dissociators were considered as a separate subgroup for comparison with those with very high dissociative tendencies. Participants with scores of 5.0 or below were therefore classified as "very low" dissociators. The terms "very high" and "very low" dissociators will be used to refer to these extreme scorers for the remainder of this report.

A review of the literature using the DES revealed total samples of as few as 42 (Ross et al., 1991) and as many as 1,190 (Ray & Faith, 1995) participants. Sample sizes of \( N > 30 \) are recommended by the authors of the DES and are considered moderate-sized samples (Carlson & Putnam, 1993). The few studies that examine memory test factors in dissociation are often case studies or small-sample studies. To more formally estimate the number of participants necessary to effectively test the primary hypotheses (high versus low dissociators) and increase the probability of obtaining statistically significant results, a power analysis was conducted. By conservative standards, the power analysis indicated that 46 participants per group (high and low) would be necessary to produce a medium effect size. Alternatively, the empirical approach to power analysis, which involves comparison of related published research findings, indicated that only 12 participants per group would be necessary to effectively test the main hypotheses.

Based on consideration of previous research studies, information from the pilot study using a similar group, and results of the power analysis, every effort was made to
acquire at least 20 but as many as 30 participants in each of the four cells (high and low; male and female). This number of participants was judged sufficient to provide a satisfactory test of the primary hypotheses (high versus low dissociators) and an acceptable test of the secondary (gender differences). Furthermore, the highest and lowest scorers from the initial screening group were contacted for participation before all others who met criteria. As done by Ross et al. (1991), high scorers were selected by beginning with the very highest scorer and working downwards in scores until enough high dissociators who met cutoff criteria completed the experiment. Thus, the high scoring sample actually had a mean score well above 20 (see Results). Similarly, low scorers were selected by starting with the lowest scorer and proceeding upwards in scores until enough low dissociators who met the cutoff score completed the experiment (per Ross et al., 1991). As mentioned above, extremely high and low dissociators (referred to as "very high" and "very low" dissociators, respectively) were examined as a separate subgroup. Final selection resulted in a total of 90 overall participants: 45 high and 45 low dissociators; of whom 40 were males and 50 females. Additional details regarding participants are presented in the Results.

Materials

Screening Instrument

*The Dissociative Experiences Scale (Second Version).* The DES-II was used as the screening measure, and determined the high and low dissociators to be included in the experiment. The DES-II is a 28-item self-report scale that is quick and easy to administer,
and can often be completed in 10 min. It has been found to have good validity and reliability, as well as internal consistency, in both clinical and non-clinical populations (Carlson & Putnam, 1993; Gleaves, Eberenz, Warner, & Fine, 1995); it also appears to have good sensitivity and specificity (Draijer & Boon, 1993). The revised DES (the DES-II) has been found to have excellent validity compared to the original DES (Ellason, Ross, Mayran, & Sainton, 1994). The test-taker is asked to circle a number from 0 to 100 (arranged in ascending order in 10s) to indicate the percentage of time s/he has the dissociative experience described when not under the influence of alcohol or other drugs. A score is then determined by calculating the average percentage across all 28 items. The DES-II is provided in Appendix A.

**Health and Life Events Questionnaire**

The Health and Life Events Questionnaire consisted of 21 questions obtained from different sources to tap a wide range of relevant life experiences that may be associated with dissociation, as well as neurological history (head injury), and features of anxiety and depression. Based on the content of the questions, the questionnaire was divided into eight scales or factors that represent that set of questions. The eight factors, listed alphabetically, were: 1) Abuse, 2) Anxiety (ANX), 3) Crime, 4) Depression (DEP), 5) Disaster (DISTR), 6) Drug and Alcohol Use (DA), 7) Neurological History (NEURO), and 8) Self-Harm (SH).

A number of the questions were adapted from other measures known to reliably assess those specific constructs. Three of the eight factors, Abuse, Crime, and Disaster,
were adapted from several subsets of questions derived from the Traumatic Events Scale (TES; Elliott, as cited in Elliott & Briere, 1995), shown to have good internal consistency in university (α = .84) and other populations, and to be related to other self-reported measures of interpersonal violence. Sets of questions from this measure were selected to obtain history of physical and sexual abuse, witness to domestic violence, torture or witness to torture (Abuse); history of victimization by or witness to criminal activity (Crime); and history of experience with natural disaster and involvement in or witness to major vehicular accidents (DISTR). In addition, Item 20, also from the Traumatic Experiences Scale (TES), inquires about history of deliberate self-harm and was included as a separate factor (Self-Harm, SH) in the analysis because of its singular importance.

Two other scales, Anxiety (ANX) and Depression (DEP), were derived from a subset of questions on the Medical Outcomes Study (MOS) Short-Form General Health Survey (Stewart, Hays, & Ware, 1988). The MOS has been found to have good reliability and validity, especially considering its brevity (less than 30 questions total) and short administration time (approximately 3 min). The Anxiety (ANX) scale in the Health and Life Events Questionnaire consisted of the total of two questions from the MOS directly related to general feelings of anxiety and nervousness during the past month. The Depression (DEP) scale was the total of three MOS questions tapping general unhappiness and overall mood.

The Drug and Alcohol Use (DA) scale of the Health and Life Events Questionnaire represented the total of four questions adapted from the well-known CAGE survey of
alcohol dependence (Mayfield, McLeod, & Hall, 1974). The acronym CAGE represents the four questions that comprise the short survey: attempts to Cut back on alcohol use; Annoyance at criticisms of use; Guilt related to using; and having used alcohol as an Eye-opener in the morning. Although brief, the CAGE has been shown to have good sensitivity and specificity in determining problem substance use (Bush, Shaw, Cleary, Delbanco, & Aronson, 1987). For the purposes of the present study, these questions were modified to include the use of other drugs in addition to alcohol. Finally, the Neurological History (NEURO) factor was a three-part question that first determined if there was any history of head injury resulting in unconsciousness and, if so, the number of injuries and the number of seconds, minutes, or hours unconscious. The NEURO score reflects the cumulative score of time unconscious from all head injuries reported.

Scores for each of the different scales (Abuse, Anxiety, Crime, Depression, Disaster, Drug and Alcohol Use, Neurological History, and Self-Harm) were determined by adding the frequency of responses (with Yes = 1 and No = 0). Responses to this questionnaire were used to discern any differences between high and low dissociators, and between men and women, in these scale areas. Although results do not imply causality, there was interest in establishing a correlational data base for these factors. The Health and Life Events Questionnaire is provided in Appendix B.
I. Verbal and Nonverbal Explicit Memory Tests

Selective Reminding Test (SRT). The Selective Reminding Test, according to Lezak (1995), is more a procedure than a standardized test format. It was originally developed in 1974 by Buschke and Fuld, but has since been revised and is administered in several variations (Lezak, 1995). Widely used as a test of verbal memory, the SRT procedure has been found to correlate well with other memory tests. In the present study, the SRT was used to assess participants' verbal recall and retention.

Statistical reliability of the SRT has been examined using test-retest procedures with a number of the different forms available, and correlation coefficients from .41 to .65 have been reported in the literature (Hannay & Levin, 1985; Lezak, 1995). Masur, Fuld, Blau, Crystal, and Aronson (1990) report "adequate" validity using one version of the SRT. In addition, some gender effects have been found, with women up to age 70 performing better than men (Lezak, 1995; Ruff, Light, & Quayhagen, 1988). Age appears to be a less important, but contributing, factor (Lezak, 1995), although there is some disagreement about this (e.g., Larrabee, Trahan, Curtiss, & Levin, 1988). Education level seems to be a less important factor in performance on the SRT (Larrabee et al., 1988; see also Lezak, 1995). For these reasons, age- and gender-corrected norms were used for scoring this test.

The SRT is comprised of three phases. In the first phase, participants were read a list of 12 words at the rate of one per 2 s. They were directed to listen carefully and to try
to remember as many of the words as possible. After the list of words was read, the participants were asked to recall, in any order, as many of the words as they could remember. When done, they were then reminded only of the words missed (i.e., not recalled) from the original word list. Participants were then asked again to recall as many words as possible, including those already given in the first trial. After this trial, the participants were again reminded only of the words missed. This procedure continued until there was either successful completion of three consecutive trials with no misses or completion of 12 total trials. The words for this test phase are provided in Appendix C.

The second phase of the SRT is a multiple choice task. Immediately after the first phase, participants were presented with a series of 12 cards, each of which displays four words: one from the initial word list participants were asked to memorize and three other words not found on the original list. Participants were instructed to read the four words on the card and to select from the multiple choices the one word that appeared on the original list (see Appendix D). Directly after completion of the second phase, timing was begun for the third phase, a 30 min delayed recall task. When 30 min had elapsed, participants were reminded of the initial word memorization task and were simply asked to recall as many of the words from the list as possible.

A number of scores can be obtained using the SRT, including: Sum recall, Long-term retrieval or Long-term storage (total words recalled on two or more consecutive trials without reminders); Short-term recall (total words recalled after reminders); Consistent long-term retrieval (words repeatedly recalled without reminder); Random
long-term retrieval (words inconsistently produced after reminders), Reminders (total reminders given during test); Intrusions (words recalled that were not on the list); a score for the total words recalled when cued; a score for the words recalled in the multiple-choice phase; and a score for the total number of words recalled at delayed free recall (Lezak, 1995). It may also be helpful to note the initial number of words recalled (i.e., on the first trial, also called the supraspan). For purposes of statistical analysis in this study, four scores were calculated for each participant: 1) Sum recall score (an overall score that reflects general acquisition); 2) Multiple-Choice score (reflecting recognition memory, and useful as a secondary test of malingering since recognition scores are expected to be higher than recall scores); 3) Delayed Recall score (an indication of ability to retain learned material in memory and recall it without the use of cues); and 4) Intrusions (the number of words recalled at Delayed Recall that were not on the original word list).

**Continuous Visual Memory Test (CVMT).** Developed by Trahan and Larrabee in 1988, the CVMT is a test of visual memory. This test was selected in order to evaluate recall and retention of material other than verbal, the type of material most commonly tested by other memory measures. No gender effects have been found on this test, and there appear to be no education effects for groups with 12 or fewer years of education compared to groups with 16 or more years. Correlations ranging from .80 to .98 have been found for inter-item reliability (Lezak, 1995).

The CVMT consists of an Acquisition Task, a Delayed Recognition Task, and a Visual Discrimination Task. Before beginning the Acquisition Task, general instructions
were given for the test. Briefly, these explained to participants that they would be shown a series of cards that depict designs, one at a time at the rate of 2 s each. Participants were warned that some of the designs in the test would be presented only once, while others would be repeated throughout the test. For the Acquisition Task, participants were instructed to attempt to remember each presented design and, as each card was presented, to say 'NEW' if it was a card not previously seen and 'OLD' if it was one seen earlier in the test, whether it was the second, third, or fourth time seen. It was made clear that, in order for a design to be considered 'OLD,' it must match exactly with the one previously displayed. A short sample trial was administered before the start of the Acquisition Task to make sure that each participant understood the procedure. The Acquisition Task generally takes approximately 4 min to complete. When this phase was completed, timing was begun for the next task, Delayed Recognition, administered 30 min after the last item was completed in the Acquisition Task. Test regulations for the CVMT specify that other tests may be given in this interval, but are not to include material with similar visual stimuli in order to prevent interference. In accordance, a non-interfering questionnaire was administered during this 30-min interval (see Procedure).

In the Delayed Recognition Task, a set of seven similar designs was first presented, with the explanation that all of the displayed designs appeared during the earlier (Acquisition) trial. Six of the designs appeared only one time during the course of the test, whereas one of the seven presented designs had been presented repeatedly, seven times,
throughout the test. Participants were instructed to study all seven designs on each card presented and to indicate which of the seven designs was the one repeated.

The Visual Discrimination Task followed immediately after the Delayed Recognition Task. Here, a set of cards with seven similar designs was presented, and each participant was asked to choose which of the seven designs matched perfectly with the single design displayed on a separate card, presented simultaneously for the test-taker to view while making this decision. Seven sets of these cards were presented and, although there was no time limit for this task, any respondents taking longer than 15 s to provide an answer for a card were encouraged to reply as quickly as possible.

Several scores are possibly obtained from the CVMT, including: a score for Hits; (correct recognition of a repeated item); False Alarms (responding that an item was repeated when it is actually a new item, not previously presented); d-Prime (an overall measure of memory sensitivity); and a Total Score (the number of hits plus the number of correct recognitions of new items). For the purposes of this experiment, three scores were determined for each student: 1) Total Score (which incorporates acquisition and number of false alarms); and 2) Delayed Recognition (reflects memory by identification); and Visual Discrimination (a quickly-obtained score of visual matching).

II. Autobiographical Memory Test

The Autobiographical Memory Test was used as a brief test of retrograde memory. Retrograde memory tests measure retention of older, previously learned material, typically dating back for years, whereas anterograde memory tests measure acquisition of new
material. Some of the more commonly-used retrograde memory tests include the Autobiographical Memory Interview and the Famous News Events test. Although retrograde memory tests have been criticized for a number of reasons, including difficulty in standardization, (for a brief review, see Lezak, 1995), a number of researchers in the area of dissociation have suggested that retrograde memory testing is an important variable to consider in assessing dissociative amnesia. Therefore, a short self-report autobiographical test was designed to obtain an impression of participants' basic retrograde memory, but was not intended as a formally standardized or validated instrument.

The Autobiographical Memory Test used in this study (see Appendix G) consisted of two 4-part questions that each assessed participants' memories for two events or time periods: a) past birthdays and b) previous teachers (or, alternatively, employers or supervisors). These questions were selected to include personal experiences common to most people irrespective of age, culture, or religious background, since it was judged that most people both celebrate birthdays in some fashion, and attend school or begin working shortly after leaving high school. Each question inquired about memory for these times from 1 year ago, 3 years ago, 5 years ago, and 10 years ago. Since the students in the study were college undergraduates, 10 years ago was judged to be the earliest reasonable time period for which most people in this age range could be expected to have some memory for these types of events.
Participants were instructed to read and think about each question carefully, and to respond as honestly as possible, with the realization that it might take some time to recall the information being asked of them. They were then asked to respond either “Yes” or “No” to four questions about memory for birthday celebrations and then memory for teachers (1 year ago, 3 years, 5 years, and 10 years). After each of the four questions, they were asked to rate how certain they were (that is, their feelings-of-knowing) about responses for each time period. A Likert-type scale was used for this purpose, with optional responses from “Very Certain” to “Not Certain At All.” Thus, it was possible for a student to respond, for example, that s/he did not remember a particular birthday celebration but at the same time be very certain of this. Of course, other combinations of these responses are also possible. There was no time limit for the Autobiographical Memory Test.

Scores for this test were produced by summing assigned values for the responses. For Yes/No questions, a “Yes” response was assigned a value of 1 and a “No” a value of 0. For ratings of certainty, values ranged from 1 to 5 on a Likert scale (1 = Very Certain, 3 = Moderately Certain, and 5 = Not Certain At All; values between these points could also be used). Six sum scores were produced for this test: 1) Autobio1 (the sum of the 4 Yes/No parts of Question 1, birthdays); 2) Autobio2 (the sum for Question 2, teachers/employers); 3) AutobioTotl (the sum of Autobio1 and Autobio2); 4) Certain1 (the sum of Likert scale responses regarding certainty for Question 1); 5) Certain2 (the
sum of certainty responses for Question 2); and 6) CertainTotl (the sum of Certain1 and Certain2).

III. Implicit Memory Test

Word-Stem Completion Test. The word-stem completion test is a verbal implicit memory task. It is implicit in that the participants are not directly instructed to recall anything, and may not even be aware that the test is one of memory. The word-stem completion test is one of the most commonly used tests of implicit memory in the literature.

The word-stem completion test materials and procedure used were adapted largely from Light & Singh (1987). All words had the following common features, as described in Graf et al. (1982): 1) each word contained either five or six letters; 2) each of the words had a different stem and had at least four alternatives, as listed in Webster's Pocket Dictionary, for completing each stem to form a word of the same length; 3) the "critical" word (i.e., one presented in the priming list) was never the most common completion of the stem. The word-stem completion test consists of a priming phase followed by a test phase.

For the priming activity, participants were first shown a list of 35 words: three of these were used as practice items, and the first and last six words were used as fillers in an attempt to control for primacy and recency effect (Chiarello & Hoyer, 1988). The words for the priming phase are provided in Appendix E. The words were printed in large, bold block letters in black type against a white background, and presented one at a time on 3 x
5 in. (7.5 x 12.5 cm) index cards at a rate of one every 5 s. The experimenter also read each word aloud. The students were instructed to look at each word closely, consider its meaning, and then verbally indicate their liking for each word on a seven-point Likert-type scale (1: Dislike very much to 7: Like very much), which was placed in front of them. Immediately after the priming activity, participants were presented with the test phase.

