# Apparent Amnesia

## interidentity memory functioning in dissociative identity disorder

Rafaële J.C. Huntjens

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# Apparent Amnesia

**interidentity memory functioning in dissociative identity disdorder**

Ogenschijnlijke amnesie

geheugenoverdracht tussen identiteiten bij patiënten
met een dissociatieve identiteitsstoornis
*(met een samenvatting in het Nederlands)*

**Proefschrift**

ter verkrijging van de graad van doctor aan de Universiteit Utrecht op gezag van de Rector Magnificus, Prof. Dr. W. H. Gispen, ingevolge het besluit van het College voor Promoties in het openbaar te verdedigen op vrijdag 26 september des middags te 12.45 uur

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"Zelfs als je niet bent wat je bent, is dat nog wie je bent"

Palmen, C. (2002) Geheel de uwe, p. 360. Amsterdam: Prometheus.

## Table of contents


| | | |
|---|---|---|
| Chapter 1 | Introduction | 9 |
| Chapter 2 | Interidentity Amnesia for Neutral, Episodic Information in Dissociative Identity Disorder | 29 |
| Chapter 3 | Perceptual and Conceptual Priming in Patients with Dissociative Identity Disorder | 55 |
| Chapter 4 | Procedural Memory in Dissociative Identity Disorder: When Can Interidentity Amnesia Be Truly Established? | 87 |
| Chapter 5 | Memory Transfer for Trauma-Related Words between Identities in Dissociative Identity Disorder | 105 |
| Chapter 6 | Transfer of Newly Acquired Stimulus Valence between Identities in Dissociative Identity Disorder | 125 |
| Chapter 7 | Discussion | 145 |
| | Dutch Summary (Samenvatting in het Nederlands) | 161 |
| | Acknowledgements (Dankwoord) | 167 |
| | Curriculum Vitae | 171 |

Chapter

# 1 Introduction

Dissociative identity disorder (DID), formerly called multiple personality disorder, is considered to be the most chronic and severe manifestation of dissociative phenomena. In the Diagnostic and Statistical Manual of Mental Disorders (4th ed., *DSM-IV*; American Psychiatric Association, 1994), DID is characterized by the presence of two or more distinct identities or personality states that recurrently take control of the individual's behavior accompanied by an inability to recall important personal information that is too extensive to be explained by ordinary forgetfulness. The disturbance is not due to the direct physiological effects of a substance or a general medical condition. The majority of the identified patients are female (Kluft, 1991a), and the prevalence of DID in inpatient psychiatric populations is estimated to be between 4% and 12%, with the most studies showing a rate around 5% (Boon & Draijer, 1993b; Horen, Leichner, & Lawson, 1995; Latz, Kramer, & Hughes, 1995; Ross, Anderson, Fleisher, & Norton, 1991; Saxe et al., 1993; for a review see Kluft, 1999).

DID is believed to develop from a self-protecting reaction to severe and persistent childhood abuse (Kluft, 1999; Freyd, 1996; Putnam, 1997; Van der Hart, van der Kolk, & Boon, 1998). Between 89% and 97% of DID patients report instances of sexual, physical, and/or psychological childhood abuse (Boon & Draijer, 1993a; Boon & Draijer, 1993b; Coons, Bowman, & Milstein, 1988; Putnam, Guroff, Silberman, Barban, & Post, 1986; Ross et al., 1990a, 1990b; Ross, Norton, & Wozney, 1989). From an attachment point of view, the conflict that a child experiencing abuse has to solve is the irreconcilable experience of the caregiver as an essential source of nourishment and safety and at the same time as a source of pain and danger (Fonagy, 1999; Liotti, 1999). To cope with these incompatible experiences, DID essentially is thought to involve the split between identity states in which patients experience trauma over and over again and identity states in which they experience partial or total amnesia for the abuse (cf. Nijenhuis & Van der Hart, 1999). The assumed function of the amnesic barriers between identities is thus 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). The basic split between an identity that contains memories of abuse and the amnesia

experienced in another identity is illustrated by Mollon (2002), who describes the behavior of one of his patients in a therapy session. Note that the DID patient, as is usually the case in DID, not only reports amnesia for the memories of abuse held by an identity, but also reports amnesia for the identity and her behavior:

> *Some years ago, a patient, Rebecca, came to her usual psychotherapy session, curled up in her chair and appeared very frightened. She seemed to be trying to fight off someone who was hurting her. My attempts to communicate and enquire with words evoked only a gasping whisper of "hide!" and "get hurt". After a few minutes she got up from the chair and hid on the floor behind it. She did not utter any more words that session. Despite this odd presentation, which appeared very removed from the present reality, she was able to leave when I indicated it was the end of the session… Following this session, Rebecca telephoned later in the day to apologize for not coming that morning. She "explained" that although she had come to the hospital she had not felt able to attend her session because she had been feeling so upset about certain events during the week. I tried to tell her that she had in fact come to her session. She seemed to presume I was misunderstanding her and repeated her explanation…When I tried to present her with the reality of her attendance, she appeared puzzled and confused, and said I must be lying but she could not understand why I would want to tell her this lie.* (pp. 177-178)

The mechanism of dissociation may become a characterological disposition with a more elaborate fragmentation of identities and compartmentalization of memories. The extent of further fragmentation and compartmentalization is thought to depend on the severity of the traumatization in terms of developmental age at trauma onset, chronicity and intensity of the traumatization, and factors such as the relationship to the perpetrator and lack of support and social recognition of the trauma (Ogawa, Sroufe, Weinfield, Carlson, & Egeland, 1997). In full-blown DID, dissociation becomes a fundamental response to all sources of exogenous and endogenous stress, with more identities being created not only to deal with experiences of abuse, but also to perform different daily activities in the adult patient's life (Van der Kolk, Van der Hart, & Marmar, 1996).

## Interidentity Amnesia

Between 95 and 100 % of DID patients report experiences of blank spells for periods of time when other identities are in control of their behavior (Boon & Draijer, 1993a; Boon & Draijer, 1993b; Coons et al., 1988; Putnam et al., 1986; Ross et al., 1990a, 1990b; Ross et al., 1989). These experiences have a discrete onset and ending and may vary from seconds to days or even years. Patients often report that they come out of a blank spell in another location, for example in a bar in the company of strangers. They report that strangers claim to know them, or call them by a different name. Friends tell them about things they have done, which they don't remember. The patient may state that objects are frequently missing, including money. Alternatively, objects may be present in her environment that she can't remember having bought (Ross, 1996). An example of such a blank spell is also taken from Mollon (1998), which is about another patient who is in therapy, and who has an identity called Alicia:

> *Some weeks later, Alicia again returned temporarily during a session. She looked around the room… She also looked out of the window, appearing puzzled, and asked what had happened to the snow. When Alicia had last appeared it had been winter and there was snow everywhere outside; now it was summer. She also remarked that the therapist had changed his clothes. Thus, in these various ways she was assuming the time was when she had last appeared and was oblivious to the changes that had taken place since then; she thought she was still in the room… in the middle of winter. (*p.65)

The blank spells may be either complete, or instead may consist of periods of partial recall. Also, instances of 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 whereas the other does not) (Ellenberger, 1970; Janet, 1907; Peters, Uyterlinde, Consemulder, & van der Hart, 1998).

