Chapter

2

Interidentity Amnesia for Neutral, Episodic Information in Dissociative Identity Disorder

Abstract

Interidentity amnesia is considered a hallmark of dissociative identity disorder (DID) in clinical practice. In this study, objective methods of testing episodic memory transfer between identities were used. Tests of both recall (interference-paradigm) and recognition were used. A sample of 31 DID patients was included. Additionally, 50 control subjects participated, half functioning as normal controls and the other half simulating interidentity amnesia. Twenty-one patients subjectively reported complete one-way amnesia for the learning episode. However, objectively, neither recall nor recognition scores of patients were different from those of normal controls. It is suggested that clinical models of amnesia in DID may be specified to exclude episodic memory impairments for emotionally neutral material.

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Introduction

Dissociative identity disorder (DID; formerly multiple personality disorder) is regarded as the most severe of the dissociative disorders and is characterized by the presence of two or more distinct identities or personality states that recurrently take control of the individual's behavior (*Diagnostic and Statistical Manual of Mental Disorders*, 4th ed., *DSM-IV*; American Psychiatric Association, 1994). A key diagnostic criterion of DID is amnesia, described in the *DSM-IV* as "the inability to recall important personal information that is too extensive to be explained by ordinary forgetfulness" (American Psychiatric Association, 1994, p.487). However, in the clinical and research literature on DID, there is disagreement whether amnesia in DID is a naturalistic phenomenon.

Gleaves (1996) has summarized the views and findings of clinicians and clinical researchers working with DID patients under the heading of the *posttraumatic* model. In this model, dissociation is regarded as a compartmentalization of the personality, serving as a naturally occurring, protective reaction to overwhelming trauma, in which memories of traumatic events are stored in one or more dissociated states (Putnam, 1997; Ross, 1997; Spiegel & Cardeña, 1991; Van der Hart, Boon, & Op den Velde, 1991). In a state in which patients can remember traumatic events, they have a prevailing affect, repertoire of behaviors, and sense of self (including body-image) different from a state in which they cannot remember these events (e.g., Putnam, 1989). The posttraumatic model therefore views the dissociative states as separate identities, with amnesia between these dissociative identities called *interidentity amnesia*. A longitudinal study spanning two decades suggested that age of onset, chronicity, and severity of trauma predict level of dissociation (Ogawa, Sroufe, Weinfield, Carlson, & Egeland, 1997). Not all dissociative identities within a patient are considered to be totally amnesic for each other's (traumatic or trauma-related) memories. Some identities experience total amnesia, some partial amnesia and some no amnesia at all. As noted a century ago, interidentity amnesia may be either symmetrical (i.e., "two-way": both identities claiming

amnesia for each other's experiences) or asymmetrical (i.e., "one-way": one identity claiming amnesia and the other not; Ellenberger, 1970; Janet, 1907; Ludwig, Brandsma, Wilbur, Benfeldt, & Jameson, 1972). Whatever its form, reported amnesia implies that some dissociative identities partly or completely fail to voluntarily retrieve memories that other identities are able to retrieve. That is, at the most, dissociated memories are unavailable to other identities, and at the least, they are not voluntarily accessible for conscious awareness.

An alternative perspective on DID is offered by the *sociocognitive* model, which regards DID to be unrelated to childhood trauma. Instead, role enactment is believed to be the principal feature of DID, wherein multiple identities are established, legitimized, maintained, and altered as a consequence of therapist influences, media portrayals, and sociocultural expectations. This role enactment is adopted by emotionally needy clients as a way of communicating their distress and gaining and maintaining attention of significant others[1] (Lilienfeld et al., 1999; Spanos, 1996). With regard to DID patients reporting or manifesting amnesia, the sociocognitive model does not predict objective evidence for this phenomenon.