The test list consisted of a total of 43 incomplete words, for which the first three letters had been provided (e.g., PAR ____). This word-stem list contained 20 word stems from words presented in the priming list and 20 word stems from words not presented on that list. Three additional word stems were used as practice items (see Appendix F). Participants were simply asked to complete each three-letter word stem to form any English word with the exception of proper nouns, and were asked to write the first word that came to mind. There was a 5 min time limit for this task, which has been found to be sufficient time to complete the task comfortably (Light & Singh, 1987). A score for this test was then determined for each participant by calculating the proportion of the words on the word-stem list completed with words from the priming list.

IV. Test of Exaggerated or Feigned Memory Problems

Test of Memory Malingering (TOMM). The TOMM, published by Tombaugh in 1996, is a fairly new visual recognition test designed to help identify true from simulated memory impairments. The TOMM is easy to administer and score, and is composed of two learning trials and a retention trial. For each trial, 50 pictures (line drawings) were presented at the rate of one every 3 s. Afterwards, 50 two-choice cards were shown, one
at a time, and each participant was asked to choose which of the two shown pictures was previously presented. The retention trial was similar in procedure, except that there was no presentation of pictures before administering 50 forced-choice recognition cards.

Although the TOMM was intentionally designed to appear as a difficult test, the forced-choice format allows for excellent performance by most individuals; that is, even without intact memory, the correct picture is expected to be chosen, based on probability theory, about 50% of the time. In reality, even those with dementia and other neuropsychological impairments produce almost perfect scores on the TOMM (Tombaugh, 1997; see norms in Appendix N), further suggesting that scores significantly below chance indicate some attempt to exaggerate memory loss. Moreover, because the task seems harder than it actually is, the TOMM has good face validity as a memory test and, in research studies, has not been found to be detectable as a test of malingering. It has been normed on both cognitively intact groups (aged 20 to 80) as well as on cognitively impaired groups. In addition, scoring the TOMM is straight-forward. For this study, three scores were obtained for each test-taker, with each score reflecting the number correct (out of 50 possible) on each of Trial 1, Trial 2, and the Retention Trial.

Procedure

Participants were tested individually by an experimenter or a trained research assistant in a setting free from noise and other distractions. They first completed an informed consent form (see Appendix H), which explained that all names and personal information were to be kept confidential, and that only an identification number would be
assigned to keep test materials together. Participants were then told that they were about
to work on a variety of tests. Although each of the tests was some type of memory task,
the experiment was presented as consisting of "a number of different types of tests"
primarily in order protect the purpose of the implicit memory task, the word-stem
completion test, as well as the test of memory malingering.

All participants then completed the same tasks in the identical order due to timing
restrictions that necessitated 30 min delays for two of the tests, the SRT and the CVMT.
Furthermore, the ordering of the tests had to remain identical (instead of counter-
balancing them) in order to reduce the possibility of contamination or interference from
presentation of similar intervening material. Therefore, testing with each participant was
done in the following order: 1) Word-stem completion test, 2) Selective Reminding Test
(SRT), Acquisition and Multiple-Choice phases, 3) Continuous Visual Memory Test
(CVMT), Acquisition Task, 4) Health and Life Events Questionnaire, 5) SRT 30 min
Delayed Recall, 6) CVMT 30 min Delayed Recognition Task and Visual Discrimination
Task, 7) Test of Memory Malingering (TOMM) Trials 1 and 2; 8) Autobiographical
Memory Test; and 9) TOMM Retention Trial. The word-stem completion test was chosen
as the first test to be administered due to its implicit nature. That is, it was judged that
placing it at the end of a series of explicit memory tests that make up the battery (the only
other option due to verbal interference factors of placing it in the middle of the battery)
may have made its true purpose more obvious. Each participant was fully debriefed upon
completion of all tests and activities (see Appendix I). In addition, a Resource List with
names, addresses, and telephone numbers of local counseling and support services was
given to each student to contact in the event that any portion of the experiment was
experienced as distressful or upsetting and the student wished to receive help or support
related to this (see Appendix J).
Results

Participant Demographics

Preliminary screening of the Psychology 100 classes at The University of Montana during the Spring and Summer 1998 semesters resulted in 430 complete DES questionnaires. Of these, 174 (40.4%) were from males and 251 (58.2%) were from females (figures equal to 425 because gender was not indicated on 5 completed questionnaires). Age of the screened participants ranged from 17 to 50 years old, with an average of 21.14 (standard deviation, SD = 4.95) for the 423 of the 430 respondents who indicated age.

For participation in the study, 90 students were selected from the screening group based on age (at least 18 years old and no older than 29) and DES score. High dissociators had scores of 20 (percent) or above, whereas low dissociators had scores of 7 (percent) or below. There were more than 90 students who scored high or low enough to participate in the study, but were excluded because they were not interested in participation, did not appear for the scheduled test session more than once, had participated in another experiment that potentially interfered with tests in the experimental battery, or simply did not complete testing once begun. In order to obtain as many participants as possible, 12 qualifying students from the Psychology 100 summer course were also used (10 females and 2 males; 5 high, 7 low dissociators). These students were required to meet the same age range requirements (18-29) and DES cutoff scores as the Spring 1998 participants. Every attempt was made to recruit equal numbers of males and
females to be tested, but because the screening sample consisted of many more women than men (approximate ratio of 3:2), slightly more women than men were used in the study. The resulting test group was comprised of 90 participants: 45 high and 45 low dissociators; 50 females (25 high and 25 low dissociators) and 40 males (20 high and 20 low dissociators). The average age was 20.13 (SD = 2.50), with a range of 18 to 28 years old. The mean DES score for high dissociators was 29.67 (SD = 7.90); for low dissociators the average was 3.47 (SD = 1.55).

Finally, more extreme high and low dissociators were considered as a separate subgroup. These were the participants who scored a 30 or above (considered a clinical level) on the DES or a 5 or below. For purposes of the present discussion, these dissociators will be referred to as "very high" or "very low" dissociators. There were a total of 58 students from the 90 in the test group who fit this description, 19 very high and 39 very low dissociators (26 males, 32 females). The average DES score for very high dissociators was 37.14 (SD = 5.79); for the very low dissociators it was 3.10 (SD = 1.30).

Statistical Analyses

Analyses were performed for the 90 test participants and the 58 students in the extreme subgroup. Statistical results are first presented for the 90 test participants, followed by analyses of the extreme subgroup.

MEMORY PERFORMANCE

For each of the explicit memory tests, separate 2 (Type: high versus low dissociator) x 2 (Gender) multivariate analyses of variance (MANOVAs) were conducted.
These tests were: the Selective Reminding Test (SRT), the Continuous Visual Memory Test (CVMT), the Autobiographical Memory Test, and the TOMM. An univariate analysis of variance (ANOVA) was conducted for the implicit memory task, the word-stem completion test.

A. Selective Reminding Test (SRT)

For this test, it was expected that high dissociators would perform significantly poorer than low dissociators. Low dissociators were expected to show normal performance (i.e., scores within the average performance range based on age and gender norms). In addition, some gender differences were expected on this test. Four scores were produced by the SRT: 1) Total Recall (sum of number correct on each trial), 2) Multiple Choice (total number correct), and 3) Delayed Recall (total correct number recalled after 30 min delay). The number of intrusions was recorded and included in the analysis as the fourth score. Intrusions are words produced at the time of delayed recall as being remembered from the original word list, but that actually were not on the list. This score is important in that it represents, in effect, one type of “false memory”--at least for verbal material under these testing circumstances. Further interpretation of the significance of this score is conducted in the Discussion.

The SRT was scored based on age and gender norms (from Larrabee et al., 1988, see Appendix K). In accordance with these norms, two scores were gender-corrected for males only. Five points were added to the Total Recall scores and one point to Delayed
Recall. Means (M) and standard deviations (SD) for male and female high and low dissociators are shown in Table 1.

Table 1. Means (+SD) for the Selective Reminding Test (SRT)

<table>
<thead>
<tr>
<th>SCORE</th>
<th>HI (n = 45)</th>
<th>LO (n = 45)</th>
<th>Females (n = 50)</th>
<th>Males (n = 40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Recall</td>
<td>127.04 (10.31)</td>
<td>123.42 (10.08)</td>
<td>125.28 (9.36)</td>
<td>125.18 (11.48)</td>
</tr>
<tr>
<td>Multiple Choice</td>
<td>12.00 (.00)</td>
<td>11.98 (.15)</td>
<td>11.98 (.14)</td>
<td>12.00 (.00)</td>
</tr>
<tr>
<td>Delayed Recall</td>
<td>11.82 (1.01)</td>
<td>11.33 (1.22)</td>
<td>11.44 (.88)</td>
<td>11.75 (1.39)</td>
</tr>
<tr>
<td>Intrusions</td>
<td>1.13 (1.39)</td>
<td>1.13 (1.69)</td>
<td>1.04 (1.46)</td>
<td>1.25 (1.64)</td>
</tr>
</tbody>
</table>

A 2 (Type: high and low dissociator) x 2 (Gender) multivariate analysis of variance (MANOVA) was performed on the four SRT scores. Main effect of dissociator type (high versus low) approached significance on two of the scores: a strong trend for Delayed Recall, $F(1, 86) = 3.74, p > .06$; and less so for Total Recall, $F(1, 86) = 3.26, p > .08$. Contrary to the hypothesis, however, the means of the high dissociators on these two scores were slightly higher than those of the low dissociators (see Table 1), although the practical significance of the differences in means is minimal (see Discussion section).

Because there were no significant gender differences, and because there was a trend toward significance between high and low dissociators on two scores, gender was collapsed to better compare the effect of type of dissociator on the SRT. With gender
collapsed, main effect of dissociator type on Total Recall remained nonsignificant, $F(1, 88) = 2.84, p > .05$, whereas it became significant for Delayed Recall, $F(1, 88) = 4.28, p < .05$, again with high dissociators scoring higher than low dissociators (see Table 1). The MANOVA yielded no main effect of gender, and no statistically significant interactions of type and gender for any of the four scores.

**Extremes**

As a further analysis, extreme scorers were considered as a separate subgroup. Means ($M$) for this group are displayed in Table 2.

<table>
<thead>
<tr>
<th>SCORE</th>
<th>Dissociator Type</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Recall</strong> I44 (+5 males)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Hi ($n = 19$)</td>
<td>127.11 (9.02)</td>
<td>124.19 (11.49)</td>
</tr>
<tr>
<td>Very Lo ($n = 39$)</td>
<td>123.00 (10.35)</td>
<td>124.47 (8.89)</td>
</tr>
<tr>
<td>Females ($n = 32$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males ($n = 26$)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Multiple Choice</strong> 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Hi ($n = 19$)</td>
<td>12.00 (.00)</td>
<td>12.00 (.00)</td>
</tr>
<tr>
<td>Very Lo ($n = 39$)</td>
<td>11.97 (.16)</td>
<td>11.97 (.18)</td>
</tr>
<tr>
<td>Females ($n = 32$)</td>
<td>11.97 (.18)</td>
<td>11.97 (.18)</td>
</tr>
<tr>
<td>Males ($n = 26$)</td>
<td>11.97 (.18)</td>
<td>11.97 (.18)</td>
</tr>
<tr>
<td><strong>Delayed Recall</strong> 12 (+1 males)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Hi ($n = 19$)</td>
<td>12.16 (.90)</td>
<td>11.81 (1.52)</td>
</tr>
<tr>
<td>Very Lo ($n = 39$)</td>
<td>11.31 (1.30)</td>
<td>11.41 (.95)</td>
</tr>
<tr>
<td>Females ($n = 32$)</td>
<td>11.41 (.95)</td>
<td>11.41 (.95)</td>
</tr>
<tr>
<td>Males ($n = 26$)</td>
<td>11.41 (.95)</td>
<td>11.41 (.95)</td>
</tr>
<tr>
<td><strong>Intrusions</strong> N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very Hi ($n = 19$)</td>
<td>1.16 (1.34)</td>
<td>1.35 (1.81)</td>
</tr>
<tr>
<td>Very Lo ($n = 39$)</td>
<td>1.21 (1.79)</td>
<td>1.21 (1.79)</td>
</tr>
<tr>
<td>Females ($n = 32$)</td>
<td>1.06 (1.52)</td>
<td>1.06 (1.52)</td>
</tr>
<tr>
<td>Males ($n = 26$)</td>
<td>1.06 (1.52)</td>
<td>1.06 (1.52)</td>
</tr>
</tbody>
</table>

When only these extreme scorers were considered, the effect of dissociator type (very high versus very low) alone on Delayed Recall (a trend toward significance in the above analysis) became statistically significant, $F(1, 54) = 6.20, p < .05$, with very high dissociators having higher means than very low dissociators (see Table 2). With gender
collapsed, the difference in performance between very high and very low dissociators on
Delayed Recall was significant at $F(1, 56) = 6.56, p < .01$. There were no other
significant main effects or interactions for this subgroup.

**B. Continuous Visual Memory Test (CVMT)**

For the CVMT, it was hypothesized that high dissociators would perform
significantly poorer than low dissociators, who were expected to show normal
performance (i.e., within average performance range based on norms). Some gender
differences were also expected. Three scores were produced by the CVMT: 1) Total
(overall number correct, taking into account the number of false alarms), 2) Delayed
Recognition (number correct), and 3) Visual Discrimination (number correct). Normative
data for this test are presented in Appendix L. Mean scores for high and low dissociating
males and females are displayed in Table 3. A 2 (Type: high or low dissociator) x 2
(Gender) MANOVA performed on the three CVMT scores produced no significant
interactions of dissociator type or gender, and no main effects.

**Table 3. Means (±SD) for the Continuous Visual Memory Test (CVMT)**

<table>
<thead>
<tr>
<th>SCORE</th>
<th>Dissociator Type</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HI (n = 45)</td>
<td>LO (n = 45)</td>
</tr>
<tr>
<td>Total Score</td>
<td>77.38 (6.99)</td>
<td>78.67 (6.74)</td>
</tr>
<tr>
<td>Delayed Recgntn</td>
<td>5.33 (1.17)</td>
<td>5.29 (1.44)</td>
</tr>
<tr>
<td>Visual Discrimn</td>
<td>7.00 (.00)</td>
<td>6.98 (.15)</td>
</tr>
</tbody>
</table>

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Extremes

Means and standard deviations for the extremely high and low dissociators are displayed in Table 4. When this group was considered separately, there were again no significant differences between very high and very low dissociators, or between males and females, and no significant interactions. It appears that visual memory as measured by the CVMT was not significantly affected by degree of dissociation.

Table 4. Means (±SD) for the Continuous Visual Memory Test (CVMT) for Extreme Subgroup

<table>
<thead>
<tr>
<th></th>
<th>Dissociator Type</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VERY HI (n = 19)</td>
<td>VERY LO (n = 39)</td>
</tr>
<tr>
<td>Total Score</td>
<td></td>
<td></td>
</tr>
<tr>
<td>96</td>
<td>79.05 (5.98)</td>
<td>78.38 (6.97)</td>
</tr>
<tr>
<td>Delayed Recgntn</td>
<td>5.53 (.96)</td>
<td>5.31 (1.38)</td>
</tr>
<tr>
<td>Visual Discrimn</td>
<td>7.00 (.00)</td>
<td>6.97 (.16)</td>
</tr>
</tbody>
</table>

C. Word-Stem Completion Test

For the implicit memory test, intact performance was expected for both high and low dissociators. Likewise, no significant differences were expected between male and female participants. Norms from a previous study using a similar age group are presented in Appendix M. The word-stem completion test score represents the percentage of items "correct"—that is, the number of words primed by the original task and reproduced on the
test portion. Mean scores for male and female high and low dissociators on the word-stem completion test are displayed in the table below.

**Table 5. Means (+SD) for the Word-Stem Completion Test**

<table>
<thead>
<tr>
<th>Dissociator Type</th>
<th>Gender</th>
<th>Female Mean ± SD</th>
<th>Male Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest possible</td>
<td>Primed</td>
<td>23.56 (12.86)</td>
<td>22.56 (12.00)</td>
</tr>
<tr>
<td>Score is 100 (%)</td>
<td>23.56 (12.86)</td>
<td>22.56 (12.00)</td>
<td>22.60 (13.22)</td>
</tr>
</tbody>
</table>

An univariate 2 (Type: high or low dissociator) x 2 (Gender) analysis of variance (ANOVA) was performed on the word-stem score and found, as predicted, no main effects for type of dissociator, $F (1, 86) = .03, p > .05$, or for gender, $F (1, 86) = .15, p > .05$. There were no significant interactions of dissociator type and gender, $F (1, 86) = 2.26, p > .05$.