Interidentity amnesia is regarded a core phenomenon in DID (Putnam et al., 1986). Cardeña (1994) emphasized the temporal continuity, essential for personal identity, which memory provides. He stated that the memory discontinuities characteristic of DID "produce a lack of self-integration, experienced by DID patients as the coexistence of diverse identities that exist more or less independently from the stream of consciousness and bank of memories of the presenting identity or alter" (p. 20). The central role that interidentity amnesia plays in the diagnosis of DID is reflected by the large number of items about amnesia in screening and diagnostic instruments. For example, the DES-T, a widely used screening instrument for dissociative disorders (Waller, Putnam, & Carlson, 1996), contains the following items of a total of eight inquiring after amnesia: (1) Some people have the experience of finding themselves in a place and having no idea how they got there, (2 Some people have the experience of finding new things among their belongings that they do not remember buying, (3) Some people are told that they sometimes do not recognize friends or family members. In the Structured Clinical Interview for the *DSM-IV* Dissociative disorders (SCID-D), the most important diagnostic tool for the *DSM-IV* dissociative disorders (Steinberg, 1993), amnesia is indexed by the following items: (1) have you ever felt as if there were large gaps in your memory? (2) Have there ever been hours or days that seemed to be missing, or that you couldn't account for? (3) Has there ever been a time in which you had difficulty remembering your daily activities? (4) Have you ever found yourself in a place and been unable to remember how or why you went there? (5) Have you ever traveled away from your home unexpectedly and been unable to remember your past? (6) Have you ever found yourself in a place away from home and been unable to remember who you were? (7) Have you ever been unable to remember your name, address, or other important personal information? Also, the interviewer has to score intra-interview amnesia, i.e., amnesia for previous replies during the interview, the purpose of talking to the interviewer, or in extreme cases, remembering who the interviewer is, where the patient is, or even the patient's own identity.

## Debates in the Field of Dissociation

The concept of dissociation should not be confused with the concept of repression, in which material is supposed to be repressed into the "unconscious" where it is bound up with affective impulses and not directly available for consciousness. In the dissociative mind, instead of consciousness and unconsciousness, what is found is a distributed consciousness with (sometimes semi-permeable) amnesic barriers dividing experiences and memories (Braun, 1988; Hilgard, 1992). It is not claimed that memories of past events, that patients claim not to know, are lost forever, but that different identities each remember different aspects of what has happened in the patient's life (Mollon, 2002; Putnam, 1997).

Although most DID experts agree on the conceptual difference between dissociation and repression, they do not agree on the precise nature of the process of dissociation. Some consider dissociation to be an intentional act by the person, like Ross (1997), who described dissociation as "a little girl imagining that the abuse is happening to someone else" (p. 92; see also Kluft, 1991b). In contrast, dissociation sometimes is considered a more automatic process (see Segall, 1996). When confronted with an ongoing danger or threat, a dissociative mechanism is initiated to safeguard the individual's psychological integrity. This more "mechanistic" view of dissociation is—among others—held in the *DSM-IV* (American Psychiatric Association, 1994), where dissociation is described as a failure to integrate various aspects of identity, memory, and consciousness. In this conceptualization, the process of dissociation is happening to the person, whereas the previous conceptualization of dissociation explained by the citation of Ross is "agentic" in that the person is an agent imaging the abuse is happening to someone else (Watkins, 1996; see also Cardeña, 1996; Orne & Bauer-Manley, 1991; Sarbin, 1995; Van der Hart, 1996).

Much debate also exists concerning the etiological cause of DID, that is, whether dissociation starts in childhood as a means of coping with severe physical or sexual abuse, or in adulthood with psychological needs such as attention-seeking as the most important motivation for behavior. The latter

is argued by proponents of the so-called sociocognitive model, that argues that DID consists of multiple role enactments used by emotionally needy patients, legitimized and maintained by social reinforcement (Lilienfeld et al., 1999; Spanos, 1994, 1996; for related accounts see Aldridge-Morris, 1989; Hacking, 1995; Merskey, 1992, Sarbin, 1995). The model is not very well delineated, except that patients are thought to synthesize identity roles by drawing on a wide variety of sources, including the print and broadcast media, (unintentional) cues provided by therapists who believe in the childhood trauma model of DID (iatrogenesis), and observations of other individuals who enact multiple identities. Possibly, the idea of multiple identities provides patients characterized by a weak self-consolidation with a structure around which to organize otherwise conflicting experiences and feelings. Also, care-giving from significant others (therapists, friends etc.), elicited by the status of DID patient, may compensate for a fragile self-esteem. The enactment of DID may form a quasi-adaptive function for patients. Historically, DID is considered to be a variant of a broader constellation of multiple identity enactments, including for example demonic possession and mass hysteria, that transcend societal and historical boundaries (Lilienfeld et al., 1999).

## Memory Systems and Memory Processes

Before presenting ideas as to which memory systems and/or memory processes are supposed to be impaired in DID and explanations for interidentity amnesia based on cognitive memory theory, some clarification of terms relating to different expressions of memory, memory systems, and memory processes, is provided.

Explicit and implicit memory are different *expressions* of memory: "explicit" refers to intentional or conscious recollection of past episodes, whereas "implicit" refers to unintentional**,** nonconscious use of previously acquired information (Schacter & Tulving, 1994). Besides the distinction between the explicit and implicit expression of memory, Tulving (1985, 2002) proposed a further division in state of consciousness during retrieval,

namely the distinction between autonoetic, noetic, and anoetic consciousness. Anoetic consciousness refers to memory retrieval without conscious awareness. Noetic consciousness makes possible conscious introspective awareness, such as awareness of the meaning of retrieved material, but not self-awareness. The latter is specifically characteristic for autonoetic consciousness, which allows an individual to retrieve events with a subjective feeling of experiencing the events, i.e., it makes a retrieved event feel personal. In a recognition test, the qualitatively different states of noetic and autonoetic awareness accompanying the identifying of test items are described as either "know", referring to noetic awareness and described to subjects as just eliciting a feeling of familiarity, without remembering specific contextual elements, and "remember", referring to autonoetic awareness and described as a recognition state in which you have a conscious recollection of aspects of the original encounter with the particular item (Conway & Dewhurst, 1995; Gardiner & Java, 1993; Knowlton & Squire, 1995; Postma, 1999).