In harmony with the *DSM-IV* definition of amnesia in DID, most experimental cognitive research on interidentity amnesia in DID has focused on episodic memory impairment. Episodic memory is the memory system involved in the conscious recollection of personal events (Schacter, 1996). It is the memory system on which most patients with neurological damage are severely impaired (e.g., Goshen-Gottstein, Moscovitch, & Melo, 2000; Moscovitch, 1982). All of the experimental cognitive studies of interidentity amnesia for episodic events to date have made use of emotionally neutral material, and the number of studies is very limited (Dick-Barnes, Nelson, & Aine, 1987; Eich, Macaulay, Loewenstein, & Dihle, 1997; Ludwig et al, 1972; Nissen, Ross, Willingham, Mackenzie, & Schacter, 1988; Peters, Uyterlinde, Consemulder, & Van der Hart, 1998; Silberman, Putnam, Weingartner, Braun, & Post, 1985; for a thorough overview, see

[1] According to Draijer and Boon (1999), this description is not the key feature of genuine DID but the characteristic of some imitated DID cases who—mainly unconsciously—simulate DID.

Dorahy, 2001). Moreover, the studies suffer from several methodological drawbacks. First, in one of the studies, the patient who was tested did not claim amnesia between the participating identities in the first place (Dick-Barnes et al., 1987). Second, only three studies have included more than one patient (Eich et al.,1997; Peters et al., 1998; Silberman et al., 1985). Third, with just one exception, no studies included a control group matched in mean age and mean years of education. Fourth, all studies but one did not include a control group instructed to mimic DID, a prerequisite given the characterization of DID by the sociocognitive model. Fifth and very important, the memory tests used did not always constitute objective measurements of memory. In the procedure followed by Eich et al. (1997) and Peters et al. (1998), for example, an identity claiming amnesia was informed that another identity had previously learned stimulus material. Memory was tested by asking the identity claiming amnesia to consciously retrieve the material learned by the other identity. Patients reported virtually no explicit memory. This result was taken by the authors as evidence of interidentity amnesia. However, we argue that the patients' denying knowledge of stimulus material learned by another identity should be taken not as objective evidence for an episodic memory impairment in DID but rather as a representation of the patients' subjective experience of amnesia.

The only study of episodic memory in DID that did include both a more objective memory test and a control group instructed to simulate interidentity amnesia was performed by Silberman et al. (1985). In this study, 9 DID patients were tested in an interference paradigm in which recall of a given body of material is influenced by prior learning (called *proactive interference*) and subsequent learning (called *retroactive interference*). The interference paradigm provided a more objective memory task because simulating controls were not able to stop the interference of competing material learned by another "identity" and thereby unable to simulate interidentity amnesia. Silberman et al. concluded that overall, the performance of patients and controls was similar. Although it is the best study up to date on episodic memory functioning in DID, several methodological problems exist in the study by Silberman et al., of which the limited number of patients is one. Second, although processes of

interference were the main focus of the study, it is not clear whether proactive and retroactive interference were active at all and to what degree they were both active in the study, because recall of the two lists used in the study was established only after both lists were learned. Furthermore, the procedure for patients and controls was not kept equal, with patients having two readings of material in one of the study conditions, which was incomparable to the one reading patients and controls received in other conditions. Finally, the formal recognition measures of sensitivity and response bias were not provided. Sensitivity refers to the ability to distinguish target items from distractor items. Response bias refers to the tendency to favor "yes" or "no" responses regardless of stimulus type. Especially in the context of investigating a disputed criterion like amnesia in DID, it seems important to discriminate between the actual memory performance measure and response bias.

The Present Study

In the present study, we tried to overcome many of the methodological drawbacks present in earlier studies of interidentity amnesia in DID. We included a sample of 31 DID patients reporting one-way amnesia as well as a normal control group ($n = 25$) and a control group instructed to enact the role of DID patient and simulate interidentity amnesia ($n = 25$). The simulating control group was included to detect the possibility of simulation on the memory measures used. If simulation proved impossible, the tasks would constitute truly objective measures of memory. If, in contrast, simulation proved possible, a simulation profile could be established and compared with the memory performance of DID patients, thereby evaluating the sociocognitive theory's role-playing claim. Patients and control subjects were matched on gender, mean age, and mean education level. Patients' subjective report of one-way amnesia was assessed twice during the experiment, and patients who reported any knowledge of the learning phase in the test phase were analyzed separately.

