Chapter

5

Memory Transfer for Trauma-Related Words between Identities in Dissociative Identity Disorder

Abstract

The present study aimed to objectively determine interidentity amnesia for trauma-related, i.e., sexual and physical abuse-related, material in dissociative identity disorder (DID). Twenty-two DID patients participated together with 25 normal controls and 25 controls instructed to simulate DID. Two wordlists A and B were constructed with neutral, positive and trauma-related material. List A was shown to one identity, while List B was shown to another identity claiming total amnesia for the first identity. The identity claiming amnesia was tested for intrusions from List A words into the recall of words from List B and recognition of the words learned by both identities. Test results indicated no objective evidence for total interidentity amnesia for trauma-related material in DID.

Huntjens, R. J. C., Postma, A., Peters, M. L., Woertman, L., & Van der Hart, O. (2003). Manuscript submitted for publication.

Introduction

Dissociative amnesia is a major symptom of dissociative identity disorder (DID). In the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders, dissociative amnesia is described as "an inability to recall important personal information that is too extensive to be explained by ordinary forgetfulness" (*DSM-IV*; American Psychiatric Association, 1994, p. 477). The DID patient's reported inability to recall information is predominantly thought to derive from the compartmentalization of memories in separate identity states. The assumed function of these amnesic barriers between identity states is to "contain" traumatic memories, so as to reduce the global effects of exposure to severely aversive stimuli, as well as to minimize the impact of these traumata on daily life (Dorahy 2001).

Despite the claims listed above, the methodologically best designed experimental studies, i.e., studies including more than one patient, an objective memory tests, and a control group, found no objective evidence of interidentity amnesia (Allen & Movius, 2000; Eich, Macaulay, Loewenstein, & Dihle, 1997; Huntjens, Postma, Peters, Hamaker, Woertman, & Van der Hart, 2002; Huntjens, Postma, Peters, Woertman, & Van der Hart, 2003; Silberman, Putnam, Weingartner, Braun, & Post, 1985). However, all previous memory studies on interidentity amnesia in DID have made use of neutrally valenced stimuli (for reviews see Dorahy, 2001, and Peters, Uyterlinde, Consemulder, & Van der Hart, 1998; see also Allen & Movius, 2000). Given the traumatic origins of dissociative amnesia and the supposed function of amnesic barriers between identity states to ward off painful memories, it is surprising that experimental memory studies on between-identity amnesia in DID have not used trauma-related stimuli. The purpose of the present study was to objectively test memory transfer between identity states for trauma-related material. DID patients as well as a normal control groups and a control group instructed to simulate DID were included. The inclusion of a simulating control group is important in order to exclude the possibility of simulation given that the so-called sociocognitive model considers DID to be a syndrome of role enactment

(Lilienfeld et al., 1999). Two wordlists A and B were composed of trauma-related words, positive words, and neutral words. The traumatic material was chosen to reflect the severe physical and sexual childhood abuse frequently experienced by dissociative patients (Lewis, Yeager, Swica, Pincus, & Lewis, 1997). Neutral words were added as a baseline measure and positive words to control for the general effect of emotional valence. List A was shown to one identity, and the identity was asked to recall the List A words. List B was shown to another identity claiming total amnesia. This identity was asked to recall the List B words. The first objective memory measure consisted of testing the identity claiming amnesia for intrusions from List A words into the recall of words from List B. The second measure was taken after a two-hour interval, when the amnesic identity was tested for recognition of the words learned by both identities.

If DID involves dissociation of emotionally loaded information, interidentity amnesia was expected for the trauma-related words for patients. Thus, in recall patients were expected to recall no List A trauma-related words as intrusions during the recall of List B. In recognition, they were hypothesized to recognize far more trauma-related words from List B (learned by the same identity) in comparison with List A (learned by another identity). More specifically, recognition of List A trauma-related words should be next to nothing, reflecting the amnesia for this list reported by the identity tested.