In terms of memory *systems*, short-term memory is concerned with retention across delays of seconds and minutes, and long-term memory is concerned with traces that last longer. The latter can be classified into four underlying memory systems (Schacter & Tulving, 1994), the first of which is the episodic memory system, which is responsible for the remembering of prior episodes embedded in the context (time and place) and including self-awareness, the experience of the self as actor in the episode. Episodic information relates new information to our environment and ourselves, i.e., representations in episodic memory carry information about the relations of represented events to the rememberer's personal identity (Baddeley, 1997). Semantic memory, the second memory system in Schacter and Tulving's (1994) classification, contains factual knowledge about the world in the broadest sense, without an autobiographical reference. The third memory system is the perceptual representation system (PRS), which operates at a presemantic level and plays an important role in identifying the physical form of words and objects. Finally, the procedural memory system is responsible for the acquisition of various kinds of behavioral and cognitive skills.

Memory *processes*, like encoding, rehearsal, activation, and retrieval, underlie the different memory systems and thus participate in the operations of more than one memory system. A distinction in memory processing that is often made is the distinction between data driven versus conceptually driven processing. These concepts are central in the so-called transfer appropriate theory (TAP; Bransford, Franks, Morris, & Stein, 1979; Roediger, 1990; Roediger, Weldon, & Challis, 1989), which proposes that learning will be most effectively when the processes at retrieval coincide with those at learning. In this approach, learning is viewed less as a process of accessing an earlier mnemonic record, than as the re-performance of an earlier act. Data driven processing involves the operation of various perceptual systems at a pre-conceptual level. Conceptually driven processing involves conceptual processing and is relatively insensitive to factors such as changing the presentation modality between presentation and test (Baddeley, 1997).

## Hypothesized Memory Impairments in DID

A review from the literature on interidentity amnesia in DID shows that there is no agreement on the memory systems and/or processes that are supposed to be impaired in DID, with some arguing that only conscious memory processes are impaired whereas others claim more nonconscious processes are also damaged (Merckelbach, Devilly, & Rassin, 2001). Cardeña (2000), for example, stated that "even though conscious recollection may be absent, the information that cannot be recalled may still affect behavior (a deficit of explicit, but not of implicit, memory)" (p. 55) and "in dissociative amnesia, the individual loses explicit memory for personal experience, although implicit memory for general knowledge, skills, habits and conditioned responses is usually unimpaired"(p. 57). Also, the *DSM-IV* (American Psychiatric Association, 1994) definition of amnesia in DID, the "inability to recall important personal information that is too extensive to be explained by ordinary forgetfulness" (p. 487) seems to pertain only to the episodic memory system, given it's use of the term "recall" in the

description (see also Kihlstrom & Schacter, 1995; Kihlstrom, Tataryn, & Hoyt, 1993; Peters et al., 1998). In contrast, Spiegel, Frischholz, and Spira (1993) stated that amnesia between identities suggests the existence of distinct memory storage structures that are functionally independent of one another. "Episodic memory developed by one personality is often not accessible by another. In many cases, even implicitly stores procedural memory is discrete" (p. 767) (see also Nijenhuis & Van der Hart, 1999; Prince, 1917; Putnam, 1997).

Sometimes, the discussion on the issue is hampered by the incorrect or at least slipshod use of concepts borrowed from cognitive memory theory without adhering to their theoretical significance in the field. This is illustrated by Putnam's discussion of the following case example (1997):

> *Carla, an electroencephalographic (EEG) technician with MPD, would suddenly be unable to recall how to wire up patients-a task she usually excelled at. When this happened, she was adept at getting other technicians to help her without revealing the nature of the problem. On occasion, she was forced to fake the wiring or to feign an asthma attack to excuse herself. She lost one job after the neurologist, made suspicious by the bizarre quality of the EEG, inspected the pattern of electrodes.* (p. 83)

Putnam (1997) mentioned in relation to this quote, that "fluctuations in the level of basic skills, in habits, and in recall of knowledge are classic forms of memory dysfunction in dissociative patients. Typically, dissociative patients describe suddenly 'drawing a blank' when asked to do something that they are familiar with. Paradoxically, it seems as if overlearned information and skills are especially susceptible to intermittent failures of memory retrieval"(pp. 82-83). In this description, it remains however unclear if Putnam meant that the patient's procedural knowledge is impaired or her conscious recall of that knowledge.

## Explanations from Cognitive Memory Theory

Which cognitive memory theories are candidates for explaining the memory impairments reported in DID? One theory eligible for explaining the reported amnesia between identities in DID is context dependent learning and memory retrieval, the idea that what has been learned in a certain external and /or internal context is most expressible in that same context. Context-dependent memory implies that when events are represented in memory, contextual information is stored along with memory targets; the context can therefore cue memories containing that contextual information (Smith, 1994).

In a classic experiment of the importance of matching external context for memory performance, members of a diving club learned a wordlist while they were either on the shore or under water. They were then tested for their ability to recall the words, again on shore or under water. Those who had learned the words under water performed better when tested under water and those who had learned them on shore performed better on shore (Godden & Baddeley, 1975). Internal states, like being drunk or sober, also provide context-dependent memory effects. For example, an alcoholic may have to get drunk to remember where he hid a bottle the last time he was drinking. Sober, he can't remember (Ross, 1997). In DID, the temporary mood states that characterize identities, like some identities who are passive, dependent, guilty, and depressed and others who are hostile, controlling, and self-destructive (American Psychiatric Association, 1994), have been suggested to provide the internal context that causes context-dependent memory effects (Braun, 1984; Freyd, 1996; Kluft, 1984). Bower (1994) noted that identity splitting usually occurs along affective lines, with each identity dealing with a related set of conflicts and feelings. Just as the amnesia between identities in DID often is not symmetric, i.e., one-way amnesia, some evidence of asymmetric amnesia has also been found in laboratory studies with internal context changes instilled by drugs, medication, and alcohol, and mood changes induced by films, music, and thought. Studies performed by Eich, Weingartner, Stillman, and

Gillin (1975) and Jensen and Poulsen (1982), for example, showed that transfer of information is often less complete in the direction of substance to substance-free than in the reverse direction.

Important to note is that mood dependent memory research has shown that in normal subjects, memory from one state to another seems to vary dramatically, according to which memory indicator is used. The memory indicator that shows the greatest loss, or amnesia, is free recall, in which no memory cues are given to the subject. Amnesia appears far less severe if tests are used with more cues, prompts, and reminders, like forced recognition. (Eich, 1995; Spiegel et al., 1993). On implicit memory measures, there is some recent evidence that mood dependent memory effects can also be found, but only on conceptually driven tasks (Eich & Forgas, 2003; Kihlstrom, Eich, Sandbrand, & Tobias, 2000; Ryan & Eich, 2000).

Another theory eligible for the reported amnesia between identities in DID is the Headed Records (HR) model, presented by Morton (1991, 1994). The basis of the HR model is that our memory is divided into discrete *records*, each linked to a separate *heading*. In a memory search, the first thing that happens when memory is interrogated is that a *description* is formed, which is then used to search the headings in parallel. If a match between description and heading is found, then the linked record is made available. Morton suggests that in DID, records are headed differently for the separate identities. If a task requires self-verification, the description contains a self-reference to the identity performing the search. If the headings of appropriate records only contain references to other identities, no match between description and headings is found.