We made use of several memory tests in determining the objective episodic memory performance of subjects independent of patients' subjective reports; in all tests, procedures were kept equal between patients and control subjects. An improved interference test was designed, consisting of two lists (A and B) made up of words from the same semantic categories, denoted shared categories. List A was read by one identity, after which recall of List A was established. Retroactive interference could thus not play a role in the recall of List A. Then, List B was read by a second identity claiming total amnesia, and again recall was determined. To assess the level of proactive interference of List A on recall of List B, we added an unshared word category to both lists as a control measure (cf. The California Verbal Learning Test; Delis, Kramer, Kaplan, & Ober, 1987). For controls, we hypothesized that the recall of the shared categories of List B would be impaired by proactive interference, that is, the tendency for words from List A to intrude on the recall of words from List B. The recall of the unshared category on List B was expected to show release from interference (i.e., causing no impairment in recall). Additionally, normal control subjects were expected to recall word intrusions from the shared categories of List A during recall of List B. Simulators were supposed to show a performance pattern equal to normal controls, because simulation of amnesia on an interference task is believed to be impossible (e.g., Bower, 1994). For the DID patients, on the other hand, a pattern of proactive interference and release from interference was not expected. We believed that their recall of the shared categories of List B would be unimpaired because the learned material of List A was supposed to be unavailable to the amnesic identity. Therefore, recall of words of List B would be equal for the shared categories and the unshared category. Patients were expected to recall no intrusions from List A during recall of List B when amnesia between identity states was present.

After a 1-week interval, the amnesic identity was also tested for recognition and list discrimination of material learned by both identities. The formal measures of sensitivity and response bias were calculated for recognition. On the recognition test, normal control subjects were hypothesized to show nearly equivalent recognition for both lists. List

discrimination was expected to be difficult for normal controls, especially after a 1-week interval. We predicted that patients, on the other hand, would recognize far more words from List B (learned by the same identity) in comparison with List A (learned by another identity). Recognition of List A should be next to nothing, reflecting the amnesia for this list reported by the identity tested. Patients were also expected to perform superiorly on list discrimination as compared with controls, because the test identity saw words only from List B and thus should easily be able to discriminate between words seen (List B) and words unseen (List A).

Finally, a question was added on the state of awareness during recognition. 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), resembling the impersonal recollection mentioned by Cardeña (2000). Because "switching" to another identity involves an internal state-shift (e.g., Bower, 1994), recognition of events learned by the same identity may be characterized more by a remember state of awareness, whereas recognition of events learned by another identity may evoke primarily knowing responses.

Method

Participants

A total of 118 clinicians treating dissociative disorders in the Netherlands and Belgium were approached 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; Boon & Draijer, 1994; Steinberg, 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; and (5) they are all able to switch between identities on request. In the Netherlands, the SCID-D was validated by Boon and Draijer (1993). The interrater reliability in their sample—as expressed in kappa—was .96 for presence versus absence of a dissociative disorder and .70 for type of dissociative disorder. Ten approached clinicians did not respond or stated they had no time or did not want to participate. Fifty-one clinicians stated they had no DID patients in treatment. Of the 57 clinicians that did have one or more DID patients, 8 stated patients were not able to switch between identities upon request, and 5 judged participation would interfere with treatment. Forty-four clinicians did ask one or more patient to participate[2], of which 17 found their patients (25 in total) unwilling to participate. Eventually, 27 clinicians provided one or more patient (31 patients in total) willing to participate. The mean number of years since diagnosis of DID for patients was 4.42 years (range = 3 months to 11 years), and DID was always the main reason for patients to be in treatment. 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.

In addition, 50 female nonpsychiatric control subjects participated. They were university staff and community volunteers and received a small payment. They did not report any relevant memory, visual, or attentional problems or psychiatric disorders; all were Caucasian. Control subjects were assigned randomly to either the control group or the simulating group. Groups were matched on age (M = 37.71, SD = 8.41 for patients [n = 21]; M = 37.72, SD = 11.29 for normal controls; and M = 32.48, SD = 10.31 for

2 We excluded 2 male patients from participation because we felt the benefit of including them did not outweigh the work of gathering additional male control groups.

simulators) and education[3] (M = 5.67, SD = 0.80 for patients (n = 21); M = 5.88, SD = 1.13 for normal controls; and M = 5.84, SD = 1.14 for simulators). Subjects 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 subjects had spent considerable effort inventing an identity. Finally, they were asked to practice during the week preceding the test in switching to their "identity" and taking on its state of mind. Subjects in the normal control group were told only that they would participate in a memory experiment. No information was provided on the DID-related aspects of the study.