Finally, a question was added on the state of awareness during recognition to provide information on the qualitative aspects of remembering in case of transfer of trauma-related material between identities. According to Cardeña (2000), episodic memories may be more semantic in nature when retrieved by an identity that did not undergo the events, as if the patient had observed them rather than experienced them. The state of awareness can be characterized as either remembering or knowing. Remembering is a recollective experience based on associative, contextual information of the learning event. Knowing is retrieval by a feeling of familiarity without specific knowledge of the original event (Gardiner & Java, 1993; Knowlton, 1998; Knowlton & Squire, 1995;

Tulving, 1985), i.e., resembling the impersonal recollection as suggested by Cardeña (2000).

Method

Participants

Twenty-two DID patients participated. They were recruited from 18 treatment settings in the Netherlands and Belgium by asking clinicians to invite patients to participate. Conditions for participation were described as follows: (1) The DID diagnosis was made by the referring clinician by administration of the Structured Clinical Interview for *DSM-IV* Dissociative Disorders (SCID-D; Steinberg, 1993; Dutch version validated by Boon & Draijer, 1993); (2) at least one of the identities is completely amnesic for the events experienced by the other participating identity during the experiment; (3) identities are able to perform the tasks without interference of other identities; (4) they are able to perform the tasks without spontaneous switches to other identities; (5) they are all able to switch between identities on request. The mean number of years since diagnosis of DID for patients in the present sample was 6 years and DID was always the main reason for patients to be in treatment. Twelve patients reported one or more prior diagnoses: major depressive disorder (n = 6), borderline personality disorder (n = 4), posttraumatic stress disorder (n = 3), anorexia nervosa (n = 3), schizophrenia (n = 3), dissociative disorder not otherwise specified (n = 2), epilepsy (n = 1), obsessive compulsive disorder (n = 1), personality disorder not otherwise specified (n = 1), bipolar disorder (n = 1), and avoidant personality disorder (n = 1). Seven patients reported present comorbid disorders: major depressive disorder (n = 2), posttraumatic stress disorder (n = 2), anorexia nervosa (n = 1), obsessive compulsive disorder (n = 1), bipolar disorder (n = 1), personality disorder not otherwise specified (n = 1), and avoidant personality disorder (n = 1).

Patients were informed that the aim of the study was to understand more about the memory problems often reported by patients with DID.

They self-selected two identities that would participate in the experiment. As mentioned in the conditions for participation, patients in this study were able to switch between the two participating identities on request, and were able to perform the tasks without spontaneous switches to other identities. The transition was initiated by asking the patient to let an identity "come forward" and take control over the patient's consciousness and behavior. Also, the patient was asked to let the other participating identity "step back", thereby moving out of consciousness. The switching process was assisted either by the patients' own clinician or by one of the authors (R.H. or O.V.).

In addition, 50 female non-psychiatric control participants participated. They were community volunteers and received a small payment. They did not report any relevant memory, visual, attentional problems or psychiatric disorders, and no history of sexual abuse. Control participants were assigned randomly to either a control group or a simulating group. Groups were matched as closely as possible on age (M = 39.95, SD = 8.81 for patients [n = 22], M = 37.40, SD = 8.00 for normal controls, and M = 36.72, SD = 7.88 for simulators) and education[4] (M = 5.36, SD = 1.59 for patients [n = 22], M = 5.72, SD = 1.14 for normal controls, and M = 5.68, SD = 1.18 for simulators). Participants in the simulating group were instructed to mimic DID. They were shown a documentary about a DID patient and were given additional written information about DID. They were subsequently asked to make up an imaginary, amnesic identity and come up with detailed characteristics of this identity. Following Silberman et al.'s (1985) procedure, they were given a 17-item data sheet for the identity on which they were asked to assign name, age, gender, physical description, personal history, and personality style. Examination of the completed data sheets confirmed that participants had spent considerable effort inventing an identity. Finally, they were asked to practice during the week preceding the test switching to their "identity" and taking on its state of mind. Participants in the normal control group were

[4] Education was assessed in categories ranging from 1(low) to 7 (high) (Verhage, 1964).

only told that they participated in a memory experiment. No information was provided on the DID-related aspects of the study.