## Aim and Outline of the Thesis

In sum, although DID patients report instances of dense amnesia between identities, no complete cognitive memory account of the reported memory problems is available and experts do not agree on the memory processes and memory systems involved. In this thesis, the fundamental question of whether objective evidence for the reported interidentity amnesia in DID

can be found under rigorous experimental conditions is addressed. The aim of the thesis is to provide a systematic exploration of interidentity amnesia in DID for both neutral as well as trauma-related information. For that purpose, a large variety of different encoding and retrieval tasks will be discussed. In order to provide an unequivocal measure of memory performance, much attention is given to the use of tasks on which simulation of amnesia-symptoms is expected to be very difficult. To ascertain that simulation isn't possible on the measures used, a control group instructed to simulate DID is included in all the experiments discussed.

In chapter two, episodic memory transfer for neutral stimulus material is tested. Both tests of recall (interference-paradigm) and recognition are presented to establish the memory performance within as well as between identities. Also, the subject's state of awareness during recognition is considered, which can be characterized as either *remembering*, referring to autonoetic awareness, or *knowing*, referring to noetic awareness. Chapters three and four focus on implicit memory transfer for neutral material in DID. Chapter three deals with priming, the benefit in accuracy and/or speed accrued to recently encountered stimuli (Vriezen, Moscovitch, & Bellos, 1995). With perceptual priming, the studied item is reinstated in whole or in part at test and perceptual identification is required, such as visual word form, auditory word form, and structural descriptions of objects. With conceptual priming, participants have to produce studied items in response to test cues that are meaningfully related to the studied item. In chapter four, the last chapter to deal with neutral stimulus material, implicit procedural memory performance is tested in a serial reaction time task. In chapters five and six, tasks are described in which we included trauma-related, i.e., sexual and physical abuse-related, material. Chapter five describes an episodic memory task establishing recall as well as recognition performance. In the last empirical chapter, an evaluative conditioning procedure is combined with an implicit affective priming procedure. In the evaluative conditioning procedure, previously neutral stimuli acquire a negative or positive connotation. The affective priming procedure is used to test the transfer of this acquired valence to an identity reporting interidentity

amnesia. Finally, in chapter seven, the results of the studies presented in this thesis will be summarized and discussed.

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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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# Chapter 3

# Perceptual and Conceptual Priming in Patients with Dissociative Identity Disorder


## Abstract

The present study examined implicit memory transfer in patients with dissociative identity disorder (DID). To determine priming impairments in DID, we included both several perceptual priming tasks and a conceptual priming task using neutral material. We tested a large sample of DID patients (n = 31), in addition to 25 controls and 25 DID simulators, comparable on gender, age, and education. Controls replicated conceptual priming results of Vriezen, Moscovitch, and Bellos (1995) by showing that conceptual priming seems to require the formation of domain-specific semantic representations, denoting either sensory or functional object attributes. We extended a study performed by Schacter, Cooper, and Delaney (1990) by demonstrating priming for impossible objects by using the sensitive priming index of response times. The simulators in the study were not able to simulate interidentity amnesia on the implicit memory tasks employed. Partly in contrast to participants in previous studies, DID patients showed evidence of perceptual priming as well as conceptual priming comparable to that of controls. DID patients thus displayed normal implicit memory performance.



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## Introduction

Dissociative identity disorder (DID; formerly multiple personality disorder) is the most severe form of the dissociative disorders and is considered to be a pathological reaction to overwhelming, chronic childhood trauma (Spiegel & Cardeña, 1991). In particular, sexual and physical abuse in association with emotional neglect in the first years of life have been found to correlate with dissociative symptoms in adulthood (Chu & Dill, 1991; Draijer & Langeland, 1999). DID is characterized by the presence of several distinct personality states, each of whom may be experienced as if it has a distinct personal history, self-image, and identity, including a separate name. In a review of 100 cases, Putnam, Guroff, Silberman, Barban, and Post (1986) reported a mode of three personality states or identities per patient. At least two identities recurrently take control of the person's behavior (American Psychiatric Association, 1994).

Episodes of interidentity amnesia**,** in which one identity claims amnesia for events experienced by other identities, are reported in 95% – 100% of DID patients (Boon & Draijer, 1993; Coons, Bowman, & Milstein, 1988; Putnam et al., 1986; Ross et al., 1990; for a review see Gleaves, May, & Cardeña, 2001). Several experimental studies have been performed on interidentity amnesia in DID (for reviews see Dorahy, 2001; Peters, Uyterlinde, Consemulder, & Van der Hart, 1998), most of them focusing on alleged explicit memory impairments. In addition, clinical accounts have reported a lack of implicit memory transfer in DID, which is the expression of information without conscious or deliberate recollection (Schacter, 1987). Putnam (1995), for example, considers "fluctuations in skills, habits, and implicit knowledge" to be very common in DID (p. 593). These reports of implicit memory impairments contrast with the normal implicit memory performance usually found in brain-damaged amnesic patients (e.g., Roediger, 1990; Shimamura, 1986).

The procedure for testing implicit memory performance is as follows. In the study phase, a participant is shown a set of stimuli. In the subsequent test phase, the participant is tested for implicit transfer of that material.

Positive priming is the facilitation or change in speed or accuracy with which participants perform a task using recently studied stimuli in comparison with unstudied stimuli (e.g., Schacter, 1987; Shimamura, 1986; Squire, 1986). With perceptual priming tasks, such as word fragment completion, the study material is reinstated in whole or in part in the test phase, and perceptual identification of the target or some aspect of it is required. With conceptual priming tasks, such as category generation, participants produce the studied item in response to test cues that are meaningfully or conceptually related to the studied item. According to the memory systems view, the two types of priming are mediated by different memory systems—that is, perceptual priming by the perceptual representation system (PRS) and conceptual priming by the semantic memory system (Schacter & Tulving, 1994). According to the memory processing view, priming is based on the principle of transfer-appropriate processing—the overlap between study and test processing operations as either both data driven or both conceptually driven (Roediger, Weldon, & Challis, 1989). Combining and extending the memory system view and the memory processing view, Vriezen, Moscovitch, and Bellos (1995) have suggested that perceptual and conceptual priming may be linked to different sequential stages in information processing; that is, perceptual identification is followed by semantic analysis. Priming occurs only when study and test involve at least the same sequential stage of processing. Conceptual encoding of the stimulus material thus does enhance priming on a perceptual priming task, whereas perceptual encoding does not enhance priming on a conceptual priming task.