**Extremes**

Table 6 displays means for the extreme subgroup on the word-stem completion test. Again, no significant main effects or interactions were found when only very high and very low dissociators were considered separately. This finding is also consistent with the hypotheses.
Table 6. Means (±SD) for the Word-Stem Completion Test for Extreme Subgroup

<table>
<thead>
<tr>
<th>Dissociator Type</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Females (n = 32)</td>
</tr>
<tr>
<td>highest possible</td>
<td></td>
</tr>
<tr>
<td>score is 100 (%)</td>
<td></td>
</tr>
<tr>
<td>Percentage Primed</td>
<td>23.16 (14.93)</td>
</tr>
<tr>
<td></td>
<td>23.97 (12.04)</td>
</tr>
</tbody>
</table>

D. Autobiographical Memory Test

For the Autobiographical Memory Test, it was predicted that high dissociators would show poorer recall for personal information compared to low dissociators, but similar degrees of certainty, or feelings-of-knowing. Gender differences were to be examined on this test, as well. There were six scores produced by the Autobiographical Memory Test. For each score, a “Yes” response was assigned a value of 1 and a “No” was assigned a value of 0. Certainty scores are sums of Likert-type scale values. As a reminder, the six scores were: 1) Autobio1 (sum for Question 1, related to birthdays); 2) Autobio2 (sum for Question 2, teachers/employers); 3) AutobioTotl (Autobio1 + Autobio2); 4) Certain1 (sum reflecting certainty for Question 1); 5) Certain2 (certainty for Question 2); and 6) CertainTotl (Certain1 + Certain2). For clarification, it should be kept in mind that it is possible to answer “No” to a question for autobiographical memory content and at the same time be very certain about the answer to that question (i.e., one could be very sure that one does not remember). Also, higher certainty scores reflect less
confidence since these scores were based on responses to a Likert scale that ranged from 1 (Very Certain) to 5 (Not Certain at All).

Means for the 84 participants on each of the six Autobiographical Memory Test scores are shown in Table 7 below. Data were missing from 6 participants (5 high and 1 low dissociator; 3 females and 3 males) for whom complete scores could not be calculated due to failure to respond to one or more test questions.

Table 7. Means (+SD) for the Autobiographical Memory Test

<table>
<thead>
<tr>
<th>SCORE</th>
<th>Dissociator Type</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HI (n = 40)</td>
<td>LO (n = 44)</td>
</tr>
<tr>
<td>Autobio1</td>
<td>1.98 (.89)</td>
<td>2.36 (1.28)</td>
</tr>
<tr>
<td>Autobio2</td>
<td>3.93 (.35)</td>
<td>3.91 (.36)</td>
</tr>
<tr>
<td>AutobioTotl</td>
<td>5.90 (1.03)</td>
<td>6.30 (1.39)</td>
</tr>
<tr>
<td>Certain1</td>
<td>7.40 (2.58)</td>
<td>7.91 (2.92)</td>
</tr>
<tr>
<td>Certain2</td>
<td>4.50 (1.18)</td>
<td>4.52 (1.58)</td>
</tr>
<tr>
<td>CertainTotl</td>
<td>11.90 (2.84)</td>
<td>12.43 (3.88)</td>
</tr>
</tbody>
</table>

A 2 (Type: high or low dissociator) x 2 (Gender) MANOVA was conducted on the six scores and, although there were no significant differences between high and low dissociators, there was a main effect of gender on two scores. The first was for Autobio1, \( F(1, 80) = 14.85, p < .01 \), with women showing higher means (see Table 7), meaning
women had better recall for this question than did men. The second main effect of gender was for AutobioTotl, $F (1, 80) = 15.67, p < .01$, with women again showing higher means than men (see Table 7). There was a trend toward significance for interaction of dissociator type and gender on AutobioTotl, $F (1, 80) = 3.55, p > .06$ (see Figure 1). All other interactions were nonsignificant.

Figure 1. Interaction of Dissociator Type and Gender on AutobioTotl

Extremes A 2 (Type: very high or very low dissociator) x 2 (Gender) MANOVA was also conducted on the six Autobiographical Memory Test scores for the extreme high and low dissociators, which for this analysis consisted of 54 of the 58 extreme dissociators due to missing data in 4 participants (3 very high and 1 very low dissociator; 2 females and 2 males). Means for this group are listed in Table 8 below.
Table 8. Means (±SD) for the Autobiographical Memory Test for Extreme Subgroup

<table>
<thead>
<tr>
<th>Dissociator Type</th>
<th>Gender</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>VERY HI (n = 16)</td>
<td>VERY LO (n = 38)</td>
<td>Females (n = 30)</td>
</tr>
<tr>
<td>Autobiograph 1</td>
<td>1.75 (0.77)</td>
<td>2.34 (1.30)</td>
<td>2.60 (1.16)</td>
<td>1.63 (1.01)</td>
</tr>
<tr>
<td>Autobiograph 2</td>
<td>3.94 (0.25)</td>
<td>3.89 (0.39)</td>
<td>4.00 (0.00)</td>
<td>3.79 (0.51)</td>
</tr>
<tr>
<td>Autobiograph Totl</td>
<td>5.69 (0.87)</td>
<td>6.26 (1.43)</td>
<td>6.63 (1.19)</td>
<td>5.42 (1.14)</td>
</tr>
</tbody>
</table>

There was a main effect of gender on Autobiograph 1, F (1, 50) = 7.12, p < .01, with women scoring higher (i.e., better recall) than men (see Table 8). There was also a main effect of gender on Autobiograph Totl, F (1, 50) = 9.78, p < .01, again with women showing higher means than men (see Table 8). In addition, there was a trend toward significance in main effect of gender on Autobiograph 2, F (1, 50) = 3.35, p > .07, with women showing better recall than men on Question 2 (see Table 8). There were no other significant main effects or interactions on the Autobiographical Memory Test scores for the extreme subgroup of dissociators.
E. Test of Memory Malingering (TOMM)

Specific directional predictions for high and low dissociators were not made for this test because there are no data available upon which to base such predictions. There was also no reason to suspect purposeful simulation of memory problems by this test group. Gender differences were also examined. The TOMM produced three scores: Trials 1 and 2 (number correct out of 50 possible on each trial) and Retention Trial (15-min delayed recall). Norms are available in Appendix N. Means for these scores are shown in Table 9. A 2 (Type: high or low dissociator) x 2 (Gender) MANOVA found no significant interactions between level of dissociation (high versus low) and gender, and no main effects.

**Table 9. Means (±SD) for the Test of Memory Malingering (TOMM)**

<table>
<thead>
<tr>
<th>Dissociator Type</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HI (n = 45)</td>
</tr>
<tr>
<td><strong>SCORE</strong></td>
<td></td>
</tr>
<tr>
<td><strong>highest possible score is in italics</strong></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>49.18 (1.27)</td>
</tr>
<tr>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Trial 2</td>
<td>49.96 (.21)</td>
</tr>
<tr>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Retention Trial</td>
<td>50.00 (.00)</td>
</tr>
<tr>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

**Extremes**

Table 10 displays means scores on the TOMM for the extreme subgroup. Analysis of this group also resulted in no significant differences between very high and very low
dissociators, or between males and females on any of the TOMM scores; there were also no significant interactions. These results suggest that there was no deliberate exaggeration or feigning of memory problems by any of the participants.

Table 10. Means (±SD) for the Test of Memory Malingering (TOMM) for Extreme Subgroup

<table>
<thead>
<tr>
<th>Dissociator Type</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VERY HI (n = 19)</td>
</tr>
<tr>
<td>Trial 1</td>
<td>49.18 (1.39)</td>
</tr>
<tr>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Trial 2</td>
<td>49.95 (.23)</td>
</tr>
<tr>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Retention Trial</td>
<td>50.00 (.00)</td>
</tr>
</tbody>
</table>

II. HEALTH AND LIFE EVENTS QUESTIONNAIRE

For the Health and Life Events Questionnaire, a 2 (Type: high versus low dissociator) x 2 (Gender) multivariate analysis of variance (MANOVA) was conducted for the eight scales. Results of this analysis are presented first, followed by results of a general comparison of response patterns to Health and Life Events Questionnaire Item 21, the dissociative amnesia item.

A. The Eight Health and Life Events Questionnaire Scales

It was hypothesized that high dissociators would report higher rates of abuse, trauma, significant neurological history, and features of anxiety and depression on the
Health and Life Events Questionnaire (H&LEQ) scales. Some differences in response patterns between men and women were also expected. One sum score was produced for each of the eight H&LEQ scales, or factors: 1) Abuse; 2) Anxiety (ANX); 3) Crime; 4) Depression (DEP); 5) Disaster (DISTR); 6) Drug and Alcohol Use (DA); 7) Neurological History (NEURO); and 8) Self-Harm (SH). Scores for each scale were obtained by adding “Yes” and “No” frequencies for that set of questions. Means may seem much higher for some scales than for others because some scores reflect the average of Likert scale values that ranged from 0 to 5 instead of the dichotomous Yes (1) and No (0) values for most of the scales.

In the case of the NEURO scale, all minutes and hours (length of time unconscious due to head injury) were converted to seconds in order to standardize the various obtained responses to this question. Answers indicating an unspecified length of time, such as “a few seconds” or “a few minutes” were assigned a value of 10 (s or min, as indicated). In the event that this part of the question was left blank, a value of 10 s was assigned. The NEURO score reflects the cumulative score of time unconscious from all head injuries reported. Scores of 900 s (15 min) or above were considered positive for significant neurological history (i.e., more serious head injury). Out of the 90 test participants, only 5 (4 male, 1 female) indicated they had ever been rendered unconscious for 15 or more min and, therefore, only descriptive statistics were performed on this small group. Of the 5 students, 2 were very low dissociators and the other 3 were high (1 of whom was a very
high dissociator). The average DES score of these 5 respondents was 19.46 (SD = 14.91).

The average Amnesia score was 9.75 (SD = 12.26).

Means for the test group on the eight Health and Life Events Questionnaire scales are displayed in Table 11.

**Table 11. Means (±SD) for the Health & Life Events Questionnaire Scales**

<table>
<thead>
<tr>
<th>SCORE</th>
<th>Dissociator Type</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hi (n = 44)</td>
<td>Lo (n = 45)</td>
<td>Females (n = 50)</td>
</tr>
<tr>
<td>Abuse</td>
<td>1.68 (1.24)</td>
<td>1.09 (1.33)</td>
</tr>
<tr>
<td>Anxiety (ANX)</td>
<td>4.57 (2.36)</td>
<td>3.42 (1.70)</td>
</tr>
<tr>
<td>Crime</td>
<td>.64 (.75)</td>
<td>.20 (.50)</td>
</tr>
<tr>
<td>Depression (DEP)</td>
<td>5.00 (3.07)</td>
<td>2.96 (1.78)</td>
</tr>
<tr>
<td>Disaster (DISTR)</td>
<td>2.09 (1.70)</td>
<td>1.51 (1.24)</td>
</tr>
<tr>
<td>Drugs &amp; Alcohol (DA)</td>
<td>1.52 (1.36)</td>
<td>.64 (1.17)</td>
</tr>
<tr>
<td>Neurological History (NEURO)</td>
<td>8278.58</td>
<td>228.31</td>
</tr>
<tr>
<td>Self-Harm (SH)</td>
<td>.36 (.49)</td>
<td>.07 (.25)</td>
</tr>
</tbody>
</table>

Responses to the Health and Life Events Questionnaire were analyzed using a 2 (Type: high or low dissociator) x 2 (Gender) MANOVA on the sum scores for each of the eight scales. The scores reported here are based on analysis of 89 instead of 90 participants, because of incomplete data from 1 participant (a very high dissociating male).

As predicted, there were significant differences between high and low dissociators on almost all of the scales: Abuse, ANX, Crime, DEP, DA, and Self-Harm (SH). These results are presented in Table 12.

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Table 12. Main Effect of Dissociator Type on Health & Life Events Questionnaire Scales

<table>
<thead>
<tr>
<th>SCALE</th>
<th>F (df: 1, 85)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abuse</td>
<td>4.30</td>
<td>.05*</td>
</tr>
<tr>
<td>Anxiety (ANX)</td>
<td>6.98</td>
<td>.01*</td>
</tr>
<tr>
<td>Crime</td>
<td>8.69</td>
<td>.01**</td>
</tr>
<tr>
<td>Depression (DEP)</td>
<td>16.01</td>
<td>.01**</td>
</tr>
<tr>
<td>Disaster (DISTR)</td>
<td>3.35</td>
<td>.07~</td>
</tr>
<tr>
<td>Drugs &amp; Alcohol (DA)</td>
<td>12.12</td>
<td>.01**</td>
</tr>
<tr>
<td>Neurological History (NEURO)</td>
<td>1.08</td>
<td>.30</td>
</tr>
<tr>
<td>Self-Harm (SH)</td>
<td>13.75</td>
<td>.01**</td>
</tr>
</tbody>
</table>

Note: * denotes significance at .05 level or greater, ** at .01 or greater, ~ denotes trend toward significance

On all scales for which there was a significant main effect of dissociator type (high versus low), or a strong trend toward significance, high dissociators had higher means (see Table 11) than did low dissociators. This implies that high dissociators showed, as expected, higher levels of abuse, anxiety, victimization by or witness to crime, depressive symptoms, exposure to disaster, and history of deliberate self-harm than low dissociators.

There was also a main effect of gender on three of the factors: DA, DEP, and DISTR. Statistical values for this analysis are presented in Table 13. For DEP, women showed more depressed mood than men, but on the DISTR scale, men indicated more exposure to disaster experiences than women. For the DA scale, males also reported more problematic substance use than females (see Table 11 above).
Table 13. Main Effect of Gender on Health & Life Events Questionnaire Scales

<table>
<thead>
<tr>
<th>SCALE</th>
<th>F (df: 1, 85)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abuse</td>
<td>.02</td>
<td>.88</td>
</tr>
<tr>
<td>Anxiety (ANX)</td>
<td>1.70</td>
<td>.20</td>
</tr>
<tr>
<td>Crime</td>
<td>2.99</td>
<td>.09</td>
</tr>
<tr>
<td>Depression (DEP)</td>
<td>4.81</td>
<td>.05*</td>
</tr>
<tr>
<td>Disaster (DISTR)</td>
<td>11.21</td>
<td>.01**</td>
</tr>
<tr>
<td>Drugs &amp; Alcohol (DA)</td>
<td>3.97</td>
<td>.05*</td>
</tr>
<tr>
<td>NEURO</td>
<td>1.10</td>
<td>.30</td>
</tr>
<tr>
<td>Self-Harm (SH)</td>
<td>.22</td>
<td>.64</td>
</tr>
</tbody>
</table>

Note: * denotes significance at .05 level or greater, ** at .01 or greater

Finally, there was a significant interaction between level of dissociation (high versus low) and gender on Drug and Alcohol Use (DA), with F (1, 85) = 4.86, p < .05 (see Figure 2 below). All interactions between dissociator type and gender for the other scales were nonsignificant.

Figure 2. Interaction of Dissociator Type and Gender on Drug and Alcohol Use
**Extremes**  Again, the very high and very low dissociators were considered as a separate, extreme subgroup. Of the 58 very high and very low dissociators, only 57 were included in analysis because of missing data on some scales from 1 student, the same very high dissociating male not included in analysis of the whole participant group above. Means for the extreme subgroup are shown in Table 14 (see below).