All participants completed both the Dissociative Experiences Scale (DES; Carlson & Putnam, 1993) and the Creative Experience Questionnaire (CEQ; Merckelbach, Rassin, & Muris, 2000). The DES is a 28-item self-report questionnaire with scores ranging from 0 to 100. Scores above 20, or more conservatively, above 30 are thought to be indicative of pathological dissociation (Carlson & Putnam, 1993). The CEQ is a Dutch 25-item self-report questionnaire with scores ranging from 0 to 25. High scores are thought to be indicative of "fantasy proneness", i.e., the inclination to be immersed in daydreams and fantasies. Mean scores on the DES were M = 52.19 (SD = 16.41) for patients, M = 9.61 (SD = 8.20) for normal controls, and M = 8.11 (SD = 4.71) for simulators. Scores on the CEV were M = 9.70 (SD = 4.50) for patients, M = 6.32 (SD = 3.22) for normal controls, and M = 6.64 (SD = 4.02) for simulators. Control participants did not show a pathological level of dissociation as measured by the DES. The normal control group and the simulating control group did not differ significantly on DES, $t(48) = 0.79$, $p = .43$. They also did not differ significantly on CEQ, $t(48) = -0.31$, $p = .76$. Patients, on the other hand, differed significantly from normal controls both on the DES, $t(45) = 11.46$, $p < .01$, and the CEQ, $t(45) = 2.99$, $p < .01$. Written informed consent was obtained from patients as well as all control participants prior to participation.

Materials

Two word lists (A and B) were constructed. List A and list B both contained 8 different trauma-related words such as "vagina" and "pain", 8 positive words such as "music" and "blossom", and 8 neutral words such as "branch" and "bag". Additionally, a recognition list was developed including all the words from Lists A and B and an equal amount of trauma-related, positive, and neutral distractor words (new words) adding up to a total of 96 words. Trauma-related words were generated by two of the authors (L.W. and O.V.). Word lists and word categories did not differ significantly with

respect to mean frequency of occurrence per million[5] and mean number of letters per word[6]. Furthermore, to ensure that participants' differences in recall could not be due to differences in list difficulty, a pilot study was performed, with 19 psychology students serving as participants. Students were randomly assigned to one of two groups and list order (AB or BA) was counterbalanced. The study showed no differences in recall between list orders AB and BA, $F(1,17) = 0.30$, $p = .59$.

As a material manipulation check, participants rated all words on a paper-and-pencil version of the Self-Assessment Manikin (SAM; see Bradley, Greenwald, Petry, & Lang, 1992), used to rate affective valence. The scale ranges from 1 (happy/positive) to 9 (unhappy/negative). Two patients did not complete the rating session, because the test session proved too long and taxing for them. Mean rating scores for controls were M = 6.90 (SD = .89) for trauma-related words, M = 2.82 (SD = 1.03) for positive words, and M = 4.46 (SD = .71) for neutral words; mean scores for patients were M = 7.70 (SD = .99) for trauma-related words, M = 3.41 (SD = .83) for positive words, and M = 4.49 (SD = .47) for neutral words; mean scores for simulators were M = 6.97 (SD = .61) for trauma-related words, M = 2.69 (SD = .54) for positive words, and M = 4.31 (SD = .44) for neutral words.

Procedure

The study was part of a larger investigation on memory (dis)abilities in DID. The present study consisted of two sessions separated by a two-hour interval. In Session 1, the 24 words of List A were presented to the patient's Identity 1 in random order on a computer screen for 2 s with a 2-s interval.

---

5 37.38 for trauma-related words, List A; 39.00 for positive words, List A; 35.88 for neutral words, List A; 36.25 for trauma-related words, List B; 40.88 for positive words, List B; 35.75 for neutral words, List B; 36.88 for trauma-related words, Recognition List; 33.75 for positive words, Recognition List; 37.06 for neutral words, Recognition List (CELEX, 1990)

6 6.00 for trauma-related words, List A; 5.63 for positive words, List A; 5.88 for neutral words, List A; 6.50 for trauma-related words, List B; 6.38 for positive words, List B; 6.00 for neutral words, List B; 6.25 for trauma-related words, Recognitio -List; 6.25 for positive words, Recognition List; 6.19 for neutral words, Recognition List (CELEX, 1990)