In DID, to our knowledge, only five experimental studies have examined implicit memory transfer between identities (Dick-Barnes, Nelson, & Aine, 1987; Eich, Macaulay, Loewenstein, & Dihle, 1997a, 1997b; Nissen, Ross, Willingham, Mackenzie, & Schacter, 1988; Peters et al., 1998). These studies have obtained mixed results, which Nissen et al. and Eich et al. (1997b) have explained in terms of the influence of what they called identity-specific factors at the time of encoding and retrieval—that is, the identity-specific interpretation of material during encoding and the identity-specific selection of responses during retrieval. In terms of the identity-

specific interpretation of material during encoding, evidence of amnesia in DID was obtained on conceptually driven tasks that make use of semantically rich materials that might be interpreted in different ways by different identities. In contrast, evidence of transfer between identities was obtained on data driven tasks, because this type of encoding leaves little room for identity-specific interpretation. In terms of identity-specific selection of responses during retrieval, transfer of information was obtained on tasks allowing for only a single response on each trial, like word fragments (e.g., *a—a—in*, which can only be completed to form the word *assassin*). Evidence of amnesia was obtained on tasks allowing a wide range of responses (i.e., word stems that could be completed to form 10 or more words) whose selection could vary from one identity to the next.

One serious shortcoming of the previous studies of implicit memory in DID is that they have tested a very limited number of patients. Two were single-case studies (Dick-Barnes et al., 1987; Nissen et al., 1988), one study included 4 patients (Peters et al., 1998), one included 7 patients (Eich et al., 1997a), and one included 9 patients (Eich et al., 1997b). Moreover, only two studies have included control participants: Peters et al. used normal controls, whereas Eich et al. (1997a) included controls instructed to simulate DID. The inclusion of simulators is important given that the so-called sociocognitive model considers DID to be a syndrome of role enactment adopted by emotionally needy clients as a way of communicating their distress and gaining and maintaining the attention of therapists and others (Lilienfeld et al., 1999; Spanos, 1996).

The goal of the present study was to systematically test interidentity implicit memory transfer in DID while overcoming some of the methodological drawbacks of previous studies. We included a larger sample of female DID patients ($n$ = 31) as well as a normal control group comparable on gender, mean age, and education level ($n$ = 25). We made use of indirect memory tasks on which we expected malingering to be very difficult—through the use of speeded priming tasks and a 1-week interval between the encoding and retrieval phases in one task. Moreover, to ensure that malingering was not possible on the tasks employed, we included a control group instructed to simulate DID ($n$ = 25). Following Silberman,

Putnam, Weingartner, Braun, and Post (1985), the DID simulators were asked to make up an imaginary, "amnesic" identity and to "switch" upon request to this amnesic identity during the experiment. Also, they were given informative instructions about how to simulate interidentity amnesia in the memory tasks used.

Three implicit memory tasks were included to examine the explanation of implicit memory performance in DID suggested by Eich et al. (1997b) and Nissen et al. (1988). The influence of identity-specific interpretation of material during encoding was tested by contrasting a task using perceptual encoding with a task using conceptual encoding. The influence of identity-specific selection of responses during retrieval was tested in a task using perceptual encoding, contrasting trials with only 1 possible response in the retrieval phase with trials with 10 or more possible responses in the retrieval phase.

To explore perceptual priming in DID, we included a task determining priming of novel, visual objects. The task uses three-dimensional drawings that depict unfamiliar structures (for an example, see Schacter, Cooper, & Valdiserri, 1992). Some of the drawings are structurally possible objects that can exist in the three-dimensional world. The others are impossible objects whose surfaces and edges contain ambiguities and inconsistencies that would prohibit them from existing as actual three-dimensional objects. Participants first performed a study phase that is considered to promote encoding of the three-dimensional object structure. In the test phase, they were given an indirect memory test, in which studied and unstudied objects were flashed briefly on the screen, and the participants' task was to decide whether each object was possible or impossible. Priming effects in the object decision task are thought to depend on a subsystem of the perceptual representation system, the so-called structural-description memory system (Schacter & Tulving, 1994). A structural description of an object refers to the mental representation of relations among components of an object that specifies its global or three-dimensional form and structure in contrast to local or two-dimensional object features. Performance on the object decision task is facilitated by access to structural descriptions of target objects. Therefore, if a study task

promotes the acquisition of a three-dimensional structural description of a target object, the availability of such knowledge at the time of test facilitates object decision performance. Priming, indicated by an increased proportion of accurate object decisions for studied objects in comparison with unstudied objects, has been observed only for possible objects and not for impossible objects, because participants are thought to have some difficulties forming mental images of structural impossibility (Cooper, Schacter, Ballesteros, & Moore, 1992; Schacter, Cooper, & Delaney, 1990; Schacter, Cooper, Delaney, Peterson, & Tharan, 1991).

Conceptual priming was measured by a semantic classification procedure (see Vriezen et al., 1995, Experiments 1 and 6). Semantic memory contains factual information—both concrete and abstract—about the world in the broadest sense, without an autobiographical reference (Schacter & Tulving, 1994). Semantic domain-specific impairments have been observed in brain-damaged patients for either sensory or functional attributes of objects (Damasio, 1990; Patterson & Hodges, 1995; Warrington & Shallice, 1984). Sensory attributes describe physical (mainly visual) properties of an object such as color or shape. Functional attributes describe the function of an object—for example, the function of a wheelbarrow as an object used by people to carry material (Schacter, 1996). The task we used involves classifying visually presented words as quickly as possible with respect to some specified criterion. Priming is observed across different semantic classification tasks only if the study and test phases require access to information of the same semantic attributes—that is, either of sensory attributes or of functional attributes (Vriezen et al., 1995). In the study phase, subjects responded to a question pertaining to sensory attributes (a question about an item's overall size in the real world). In the test phase, they had to respond to a second question pertaining to sensory attributes (about an item's relative dimensions) and a question pertaining to functional attributes (whether an item is man-made or not). The sensory attribute question in the test phase is denoted the related question, and the functional attribute question is denoted the unrelated question.

Finally, a word stem completion task was added to investigate the influence of identity-specific selection of responses during retrieval. The

task was a Dutch equivalent of tasks that are frequently referred to in the literature on amnesic patients as the "*juice* task" and the "*motel* task" (Graf, Squire, & Mandler, 1984; Squire, Shimamura, & Graf, 1987). In the task used, half of the word stems could only be completed with one word or a variation of the word (e.g., *jui* with *juice* or *juicy* as completion). These were designated the single completion word stems. The other half had 10 or more completions (i.e., *motel* or *motive* for *mot*) and were denoted the multiple completion word stems.

In the object decision task we used a 1-week interval between the study and test phases, instead of the test phase immediately following the study phase, as in the procedure employed by Cooper et al. (1992) and Schacter et al. (1990; Schacter et al., 1991 ; Schacter et al., 1992). Also, in all three tasks, we instructed participants to react as fast as possible and repeated this instruction after the practice trials to ensure high-speed performance. Both measures were taken to prevent malingering by decreasing the explicit memory traces of the studied objects available for participants in the test phase. We expected these measures as well as the encoding instructions in the implicit task to result in the absence of explicit recollection of stimulus material in the test phase. Consequently, we expected simulators to perform at about the same level as controls. If explicit recollection of the studied items was still available and applicable, simulators might use their recollection of studied items to decrease the proportion of correct responses and to slow down their responses to studied items.