Responses to the Health and Life Events Questionnaire for the extreme subgroup were also analyzed using a 2 (Type: very high or very low dissociator) x 2 (Gender) MANOVA. For this group, there was a significant main effect of dissociator type on five of the eight scales. These were: ANX, Crime, DEP, DA, and SH. Table 15 (below) displays statistical values for this analysis. Once again, on all scales for which there were significant differences between very high and very low dissociators, or a strong trend toward significance, very high dissociators had higher means than did very low dissociators (see Table 14). Although there was a possible trend toward significance between high and low dissociators on Disaster for the general test group, this was not the case for the extreme dissociators (very high versus very low). Additionally, whereas there were significant differences between high and low dissociators on Abuse for the general test group considered above, there was only a trend toward significance on this scale for the extreme subgroup, $F(1, 53) = 3.44$, $p > .07$. Very high dissociators indicated somewhat more abuse than very low dissociators (see Table 14).
### Table 14. Means (±SD) for Extreme Subgroup on the Health & Life Events Questionnaire Scales

<table>
<thead>
<tr>
<th>Dissociator Type</th>
<th>Gender</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 18)</td>
<td>(n = 39)</td>
</tr>
<tr>
<td>Abuse</td>
<td>1.78 (1.40)</td>
<td>1.03 (1.29)</td>
</tr>
<tr>
<td>Anxiety (ANX)</td>
<td>4.89 (2.42)</td>
<td>3.41 (1.74)</td>
</tr>
<tr>
<td>Crime</td>
<td>.89 (.83)</td>
<td>.23 (.54)</td>
</tr>
<tr>
<td>Depression (DEP)</td>
<td>5.78 (3.47)</td>
<td>3.03 (1.90)</td>
</tr>
<tr>
<td>Disaster (DISTR)</td>
<td>2.06 (1.51)</td>
<td>1.64 (1.25)</td>
</tr>
<tr>
<td>Drugs &amp; Alcohol (DA)</td>
<td>1.67 (1.33)</td>
<td>.49 (1.02)</td>
</tr>
<tr>
<td>NEURO</td>
<td>20046.11</td>
<td>262.56</td>
</tr>
<tr>
<td>(SH)</td>
<td>(84841.42)</td>
<td>(1165.55)</td>
</tr>
<tr>
<td>Self-Harm (SH)</td>
<td>.44 (.51)</td>
<td>.05 (.22)</td>
</tr>
</tbody>
</table>

Note: * denotes significance at .05 level, ** at .01 or greater
~ denotes trend toward significance

### Table 15. Main Effect of Dissociator Type on the Health & Life Events Questionnaire Scales for Extreme Subgroup

<table>
<thead>
<tr>
<th>Scale</th>
<th>F (df: 1, 53)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abuse</td>
<td>3.44</td>
<td>.07~</td>
</tr>
<tr>
<td>Anxiety (ANX)</td>
<td>6.33</td>
<td>.05*</td>
</tr>
<tr>
<td>Crime</td>
<td>11.85</td>
<td>.01**</td>
</tr>
<tr>
<td>Depression (DEP)</td>
<td>15.64</td>
<td>.01**</td>
</tr>
<tr>
<td>Disaster (DISTR)</td>
<td>1.50</td>
<td>.23</td>
</tr>
<tr>
<td>Drugs &amp; Alcohol (DA)</td>
<td>15.88</td>
<td>.01**</td>
</tr>
<tr>
<td>NEURO</td>
<td>2.83</td>
<td>.10</td>
</tr>
<tr>
<td>Self-Harm (SH)</td>
<td>15.98</td>
<td>.01**</td>
</tr>
</tbody>
</table>

Note: * denotes significance at .05 level, ** at .01 or greater
~ denotes trend toward significance
For the extreme subgroup, there was also a significant main effect of gender on the same three scales that were significantly affected by gender for the general test group. These were DEP, DISTR, and DA (see Table 16 for statistical results for all eight scales).

**Table 16. Main Effect of Gender on H&LEQ Scales for Extreme Dissociators**

<table>
<thead>
<tr>
<th>SCALE</th>
<th>F (df: 1, 53)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abuse</td>
<td>.76</td>
<td>.39</td>
</tr>
<tr>
<td>Anxiety (ANX)</td>
<td>.98</td>
<td>.33</td>
</tr>
<tr>
<td>Crime</td>
<td>.24</td>
<td>.63</td>
</tr>
<tr>
<td>Depression (DEP)</td>
<td>8.49</td>
<td>.01**</td>
</tr>
<tr>
<td>Disaster (DISTR)</td>
<td>5.08</td>
<td>.05*</td>
</tr>
<tr>
<td>Drugs &amp; Alcohol (DA)</td>
<td>5.47</td>
<td>.05*</td>
</tr>
<tr>
<td>NEURO</td>
<td>2.85</td>
<td>.10</td>
</tr>
<tr>
<td>Self-Harm (SH)</td>
<td>1.21</td>
<td>.28</td>
</tr>
</tbody>
</table>

Note: * denotes significance at .05 level or greater, ** at .01 or greater

For DEP, women endorsed depressive mood items more so than men. However, on DISTR, men indicated more experiences with disaster than women; and for DA, males again endorsed more problems with substance use than women (see Table 14 above). For the extreme subgroup, there were no statistically significant interactions of level of dissociation and gender. This interaction did, however, approach significance for the Crime scale, $F(1, 53) = 3.55, p > .07$ (see Figure 3). On DA, for which interaction of dissociator type and gender had been statistically significant for the general high and low groups (i.e., the entire test group; see above), the interaction for the extreme subgroup was nonsignificant, $F(1, 53) = 3.11, p > .08$. 

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B. Item 21: Dissociative Amnesia Item

As a supplementary examination of the effects of dissociation and gender on memory, Item 21 on the Health and Life Events Questionnaire was considered individually. This item is a Yes/No question that inquires whether there has ever been loss of memory or awareness of past sexual abuse, assault, or rape, but is to be answered only if the respondent has had these types of experiences. Only 12 of the total participants (13%) indicated this type of mistreatment and answered this question. Because of this, Item 21 was not included in the overall analysis as a separate factor or scale, and formal statistics were not performed. Rather, a general comparison of response trends for the groups was conducted because the content of this question is so close to dissociative amnesia for traumatic events--essentially the basis of this study. The following comparison, therefore, is not intended as a formal statistical presentation, and is to be used primarily as supplementary information.
Of the 90 test participants, 12 responded to Item 21 (see Table 17 for division by level of dissociation and gender), with 3 answering affirmatively and 9 negatively. All 3 of the students who answered "Yes" were female and were high dissociators (1 of these was a very high dissociator). No low dissociator answered "Yes." Both males (1 very high, 1 very low) answered "No" to this item, $M = .00$ (SD = .00). The 7 others who answered negatively were female. The mean score for all females was .30 (SD = .48). The mean for the 9 high dissociators was .33 (SD = .50). The average DES score for these 12 respondents was 23.17 (SD = 13.02); this mean is in the high dissociator score range. The average Amnesia subscale score for this group was 14.38 (SD = 10.41).

Table 17. Classification by Dissociator Type and Gender of Respondents to H&LEQ Item 21

<table>
<thead>
<tr>
<th>High Dissociators</th>
<th>Low Dissociators</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 Females</td>
<td>0 Females</td>
</tr>
<tr>
<td>0 Males</td>
<td>0 Males</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Very High Dissociators</th>
<th>Very Low Dissociators</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Females</td>
<td>2 Females</td>
</tr>
<tr>
<td>1 Male</td>
<td>1 Male</td>
</tr>
</tbody>
</table>

**(Totals by Gender: 10 Females, 2 Males)**

**Extremes** Of the 12 participants responding to this question, only 6 qualified as very high or very low dissociators (see Table 17). From this group, 5 answered "No" and 1
student, a very high dissociating female, answered "Yes." Both of the males were in this extreme subgroup. The mean for the females in this subgroup was .25 (SD = .50). All 3 of the very low dissociators answered negatively to Item 21, M = .00 (SD = .00). The mean for the very high dissociators was .33 (SD = .58). These results are interpreted in the Discussion section.

III. AMNESIA SUBSCALE

For the Amnesia subscale of the DES, item correlations were first conducted for comparison of the individual amnesia items to the average Amnesia score, as well as to the average DES score. Correlational analyses were then conducted to examine the relationship between gender and the amnesia and other DES items. Next, Amnesia scores were compared to memory test scores and to responses on the eight Health and Life Events Questionnaire scales, as well as to responses to Item 21, the dissociative amnesia item.

The Amnesia subscale of the Dissociative Experiences Scale (DES) consists of eight (#s 3, 4, 5, 6, 8, 10, 25, and 26) of the 28 DES items that inquire specifically about memory-related dissociative experiences. An examination of the possible Amnesia subscale item was conducted in order to determine the relative contribution of amnesia-related items to the average Amnesia score and overall DES score. Also of interest was the relationship between the Amnesia score and scores on the memory tests. It was generally expected that the Amnesia score would correlate positively with the DES score and with scores on the explicit memory tests, but not with the implicit memory test score,
on which normal performance was expected for all groups. Relationships between the Amnesia score and the Health and Life Events Questionnaire scales were also explored, with the prediction of positive correlations between Amnesia scores and the types of clinical features (substance use, mood, trauma and abuse) tapped by this survey. Gender differences were also expected in responses to the amnesia items.

A. Amnesia Subscale Item Correlations

Corrected item total correlations (CITCs; which are correlations of the individual items to the scale average, but with the item itself removed from analysis), were conducted first on the entire screening sample and then separately on only the 90 test participants. The entire sample was used not only because this information was available, but also because doing so provided a more continuous range of Amnesia and DES scores with which to compare individual items, as well as supplying a larger sample on which to base results. For item analyses, the more extreme subgroup was not considered as a separate group, as was done in analysis with the other measures, because doing so would inflate correlations, which would naturally be higher since the subgroup, by definition, consists of extreme scorers.

i. Amnesia subscale item correlations to average Amnesia score

First, corrected item total correlations (CITCs) were conducted to determine the correlation of each of the eight amnesia items to the Amnesia score. CITCs are shown in Table 18 (see below) for both the entire screened group and the test group. In general, correlation coefficients were moderate to good, with the poorest coefficient for Item 8.
(refers to inability to recognize friends or family; see Appendix A) in the entire screening group ($r = .29$). However, statistics suggest that removal of Item 8 would not significantly affect the reliability coefficient ($\alpha$) for the subscale. Reliability coefficients for the Amnesia scale (all eight items) were good for both groups ($\alpha = .76$ to .79; see Table 18).

Therefore, it appears that the Amnesia subscale does represent a fairly cohesive group of items within the DES scale.

Table 18. Corrected Item Total Correlations (CITCs) of Individual Amnesia Items to Average Amnesia Score

<table>
<thead>
<tr>
<th>ITEM #</th>
<th>$r$ value</th>
<th>Alpha if Item Deleted</th>
<th>$r$ value</th>
<th>Alpha if Item Deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>.44</td>
<td>.73</td>
<td>.55</td>
<td>.76</td>
</tr>
<tr>
<td>4</td>
<td>.43</td>
<td>.74</td>
<td>.46</td>
<td>.78</td>
</tr>
<tr>
<td>5</td>
<td>.50</td>
<td>.73</td>
<td>.52</td>
<td>.77</td>
</tr>
<tr>
<td>6</td>
<td>.45</td>
<td>.74</td>
<td>.49</td>
<td>.78</td>
</tr>
<tr>
<td>8</td>
<td>.29</td>
<td>.75</td>
<td>.41</td>
<td>.79</td>
</tr>
<tr>
<td>10</td>
<td>.54</td>
<td>.71</td>
<td>.61</td>
<td>.75</td>
</tr>
<tr>
<td>25</td>
<td>.57</td>
<td>.70</td>
<td>.60</td>
<td>.75</td>
</tr>
<tr>
<td>26</td>
<td>.55</td>
<td>.71</td>
<td>.59</td>
<td>.75</td>
</tr>
</tbody>
</table>

Re:liability Coefficient: $\alpha = .76$  

Reliability Coefficient: $\alpha = .79$

### ii. Amnesia subscale item correlations to average DES score

Next, CITCs were conducted to determine the relative variance of each of the amnesia items to the overall DES score (average of all 28 items on the scale). CITCs for both the screening sample and the test group are listed in Table 19 below. Correlation
coefficients for this analysis were moderate to good for all items, again with the lowest correlation for Item 8 in the screening group \( (r = .29) \), and Item 4 (relates to inability to remember putting on the clothes being worn; see Appendix A) in the test group \( (r = .35) \).

As in the above analysis, statistics indicate that removing these items would not significantly change reliability coefficients for the scale. Reliability coefficients for the DES scale (all 28 items) were excellent for both groups, with \( \alpha = .91 \) to .95 (see Table 19).

**Table 19. Corrected Item Total Correlations (CITCs) of Individual Amnesia Items to Overall DES Score**

<table>
<thead>
<tr>
<th>ITEM #</th>
<th>Entire Screening Sample (N = 430)</th>
<th>Test Sample (n = 90)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r value Alpha if Item Deleted</td>
<td>r value Alpha if Item Deleted</td>
</tr>
<tr>
<td>3</td>
<td>.50 .90</td>
<td>.58 .94</td>
</tr>
<tr>
<td>4</td>
<td>.41 .91</td>
<td>.35 .95</td>
</tr>
<tr>
<td>5</td>
<td>.44 .90</td>
<td>.52 .94</td>
</tr>
<tr>
<td>6</td>
<td>.45 .90</td>
<td>.53 .94</td>
</tr>
<tr>
<td>8</td>
<td>.29 .91</td>
<td>.44 .95</td>
</tr>
<tr>
<td>10</td>
<td>.54 .90</td>
<td>.65 .94</td>
</tr>
<tr>
<td>25</td>
<td>.62 .90</td>
<td>.67 .94</td>
</tr>
<tr>
<td>26</td>
<td>.59 .90</td>
<td>.64 .94</td>
</tr>
</tbody>
</table>

Reliability Coefficient: \( \alpha = .91 \) Reliability Coefficient: \( \alpha = .95 \)

Finally, the relationship between the Amnesia score and the DES score was computed, and a strong positive relationship was found between these two scores \( (r = .83, p < .01) \). In summary, there appears to be a moderate to good relationship between most of the amnesia items and both the average Amnesia and DES scores. Removal of specific
items from the subscale is not indicated based on these results. The Amnesia score and the DES score are well-correlated.

B. Gender and Item Correlations

i. Amnesia score and items

The correlation between gender and the average Amnesia score was nonsignificant for the screening sample, the general test group, and the extreme subgroup. An one-way MANOVA was conducted to assess the effect of gender on the eight amnesia items. No significant effects of gender were found on any of the individual items for either the test group or the extreme subgroup. For the screening group, however, gender did significantly affect Item 4, which relates to memory for dressing oneself, $F(1, 423) = 6.02$, $p < .05$. Women reported lower means (i.e., fewer problems) with this type of experience; $M = 2.29$ (SD = 8.27) for males and $M = 1.12$ (SD = 4.04) for females. Overall, however, gender was not strongly tied to any of the eight Amnesia subscale items.

ii. DES score and items

The correlation between gender and overall DES score was nonsignificant for the screening sample, the test group, and the extreme subgroup. An one-way MANOVA was also conducted to test the effect of gender on all 28 of the DES items (which include the eight amnesia items). Analysis revealed a significant effect of gender [$F(1, 88) = 5.46$, $p < .05$] for the general test group only for Item 19, which relates to the ability to ignore pain (see Appendix A). For this item, males indicated higher mean percentages than females,
with $M = 31.75$ (SD = 25.71) compared to $M = 18.80$ (SD = 26.47). There was no significant effect of gender on any of the DES items for the extreme subgroup.

When the entire screening sample ($N = 425$) was considered, gender produced a significant effect on 4 of the 28 DES items. Statistics for Item 4, which is an Amnesia subscale item, are reported in the section above. For Item 15 ("Some people have the experience of not being sure whether things that they remember happening really did happen or whether they just dream them"), $F (1, 423) = 2.97, p < .05$, this time with females indicating higher means, $M = 22.53$ (SD = 21.12), than males, $M = 18.05$ (SD = 19.15). There was also a significant effect of gender on Item 19 (which relates to the ability to ignore pain) for this group, as there was for the test group, with $F (1, 423) = 15.93, p < .01$. Males had higher means, $M = 31.41$ (SD = 26.85), compared to females, $M = 18.25$ (SD = 21.26). Finally, for Item 23 ("Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them..."), $F (1, 423) = 8.30, p < .01$. Here again, males had higher means, $M = 29.80$ (SD = 26.68), than did females, $M = 20.74$ (SD = 20.47). These results suggest that gender did affect some of the DES items, including one of the amnesia items, but that this was not the pattern for most of the items on the DES scale.

C. Amnesia Score and Memory Test Scores

The next set of correlational analyses was conducted to compare Amnesia scores to scores on each of the memory tests. For each subsection below, results of the general
analysis for all 90 participants is reported first, followed by a description of results for the extreme subgroup (the very high and very low dissociators).

For the Selective Reminding Test (SRT), it was predicted that the Amnesia score would significantly and inversely correlate with the SRT scores. However, there were no significant correlations between the Amnesia score and any of the four SRT scores: Total, Multiple Choice, Delayed Recall, and Intrusions (again, the number of words mentioned at Delayed Recall that were not part of the original list). For the extreme subgroup, correlations were nonsignificant for three of the SRT scores, but there was a trend toward significance on Delayed Recall, $r = .24$, $p > .07$. This trend was not, however, in the direction expected. That is, there was a slight tendency for Delayed Recall scores to increase as the Amnesia score increased, although the practical significance of this result is questionable (see comments above in Results for Memory Performance on SRT).