Participants were told that they should try to encode the words to the best of their ability in order to recall them subsequently. Following the presentation, participants were tested for free recall of the studied words. After this, patients were requested to switch to the amnesic Identity 2. When the patient confirmed the presence of Identity 2, this identity was directly asked if and what she knew of the learning phase and the material Identity 1 had seen. They answered with either "yes" or "no". Then, the words of List B were presented to Identity 2, and the participant was tested for free recall. After a two-hour interval, Session 2 took place in which Identity 2 was tested for recognition. The recognition test had not been announced in Session 1. The words of the recognition list were presented one at a time and the patients had to state whether they recognized the words as old, i.e., from Session 1. If they recognized a word, they additionally had to state if their recognition was a remember or a know recognition. Participants received extensive instructions about the remember and know responses resembling instructions described by Gardiner (1988; see also Gardiner & Parkin, 1990). Remember responses were described as recognition states in which you have a conscious recollection of some aspect of the original encounter with the particular item. Know responses just elicit a feeling of familiarity, without however remembering specific contextual elements (Postma, 1999).

Participants in the simulating control group learned and were tested for List A while being in their normal identity state and List B after having switched to their imagined "amnesic" identity. The recognition test also had to be performed by this imagined identity. Before "switching" to their other identity, they were instructed to pretend that they did not know their normal identity had seen a list called A and so they had no remembrance of the words and no practice in remembering. Subsequently, they were given 2 min to take on the other identity's state of mind. Participants in the control group performed the task without switching. Instead, they had a 2-min break to keep the length of procedures equal between groups.

Results

Of the 22 DID patients tested, three patients reported, after their switch to Identity 2, knowledge of some sort of the learning phase. These patients were not included. The data thus pertain to 19 DID patients who subjectively reported complete one-way amnesia for the learning phase including the words presented in List A.

An alpha level of .05 was used for all statistical tests and all tests described were two-tailed. All multiple-comparison procedures described were Bonferroni tests.

Recall

Although not crucial for the claim of interidentity amnesia, except for the intrusions of words from List A into the recall of List B, recall scores are presented to give a detailed account of the participants' overall memory performance for trauma-related material. The mean number of recalled trauma-related, positive and neutral words of List A and List B for patients, controls and simulating controls is presented in Table 1. Analysis was accomplished by repeated measures analysis of variance with list [List A vs. List B] and word category [trauma-related vs. positive vs. neutral] as within-subjects factors, and diagnosis [patients vs. controls vs. simulators] as a between-subjects factor. A significant word category main effect was found, $F(2, 65) = 43.28$, $p < .01$. Within-subjects contrasts indicated that participants recalled significantly more trauma-related words than positive words, $F(1, 66) = 50.19$, $p < .01$, and significantly more trauma-related words than neutral words, $F(1, 66) = 83.47$, $p < .01$. Positive words were not recalled significantly more than neutral words, $F(1, 66) = 0.97$, $p = .33$. Importantly, the Word Category x Diagnosis interaction proved not significant, $F(4, 132) = 0.89$, $p = .47$, indicating that all diagnosis groups, including DID patients, recalled more trauma-related words in comparison with positive and neutral words. Furthermore, a main effect of diagnosis was observed, $F(2, 66) = 5.33$, $p < .01$. A multiple-comparison procedure showed that patients demonstrated a significantly overall lower recall than

controls, $p < .01$. The difference between patients and simulators did not reach significance, $p = .06$, whereas simulators clearly did not differ from normal controls in overall recall, $p = 1.00$.

Table 1. List-Dependent Recall for Trauma-Related, Positive, and Neutral Words for Dissociative Identity Disorder (DID) Patients ($n = 19$), Controls ($n = 25$), and Simulators ($n = 25$)

List	*DID patients*	*Controls*	*Simulators*
List A			
Trauma-related words	4.47 (1.26)	5.12 (1.17)	5.00 (1.32)
Positive words	2.68 (1.83)	3.40 (1.78)	4.12 (1.69)
Neutral words	2.63 (1.42)	3.08 (1.47)	3.44 (1.47)
List B			
Trauma-related words	3.79 (2.15)	4.48 (1.83)	3.92 (1.53)
Positive words	2.16 (1.07)	3.68 (1.44)	2.96 (1.49)
Neutral words	2.53 (1.61)	3.72 (1.46)	2.68 (1.52)

Note. The values represent means (with standard deviations in parentheses).