All control subjects completed both the Dissociative Experiences Scale (DES; Carlson & Putnam, 1993) and the Creative Experience Questionnaire (CEQ; Merckelbach, Rassin, and 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. Scores are thought to be indicative of "fantasy proneness", that is, the inclination to be immersed in daydreams and fantasies. The normal control group (M = 6.31, SD = 4.10) and the simulating control group (M = 6.54, SD = 3.93) did not differ significantly on the DES, $t(48) = -.21$, $p = .837$, $d = .059$. The normal control group (M = 5.48, SD = 3.24) and the simulating control group (M = 4.20, SD = 2.58) also did not differ significantly on the CEQ, $t(48) = 1.54$, $p = .129$, $d = .437$. Subjects did not show a pathological level of dissociation as measured by the DES. Written informed consent was obtained from patients as well as all control subjects prior to participation.

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3 Education was assessed in categories ranging from 1(*low*) to 7 (*high*) (Verhage, 1964).

Materials

Two word lists (A and B) were constructed. List A contained 8 names of vegetables, 8 names of animals, and 8 names of flowers. List B contained 8 new names of vegetables, 8 new names of animals, and 8 names of pieces of furniture. Therefore, the lists shared the categories animals and vegetables, but they did not share the categories flowers (List A) and furniture (List B). Additionally, a recognition list was developed including all the words from Lists A and B and an equal number of distractor words (new words from the same semantic categories), adding up to 96 words.

Word lists were matched as closely as possible with respect to mean frequency of occurrence per million (range from 0 to 284) and mean number of letters per word (range from 3 to 12; CELEX, 1990). Furthermore, to ensure that subjects' differences in recall could not be due to differences in list difficulty, we performed a pilot study. In this study, 32 psychology students served as subjects (mean age = 21.41 years, SD = 2.99). Students were randomly assigned to one of two groups, and list order (AB or BA) was counterbalanced. The study revealed no differences in recall between list orders AB and BA, $F(1, 33) = 1.54$, $p = .223$, $\eta^2 = .045$.

Procedure

The study was part of a larger investigation on memory (dis)abilities in DID. The present study consisted of two sessions separated by 1 week (Table 1). 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. Subjects 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, subjects were tested for free recall of the studied words (Trial 1). Subsequently, the presentation and free recall test of List A were repeated twice, with the subject instructed to encode more words each successive time (Trials 2 and 3).

Table 1. Procedure Followed by Dissociative Identity Disorder (DID) Patients, Controls, and Simulators

Session	DID patients	*Controls*	*Simulators*
Session 1:			
Recall List A			
Trial 1	identity 1	normal identity	normal identity
Trial 2	identity 1	normal identity	normal identity
Trial 3	identity 1	normal identity	normal identity
Recall List B			
Trial 1	amnesic identity 2	normal identity	simulated amnesic identity
Trial 2	amnesic identity 2	normal identity	simulated amnesic identity
Trial 3	amnesic identity 2	normal identity	simulated amnesic identity
Session 2:			
Recognition	amnesic identity 2	normal identity	simulated amnesic identity
Remember/know	amnesic identity 2	normal identity	simulated amnesic identity
List discrimination	amnesic identity 2	normal identity	simulated amnesic identity

After this, patients were requested to switch to the amnesic identity (Identity 2). The switching process was supervised either by their own clinician or by one of the authors (R.H. or O.V.). The switching process was always accomplished in less than 2 min. When the presence of Identity 2 was confirmed by the patient, this identity was directly asked whether and what she knew of the learning phase and the material Identity 1 had seen. Patients answered with either "yes" or "no". If they answered with "yes", they were asked what they knew (e.g., instructions, stimulus material) and whether they knew either "directly" by coconsciousness or "indirectly" by way of other participating identities. Then, the words of List B were presented to Identity 2 three times in the same way as in Trial 1, and the subject was tested for free recall after each presentation. List A was presented repeatedly (three times) because this increases proactive interference. List B was presented repeatedly to ensure equal procedures for both lists.