Contrary to the hypothesis, there were no significant correlations between the Amnesia score and any of the three Continuous Visual Memory Test (CVMT) scores: Total, Delayed Recall, and Visual Discrimination. There were also no significant correlations between the Amnesia score and any of the CVMT scores for the extreme subgroup. Results imply no direct relationship between Amnesia score and nonverbal (visual) memory.

As predicted, there was no significant correlation between the Amnesia score and the single score on the word-stem completion test. This was also true for the extreme subgroup. Amnesia scores, then, were not significantly related to performance on this task.
There were also no significant correlations between Amnesia score and the three TOMM scores for either the general test group or the extreme subgroup. This finding suggests no purposeful exaggeration or feigning of memory problems regardless of Amnesia score.

For the Autobiographical Memory Test, it was hypothesized that recall (but not certainty for recall) for retrograde memories would decrease as Amnesia scores increased. Again, the six scores for this test were: 1) Autobio1 (sum for Question 1, birthdays); 2) Autobio2 (Question 2, teachers/employers); 3) AutobioTotl (Autobio1 + Autobio2); 4) Certain1 (certainty for Question 1); 5) Certain2 (certainty for Question 2); and 6) CertainTotl (Certain1 + Certain2). Results of the correlational analysis for both the general test group and the extreme subgroup are shown in Table 20.

**Table 20. Correlation Coefficients for Amnesia Scores and Autobiographical Memory Test Scores**

<table>
<thead>
<tr>
<th>SCALE</th>
<th>General Test Group</th>
<th></th>
<th></th>
<th>Extreme Subgroup</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>r value</td>
<td>p value</td>
<td>n</td>
<td>r value</td>
<td>p value</td>
</tr>
<tr>
<td>Autobio1</td>
<td>90</td>
<td>-0.20</td>
<td>0.06~</td>
<td>58</td>
<td>-0.23</td>
<td>0.08</td>
</tr>
<tr>
<td>Autobio2</td>
<td>90</td>
<td>-0.03</td>
<td>0.80</td>
<td>58</td>
<td>0.03</td>
<td>0.81</td>
</tr>
<tr>
<td>AutobioTotl (Autobio1 + Autobio2)</td>
<td>90</td>
<td>-0.20</td>
<td>0.06~</td>
<td>58</td>
<td>-0.21</td>
<td>0.11</td>
</tr>
<tr>
<td>Certain1</td>
<td>84</td>
<td>-0.10</td>
<td>0.39</td>
<td>54</td>
<td>-0.12</td>
<td>0.38</td>
</tr>
<tr>
<td>Certain2</td>
<td>90</td>
<td>0.20</td>
<td>0.06~</td>
<td>58</td>
<td>0.30</td>
<td>0.05*</td>
</tr>
<tr>
<td>CertainTotl (Certain1 + Certain2)</td>
<td>84</td>
<td>-0.02</td>
<td>0.89</td>
<td>54</td>
<td>0.01</td>
<td>0.92</td>
</tr>
</tbody>
</table>

Note: * denotes significance at .05 level or greater
~ denotes trend toward significance
For the general test group, there was a strong trend toward significance in correlation between the Amnesia score and three of the six Autobiographical Memory Test scores. For Autobiol, $r = -.20, p > .06$, suggesting that recall for Question 1 decreased as the Amnesia score increased. For AutobioTotl, $r = -.20, p > .06$, again implying an inverse relationship between the Amnesia score and recall for personal information. The relationship between the Amnesia score and Certain2 also approached significance, with $r = .20, p > .06$. As the Amnesia score increased, the total on the Likert scale increased for Question 2. Here, the $r$ value is positive because higher numbers on this score indicate poorer certainty of response. Therefore, as the Amnesia score increased, the less certain participants were about answers to Question 2. Correlations between Amnesia and Question 1 (Certain1), Amnesia and Autobiol, and Amnesia and CertainTotl were nonsignificant.

For the extreme subgroup, there was a significant correlation between the Amnesia score and Certain2, with $r = .30, p < .05$, meaning that, when the extreme scorers were considered, the trend noted above for all 90 participants on this score became statistically significant. Respondents became more uncertain of recall for Question 2 as Amnesia scores increased. All correlations between Amnesia and the other Autobiographical Memory Test scores for the extreme subgroup were nonsignificant. The Amnesia score, therefore, appears to be most strongly related—particularly in the extreme subgroup—to lack of certainty for autobiographical recall for Question 2, which relates to memory for
past teachers or employers. Amnesia scores are less predictably related to the other Autobiographical Memory Test scores.

D. Amnesia Score and the Health and Life Events Questionnaire (H&LEQ)

Amnesia scores were then correlated with the scales from the Health and Life Events Questionnaire (H&LEQ). The H&LEQ scales are: 1) Abuse, 2) Anxiety (ANX), 3) Crime, 4) Depression (DEP), 5) Disaster (DISTR), 6) Drug and Alcohol Use (DA), 7) Neurological History (NEURO), and 8) Self-Harm (SH). Analysis of all 90 participants was first conducted, followed by analysis of the extreme subgroup. Two scales (Abuse and DISTR) had data missing from one participant, a very high dissociating male.

As expected, there were significant correlations between the Amnesia score and most of the eight scales, both for the general test group and the extreme subgroup.

Correlations for both groups on each of the eight scales are listed in Table 21.

<table>
<thead>
<tr>
<th>SCALE</th>
<th>General Test Group</th>
<th></th>
<th></th>
<th>Extreme Subgroup</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>r value</td>
<td>p value</td>
<td>n</td>
<td>r value</td>
<td>p value</td>
</tr>
<tr>
<td>Abuse</td>
<td>89</td>
<td>.24</td>
<td>.05*</td>
<td>57</td>
<td>.30</td>
<td>.05*</td>
</tr>
<tr>
<td>Anxiety (ANX)</td>
<td>90</td>
<td>.29</td>
<td>.01*</td>
<td>58</td>
<td>.38</td>
<td>.01*</td>
</tr>
<tr>
<td>Crime</td>
<td>90</td>
<td>.42</td>
<td>.01**</td>
<td>58</td>
<td>.48</td>
<td>.01**</td>
</tr>
<tr>
<td>Depression (DEP)</td>
<td>90</td>
<td>.38</td>
<td>.01**</td>
<td>58</td>
<td>.47</td>
<td>.01**</td>
</tr>
<tr>
<td>Disaster (DISTR)</td>
<td>89</td>
<td>.18</td>
<td>.09</td>
<td>57</td>
<td>.24</td>
<td>.07~</td>
</tr>
<tr>
<td>Drugs &amp; Alcohol (DA)</td>
<td>90</td>
<td>.33</td>
<td>.01**</td>
<td>58</td>
<td>.47</td>
<td>.01**</td>
</tr>
<tr>
<td>(NEURO)</td>
<td>90</td>
<td>.22</td>
<td>.05*</td>
<td>58</td>
<td>.26</td>
<td>.05*</td>
</tr>
<tr>
<td>Self-Harm (SH)</td>
<td>90</td>
<td>.33</td>
<td>.01*</td>
<td>58</td>
<td>.42</td>
<td>.01**</td>
</tr>
</tbody>
</table>

Note: * denotes significance at .05 level or greater, ** at .01 or greater
~ denotes trend toward significance
Significant correlations and trends toward significance were all positive, implying that reported rates of these kinds of experiences increased as Amnesia scores increased. In sum, it seems there is a significant positive relationship between the Amnesia score and at least seven of the eight factors on the Health and Life Events Questionnaire. Comparison of Amnesia scores to responses on Item 21 of the H&LEQ, which inquires about dissociative amnesia for sexual abuse or assault, was not conducted. Although this comparison was of theoretical interest, it was judged to be statistically unjustified because only 12 (13% of the sample) of the 90 test participants responded to this item.
MEMORY PERFORMANCE

All together, there were five memory tests administered. These were: 1) the Selective Reminding Test (SRT), an explicit verbal memory test; 2) the Continuous Visual Memory Test (CVMT), an explicit nonverbal test; 3) the Autobiographical Memory Test, a test of retrograde memory; 4) a word-stem completion test, an implicit memory test; and 5) the Test of Memory Malingering (TOMM).

Significant differences between high and low dissociators were expected on the verbal (Selective Reminding Test) and nonverbal (Continuous Visual Memory Test) explicit memory tests, with high dissociators scoring lower than low dissociators. Gender differences were also expected on both explicit memory tests based on suggestion in the literature that men and women may display different patterns of dissociation (Sanders & Green, 1994).

Results for the Selective Reminding Test indicate that, although there were trends toward significance of main effect of dissociator type (high or low) on two of the SRT scores, Delayed Recall and Total Recall, these trends were not in the direction expected. The high dissociators showed a tendency to have better, not worse, recall than low dissociators on these two SRT scores. With gender collapsed to better test this trend, the effect of type of dissociator on Delayed Recall became significant, both for the general test group and for the extreme subgroup of dissociators, but again not in the direction predicted. It is important to note that despite a statistically significant main effect of
dissociator level (high versus low) on this test, the practical significance of the difference in mean scores between the two groups is negligible. For example, although the mean of 11.82 for the high dissociators (12.16 for the very high) on Delayed Recall was statistically higher than the mean of 11.33 for the low dissociators (11.31 for the very low), the highest score possible on the SRT Delayed Recall is 12 for females and 13 for males (due to gender-corrected norms). Although the differences in the group means may have produced a statistically significant result, all of the means are well within the normal range for this age group (see Larrabee et al., 1988 norms, Appendix K), and therefore cannot be taken to mean impairment on these scores for any of the groups. Thus, although there were some indications of a statistical difference in means between high and low dissociators on two of the SRT scores, particularly Delayed Recall, the practical relevance of this difference is minimal.

A final note must be made here about the importance of one of the four SRT scores, Intrusions. This score represents the number of words recalled at the Delayed Recall phase believed by the test-taker to have been a part of the original word list s/he was to memorize, even though these words were actually not on that list. This is, in effect, a production of a "false memory," in that a word was "recalled" despite the fact that it was never presented and thus the participant is remembering something that never "occurred." It should be stressed that, clearly, the content of this type of "false memory" is not analogous to the kinds of alleged false memories that have created recent controversy, since most of those involve cases of past incidents of abuse. However, the Intrusion score
is important in that it replicates, under a controlled testing environment, at least one type of false memory. The results of this study found no significant differences between groups or genders for this score, and scores for all groups were within norms for this age group on this test (see Appendix K). This finding may provide at least some evidence that even high dissociators, as defined by this study, do not show any tendency to remember verbal material that was not presented. Further research is, of course, necessary to replicate and validate this finding, with the understanding that this kind of false memory does not necessarily represent the kind of false memory referred to in the false-memory debate.

Overall, then, it can be concluded that neither classification as a high or low dissociator nor gender appear to clearly affect performance of high or low dissociators on this explicit verbal memory test.

For the CVMT, it was expected that high dissociators would perform significantly poorer than low dissociators. Possible gender differences in performance were also explored. Analysis produced no significant main effects or interactions of dissociator level (high or low) and gender on the CVMT, and no significant gender effects, both for the general test group and the extreme subgroup. In sum, results for the CVMT suggest that, contrary to the hypothesis, neither type of dissociator nor gender seem to greatly influence scores on this kind of nonverbal explicit memory test.

The Autobiographical Memory Test was constructed and included in the test battery of the present study as a test of retrograde autobiographical memory largely because of some suggestion in the literature that memory for this kind of personal
information may be particularly useful in distinguishing organic from dissociative amnesia. This is because retrograde memory appears to be generally intact even in those with organic amnesia, whereas there may be some loss of memory for personal information in cases of dissociative amnesia (see Campodonico & Rediess, 1996). However, it must be noted that the veracity of autobiographical memories is difficult to establish, particularly when a self-report measure is used, as was the case in this study. Although the autobiographical memory test used in this study is certainly not an empirically validated or standardized test, it does give some cursory impression of autobiographical memory in high and low dissociating men and women of this age group.

It was hypothesized that high dissociators would show poorer recall for personal information than would low dissociators, but show equivalent degrees of certainty (feelings-of-knowing). Possible gender differences were also examined. Results indicate that, although high versus low dissociator type did not produce significant effects on any of the six Autobiographical Memory Test scores, gender produced a significant effect on two of the six scores (see Results section), both related to recall for Question 1, which inquired about memory for birthday celebrations. For both the general test participants and the extreme subgroup, women seemed to have better recall than men for this question. Although there were possible trends toward significance on other factors (see Results), the effect of gender on Question 1 appears to be the strongest finding for this retrograde memory test. While there is no obvious explanation for this gender difference, it is likely that a number of factors contributed to this finding; perhaps, for example, possible

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differences in gender role socialization, or differences in self-report tendencies. There were no significant differences between any of the groups on certainty of recall; that is, feelings-of-knowing. This is consistent with the hypothesis for this factor.

Based on the results of this study, it appears that even individuals with a strong tendency to dissociate have intact autobiographical memory for certain events. However, the findings of this study do not preclude the possibility that high dissociators may have poorer recall for other types of more stressful life events, such as the kinds of personal traumas inquired about in the Health and Life Events Questionnaire (see below). Moreover, because most autobiographical memory tests are self-report measures, the validity of participants' reported memories is not known. Caution should therefore be exercised in applying the findings from the brief autobiographical memory survey used in this study to other populations, or to memory for events other than the kind inquired about in this Autobiographical Memory Test.

For the word-stem completion test, no significant differences between groups were expected because past studies with dissociative populations have found generally intact implicit memory even in cases of impaired explicit memory. Similarly, no gender differences were expected based on previous results using the word-stem completion test with a comparable age group (Simotas & Hall, 1996; for norms from that study, see Appendix M). Findings of this study confirmed the hypotheses: no main effects or interactions of high versus low dissociator type and gender were found, and there were no significant differences between men and women on this test. This was true for both the
general test group and the extreme subgroup. In addition, since the word-stem completion test has also been found to be a secondary test of more purposeful exaggeration or feigning of memory problems, especially by more sophisticated malingerers (Hilsabeck et al., 1997), these results also suggest there was no intentional malingering of memory impairment by any of the groups on this test.

In sum, the finding of no significant differences between test groups on this implicit memory test may be taken to mean that verbal information appears to be equally preserved for both high and low dissociators at a deeper, more unconscious cognitive level. Moreover, findings on this test serve as additional reassurance that participants in this study did not purposely attempt to feign or exaggerate problems with memory, and corroborate the results of the TOMM.

Directional hypotheses were not made for the TOMM since this measure had not, until now, been used with a dissociative population. However, this test was included to eliminate any suspicion of outward exaggeration or feigning of memory difficulties. Results indicate no evidence that there was any such attempt made by either high or low dissociator groups, or by men or women as a group. This finding also lends some confidence that participants’ performance on other memory measures was an legitimate reflection of memory functioning as determined by those tests.

Summary of Memory Performance

In conclusion of the effects of level of dissociator on memory performance overall, the findings of this study suggest that, although high dissociators report some problems
with memory such as those inquired about on the DES, these do not appear to significantly affect general, testable explicit and implicit memory functioning. However, women may have better retrograde memory for certain kinds of autobiographical events, although the accuracy of these autobiographical memories cannot be confirmed since this was a self-report test. In addition, a very small percentage of the tested individuals (3 participants) did indicate that they have experienced dissociative amnesia for a traumatic past event, and these participants tended to be high dissociators. Moreover, there is no indication in the results of this study that high dissociators are any more likely than low dissociators to produce intrusions in verbal material; that is, to recall, even after a delay in time, verbal material that was not actually presented. Because there was no evidence of outright malingering or exaggeration of memory impairment, these results may be taken as an accurate representation of memory functioning in the test participants. The results of this study are not to be taken to mean that dissociators do not experience any problems with memory. Rather, results suggest that memory problems experienced by dissociators do not seem to produce testable impairment or, alternatively, may not be accurately measured by standard verbal and nonverbal memory tests. Further implications of these findings are discussed in the section below (see IMPLICATIONS).

HEALTH AND LIFE EVENTS QUESTIONNAIRE (H&LEQ)

The H&LEQ asked participants a number of questions about health and life experiences, including history of head injury, substance use, general mood, and trauma and abuse. For this measure, it was hypothesized that, because of the strong association
between dissociation and past trauma or abuse, high dissociating individuals would report more frequent and severe incidents of trauma, abuse, or both. It also seemed reasonable to expect that high dissociators would report more substance dependence or abuse, problems with mood, history of significant head injury, and purposeful attempts at self-harm.