Important for the hypothesis of interidentity amnesia in DID is the number of word-intrusions from List A into the recall of List B. Overall, 7 patients recalled one or more intrusions from List A when recalling words from List B, compared to 10 controls and 7 simulators. More specifically, three patients compared to three controls and three simulators recalled a *trauma-related* intrusion from List A when recalling words from List B, a result not expected for patients in the case of interidentity amnesia for trauma-related material.

Recognition

First and most interesting for the claim of interidentity amnesia for trauma-related material, list-dependent recognition hit rates were determined for List A and List B. Additionally, to gain an impression of the general memory

performance of the participants, overall recognition hit rate (that is for both lists together), false alarm rate, sensitivity and response bias were determined. The measures of sensitivity and response bias were calculated from *z* scores, as described by MacMillan and Creelman (1991). Sensitivity is expressed in the measure of *d'* and includes the number of targets (old words recognized as old) while correcting for the number of distractor words falsely recognized. Response bias is expressed in the measure of *C* and refers to the tendency to favor "old" or "new" responses. All recognition memory scores are presented in Tables 2 and 3.

Table 2. List-Dependent Recognition for Trauma-Related, Positive, and Neutral Words for Dissociative Identity Disorder (DID) Patients (n = 19), Controls (n = 25), and Simulators (n = 25)

	DID patients	*Controls*	*Simulators*
Hit rate List A			
Trauma-related words	.38 (.32)	.73 (.22)	.45 (.31)
Positive words	.31 (.23)	.68 (.17)	.38 (.28)
Neutral words	.30 (.25)	.62 (.21)	.36 (.24)
Hit rate List B			
Trauma-related words	.54 (.30)	.72 (.20)	.62 (.24)
Positive words	.42 (.23)	.72 (.18)	.57 (.22)
Neutral words	.42 (.23)	.72 (.20)	.50 (.24)

Note. The values represent means (with standard deviations in parentheses).

The most important finding in the list-dependent hit rates was that the patients' mean List A recognition hit rate for trauma-related words was not 0, as would be expected if patients were completely amnesic (Table 2). In their amnesic identity state, they recognized 38% of the trauma-related words learned by the other identity, compared to 54% of the trauma-related words learned in the same identity state. They also recalled 31% of the positive words and 30% of the neutral words learned by the other identity,

compared to 42% of the positive and neutral words learned in the same identity state.

Table 3. Overall Recognition, Sensitivity, and Response Bias for Trauma-Related, Positive, and Neutral Words for Dissociative Identity Disorder (DID) Patients (n = 19), Controls (n = 25), and Simulators (n = 25)

	DID patients	*Controls*	*Simulators*
Hit rate			
Trauma-related words	.46 (.27)	.72 (.18)	.53 (.23)
Positive words	.37 (.21)	.70 (.15)	.47 (.21)
Neutral words	.36 (.21)	.67 (.17)	.43 (.18)
False alarm rate			
Trauma-related words	.12 (.19)	.12 (.18)	.06 (.08)
Positive words	.08 (.14)	.11 (.12)	.05 (.07)
Neutral words	.08 (.14)	.13 (.13)	.05 (.08)
Sensitivity			
Trauma-related words	1.20 (0.74)	2.01 (0.85)	1.65 (0.57)
Positive words	1.09 (0.66)	1.91 (0.73)	1.52 (0.48)
Neutral words	1.09 (0.63)	0.73 (0.79)	1.45 (0.43)
Response bias			
Trauma-related words	0.75 (0.71)	0.33 (0.47)	0.72 (0.48)
Positive words	0.98 (0.51)	0.36 (0.35)	0.85 (0.45)
Neutral words	0.97 (0.52)	0.38 (0.32)	0.91 (0.42)

Note. The values represent means (with standard deviations in parentheses).

A corresponding repeated measures analysis showed a significant word category main effect, $F(2, 65) = 4.22$, $p = .02$. Within-subjects comparisons revealed that the trauma-related words mean hit rate was significantly higher than the mean positive words hit rate, $F(1, 66) = 5.44$, $p = .02$, and the mean

neutral words hit rate, $F(1, 66) = 8.26$, $p = .01$. Importantly, however, the List x Word Category x Diagnosis interaction was not significant, $F(4, 132) = 1.00$, $p = .41$, which would be expected if patients showed interidentity amnesia for trauma-related words on List B, learned in the same identity, compared to List A, learned in another identity.