Controls were expected to reveal a priming effect on the possible objects in the perceptual priming task and on the related question in the conceptual priming task, and no priming effect on the impossible objects and the unrelated question. They also were expected to show evidence of priming on both single- and multiple-completion word stems. Following Eich et al. (1997b) and Nissen et al. (1988), DID patients were expected to perform equally to controls on the perceptual priming task but to show evidence of interidentity amnesia on both the related and the unrelated questions of the conceptual priming task due to the task's conceptual encoding in the study phase. Evidence of transfer was expected on the

single completions, and evidence of interidentity amnesia was expected on the multiple completions in the word stem completion task.

## Method

### *Participants*

Thirty-one female DID patients participated in the study. Patients were recruited with the help of clinicians in the Netherlands and Belgium. To be eligible for participation, patients had to meet the DSM-IV (American Psychiatric Association, 1994) criteria and the criteria of the Structured Clinical Interview for DSM-IV Dissociative Disorders (SCID-D), a semistructured interview used to diagnose the DSM-IV dissociative disorders (Boon & Draijer, 1994; Steinberg, 1993). 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. Participants were informed that the aim of the study was to understand more about the memory problems often reported by DID patients. Patients self-selected two identities that would participate in the experiment. Borrowing terms prevalent in DID clinical practice, we described conditions for participation as follows: (1) at least one of the identities is completely amnesic for the events experienced by the other participating identity during the experiment; (2) these two identities are able to perform the tasks without interference from other identities; (3) these two identities are able to perform the tasks without spontaneous switches to other identities; (4) the patient is able to switch between these two identities on request. The selected identities could be either female or male.

In addition, 50 female controls participated. Groups were comparable on age and education (Table 1). Control participants did not report any relevant memory, visual, or attentional problems or psychiatric disorders. Control participants were divided into two groups, the controls and the simulators. Simulators were instructed to imitate 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. (1985), 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 invested considerable effort inventing an identity. Finally, they were asked to practice during the week preceding the experiment switching to their new identity and taking on it's state of mind.

Table 1. Participant Characteristics for Dissociative Identity Disorder (DID) Patients ($n$ = 31), Controls ($n$ = 25), and Simulators ($n$ = 25)

| | *Age* | *Education* | *DES* | *CEQ* |
|---|---|---|---|---|
| DID patients | 38.48 (8.68) | 5.39 (1.20) | - | - |
| Controls | 37.72 (11.29) | 5.88 (1.13) | 6.31 (4.10) | 5.48 (3.24) |
| Simulators | 32.48 (10.31) | 5.84 (1.14) | 6.54 (3.93) | 4.20 (2.58) |

*Note.* The values represent means (with standard deviations in parentheses). Education was assessed in categories ranging from 1(*low*) to 7 (*high*) (Verhage, 1964); The DES is the Dissociative Experiences Scale with score range from 0 to 100, and the CEQ is the Creative Experiences Questionnaire with score range from 0 to 25.

Both the controls and the simulators completed the Dissociative Experiences Scale (DES; Carlson & Putnam, 1993) and the Creative Experiences Questionnaire (CEQ; Merckelbach, Muris, Schmidt, Rassin, & Horselenberg, 1998) (Table 1). 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. The CEQ is a 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 controls and the simulators did not differ significantly on

DES scores or CEQ scores. Neither controls nor simulators showed pathological levels of dissociation as measured by the DES. Written informed consent was obtained from all participants prior to participation.

*Design*

Participants were tested in two sessions separated by a 1-week interval. Because of illness, 5 participants were tested after a longer interval: one patient after 9 days, 1 control subject after 8 and 1 after 14 days, and 1 simulator after 10 and 1 after 12 days. In the first session, participants initially completed the study and test phases of the word stem completion task. Subsequently, they performed the study phase of the perceptual encoding task. In the second session, they performed the test phase of the perceptual encoding task, after which they completed the study and test phases of the conceptual encoding task. Participants performed the priming tasks as part of a larger study on reported memory impairments in DID (Huntjens, Postma, Peters, Woertman, & Van der Hart, 2003). There was no overlap in study material between tasks. The encoding and retrieval phases of all of the studies described were performed by different identities, with the retrieval phase performed by an identity subjectively reporting complete amnesia for the encoding phase. At the beginning of each retrieval phase, the identity reporting amnesia was asked if she knew anything about the encoding phase performed by the other participating identity and/or of the material presented in the encoding phase. She was asked to answer with "yes" or "no". If she answered with "yes", she was asked what she knew exactly (e.g., instructions, stimulus material).

In the laboratory, many DID patients can alternate or "switch" between identities on demand, although this is not always under their control. Switches typically occur in seconds to minutes and are manifested by changes in facial expression, quality and quantity of speech, attentional focus, reported cognitive capacities, and affect (Putnam, 1997). 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. Patients made the switch to and from the participating identities at the beginning and end of both sessions and between participating identities before each test phase. The transition was initiated by asking the patient to let an identity "come forward" and take control of 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.). The switching process was always accomplished in less than 2 min. Controls performed the tasks without switching; instead, they had a 2-min break to keep the length of procedures equal between groups. Simulators performed the study phase of all three tasks in their normal identity state and the test phase in their imagined amnesic identity.

*Materials*

Line drawings representing objects were used in the perceptual priming task. Like all stimuli in this study, they had a neutral affective meaning. Object drawings were obtained from Schacter et al. (1990). Four sets of drawings were constructed on the basis of a pilot study in which 35 psychology students (mean age = 21.41 years, SD = 2.99) were shown object drawings and were asked to classify each object as possible or impossible. On the basis of the participants' scores, four sets of drawings were assembled, two sets depicting possible objects and two sets depicting impossible objects. The two sets depicting possible objects were matched according to proportion-correct object decisions, $t(34) = 0.35$, $p = .73$, and mean response time, $t(34) = -1.03$, $p = .31$, one to function as a studied set and one to function as an unstudied set. Because it did not prove possible to construct sets of 10 drawings of impossible objects that did not differ in mean proportion-correct object decisions, sets of 9 drawings were used. These were also matched according to proportion-correct object decisions, $t(34) = -0.78$, $p = .44$, and mean response time, $t(34) = 0.02$, $p = .98$. The measurement of response times was not part of the original studies

developed by Schacter et al. (1992); response time was used as an additional index of priming.