The eight Health and Life Events Questionnaire (H&LEQ) scales were: 1) Abuse, 2) Anxiety (ANX), 3) Crime, 4) Depression (DEP), 5) Disaster (DISTR), 6) Drug and Alcohol Use (DA), 7) Neurological History (NEURO), and 8) Self-Harm (SH). Results of analysis for the scales largely confirmed the hypothesis that high dissociators would endorse more problems in most of the areas tapped by this measure. High versus low dissociator type produced a significant main effect for both the general test group and for the extreme subgroup on most of the eight scales: ANX, Crime, DEP, DA, and SH. Furthermore, for the general group only, there was a significant main effect of dissociator type on Abuse, as well, and a possible trend toward significance for an additional scale, DISTR. In the extreme subgroup, there was a trend toward significance for main effect of dissociation level (very high or very low) on Abuse.

On all of the scales for which effect of high versus low dissociator type was significant (or produced a trend toward significance), high dissociators had higher means than low dissociators, meaning that the former group reported more of these kinds of past experiences, including abuse and trauma, victimization by crime, anxiety and depression, and problematic alcohol and drug use. This finding is consistent with results of other studies that have linked—but not necessarily attributed—dissociation to such kinds of
trauma and other clinical types of features. In other words, it is not possible to discern whether these types of experiences lead to the formation of dissociative processes in these individuals, or whether pre-existing dissociative tendencies lead to these experiences. These results should therefore be interpreted with great caution, but again do confirm findings from other published studies.

Some gender differences were also predicted for the H&LEQ, and this hypothesis was confirmed on three of the eight scales. For both the general test group and the extreme subgroup, gender alone produced a significant effect on the same three scales: Depression (DEP), Disaster (DISTR), and Drug and Alcohol Use (DA). For both DISTR and DA, men indicated higher rates of these kinds of experiences or habits. Women, however, tended to endorse more depressive items (DEP) than men. The reasons for these gender differences cannot be determined with certainty, but may reflect differences in coping styles, behaviors, or willingness to report certain types of experiences. Future researchers may wish to further investigate these differences in response patterns.

In addition to the above main effects, there was a significant interaction of high versus low dissociation type and gender on the DA scale, but only for the general test group and not the extreme subgroup. High dissociating males reported the highest rates of problematic substance use. For the extreme subgroup only, there was a trend toward significant interaction of dissociation level and gender on the Crime scale. Here, very high dissociating females tended to have the highest reported rates of victimization by or witness to criminal activities.
The Health and Life Events Questionnaire used in this study also obtained information from participants regarding neurological history; namely, history of significant head injury, which in this study was considered serious injury if consciousness was lost for 15 or more min. Of the 90 test participants in this study, only 5 reported a history of significant head injury (4 males, 1 female). Of these 5 students, 2 were very low dissociators and the other 3 were high dissociators (1 was a very high dissociator). Unfortunately, there was not enough data produced for this factor to conduct a meaningful comparison of those with and without significant head injury, although it is possible that the distinguishing criteria for significant head injury was somewhat stringent (see IMPLICATIONS below). However, other known studies using a dissociative population have not reported any such neurological data on test participants, even in cases in which the presentation of dissociative symptoms is complicated by the possibility of organic head injury. Future researchers may therefore want to obtain and report this important additional information.

As supplementary information, responses to DES Item 21 were examined separately from responses to the other items. Item 21 inquires whether those respondents who had experienced sexual abuse, assault, or rape had ever had “a time when you could not recall or were not aware that any or parts of the incident(s) occurred.” Responses to this single item were examined more closely because the nature of the question, dissociative amnesia for traumatic experiences, is so close to the basis of this study, memory functioning in dissociators. Of the 90 test participants in the study, only 12
students responded to Item 21, and of these only 3 responded affirmatively; that is, indicated not only that they had been sexually traumatized but had also experienced some period of time during which they could not recall or were not aware of the abusive incidents. Only 2 of the 12 students were males (1 very high and 1 very low dissociator), and both of these answered “No” to Item 21. All 3 of the students who answered “Yes” were females (two high and one very high dissociator). In other words, the few affirmative responses to this question were given by high dissociating females.

It is not possible to make strong conclusive remarks given such limited data. However, some general summary comments can be made regarding trends in the data. The following summary statements should not, therefore, be taken as definitive results of this study, but rather as an interesting pattern of responses that warrants further research by future studies. On the whole, it seems that the high dissociators in this study had more of a tendency than low dissociators to have experienced dissociative amnesia for sexual abuse, assault, or rape, whereas the few low dissociators who did have such experiences reported no subsequent memory loss (or lack of awareness) for these events. It also appears that women were somewhat more likely than men to report both having had such experiences and experiencing more memory loss for these incidents. Again, these are only speculations based on the few responses to this item.

**Summary of Health & Life Events Questionnaire**

In sum, high levels of dissociative tendencies are associated with more clinical types of features, particularly abuse, anxiety, crime, depression, drug and alcohol use, and
history of self-harm. Gender appears to be related to higher rates on at least some of the
H&LEQ scales: depression for women, and problematic substance use and more
disastrous experiences for men.

It must be stressed that these results cannot be interpreted as causal in that it
cannot be determined whether being a certain dissociator type (high versus low) or of a
particular gender actually lead to having more of these experiences, or whether these
experiences contributed to the development of a particular dissociative style or are
associated with a certain gender. Effects of dissociation level and gender on factors
measured by the H&LEQ scales should therefore be viewed as associated rather than
causal variables.

AMNESIA SUBSCALE

The amnesia component of the DES, currently of questionable validity in the
literature as a separate factor of the scale, was studied to determine the relative
contribution of each of the amnesia items to the overall Amnesia and DES scores, as well
as the correlation between the average Amnesia score and DES scores. In addition, some
gender differences were expected in responses to the amnesia items, again because of
suggestion in the literature of different patterns of dissociation for women and men.

Relationships between the Amnesia score and scores on each of the memory tests
were also examined. It was hypothesized that the Amnesia score would correlate
positively with the DES score. The latter was an especially important relationship to
consider because, although the primary aim of this study was memory in dissociators, the
DES score was used to classify dissociator, since there is no known good self-report measure of dissociative amnesia separate from general dissociation. Therefore, it was important to assess how well the DES score related to the Amnesia score. Relationships between the Amnesia score and the eight Health and Life Events Questionnaire were also examined, with the general expectation that high dissociators would indicate more significant histories of the kind of experiences inquired about by the survey.

Analysis of the eight amnesia items indicated moderate to good correlation with the average Amnesia scale score (with that item removed). This held true for all eight items for the entire screening sample, and for seven of the eight items for the test population. The poorest correlation coefficient for the latter group was for Item 8, which reads: “Some people are told that they sometimes do not recognize friends or family members...” It is possible that the wording or phrasing of this item is too vague to tap dissociative amnesia, and may perhaps better tap some other, undetermined construct. Also possible is that this item is misinterpreted when read (e.g., under what circumstances does the question refer?, etc.), and thus was not accurately or precisely answered. Yet another possibility is that the item may simply have a low baseline response; that is, is may be that most people simply do not often have the experience of not recognizing friends or family members. However, although Item 8 showed the poorest correlation to the scale score, there was not enough indication that this item should be removed from the scale, since doing so would not significantly alter the reliability of the subscale.
The relationship between the amnesia items and the DES score was also moderate to good. The DES showed excellent reliability for both the screening and test groups, and the relationship between the Amnesia score and the DES score was found to be strong, indicating that the Amnesia subscale may be a useful, but not complete, predictor of the dissociation (DES) score. Nevertheless, although Amnesia may not encompass all aspects of dissociation, it does appear to be one important component of dissociation.

Gender differences in response patterns were expected on the Amnesia subscale items and, more generally, on other DES items because of the suggestion in the literature (Sanders & Green, 1994) that men and women have shown different patterns of dissociation. These authors proposed that data from men and women should not be collapsed because important differences between the genders in response patterns may be lost. The present study found only minimal evidence to support this suggestion. There was no significant correlation between gender and the average Amnesia score, and a significant effect of gender on only one of the eight Amnesia subscale items (Item 4) that contribute to that score; this result was produced only for the screening group as a whole, and not for the test group. Responses to Item 4, which relates to memory for dressing oneself in the clothes one is wearing, indicate that men had more problems with this than did the women. This difference could be attributed to a number of factors; one possible explanation may relate to social forces that emphasize more detailed attention to attire in one gender but not the other. However, the exact reason for this gender difference on Item 4 cannot be determined from the information obtained, and may be an interesting area for future
research. For the most part, amnesia items were not responded to differently by men and women in this study.

In addition, the relationship between gender and the average DES score, as well as the other DES items (which include the eight amnesia items), was examined for both the test group and the extreme subgroup. Gender did not correlate significantly with the general dissociation (DES) score, and had little effect on most of the DES items. There was, however, a significant effect of gender on three of the DES items (Items 15, 19, and 23) for the entire screening group, and on only one (Item 19) of these three items for the group that was tested.

For Item 15, ("Some people have the experience of not being sure whether things that they remember happening really did happen or whether they just dream them"), females reported higher means than males, indicating they had more trouble with this kind of experience. For Item 19 (which relates to the ability to ignore pain), men indicated that they were able to have this experience a higher mean percentage of the time, compared to women in this group. Men also showed higher means for Item 23 ("Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them..."). Precise explanations for the gender differences on these isolated items cannot be determined given the available data, but probably reflect an interaction of a number of factors, including possible self-report response tendencies. Future research may help explain these apparent gender differences on specific items. On the whole, however, it can be concluded that gender and the DES
items, including the eight Amnesia subscale items, were not significantly related for this test sample. Findings indicate that the men and women responded differently to only a few select Amnesia subscale and DES items.

Amnesia scores from both the general test group and the extreme subgroup were compared to scores on each of the administered memory tests in order to determine whether those with higher Amnesia scores showed poorer memory performance. For the two explicit memory tests, the SRT and the CVMT, Amnesia scores did not overall correlate significantly with test scores on these two tests. Although there was a possible trend for the SRT Delayed Recall score to increase as the Amnesia score increased, this trend was of questionable practical significance and does not warrant further discussion.

There was no significant correlation between Amnesia score and the implicit memory test, the word-stem completion test. This result was true both for the general test group as well as for the extreme subgroup, and was the expected result because of the general finding in the literature that implicit memory is typically spared even in cases of impaired explicit memory. The results of this study confirmed the research literature’s findings for implicit memory tests. It may therefore be concluded that implicit memory appears to remain intact even in those with high Amnesia scores, as measured by the DES Amnesia subscale.

There were also no significant correlations between Amnesia scores and scores on the Test of Memory Malingering (TOMM). This finding suggests that there was no apparent effort made in relation to Amnesia score to purposely exaggerate or feign
memory impairment. This result is consistent with the findings above for the TOMM that indicated no significant differences between high and low dissociators.

On the Autobiographical Memory Test, which was the retrograde memory test, it was expected that recall, but not certainty for recall (feelings-of-knowing), would decrease as Amnesia scores increased; that is, an inverse relationship was expected between memory and Amnesia score, but not between certainty for recall and Amnesia. There were indeed some strong trends toward significance in the expected directions for correlation between Amnesia score and some scores on this test, but results on the whole indicated that there is not a clear relationship between amnesia as measured in this study and recall for the kind of personal information asked about in this retrograde memory test (Question 1 inquired about past birthdays and Question 2 related to memory for past teachers or supervisors). Respondents did, however, seem to be less certain about recall for Question 2 versus Question 1 on this test, especially in the extreme subgroup. However, since recall and certainty for recall do not always correspond, participants tended to have poorer memory for Question 1 than Question 2 but to be more certain at the same time that they could not recall the information asked for by the first question rather than the second. Therefore, it seems that most participants felt more confident about their memory, or even lack of memory, for birthdays than for teachers/supervisors. The reason for this finding is not clear, but may related to a number of possible factors, which may include possible attachment of greater personal meaning to some types of events over others, or possible trends in self-reporting. As previously discussed, the two 4-part questions on this
autobiographical test have not been validated, but were constructed in an effort to obtain some measure of retrograde memory from participants in this study. However, because retrograde memory tests are difficult to validate and standardize due to their dated nature and, often, personal relevance, much more research is needed to obtain a better measure of this subjective type of memory.

The Amnesia score was expected to significantly correlate with most of the eight H&LEQ scales. That is, those with higher Amnesia scores were expected to indicate higher levels of the kinds of experiences asked about on the H&LEQ. Results on the whole confirmed this hypothesis, with significant positive correlations between Amnesia score and scores on seven of the eight scales. For both the general test group and the extreme subgroup, H&LEQ scale scores increased with the Amnesia score for all scales except Disaster, for which there was a trend toward significance for the extreme subgroup, but not for the general group. As expected, there was a positive relationship between Amnesia score and reported levels of abuse, anxiety and depression, victimization by crime, problematic drug and alcohol use, and self-harm. This finding corroborates the results reported for main effect of dissociator type on the eight H&LEQ scales. Similarly, the cautionary notes made above regarding causality also apply to these findings.

Summary of Amnesia Subscale

In general, it can be concluded that the eight individual items believed to make up the Amnesia subscale of the DES show moderate to good correlation with the average
Amnesia score. Similarly, the eight amnesia items showed moderate to good correlation with the overall DES score, which determined classification of participants as either high or low dissociators. However, there appear to be one or more items that show questionable relation both to the Amnesia score and to the DES score. For this reason, results suggest that, although the average Amnesia score does appear to represent one factor in the DES, it does not account for some variability in the DES score. Thus, the Amnesia score when taken alone may only partially represent the construct general dissociative tendency. Given that the entire DES scale consists of only 28 self-report items that are easy to administer and score, it may be prudent to obtain a complete scale score as the primary indicator of dissociative tendency, with use of the Amnesia subscale score as a secondary measure of specifically dissociative amnesia.

Results for correlation of Amnesia scores and memory tests suggest no consistent relationship, with the exception that self-reported certainty for recall of some autobiographical memories decreased as Amnesia scores increased, especially in the extreme subgroup. However, it can be concluded from the results of this study that the Amnesia score is strongly related to most of the factors and life experiences inquired about by the Health and Life Events Questionnaire. Finally, gender did not generally correlate significantly with the majority of the DES items, which include the Amnesia subscale items, or with the average Amnesia or DES score.
IMPLICATIONS

The primary goal of this study was an examination of general memory functioning in high and low dissociators in a non-clinical population. An examination of gender effects was also a part of the primary and exploratory goals, but was secondary to the main goal of an examination of effects of dissociator type on memory functioning.

The results of this study suggest that, on the whole, the kinds of memory problems reported by high dissociators do not significantly impair memory performance on general verbal and nonverbal memory tests, contrary to the hypothesis. However, of the 12 students who had indicated history of sexual abuse, 3 noted having had a period of time during which they were not able to recall the event or experience; all 3 of these students had high dissociative tendencies, and all were women. Although there was not enough data upon which to draw conclusions about this finding, the available results suggest that this may be an important area for future study. In addition, there was no indication in the data that high dissociators were any more likely than low dissociators to produce one type of "false memory" for verbal material. This is not to suggest that verbal intrusions are equivalent in content to memories for childhood abuse or past traumas. However, findings similar to these, if replicated by future studies, may have some important implications in the false memory debate discussed in the Introduction and which provided some impetus for this study. Naturally, caution is in order when interpreting these types of results.

Despite the results of high versus low dissociator type on memory functioning in this study, it is possible that high dissociators do experience some memory problems that
may be difficult to test using standard memory measures. That is, the results of this study do not rule out the possibility that individuals with high dissociative tendencies have some memory disturbance that is perhaps not readily apparent using the types of memory tests used in this research. The effects of memory disturbance in dissociation may also be modulated by other symptoms related to dissociation (e.g., emotional numbness, derealization, etc.). Since the main goal of this study involved memory functioning in dissociators, an ideal screening measure for use in selection of test participants would directly assess levels of dissociative amnesia as separate from general dissociation. At present, however, there is no known statistically-validated measure that tests directly for dissociative amnesia as separate from general dissociation, and it would therefore be difficult to distinguish dissociative amnesia (from general dissociative) tendencies using a single self-administered scale. At this time, the Dissociative Experiences Scale (DES) is the best known measure to assess overall dissociative tendencies. Development of a better self-report measure to isolate dissociative amnesia from general dissociative tendencies may be an important way for future researchers to more clearly test memory disturbance in dissociative amnesia.

For the first of the two exploratory goals of this study, an examination of general health and life experiences using the Health and Life Events Questionnaire (H&LEQ), it can be concluded that high levels of dissociation are indeed related, as predicted, to certain life experiences. These include symptoms of anxiety and depression, victimization by crime, problematic alcohol and drug use, and history of self-harm. Also, gender seems
more closely related to depression for women, and to substance dependence or abuse and more exposure to or involvement in disasters for men. History of significant head injury did not appear to be related to degree of dissociation in this study. However, it is possible that the criterion used in this study to distinguish significant from non-significant head injury was too stringent, and perhaps did not take into account the possibility of other effects resulting from numerous, but more minor, head injuries (e.g., mild concussions). Future researchers may wish to consider different ways of identifying effects of more severe head injury, since this type of data has not been typically reported in other dissociation studies.