On overall sensitivity (Table 3), there was no significant word category main effect, $F(2, 65) = 2.42$, $p = .10$, nor a significant Word Category x Diagnosis interaction, $F(4, 132) = 0.28$, $p = .89$. There was, however, a significant diagnosis main effect, $F(2, 66) = 11.18$, $p < .01$. A multiple-comparison procedure revealed that patients scored significantly lower on overall sensitivity than normal control groups, $p < .01$, and simulators, $p = .04$. Simulators did not differ significantly from normal controls, $p = .07$.

On overall response bias, there was a significant word category main effect, $F(2, 65) = 3.73$, $p = .03$. Within-subjects contrasts revealed that the trauma-related words response bias was more liberal than the positive words response bias, $F(1, 66) = 5.54$, $p = .02$, and the neutral words response bias, $F(1, 66) = 7.16$, $p = .01$. The positive words response bias did not differ significantly from the neutral words response bias, $F(1, 66) = 0.31$, $p = .58$. This word category main effect did not differ between diagnosis groups, $F(4, 132) = 0.64$, $p = .63$. Finally, there was a significant diagnosis main effect, $F(2, 66) = 12.23$, $p < .01$. A multiple-comparison procedure revealed that patients as well as simulators scored significantly more conservative than normal controls, $p < .01$ for both comparisons. Patients did not differ significantly from simulators, $p = 1.00$.

Remember and Know Responses

The remember and know rate for each list was determined as the number of words correctly recognized and assigned either a remember or know quality divided by the total number of words on the list of origin. The mean proportions remember and know responses are presented in Table 4.

Controls characterized their recognitions on both lists more as remembering. In contrast, both patients and simulators characterized their

recognitions from their own list (List B) more as remembering, whereas they characterized their recognitions from the list learned by the other identity (List A) more as knowing. This difference however, reflected in the interaction List x Diagnosis x Quality (remember vs. know), proved not significant, $F(2, 66) = 0.93$, $p = .40$.

Table 4. Proportions Remember and Know Responses for Trauma-Related, Positive, and Neutral Words for Dissociative Identity Disorder (DID) Patients ($n = 19$), Controls ($n = 25$), and Simulators ($n = 25$)

	DID patients	*Controls*	*Simulators*
Remember List A			
Trauma-related words	.20 (.28)	.41 (.27)	.22 (.22)
Positive words	.14 (.14)	.38 (.25)	.16 (.21)
Neutral words	.09 (.14)	.34 (.24)	.10 (.13)
Know List A			
Trauma-related words	.17 (.24)	.32 (.23)	.23 (.24)
Positive words	.17 (.15)	.30 (.20)	.22 (.26)
Neutral words	.21 (.17)	.28 (.21)	.26 (.24)
Remember List B			
Trauma-related words	.31 (.27)	.40 (.24)	.41 (.23)
Positive words	.22 (.16)	.45 (.26)	.29 (.23)
Neutral words	.24 (.21)	.43 (.27)	.24 (.21)
Know List B			
Trauma-related words	.23 (.17)	.32 (.24)	.21 (.24)
Positive words	.20 (.19)	.27 (.18)	.28 (.26)
Neutral words	.18 (.13)	.30 (.24)	.27 (.23)

Note. The values represent means (with standard deviations in parentheses).

We thus did not find a significant difference between diagnosis groups in remember and know responses for information learned in the same versus other identity. More importantly for the question of state of awareness during recognition of trauma-related material, the interaction List x Diagnosis x Quality x Word Category also was not significant, $F(4, 132) = 1.49$, $p = .21$, indicating that the (nonsignificant) differences in states of awareness during list recognition between controls on the one hand and patients and simulating controls on the other hand, did not differ for trauma-related, positive, and neutral words. Finally, the interaction Diagnosis x Word Category x Quality also proved not significant, $F(4, 132) = 1.22$, $p = .31$.