After 1 week, Session 2 took place in which Identity 2 was tested for recognition. Because of physical illness, 5 subjects were tested after a longer interval: 1 patient after 9 days, 1 control subject after 8 and 1 after 14 days, and 1 simulating control subject after 10 and 1 after 12 days. 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 whether their recognition was a *remember* or a *know* recognition. Subjects 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 one has 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).

After completion of the recognition test for all the words, list discrimination was determined. Identity 2 was informed that Identity 1 had seen a different word list called List A. It was not mentioned that List A included a different, unshared category. Then Identity 2 was told that she would now see a new set of words and that each word had originated from

either her own List B or from List A, seen by Identity 1. Patients were asked to state for each word whether it had originated from their own List B. It was explained that if they had not seen the word, it had originated from List A. However, the set of words that patients saw actually was not a new set of words from List A and B but rather the words patients previously had "recognized" (both correctly and incorrectly).

Subjects 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.

Subjects 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.

Measures and Statistical Analysis

Recall. To assess the development of proactive interference, we contrasted the number of recalled shared category words on Trial 1 of List A with the number of recalled shared category words on Trial 1 of List B. We established release from interference by comparing the number of words from unshared categories from the first trials of both lists; when List B was recalled equivalently to or better than List A, release was present. Instead of raw word count, a weighted average of shared and unshared category members was computed for Trial 1 of List A according to the method suggested by Kramer and Delis (1991). A second measure was the number of word intrusions from the shared categories of List A into the recall of shared categories of List B (Trials 1, 2 and 3).

Recognition. First and most interesting for the claim of interidentity amnesia, list-dependent recognition hit rates were determined for List A and List B. Furthermore, to gain an impression of the general performance of

the subjects, overall recognition hit rate (i.e., 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 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.

List Discrimination. The List discrimination hit rate was calculated as the number of words correctly assigned to List A and List B divided by the number of 'old' words recognized correctly. Response bias was determined as the List A hit rate divided by the List B hit rate.

Remember and Know Responses. The remember and know rate for each list was determined by the number of words correctly recognized as originating from that list that was assigned either a remember or know quality.

An alpha level of .05 was used for all statistical tests. All multiple-comparison procedures described were Tukey's honestly significantly difference (HSD) tests.

Results

Of the 31 DID patients tested, 8 subjectively reported knowledge of some sort of the learning phase after their switch to Identity 2. Some patients reported knowledge as a result of *co-consciousness*: the simultaneous presence of both Identity 1 and Identity 2 during the learning episode. Other patients reported knowledge by way of a third identity. Data of these patients were analyzed separately. Data of 2 additional patients were not included because emotional problems unrelated to the study interfered with the testing. The results described here therefore pertain to the 21 patients who subjectively reported complete one-way amnesia for the learning phase including the words presented in List A. Recognition data of 1 patient were missing owing to errors in the experimental software. Discrimination bias of one control

participant could not be calculated because her List B hit rate was 0. The power of F tests to detect medium effect sizes (given a mean sample size of 24) is .45 ($df_b = 2$) (Cohen, 1988).

Recall

Recall mean scores are shown in Table 2. We analyzed the pattern of proactive interference and release from interference using repeated measures analysis of variance (ANOVA) with list (List A, Trial 1 vs. List B, Trial 1) and category (shared vs. unshared) as within-subjects factors and diagnosis (patients, controls, or simulators) as between-subjects factor. Of central interest are the two-way interaction List x Category, which reflects the existence of a proactive interference/release from interference pattern, and the three-way interaction List x Category x Diagnosis, which reflects the difference in pattern between the diagnosis groups. Results indicated that the List x Category interaction was significant, $F(1, 68) = 42.82$, $p < .001$, $\eta^2 = .386$, whereas the List x Category x Diagnosis interaction was not significant, $F(2, 68) = 0.20$, $p = .818$, $\eta^2 = .006$. In other words, the pattern of proactive interference for shared categories and release from interference for unshared categories was found for both control groups and patients. Patients thus did not show the expected absence of proactive interference. A main effect of diagnosis was observed, $F(2, 68) = 8.42$, $p = .001$, $\eta^2 = .199$. Multiple-comparison procedures showed that patients ($M = 3.65$, $SE = 0.22$) demonstrated a significantly overall lower recall than controls ($M = 4.86$, $SE = 0.20$) and simulators ($M = 4.42$, $SE = 0.20$), $p < .001$ and $p = .030$, respectively. Simulators did not differ significantly from normal controls on overall performance, $p = .279$.