For the conceptual priming task, four sets of 16 Dutch words representing objects were assembled. Words in each of two sets were matched with respect to the response times of 38 pilot participants to the question "Is it taller than it is wide?" (the dimension question). These matched sets are called Set A and Set C. Words in each of the other two sets were matched with respect to the response times of the pilot participants to the question "Is it man-made?"(the man-made question). These matched sets are called Set B and Set D. In a second pilot study (n = 20), some adjustments were made to the sets, and in a third pilot study (n = 35; mean age = 21.41 years, SD = 2.99), the final sets were tested for mean response times. The difference in mean response time between Sets A and C was non-significant, $F(1, 33) = 3.05$, $MS_e = 1167.02$, $p = .09$. Also, the difference in mean response time between Sets B and D was non-significant, $F(1, 33) = 0.02$, $MS_e = 2066.39$, $p = .89$. The pilot study was also used to test order of questions. Half of the participants (n = 18) answered the dimension question first and the other half (n = 17) answered the man-made question first. No significant effects of order were found. Subsequently, three lists were made, each for a different classification task. List 1 was used in the study phase and consisted of Set A and Set B. List 2 was used for the related categorization question and consisted of Set A and Set C, and List 3 was used for the unrelated categorization question and consisted of Set B and Set D. Three additional lists of four words served as practice items preceding Lists 1, 2, and 3.

For the word stem completion task, four sets of word stems were constructed on the basis of a pilot study in which 33 psychology students (mean age = 21.48 years, SD = 3.01) served as participants. They were shown 40 three-letter word stems sequentially and were asked to say aloud the first word that popped into mind that would complete the word stem. On the basis of the proportion of word stem completions and response times, two sets of single-completion word stems were constructed, one to function as a studied set and one as an unstudied set. Because it did not prove possible to construct sets of 10 word stems that did not differ in

priming measures, we made sets of 9 word stems. These single-completion word stem sets did not differ in mean correct completions, $t(32) = -1.11$, $p = .28$, nor did they differ in mean response time, $t(32) = 0.82$, $p = .42$. Two sets of 10 multiple-completions word stems were composed that did not differ in mean correct completions, $t(32) = -0.82$, $p = .42$, nor in mean response time, $t(32) = -.51$, $p = .61$.

*Procedure*

In the perceptual priming task, patients were informed in Identity State 1 that they would see complicated drawings of objects and that the experiment was concerned with short-term memory for objects. Patients were instructed to study each object for 5 s and then to decide how they would divide it in two equal halves (i.e., to look for the plane of symmetry). They were instructed to study the entire object, not just parts of it. After 5 s, the drawing disappeared and participants had to indicate with their hands how they would divide the object in two equal halves. After the presentation of five practice items, participants were shown a set of possible and a set of impossible object drawings, all presented in a different random order for each participant. The symmetry task was meant to ensure the encoding of the three-dimensional object structure.

In the second session, patients were told that they would be exposed to a series of briefly displayed drawings. They were informed that some of the drawings represented valid, possible three-dimensional objects that could exist in the real world, whereas other drawings represented impossible objects that could not exist as actual objects in the real world. It was explained that their task was to decide whether each object was possible or impossible. One practice object of each type was then shown. They were informed that all possible objects must have volume and be solid, need not be familiar, could be made out of stone or clay, and that they could not see through them. Participants were instructed to respond by pressing the "M" key in response to possible objects and the "Z" key in response to impossible objects. They were asked to do this as quickly and as accurately as possible. The object decision task then began with the presentation of 10

practice items. Subsequently, participants were informed that the critical test would now begin and the instruction to react as fast as possible was repeated. The critical test consisted of the sequential presentation of 40 drawings in a different random order for each participant. Each drawing was presented for 100 ms, preceded by a fixation point for 500 ms and followed by a dark screen. The intertrial interval was 2,000 ms. Before switching to their amnesic identity in Session 2, simulators were told that they would be asked to perform a task that would involve both drawings they had already seen in Session 1 and unstudied, new drawings. They were instructed to pretend that they did not know their normal identity had performed the object-dividing task and thus to pretend to have no memory of the drawings. Subsequently, they were given 2 min to take on their amnesic identity's state of mind.

In the conceptual priming task, participants were informed that the purpose of the experiment was to see how quickly people have access to knowledge about words. Patients were first instructed to categorize objects as fast as possible by overall size ("Is it larger than a television set?") in Identity State 1. They performed four practice items on which they received feedback, after which List 1 was presented. They were instructed to respond by pressing the "M" key if their answer was "yes" and the "Z" key if their answer was "no". Each word was shown until a response was made. Once a response was made, the word was removed and the screen remained blank for 2,000 ms; then the next word appeared. Subsequently, patients performed the related categorization trials (the dimension question) in Identity 2. They again started with four practice items, and then they were shown List 2. Finally, patients performed the unrelated categorization trials (the man-made question), also in Identity 2. They again started with four practice items, followed by List 3. Simulators performed the size categorization question in their normal identity state. They performed the related dimension question and the unrelated man-made question after having switched to their imagined amnesic identity. Before being given 2 min to take on their amnesic identity's state of mind, they were told that they would be asked to answer two similar questions with both words they had already seen and unstudied words. They were instructed to pretend that

they did not know that their normal identity had performed the size question and thus to pretend to have no memory of the words. They were also instructed to respond as fast as possible but not faster to words they had seen in their normal identity state.

In the study phase of the word stem completion task, 23 nouns were presented sequentially to the patient's Identity 1 in random order on a computer screen. Patients were asked to count the number of letters that either had a "stick" (e.g., "b" or "f") or a "tail"(e.g., "g" or "j"). Each word was shown for 2 s. Then, a question mark appeared on the screen and participants had a maximum of 10 s to press the correct key. This task was to ensure that patients encoded the words without being told that the words would be referred to in a stem completion phase later on. The 23 words were the possible completions of one set of single completions and one set of multiple completions together with four items to prevent primacy and recency effects. Then, after four practice trials, all 38 word stems of the studied and unstudied single- and multiple-completion sets were presented to Identity 2 in random order without making reference to having been studied by Identity 1. The procedure in this phase was the same as the procedure followed in the pilot study. The participants' response time was determined using a voicekey. The experimenter scored their verbal response. Participants were allowed a maximum of 3 s to provide an answer. Simulators were told that they would now be asked to perform a word stem task in which half of the stems could be completed with a word they had just studied. They were instructed to pretend that they did not know their normal identity had performed the study phase and thus had no memory of the words.

## Results

Of the 31 DID patients tested, a number of patients reported some explicit knowledge of the study phase in the test phase—namely 6 patients in the perceptual priming task, 2 patients in the conceptual priming task, and 5 patients in the word stem completion task. These patients were left out of

the analyses. Data of 1 other patient in the perceptual priming task, 3 patients in the conceptual priming task, and 2 patients in the word stem completion task were not included because emotional problems unrelated to the study interfered with the testing. Data of 2 additional patients in the word stem completion task were not included because of software errors. The results described therefore pertain to 24 DID patients in the perceptual priming task, 26 in the conceptual priming task, and 22 in the word stem completion task.

In the analyses reported, response times more than 2 *SD* from the mean per participant per word set were excluded. However, because it could be argued that removal of scores more than 2 *SD* from the mean excludes extreme scores, reducing the mean response times for studied words of simulators in particular, all analyses were repeated with the inclusion of response times that were more than 2 *SD* from the mean. These analyses, however, yielded equivalent priming results for simulators.