Discussion

The main objective of this study was to investigate interidentity memory performance for trauma-related material in DID. In the case of interidentity amnesia, patients were expected to recall no intrusions from trauma-related words on List A during recall of List B and not to recognize List A trauma-related words. We found them, however, to recall the same number of trauma-related intrusions as normal controls and to recognize a considerable amount of words, that is 38%, of the trauma-related words learned by the other identity. The patients' superior List B recognition for all word categories when compared to their List A recognition performance seems to indicate evidence of partial amnesia. However, this conclusion cannot be drawn because of the simulators' ability to simulate this performance and because of the nonsignificant List x Word Category x Diagnosis interaction. Finally, we found that patients did not show qualitatively different ways of retrieving trauma-related words compared to other groups. Taken together, we did not find evidence of total interidentity amnesia for trauma-related material in DID. These findings strikingly contrast with the patients' subjective reports of total amnesia for the task and material performed by the learning identity.

The patients' memory performance did differ from normal controls in that they overall recalled less words and they scored significantly lower than normal controls and simulators on overall recognition sensitivity, i.e., the ability to distinguish "old" words from "new" words in recognition. A general impaired memory performance is often found in other psychiatric disorders, notably anxiety disorders like PTSD (Bremner et al., 1993) and depression, patients with which have been suggested to have diminished processing resources available for memory tasks as a result of their emotional preoccupation (Baddeley, Wilson, & Watts, 1995).

One can argue about the validity of the traumatic stimuli in this study. The DSM-IV (American Psychiatric Association, 1994) speaks about "important personal information" (p.477) in describing the DID symptom of amnesia. While we cannot guarantee the material used had bearing to patients' personally experienced traumatic events, the trauma-related words in this study were checked by two therapists treating patients with DID for face validity, and the rating scores of patients did indicate they regarded trauma-related words in this study as more negative than positive and neutral words. In sum, we did not find evidence of total interidentity amnesia for trauma-related words. The findings of lack of objective evidence for reported interidentity amnesia in the present study concur with the results of our previous studies on interidentity amnesia that deal with retrieval of neutral material (Huntjens et al., 2002; Huntjens et al., 2003). These findings may have important implications for the conceptualization of DID in the future. Dissociative amnesia in DID may more adequately be described in the DSM as an experiental disturbance in memory functioning. Central to the disorder seems to be the patients' belief of the inability to recall information instead of an actual, objective inability to recall. Patients seem to lack the acknowledgement of remembered memories of other identities as belonging to themselves, which seems a direct result of their lack of an integrated feeling of identity. Objectively, however, there is transfer of memories across identities in DID.

References

Allen, J. B., & Movius, H. L. (2000). The objective assessment of amnesia in dissociative identity disorder using event-related potentials. International Journal of Psychophysiology, 38, 21-41.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Baddeley, A. D., Wilson, B. A., & Watts, F. N. (1995). *Handbook of memory disorders.* Chichester, England: Wiley.

Boon, S., & Draijer, N. (1993). *Multiple personality disorder in the Netherlands: A study on reliability and validity of the diagnosis.* Lisse: Swets & Zeitlinger.

Boon, S., & Draijer, N. (1994). *Gestructureerd klinisch interview voor de vaststelling van DSM-IV dissociatieve stoornissen (SCID-D) [Structured Clinical Interview for the Diagnosis of DSM-IV Dissociative Disorders (SCID-D)].* Lisse: Swets & Zeitlinger.

Bradley, M. M., Greenwald, M. K., Petry, M. C., & Lang, P. J. (1992). Remembering pictures: Pleasure and arousal in memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 18*, 379-390.

Bremner, J. D., Scott, T. M., Delaney, R. C., Southwick, S. M., Mason, J. W., Johnson, D. R., Innis, R. B., McCarthy, G., & Charney, D. S. (1993). Deficits in short-term memory in posttraumatic stress disorder. *American Journal of Psychiatry, 150*, 1015-1019.

Cardeña, E. (2000). Dissociative disorders. In A. E. Kazdin (Ed.), *Encyclopedia of psychology* (pp. 55-59). Oxford, England: Oxford University Press.

Carlson, E. B., & Putnam, F. W. (1993). An update on the dissociative experiences scale. *Dissociation, 6*, 16-27.