Patients did recall intrusions from List A from the shared categories during all trials of recall of List B, and a corresponding ANOVA showed that their mean sum of intrusions did not differ significantly from normal controls and simulators ($M = 0.57$, $SD = 0.81$, for patients; $M = 0.80$, $SD = 1.26$, for normal controls; $M = 1.04$, $SD = 1.34$, for simulators, $F(2, 68) = 0.91$, $p = .408$, $\eta^2 = .026$.

Table 2. List-Dependent Recall for Shared and Unshared Categories for Dissociative Identity Disorder (DID) Patients (n = 21), Controls (n = 25), and Simulators (n = 25)

Recall score	*DID patients*	*Controls*	*Simulators*
List A weighted scores on Trial 1			
Shared categories	3.90 (0.84)	4.64 (1.12)	4.66 (1.12)
Unshared category	3.82 (1.05)	4.84 (1.09)	4.60 (1.22)
List B raw scores on Trial 1			
Shared categories	2.93 (1.40)	4.18 (1.22)	3.66 (1.40)
Unshared category	3.95 (1.56)	5.76 (1.30)	4.76 (1.36)

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

Recognition

All recognition memory scores are shown in Table 3. The most important finding in the list-dependent hit rates was that the patients' List A recognition hit rate was not 0, as would be expected if patients were completely amnesic. They recognized a considerable number of words (50%) from the list learned by another identity. A repeated measures ANOVA revealed a significant increase in list-dependent hit rate from List A (M = 0.70, SE = 0.02) to List B (M = 0.80, SE = 0.02) for all subjects, $F(1, 67) = 16.98$, $p < .001$, $\eta^2 = .202$. However, this is not surprising, because List B was the list most recently learned. More important, the increase did not differ significantly between groups, $F(2, 67) = 2.16$, $p = .123$, $\eta^2 = .061$. A significant difference between groups would have been expected if patients were to have a significantly lower score on hit rate for List A than on List B in comparison with other groups.

Diagnosis groups differed significantly on overall sensitivity, $F(2, 67) = 24.93$, $p < .001$, $\eta^2 = .427$, and overall response bias, $F(2, 67) = 19.49$, $p < .001$, $\eta^2 = .368$. Multiple-comparison procedures revealed that patients scored significantly lower on overall sensitivity than normal control groups

(p < .001). Simulators scored significantly lower on overall sensitivity than normal controls (p < .001). Patients and simulators did not differ significantly (p = 179). Thus, overall recognition scores of both patients and simulators were significantly lower than those of normal controls. Patients also scored significantly higher on overall response bias in comparison with normal controls, so they were overall more conservative, that is, less inclined to recognize words (p < .001). Simulators scored significantly lower on response bias in comparison with patients, so they were significantly more liberal (p = .026). In comparison with normal controls, they were significantly more conservative (p = .001).

Table 3. Overall and List-Dependent Recognition and List Discrimination for Dissociative Identity Disorder (DID) Patients (n = 20), Controls (n = 25), and Simulators (n = 25)

	DID patients	*Controls*	*Simulators*
List-dependent recognition			
Hit rate List A	.50 (.26)	.91 (.10)	.69 (.23)
Hit rate List B	.65 (.25)	.94 (.07)	.80 (.15)
Overall recognition			
Hit rate	.57 (.22)	.92 (.08)	.74 (.15)
False alarm rate	.14 (.12)	.22 (.12)	.18 (.12)
Sensitivity	1.45 (0.49)	2.40 (0.47)	1.70 (0.47)
Response bias	0.49 (0.56)	-0.35 (0.39)	0.13 (0.41)
List discriminability			
Hit rate	.63 (.10)	.66 (.12)	.64 (.12)
Response bias	0.58 (0.52)	0.91 (0.26)	0.60 (0.34)

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

List Discrimination

In contrast to the hypothesis of patient superiority in list discrimination, an ANOVA on list discrimination hit rate revealed that diagnosis groups did not differ significantly, $F(2, 67) = 0.60$, $p = .549$, $\eta^2 = .018$. Patients were thus not better able to discriminate between words seen by their own identity and words seen by the other identity.