Results for the H&LEQ generally confirmed the hypothesis of higher reported rates of these experiences and features in high dissociators compared to low dissociators. As expected, there were also some gender differences on this questionnaire. In fact, the H&LEQ—although intended as an exploratory goal of the study—appears to have produced fairly robust results overall, in that it was associated with significant findings for several of the study’s hypotheses, including main effect of dissociation level (high versus low) and gender, and relationship to the Amnesia subscale score.

The main problem in discussing implications of results of the H&LEQ involves the question of causality. Although the findings of this study on this questionnaire confirm the hypothesis that high dissociative tendency is associated with certain past experiences, it cannot be determined whether being a high or low dissociator produced or lead to these experiences, or whether the experiences in and of themselves contributed to the
development of a particular dissociative style. It may also be that each of these possibilities is true to some extent, and that there may be an interplay of dissociator type and experience. In any case, it is not possible to extrapolate information regarding causality from the results at hand. It must be concluded, then, that these are associated but not causal variables.

The other secondary goal of this study was an investigation of the possible Amnesia subscale, as well as an examination of the relation of the Amnesia subscale score to the memory tests, the Health and Life Events Questionnaire (H&LEQ), and gender. Findings from this study suggest that, although the Amnesia subscale score correlates highly with the DES score and does seem to represent one factor in the DES scale, the Amnesia score may not be adequate enough to be considered a good measure of dissociative amnesia when used alone. Further, the Amnesia subscale score does not appear to be strongly tied to gender or to general memory test performance, but is significantly related to most of the H&LEQ scales, indicating that there is some association between amount of reported amnesia and certain experiences and life events.

The set of results for the Amnesia subscale closely matches the findings reported above for the primary goal of this study (comparison of high versus low dissociators) in that Amnesia scores correlated more strongly with scores on the H&LEQ than with the memory tests. Test correlations with the Amnesia subscale score do, therefore, appear related to the effects produced by dissociation level, implying that, although the Amnesia and DES scores may not be interchangeable, there is enough overlap between the two
constructs to produce consistency in findings on other tested factors. Results of this study suggest continued primary use of the DES score for general dissociative tendency, with possible secondary use of the Amnesia subscale score as a more specific measure of dissociative amnesia per se. Neither the DES score nor the Amnesia score appear to be strongly related to gender.

Further study is certainly needed to replicate and confirm the results and implications of this study, especially since this is the first known testing of a large group of dissociators using many of these memory measures. As a whole, however, this study provides some valuable new data not provided by other studies of dissociation. Testing for this study included a comprehensive range of tests and measures, including explicit and implicit memory tests, a test of memory malingering, a health and life events survey, and an additional examination of the possible DES Amnesia subscale. Data was obtained from a large screening sample in addition to a respectably-sized testing sample.

LIMITATIONS

The present study was designed to incorporate a number of tests and surveys in order to comprehensively and efficiently test the research hypotheses. Although some conclusions have been made based on the given results, there are a number of factors that place some limits on the outcomes of this study and their implications.

One obvious limitation of this study is that the population tested was generally a young, non-clinical or subclinical, student group. Because the test participants were from a college population, each had at least 12 or more years of education, although this was not
directly assessed. Nevertheless, these students had at least some college education, implying a certain level of general mental health as well as socioeconomic status. The results of this study, therefore, may not generalize to the general population or to clinical groups. However, this study was undertaken in part because of the reported commonality of dissociative symptoms even in the general population. In that case, even trends in statistical results found in a subclinical population are important findings.

Another factor commonly considered in interpreting the results of any study is the size of the test sample. In this study, every effort was made to obtain as many participants as possible, including as many men and women as possible. Unfortunately, neither dissociator type (high or low) nor gender are variables that can be randomly assigned to participants. For this reason, most previous published studies examining memory in dissociators are small-sample or case studies. The selected test sample for this study included equal numbers of high and low dissociators, but slightly more women than men. This gender distribution, in reality, represented typical enrollment patterns in the introductory psychology courses at the university from which the test sample was chosen. Nonetheless, a larger overall sample would have produced a stronger test of the various factors under examination, and a more equal male-to-female ratio would have provided a better test of gender effects. Fortunately, the ratio of high to low dissociators was somewhat easier to maintain equal, and thus provided an adequate comparison between high and low dissociation levels, which was the main hypothesis. Despite these precautions and justifications for the sample size used in this study, a larger sample may have produced
clearer or more definitive results, especially in instances in which trends toward significance on some measures were found. Still, this study represents to date the largest known comprehensive neuropsychological memory testing and health and life events survey with a single dissociative population.

Another limitation of this study stems from the difficulty of interpreting causality from correlational statistical results. This is because it is simply not possible to determine whether one correlated factor was caused by or contributed to the development of the other factor, even if there are strong hypotheses about the direction of this interaction. Because of this causality problem, extra caution must be taken when interpreting and applying correlational data so as not to misconstrue results or take them out of the context in which they were presented.

Still another possible limitation of this study is the fundamental complexity and, to some degree, subjective nature of dissociation itself. That is, it is difficult to validate reported experiences of dissociation because dissociation typically cannot be observed or measured like some other disorders can, and appears to involve a number of overlapping and interwoven constructs, such as depersonalization, derealization, amnesia, and fantasy or imaginative ability, many of which cannot always be easily distinguished from one another. Thus, although it may be possible to assess reliability of these scales believed to measure these constructs, it is much more difficult to test validity. Related to this is the difficulty in producing clear, concise, and specific enough scale items to tap the subtleties of dissociative processes. Because the participants in this study were screened and selected...
using the Dissociative Experiences Scale (DES), which is a self-report measure, all of these limitations apply to the findings.

In addition, some of the scores and scales (e.g., Autobiographical Memory Test scores, the Health and Life Events Questionnaire scales) in this study were designed to be used as relative comparisons of responses from the different test groups, and are not in and of themselves statistically validated constructs or scales. Rather, these were created or included to obtain a more thorough sampling of the various behaviors, symptoms, and experiences in question, and some included only a handful of items. Therefore, these measures are not to be taken as validated scales, but rather as clusters or indicators of the behavior or experience in question. This lack of statistical confirmation most certainly affected the results produced by this study, and should be taken into account when applying or comparing these results.

Finally, one pragmatic problem related to this area of research is that it is not only difficult but unethical for research purposes to induce trauma or even the extreme and intense type of fear or stress that has been linked to dissociation. Other problems arise from using staged visual recreations of crime or accident scenes, as has been done in the eyewitness testimony research (see Memory Factors under ETIOLOGY in Introduction section), since memory for stressful incidents is believed to depend on a number of factors, including the type of event and detail, how personal or relevant the event was to the individual, the time of test for recall of the event, and the kind of retrieval information requested. For example, it has been suggested that the closer one is in relationship to the
abuser, the more psychologically damaging and traumatic the event becomes in experience and memory, possibly leading to greater posttraumatic stress reaction, including dissociation (Freyd, 1994). Thus, more personal events such as childhood trauma may be remembered differently than crimes to strangers, accidents and natural disasters, or verbal material on a memory test. These factors are important to consider in alleged cases of "false memory" or memory for trauma in general.

Despite these limitations, this study contributes important new data to research on dissociative processes, and implies that further research in the area of dissociation is clearly warranted. Future researchers may want to consider the presented limitations in designing studies on dissociation. Particular areas in need of improvement or further study include better measures of the various processes and experiences that contribute to dissociation, and methods to test dissociation using more realistic and objective but nonetheless ethical procedures. Continued caution is recommended in applying results from any study of dissociation, given the potential for clinical, social, and possible legal ramifications. Difficulty in measuring a construct does not revoke its validity or complexity.
Appendix A

Dissociative Experiences Scale-II

(Carlson & Putnam, 1993)

DES

Eve Bernstein Carlson, Ph. D.          Frank W. Putnam, M. D.

DIRECTIONS

This questionnaire consists of twenty-eight questions about experiences that you may have in your daily life. We are interested in how often you have these experiences. It is important, however, that your answers show how often these experiences happen to you when you are not under the influence of alcohol or drugs.

To answer the questions, please determine to what degree the experience described in the question applies to you and circle the number to show what percentage of the time you have the experience.

EXAMPLE:

0% 10 20 30 40 50 60 70 80 90 100%
(never) (always)
Appendix A (contd.)

Date ___________________ Age ________ Sex: M F

1. Some people have the experience of driving or riding in a car or bus or subway and suddenly realizing that they don’t remember what has happened during all or part of the trip. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

2. Some people find that sometimes they are listening to someone talk and they suddenly realize that they did not hear part or all of what was said. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

3. Some people have the experience of finding themselves in a place and having no idea how they got there. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

4. Some people have the experience of finding themselves dressed in clothes that they don’t remember putting on. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

5. Some people have the experience of finding new things among their belongings that they do not remember buying. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

6. Some people sometimes find that they are approached by people that they do not know who call them by another name or insist that they have met them before. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

7. Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something and they actually see themselves as if they were looking at another person. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

8. Some people are told that they sometimes do not recognize friends or family members. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

9. Some people find that they have no memory for some important events in their lives (for example, a wedding or graduation). Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%
Appendix A (contd.)

10. Some people have the experience of being accused of lying when they do not think that they have lied. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

11. Some people have the experience of looking in a mirror and not recognizing themselves. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

12. Some people have the experience of feeling that other people, objects, and the world around them are not real. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

13. Some people have the experience of feeling that their body does not seem to belong to them. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

14. Some people have the experience of sometimes remembering a past event so vividly that they feel as if they were reliving that event. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

15. Some people have the experience of not being sure whether things that they remember happening really did happen or whether they just dreamed them. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

16. Some people have the experience of being in a familiar place but finding it strange and unfamiliar. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

17. Some people find that when they are watching television or a movie they become so absorbed in the story that they are unaware of other events happening around them. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

18. Some people find that they become so involved in a fantasy or daydream that it feels as though it were really happening to them. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

19. Some people find that they sometimes are able to ignore pain. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%
Appendix A (contd.)

20. Some people find that they sometimes sit staring off into space, thinking of nothing, and are not aware of the passage of time. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

21. Some people sometimes find that when they are alone they talk out loud to themselves. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

22. Some people find that in one situation they may act so differently compared with another situation that they feel almost as if they were two different people. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

23. Some people sometimes find that in certain situations they are able to do things with amazing ease and spontaneity that would usually be difficult for them (for example, sports, work, social situations, etc.). Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

24. Some people sometimes find that they cannot remember whether they have done something or have just thought about doing that thing (for example, not knowing whether they have just mailed a letter or have just thought about mailing it). Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

25. Some people find evidence that they have done things that they do not remember doing. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

26. Some people sometimes find writings, drawings, or notes among their belongings that they must have done but cannot remember doing. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

27. Some people sometimes find that they hear voices inside their head that tell them to do things or comment on things that they are doing. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%

28. Some people sometimes feel as if they are looking at the world through a fog so that people and objects appear far away or unclear. Circle a number to show what percentage of the time this happens to you.

0% 10 20 30 40 50 60 70 80 90 100%
Appendix B

Health and Life Events Questionnaire

1. Have you ever had an injury to your head that resulted in unconsciousness? _ _ _ _
   If yes, how many times? _____________________________
   For each instance, how long were you unconscious? _____________________________

2. Have you ever felt you should cut down on your drinking or other drugs? _ _ _ _
3. Have people annoyed you by criticizing your drinking or use of other drugs? _ _ _ _
4. Have you ever felt bad or guilty about your drinking or use of other drugs? _ _ _ _
5. Have you ever had a drink (or used drugs) first thing in the morning to steady your nerves or to get rid of a hangover? _ _ _ _

For each of the following questions, please circle one number on each line to indicate the answer that comes closest to the way you have been feeling during the past month.

<table>
<thead>
<tr>
<th>Question</th>
<th>All of the time</th>
<th>Most of the time</th>
<th>A Good Bit of the time</th>
<th>Some of the time</th>
<th>A Little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. How much of the time, during the past month, have you been a very nervous person?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>7. During the past month, how much of the time have you felt calm and peaceful?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>8. How much of the time, during the past month, have you felt downhearted and blue?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>9. During the past month, how much of the time have you been a happy person?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>10. How often, during the past month, have you felt so down in the dumps that nothing could cheer you up?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>
Appendix B (contd.)

11. Have any of the following things happened to you? (Check all that apply):
   _____ Accident ( ____ automobile ____ boat ____ motorcycle ____ plane ____ train)
   --> Your age at the time(s): ____________________________
   _____ Witnessing an accident like those above that you were NOT involved in
   --> Your age at the time(s): ____________________________
   _____ Earthquake
   --> Your age at the time(s): ____________________________
   _____ Fire
   --> Your age at the time(s): ____________________________
   _____ Flood
   --> Your age at the time(s): ____________________________
   _____ Hurricane
   --> Your age at the time(s): ____________________________
   _____ Tornado
   --> Your age at the time(s): ____________________________
   _____ Other ( ______________________ )
   --> Your age at the time(s): ____________________________

12. As a child or adult, have you ever been present when someone was killed or injured
    (so as to result in bruises, blood, or broken bones)?  ____ No  ____ Yes
    --> If yes, was it someone you knew?  ____ No  ____ Yes
    --> If yes, your age at the time(s): ____________________________

13. As a child or adult, have you ever been physically assaulted (hit or beaten) by a
    spouse, lover, family member, or stranger?  ____ No  ____ Yes
    --> If yes, please circle what the relationship of the assaulter was to you:
        Spouse    Lover    Family Member    Stranger
    --> If yes, your age at the time(s): ____________________________

14. As a child or adult, have you ever been raped (defined as being threatened or physically
    forced to have oral, anal, or vaginal intercourse) OR sexually assaulted (sexual contact that did
    not include intercourse but occurred because you were threatened or forced) by a spouse,
    lover, family member, or stranger?  ____ No  ____ Yes
    --> If yes, please circle what the relationship of the assaulter was to you:
        Spouse    Lover    Family Member    Stranger
    --> If yes, your age at the time(s): ____________________________

15. As a child or adult, did anyone in your family hit you with a hand or fist, kick you, throw
    you, or throw something at you on purpose, which caused you to have marks, bruises, blood,
    or broken bones?  ____ No  ____ Yes
    --> If yes, your age at the time(s): ____________________________

16. As a child or adult, did you ever see anyone in your family hit, beat, kick, or throw
    someone else in your family on purpose so that marks, bruises, blood, or broken bones
    resulted?  ____ No  ____ Yes
    --> If yes, your age at the time(s): ____________________________
Appendix B (contd.)