CELEX. (1990). On-line Dutch database (Release N31). Nijmegen: Centre for Lexical information.

Dorahy, M. J. (2001). Dissociative identity disorder and memory dysfunction: The current state of experimental research, and its future directions. *Clinical Psychology Review, 21*, 771-795.

Eich, E., Macaulay, D., Loewenstein, R. J., & Dihle, P. H. (1997). Implicit memory, interpersonality amnesia, and dissociative identity disorder: Comparing patients with simulators. In J. D. Read & D. S. Lindsay (Eds.*), Recollections of trauma: Scientific research and clinical practice* (pp. 469-474). New York: Plenum Press.

Freyd, J. J. (1996). *Betrayal trauma: the logic of forgetting childhood abuse*. Cambridge, MA: Harvard University Press.

Gardiner, J. M. (1988). Functional aspects of recollective experience. *Memory & Cognition, 16*, 309-313.

Gardiner, J. M., & Java, R. I. (1993). Recognition memory and awareness: An experimental approach. *European Journal of Cognitive Psychology, 5*, 337-346.

Gardiner, J. M., & Parkin, A. J. (1990). Attention and recollective experience in recognition memory. *Memory & Cognition, 18*, 579-583.

Huntjens, R. J. C., Postma, A., Peters, M., Hamaker, E.L., Woertman, L., & Van der Hart, O. (2002). Perceptual and conceptual priming in patients with dissociative identity disorder. *Memory & Cognition, 30,* 1033-1043.

Huntjens, R. J. C., Postma, A., Peters, M., Woertman, L., & Van der Hart, O. (2003). Interidentity amnesia for neutral, episodic information in dissociative identity disorder. *Journal of Abnormal Psychology, 112,* 290-297.

Knowlton, B. J. (1998). The relationship between remembering and knowing: A cognitive neuroscience perspective. *Acta Psychologica, 98,* 253-265.

Knowlton, B.J. & Squire, L. R. (1995). Remembering and knowing: Two different expressions of declarative memory. *Journal of Experimental Psychology: Learning, Memory , and Cognition, 21,* 699-710.

Lewis, D. O., Yeager, C. A., Swica, Y., Pincus, J. H., & Lewis, M. (1997). Objective documentation of child abuse and dissociation in 12 murderers with dissociative identity disorder. *American Journal of Psychiatry, 154*, 1703-1710.

Lilienfeld, S. O., Lynn, S. J., Kirsch, I., Chaves, J. F., Sarbin, T. R., Ganaway, G. K., & Powell, R. A. (1999). Dissociative identity disorder and the sociocognitive model: Recalling the lessons of the past. *Psychological Bulletin, 125*, 507-523.

Macmillan, N. A., & Creelman, C. D. (1991). *Detection theory: A user's guide.* Cambridge, England: Cambridge University Press.

Merckelbach, H., Rassin, E., & Muris, P. (2000). Dissociation, schizotypy, and fantasy proneness in undergraduate students. *Journal of Nervous and Mental Disease, 188*, 428-431.

Peters, M. L., Uyterlinde, S. A., Consemulder, J., & Van der Hart, O. (1998). Apparent amnesia on experimental memory tests in dissociative identity order: An exploratory study. *Consciousness and Cognition, 7*, 27-41.

Postma, A. (1999). The influence of decision criteria upon remembering and knowing in recognition memory. *Acta Psychologica, 103*, 65-76.

Silberman, E. K., Putnam, F. W., Weingartner, H., Braun, B. G., & Post, R. M. (1985). Dissociative states in multiple personality disorder: A quantitative study. *Psychiatry Research, 15*, 253-260.

Steinberg, M. M. D. (1993*). Structured clinical interview for DSM-IV dissociative disorders (SCID-D).* Washington, DC: American Psychiatric Press.

Tulving, E. (1985). Memory and consciousness. *Canadian Psychologist, 26,* 1-12.

Verhage, F. (1964). *Intelligentie en leeftijd: Onderzoek bij Nederlanders van twaalf tot zevenenzeventig jaar [Intelligence and age: Study with Dutch people from age 12 to 77].* Assen: Van Gorcum.