The discrimination response bias is smaller than 1 for all diagnosis groups, reflecting an inclination to assign words to List B. This is not surprising, since List B was the last list to learn. An ANOVA did show a significant diagnosis main effect, $F(2, 66) = 5.42$, $p = .007$, $\eta^2 = .141$. Control participants scored significantly higher compared to patients, $p = .015$, and simulators, $p = .018$. Patients did not differ significantly from simulators, $p = .969$. The lower score of patients and simulators indicates their inclination to assign more words to List B compared to controls.

Combining the recognition and discrimination results, we conclude that patients did not show a superior list discrimination performance. Furthermore, although patients as well as simulating controls did recognize words from List A, they assigned them relatively less to List A. Instead, they assigned them to the list they had seen as the same identity, List B.

Remember and Know Responses

The mean remember and know response rates (with standard deviations in parentheses) for List A were $M_{remember}$ = .19 (.20), .38 (.22), .28 (.19); M_{know} = .30 (.19), .53 (.23), .41 (.26) for patients, normal controls, and simulators, respectively. Mean response rates for List B were $M_{remember}$ = .37 (.25), .44 (.27), .42 (.24); M_{know} = .28 (.22), .50 (.27), .38 (.24) for patients, normal controls, and simulators, respectively. Normal controls characterized their recognitions from both lists more as know responses. In contrast, both patients and simulators characterized their recognitions from their own list (List B) more as remember responses, whereas they characterized their recognitions from the list learned by the other identity (List A) more as know responses. This difference, however, reflected in the three-way

interaction List x Diagnosis x Quality (remember vs. know), proved not significant, $F(2, 67) = 0.87$, $p = .423$, $\eta^2 = .025$, whereas the two-way interaction List x Quality did prove significant, $F(1, 67) = 19.43$, $p < .001$, $\eta^2 = .225$, reflecting the decreased remember responses on List A ($M = 0.28$, $SE = 0.02$) compared with the know responses on List A ($M = 0.41$, $SE = 0.03$), and the remember ($M = 0.41$, $SE = 0.03$) and know ($M = 0.39$, $SE = 0.03$) responses on List B. The interaction Diagnosis x Quality proved not significant, $F(2, 67) = 0.32$, $p = .725$, $\eta^2 = .010$. The main effect of quality also proved not significant, $F(1, 67) = 1.23$, $p = .271$, $\eta^2 = .018$. 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.

All analyses described were also performed including the 8 patients who reported some knowledge of the learning episode. These analyses yielded equivalent results.

Discussion

The present study aimed to assess the transfer of episodic, neutral information between identities in DID. When directly asked to recall the learning episode of another participating identity, 21 patients subjectively reported complete one-way amnesia for this episode. However, more formal testing showed no objective evidence for this reported amnesia. The proactive interference/release from interference pattern, mean intrusions, and the list-dependent recognition hit rates of patients all were not significantly different from those of normal controls matched on age and education. Also, patients did not perform superiorly in list discrimination. Moreover, we found no significant differences in remember and know responses in recognition of List A and List B. This indicates that patients did not use qualitatively different ways of retrieving material learned in another identity versus material learned in the same identity. Our results contrast with the reasoning of Eich et al. (1997) and Peters et al. (1998), who claimed that amnesic barriers between identities do show up in explicit memory tests using neutral material. However, we wish to emphasize that

the memory measures used in the studies by Eich et al. and Peters et al. should be taken primarily as a representation of the patients' subjective report of interidentity amnesia, whereas the measures used in this study index objective memory performance. Interestingly, our findings are in harmony with those of Silberman et al. (1985), the only study to date that has included more objective memory measures.