17. As a child or adult, were there ever times when you were tortured, repeatedly hurt, or forced to do something sexual during some sort of meeting, ritual, cult gathering, or religious activity?  ____ No  ____ Yes  --> If yes, your age at the time(s): __________________

18. Were you ever forced to watch this (#17 above) happen to somebody else?  ____ No  ____ Yes  --> If yes, your age at the time(s): __________________

19. Have you ever been a victim of any of the following? (Check all that apply):

   ____ Attempted assault  --> Your age at the time(s): __________________
   ____ Car jacking  --> Your age at the time(s): __________________
   ____ Drive-by shooting  --> Your age at the time(s): __________________
   ____ Kidnapping  --> Your age at the time(s): __________________
   ____ Being held at gun or knife point  --> Your age at the time(s): __________________
   ____ Gang-related violence  --> Your age at the time(s): __________________
   ____ Torture  --> Your age at the time(s): __________________
   ____ Stalking  --> Your age at the time(s): __________________
   ____ Other ( )

   --> Your age at the time(s): __________________

   Are there any of the above that have not happened to you directly, but that you have witnessed?  ____ No  ____ Yes  --> If yes, which one(s)? __________________

   --> Your age at the time(s): __________________

20. Have you ever done anything to purposefully hurt yourself physically?  ____ No  ____ Yes  --> If yes, your age at the time(s): __________________

21. If you were ever sexually abused, assaulted, or raped was there ever a time when you could not recall or were not aware that any OR parts of the incident(s) had happened?  ____ No  ____ Yes

If yes, what circumstances prompted you to recall the incident(s)? (Check all that apply):

   ____ Psychotherapy (Counseling)
   ____ Someone revealed their own abuse by the same abuser
   ____ TV shows, books, or movies
   ____ Other ( )

   --> If you answered YES to #21, at what age(s) did you recall or become aware of the incident(s)? __________________

THANK YOU VERY MUCH -- YOUR RESPONSES WILL REMAIN CONFIDENTIAL
Appendix C

Selective Reminding Test Initial Word List

1. Bowl
2. Passion
3. Dawn
4. Judgement
5. Grant
6. Bee
7. Plane
8. County
9. Choice
10. Seed
11. Wool
12. Meal
### Appendix D

#### Selective Reminding Test Multiple Choice Task

<table>
<thead>
<tr>
<th>Bowl*</th>
<th>Dish</th>
<th>Pain</th>
<th>Plane*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bell</td>
<td>View</td>
<td>Pulled</td>
<td>Jet</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Love</th>
<th>Poison</th>
<th>County*</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conform</td>
<td>Passion*</td>
<td>Tasted</td>
<td>Counter</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dawn*</th>
<th>Sunrise</th>
<th>Voice</th>
<th>Select</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bet</td>
<td>Down</td>
<td>Choice*</td>
<td>Cheese</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pasteboard</th>
<th>Verdict</th>
<th>Flower</th>
<th>Seed*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judgement*</td>
<td>Fudge</td>
<td>Herd</td>
<td>Seek</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grand</th>
<th>Grant*</th>
<th>Date</th>
<th>Sheep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give</td>
<td>Jazz</td>
<td>Wool*</td>
<td>Would</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>See</th>
<th>Sting</th>
<th>Mill</th>
<th>Queen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fold</td>
<td>Bee*</td>
<td>Food</td>
<td>Meal*</td>
</tr>
</tbody>
</table>

*Note:* * denotes correct response
Appendix E

Word-Stem Completion Test Priming Word List

Practice Words

1. NOTCH  2. BALLOT  3. ATTIC

Test Words

1. MENACE  17. WALLET
2. BELCH  18. ASSET
3. ALIBI  19. CRUTCH
4. BLIGHT  20. GARLIC
5. DREAD  21. FINITE
6. FRIGID  22. REGAIN
7. TURKEY  23. BRONZE
8. SURGE  24. IMPEL
9. CHANT  25. BANANA
10. SAVIOR  26. DEVOID
11. MORTAL  27. BLEND
12. COMPLY  28. BEHOLD
13. BLUNT  29. ALOOF
14. Rotor  30. BLOAT
15. CORTEX  31. DEADLY
16. BLANK  32. ACCORD
Appendix F

Word-Stem Completion Test Stem List

INSTRUCTIONS: Please complete each three-letter word-stem below to form an English word. Write the first completion that comes to mind. Any English word is acceptable as long as it is not a proper noun.

Practice Items: 1. FLO  2. SAL  3. DRA

Test Items:

2. GRI  17. PLA  22. COM  27. TUR  32. SUR
3. STO  18. INF  23. ALL  28. POR  33. PRO
4. MIN  19. ASS  24. WAL  29. SHR  34. SAV
5. PAT  20. LIN  25. REG  30. BLU  35. LEG
6. SPI  21. THI  36. CHA  37. BAN
7. ROT  22. COM
8. COR  23. ALL
9. CRU  24. WAL
10. IMP  25. REG
11. DEM  26. DEV
12. BEA  27. TUR
13. BLA  28. POR
14. SLO  29. SHR
15. GAR  30. BLU
Appendix G

Autobiographical Memory Test

Instructions: Please answer the following questions as honestly as you can. It may take a moment to remember some of the information that is being asked for, so please take some time to think about each question.

1. a.) Do you remember what you did for your birthday one year ago? (this can include any celebration or event in connection with your birthday, even if it did not actually occur on your birthday) _______ _______

   How certain do you feel about your answer to this question?

   1  2  3  4  5
   Very Certain Moderately Certain Not Certain At All

b.) Do you remember what you did for your birthday 3 years ago? _______ _______

   How certain do you feel about your answer to this question?

   1  2  3  4  5
   Very Certain Moderately Certain Not Certain At All

c.) Do you remember what you did for your birthday 5 years ago? _______ _______

   How certain do you feel about your answer to this question?

   1  2  3  4  5
   Very Certain Moderately Certain Not Certain At All

d.) Do you remember what you did for your birthday 10 years ago? _______ _______

   How certain do you feel about your answer to this question?

   1  2  3  4  5
   Very Certain Moderately Certain Not Certain At All
Appendix G (contd.)

2. a.) Do you remember the name of (or at least picture in your mind) one of your teachers (or, if you were not in school, one of your employers or supervisors) from one year ago? __________ __________

*How certain do you feel about your answer to this question?*

1 2 3 4 5

Very Certain Moderately Certain Not Certain At All

b.) Do you remember the name of (or at least picture in your mind) one of your teachers (or, if you were not in school, one of your employers or supervisors) from 3 years ago? __________ __________

*How certain do you feel about your answer to this question?*

1 2 3 4 5

Very Certain Moderately Certain Not Certain At All

c.) Do you remember the name of (or at least picture in your mind) one of your teachers (or, if you were not in school, one of your employers or supervisors) from 5 years ago? __________ __________

*How certain do you feel about your answer to this question?*

1 2 3 4 5

Very Certain Moderately Certain Not Certain At All

d.) Do you remember the name of (or at least picture in your mind) one of your teachers (or, if you were not in school, one of your employers or supervisors) from 10 years ago? __________ __________

*How certain do you feel about your answer to this question?*

1 2 3 4 5

Very Certain Moderately Certain Not Certain At All
Appendix H

Informed Consent Form

Thank you for considering to take part in this experiment. If you decide to participate, you will be completing several different activities that involve working with words and line drawings. You will also be asked to answer some questions regarding your general medical history and life events, including experience with natural disasters and victimization due to crime or abuse. This information will be used to compare background data from everyone who participates in this study, and will be kept strictly confidential.

The main risk of participation in this experiment is that you may feel frustrated if you do not do as well as you think you should have on a particular activity. However, please remember that it is common for people to feel that they have made some mistakes on these tasks. It is also possible that you may feel somewhat uneasy answering questions about your background, such as about abuse, but please keep in mind that everyone will be asked the same questions, and all responses will be confidential. Please try to answer each question to the best of your ability, but, if a particular question makes you too uncomfortable, you may skip it. Should you become upset as a result of any question asked of you, you may contact and speak with the project director, a graduate student in clinical psychology. In addition, several counseling resources are available to you, both on campus and in the community. A list of these resources will be provided to everyone.

The benefits of participating in this experiment include the opportunity to be involved in psychological research, and receiving experimental credits for your Psychology 100 class.

All information you provide will be completely confidential. Your name will not appear anywhere in association with any of the data you provide. You will be assigned a participant number that will be used to keep all of the information you provide together. The experimenter will not be able to give you extensive feedback about your performance. Your participation in this study is strictly voluntary, and you may withdraw at any time without any negative consequences, even if you previously agreed to participate. If you choose to withdraw, all of the information you provided us will be discarded, and no data from your tests will be used in this study.

We do not anticipate that your participation in this study will cause you any harm. However, the University requires that we provide you with the following information:

In the event that you are injured as a result of this research you should individually seek appropriate medical treatment. If the injury is caused by the negligence of the University or any of its employees, you may be entitled to reimbursement or compensation pursuant to the Comprehensive State Insurance Plan established by the Department of Administration under the authority of M.C.A., Title 2, Chapter 9. In the event of a claim for such injury, further information may be obtained from University Legal Counsel (Reviewed by University Legal Counsel, July 6, 1993.)

I have read and understood the above and I agree to participate in this study.

Participant's Signature ____________________________ Date __________

Any questions or concerns regarding this study should be directed to Sofia Simotas, M.A., Department of Psychology, at 243-4521, or Dr. Stuart Hall at 243-5667. Participant #: ________
Appendix I

Debriefing Form

Thank you for participating in this experiment. This study is comparing the memory performance of people with a tendency to dissociate to the memory performance of people without this tendency. It is also investigating whether men and women display different patterns of dissociation. Dissociation includes a range of experiences people sometimes have, from the common to the not-so-common. One example of dissociation is forgetting something important (like a major accident) you have experienced that cannot be explained by ordinary forgetfulness. This study is also investigating how people who dissociate compare to people who do not in their general medical, abuse, and trauma histories.

All of the tests you took measured some kind of memory. At one point in the experiment we tested your memory without asking you to purposely memorize or later recall the words or sentences presented to you. This was done in the activity in which you rated words on their likability and were later asked to complete word stems with the first word that came to mind. This type of memory is called implicit memory, and is a type of indirect memory. The other memory tests are classified as explicit memory tests because they are more direct tests of memory.

Because we are still collecting data for this project, we would appreciate it if you did not share details of the experiment (such as the specific words and pictures you saw and were asked to memorize, or questions you were asked) with other students in Psychology 100 who might also be participating but have not yet done so. Thank you.

We hope you have enjoyed working on these activities. Thank you again for your participation. This study would not have been possible without your involvement.
Appendix J

Resource List

It is sincerely hoped that none of the activities you performed or questions you were asked caused any distress for you. All of the information asked for will be kept strictly confidential, and will only be used to compare backrounds and life experiences of everyone who participated. Your name will not appear anywhere in the results of this experiment. The participant number assigned to you when you signed the Informed Consent Form will be used instead of your name to keep all of your materials together.

If for any reason you became upset by any question asked of you during this experiment and would like to talk with someone, you may contact the project director, Sofia Simotas, M.A., a graduate student in clinical psychology, at 243-4521 or 721-7130. You may also contact any of the agencies listed below for medical or counseling services and support. Thank you again for your participation.

Student Health Services: The University of Montana, 634 Eddy Ave., Missoula, MT 59812: 243-2122

Counseling and Psychological Services (CAPS): Student Health Services, The University of Montana, 634 Eddy Ave., Missoula, MT 59812: 243-4711

Student Assault and Recovery Services (SARS): Student Health Services, The University of Montana, 634 Eddy Ave., Missoula, MT 59812: 243-6559

Clinical Psychology Center (CPC): 1444 Mansfield Ave., The University of Montana, Missoula, MT 59812: 243-4523

Mental Health Center: 337 Stephens Ave., Missoula, MT 59801: 721-3600
Normative Data for the Selective Reminding Test
(from Larrabee, Trahan, Curtiss, & Levin, 1988)

Correction values for raw scores of males (calculate before entering normative tables):
Total = +5; Multiple Choice = 0; Delayed Recall = +1; Intrusions = 0.

Age Group: 18-29

Mean Age (SD): 22.55 (3.30)
Education mean (SD): 12.88 (1.73)
N = 51
Female/male: 23/28

<table>
<thead>
<tr>
<th>SCORE</th>
<th>Total Recall</th>
<th>Multiple Choice</th>
<th>Delayed Recall</th>
<th>Intrusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>128.18</td>
<td>12.00</td>
<td>11.53</td>
<td>.84</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>(9.16)</td>
<td>(0.00)</td>
<td>(.83)</td>
<td>(1.29)</td>
</tr>
</tbody>
</table>

Note: Reported norms apply only to the specified age group. Norms for other age groups are available in Larrabee et al. (1988).
Appendix L

Normative Data for the Continuous Visual Memory Test
(from Trahan & Larrabee, 1988)

Note: Reported norms apply only to the specified age group. Norms for other age groups are available in Trahan & Larrabee (1988).

Table A. Normative Table for Ages 18-29*

<table>
<thead>
<tr>
<th>Total Score</th>
<th>Total Score</th>
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<tbody>
<tr>
<td>Score</td>
<td>Percentile</td>
</tr>
<tr>
<td>73</td>
<td>1.2</td>
</tr>
<tr>
<td>74</td>
<td>6.0</td>
</tr>
<tr>
<td>75</td>
<td>10.8</td>
</tr>
<tr>
<td>76</td>
<td>12.0</td>
</tr>
<tr>
<td>77</td>
<td>13.3</td>
</tr>
<tr>
<td>78</td>
<td>15.7</td>
</tr>
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</table>

Mean = 82.07, SD = 4.05, Median = 82.00

Delayed Recognition Task

<table>
<thead>
<tr>
<th>Delayed Recognition Task</th>
<th>Delayed Recognition Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>Percentile</td>
</tr>
<tr>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>3</td>
<td>7.2</td>
</tr>
</tbody>
</table>

Mean = 5.33, SD = 1.09, Median = 6.00

* Reported norms are for selected scores only; norms for other scores available in Trahan & Larrabee (1988). Normative scores for Visual Recognition Task are not reported.
### Table B. CVMT Comparisons for Matched Males and Females

<table>
<thead>
<tr>
<th>VARIABLE</th>
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<th>Females++</th>
<th>t</th>
<th>p</th>
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<tbody>
<tr>
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<td>78.25</td>
<td>0.83</td>
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<tr>
<td></td>
<td>(5.26)</td>
<td>(6.08)</td>
<td></td>
<td></td>
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<tr>
<td>d-Prime</td>
<td>2.33</td>
<td>2.21</td>
<td>1.06</td>
<td>NS</td>
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<tr>
<td></td>
<td>(0.50)</td>
<td>(0.53)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delayed Recognition</td>
<td>4.56</td>
<td>4.48</td>
<td>0.69</td>
<td>NS</td>
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<tr>
<td></td>
<td>(1.41)</td>
<td>(1.52)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+ n = 32; mean age = 42.03 (SD = 21.05); mean years of education = 14.31 (SD = 2.02).
++ n = 32; mean age = 41.62 (SD = 20.49); mean years of education = 14.09 (SD = 2.30).
Appendix M

Normative Data for the Word-Stem Completion Test
(from Simotas & Hall, 1996)

**Age Group:** 18-25

**Mean Age (SD):** 19.75 (1.97)

**Education mean (SD):** 13.13 (.97)

**N = 60**

**Female/male:** 30/30

<table>
<thead>
<tr>
<th>Scores listed are percentage primed</th>
<th>Males</th>
<th>Females</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M</strong></td>
<td>22.0</td>
<td>24.0</td>
<td>23.0</td>
</tr>
<tr>
<td><strong>SD</strong></td>
<td>(12.0)</td>
<td>(15.0)</td>
<td>(16.0)</td>
</tr>
</tbody>
</table>

*Note:* Reported norms apply only to the specified age group.
Appendix N

Normative Data for the Test of Memory Malingering

(from Tombaugh, 1997)

*Note:* Gender norms are not reported.

**Table A. Group Means and Standard Deviations for Age, Years of Education, and Number of Correct Responses on the Test of Memory Malingering (Two-Choice Version) for the Clinical Sample**

<table>
<thead>
<tr>
<th>GROUP</th>
<th>n</th>
<th>Age</th>
<th>Education</th>
<th>Trial 1</th>
<th>Trial 2</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>No cognitive impairment</td>
<td>13</td>
<td>45.9</td>
<td>13.0</td>
<td>47.9</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(15.0)</td>
<td>(3.6)</td>
<td>(2.1)</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Cognitive Impairment</td>
<td>42</td>
<td>57.2</td>
<td>12.4</td>
<td>43.9</td>
<td>48.6</td>
<td>49.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(15.1)</td>
<td>(3.0)</td>
<td>(5.3)</td>
<td>(3.1)</td>
</tr>
<tr>
<td>Aphasia</td>
<td>21</td>
<td>66.2</td>
<td>13.0</td>
<td>46.3</td>
<td>49.3</td>
<td>49.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(10.9)</td>
<td>(3.5)</td>
<td>(4.2)</td>
<td>(1.9)</td>
</tr>
<tr>
<td>Traumatic Brain Injury+</td>
<td>45</td>
<td>40.0</td>
<td>13.0</td>
<td>45.9</td>
<td>49.4</td>
<td>49.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(15.3)</td>
<td>(2.4)</td>
<td>(4.7)</td>
<td>(1.3)</td>
</tr>
<tr>
<td>Dementia+++</td>
<td>37</td>
<td>72.1</td>
<td>11.9</td>
<td>41.0</td>
<td>45.7</td>
<td>47.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(7.6)</td>
<td>(3.4)</td>
<td>(6.6)</td>
<td>(5.3)</td>
</tr>
</tbody>
</table>

+ No patient of the traumatic brain injury group was involved in compensation hearing or litigation.
++ Three of the original 40 patients were too severely demented to be tested and are not included in the table
Table B. Group Means and Standard Deviations for Scores on the TOMM for Malingering and Control Groups

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Malingering</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCORE</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Trial 1</td>
<td>27.2 (6.8)</td>
<td></td>
</tr>
<tr>
<td>Trial 2</td>
<td>27.9 (7.2)</td>
<td></td>
</tr>
<tr>
<td>Retention Trial</td>
<td>26.4 (7.5)</td>
<td></td>
</tr>
</tbody>
</table>
References