It is debatable precisely what memory systems are involved in the performance of the tasks we used. With regard to the interference task, it may be argued that this should be considered to be a task showing implicit transfer of explicit material instead of a pure task of explicit recall. The recognition task, however, is a clear measure of explicit recognition, requiring conscious recognition of previously studied words. Most important, regardless of the precise nature of the memory tasks, there was no indication of noticeable amnesia between identities.

Although our findings do not support the hypothesis generated by the posttraumatic model—that is, the inability of a dissociated identity to voluntarily retrieve memories learned by another identity—they are more concordant with that of the sociocognitive model, which states that no objective evidence for interidentity amnesia in DID is to be expected. However, although our results are in harmony with the sociocognitive model's specific hypothesis about the absence of interidentity amnesia in DID, the crucial claim of DID as a role-enactment syndrome indigenous to the sociocognitive model cannot be inferred from our findings. We included simulating control subjects who received detailed instruction on how to enact the role of DID patient and how to feign interidentity amnesia. Despite this instruction, they proved unable to simulate interidentity amnesia. This demonstrates that the tasks in this study were malingering-proof. Therefore, it cannot be concluded whether patients were or were not simulating interidentity amnesia.

What we did find was that DID patients showed a reduced general capacity to recall and recognize previously learned words in comparison with controls. Simulating controls also showed a reduced overall performance on recognition, that is, in their imagined identity. Finally, both simulators and patients showed a more conservative List A discrimination

response bias than controls, which indicates that although they did recognize words from the list learned by another identity, they rarely assigned them to that list. Instead, they assigned these words to their own list.

The performance of simulators parallels some of the findings of Silberman et al (1985), in which simulators showed deteriorated performance when learning was done by different "identities" compared with when it was done without switching. The reduced performance of simulators may be the result of simultaneously having to perform the memory task and the role playing, which also uses up cognitive resources. For patients, the issue of comorbidity must be taken into account in explaining their overall reduced performance. Baddeley, Wilson, and Watts (1995) suggested both depressed and anxious patients have diminished processing resources available for memory tasks as a result of their emotional preoccupation. In the present study, we had no information about comorbidity. However, the diagnostic categories of both depression and anxiety are often diagnosed comorbid disorders in DID (Boon & Draijer, 1993; Kluft, 1996). Second, the reduced overall memory performance of patients may also be due to specific medication treatments, on which we also had no sample information. Data on both comorbidity and medication treatment should thus be gathered in future studies.

It should also be noted that in this study, the establishment of psychiatric, memory, visual, and attentional problems in our control group was based solely on self-report. Also, the study staff didn not confirm the patients' diagnoses, and interrrater reliability for administrating the SCID-D was not determined for the current sample. Most importantly, even the 31 patients included in this study gave us only adequate power to detect large differences: Future studies ideally should include large patient samples. Furthermore, our sample constituted a subsample of DID patients, possibly limiting the generalizability of our findings. Patients were all in therapy for a longer period (a mean period of more than 4 years) and had to meet specific entrance criteria (i.e., identities were able to perform the tasks without interference of other identities, they were able to perform the tasks without spontaneous switches to other identities, and they were all able to switch

between the participating identities upon request). Also, not all identities of a patient were tested. Finally, the inclusion of a DID control group not switching between identities would aid in the interpretation of the patients' reduced performance on overall recall and recognition.

In sum, this study shows that reports of interidentity amnesia, although possibly reflecting the patient's subjective experience, should not be taken as evidence for objective episodic memory impairment for neutral material. Although the subjective experience of patients is always an important starting point for therapeutic treatment, more attention may be given to the insight patients seem to lack in the nature of their memory complaints. The specific prediction of the posttraumatic model of interidentity amnesia was not supported by formal memory testing, indicating that, at least, the model should be specified to exclude episodic impairments for neutral material. However, the model emphasizes the traumatic origins of the symptoms of DID and the function of compartmentalization of memories as a coping mechanism to deal with traumatic experiences (Nijenhuis & Van der Hart, 1999). This study, as well as previous experimental studies of interidentity amnesia in DID, does not deny or confirm the reality of traumatic experiences of DID patients, and as yet, it cannot be concluded from the present experimental studies that DID patients do not suffer amnesia for emotional material or trauma-related material. Future studies should combine an emphasis on objective memory testing with the use of material more closely related to reported trauma of DID patients.

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