*Perceptual Priming*

Mean proportion-correct object decisions and mean response times for correct object decisions for possible and impossible objects are presented in Tables 2 and 3. Consider first the mean proportion-correct object decisions for possible objects. A 2 x 3 Object Repetition [studied vs. unstudied] x Diagnosis [patients vs. controls vs. simulators] analysis of variance (ANOVA) revealed a significant repetition effect, $F(1, 71) = 62.95$, $MS_e = 0.015$, $p < .001$. The Object Repetition x Diagnosis interaction proved nonsignificant, $F(2, 71) = 1.78$, $MS_e = 0.015$, $p = .18$, indicating that the repetition effect did not differ between the diagnosis groups. There was no significant main effect of diagnosis, $F(2, 71) = 1.39$, $MS_e = 0.022$, $p = .26$. For the mean response times for possible objects, a corresponding ANOVA revealed a significant repetition effect, $F(1, 71) = 6.25$, $MS_e = 80{,}182.61$, $p = .015$. The Object Repetition x Diagnosis interaction again proved nonsignificant, $F(2, 71) = .94$, $MS_e = 80{,}182.61$, $p = .40$, indicating that the repetition effect did not differ between the diagnosis groups. The main

effect of diagnosis was not significant, $F(2, 71) = 2.84$, $MS_e = 196{,}851.46$, $p = .065$.

Table 2. Perceptual Priming: Proportion-Correct Object Decisions for Possible and Impossible Objects for Dissociative Identity Disorder (DID) Patients ($n = 24$), Controls ($n = 25$), and Simulators ($n = 25$)

| *Object type* | *DID patients* | *Controls* | *Simulators* |
|---|---|---|---|
| Possible objects | | | |
| Studied | .75 (.17) | .85 (.18) | .85 (.13) |
| Unstudied | .64 (.21) | .65 (.15) | .68 (.17) |
| | | | |
| Impossible objects | | | |
| Studied | .66 (.18) | .74 (.15) | .80 (.18) |
| Unstudied | .66 (.18) | .67 (.21) | .76 (.16) |

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

For the mean proportion-correct object decisions for impossible objects, the corresponding ANOVA showed no significant repetition effect, $F(1, 71) = 2.23$, $MS_e = 0.018$, $p = .14$. The Object Repetition x Diagnosis interaction was not significant either, $F(2, 71) = 0.70$, $MS_e = 0.018$, $p = .50$, indicating that this was the case for all the diagnosis groups. There was, however, a significant main effect of diagnosis, $F(2, 71) = 3.90$, $MS_e = 0.022$, $p = .025$. Tukey's honestly significant difference (HSD) pairwise comparison procedures indicated that patients had significantly smaller proportions of correct decisions than did simulators ($p = .020$). Patients did not score differently from controls ($p = .60$). Neither did simulator's proportion of correct decisions differ from controls' ($p = .18$). For mean response times for impossible objects, the corresponding ANOVA revealed a significant repetition effect, $F(1, 71) = 4.81$, $MS_e = 84{,}520.65$, $p = .032$. The Object Repetition x Diagnosis interaction was not significant, $F(2, 71) = .52$, $MS_e = 84{,}520.65$, $p = .60$, indicating that the repetition effect did not differ

between the diagnosis groups. There was no significant main effect of diagnosis, $F(2, 71) = 2.11$, $MS_e = 279{,}583.23$, $p = .13$.

Table 3. Perceptual Priming: Response Times (in Milliseconds) for Correct Object Decisions for Possible and Impossible Objects for Dissociative Identity Disorder (DID) Patients ($n = 24$), Controls ($n = 25$), and Simulators ($n = 25$)

| *Object type* | *DID patients* | *Controls* | *Simulators* |
|---|---|---|---|
| Possible objects | | | |
| Studied | 1098 (413) | 865 (292) | 930 (603) |
| Unstudied | 1295 (752) | 977 (272) | 970 (417) |
| | | | |
| Impossible objects | | | |
| Studied | 1209 (643) | 956 (271) | 990 (497) |
| Unstudied | 1359 (628) | 1085 (533) | 1027 (725) |

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

### *Conceptual Priming*

Proportion-incorrect responses on the related and unrelated questions was very low ($M = .039$, $SD = .041$). No main effect or interaction reached significance. As in the Vriezen et al. (1995) study, this measure could not be used as an index of priming. Mean response times for the related and unrelated trial condition are presented in Table 4. We excluded incorrect responses. On the related question, a 2 x 3 Word Repetition [studied vs. unstudied] x Diagnosis [patients vs. controls vs. simulators] ANOVA showed a significant repetition effect, $F(1, 73) = 23.09$, $MS_e = 13{,}709.66$, $p < .001$. The Word Repetition x Diagnosis interaction was not significant, $F(2, 73) = 1.43$, $MS_e = 13{,}709.66$, $p = .25$, indicating that the repetition effect did not differ between the diagnosis groups. There was a significant main effect of diagnosis, $F(2, 73) = 14.35$, $MS_e = 154{,}835.29$, $p < .001$. Tukey's HSD pairwise comparison procedures indicated that patients

reacted significantly more slowly than controls ($p$ <.001) and more slowly than simulators ($p$ =.001). Simulators' response times did not differ from controls' ($p$ =.31).

On the unrelated question, the corresponding ANOVA revealed no significant repetition effect, $F(1, 73) = 0.04$, $MS_e = 19{,}314.72$, $p = .85$. The Word Repetition x Diagnosis interaction was not significant, $F(2, 73) = 0.17$, $MS_e = 19{,}314.72$, $p = .85$, indicating that this was the case for all of the diagnosis groups. There was a significant main effect for diagnosis, $F(2, 73) = 5.61$, $MS_e = 97{,}674.23$, $p = .005$. Tukey's HSD pairwise comparison procedures indicated that patients reacted significantly more slowly than controls ($p$ = .005). The difference between DID patients and simulators was marginally significant ($p$ =.051). Simulators' response times did not differ from controls' ($p$ =.69).

Table 4. Conceptual Priming: Response Times (in Milliseconds) for Correct Responses for Semantically Related and Unrelated Classification Questions for Dissociative Identity Disorder (DID) Patients ($n$ = 26), Controls ($n$ = 25), and Simulators ($n$ = 25)

| *Question type* | *DID patients* | *Controls* | *Simulators* |
|---|---|---|---|
| Semantically related | | | |
| Studied | 1346 (534) | 786 (104) | 976 (333) |
| Unstudied | 1471 (647) | 887 (147) | 1024 (326) |
| | | | |
| Semantically unrelated | | | |
| Studied | 1080 (387) | 806 (179) | 888 (283) |
| Unstudied | 1100 (539) | 811 (153) | 876 (243) |

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

For the single-completion stems, the proportion correctly completed studied and unstudied word stems was calculated. For the multiple-completion stems, the proportion correctly completed word stems was calculated as the proportion of word stems completed to a studied word or another correct completion. For single- and multiple-word stems, the mean studied and unstudied response times were calculated as the mean response time of the word stems that were correctly completed. Mean proportions of correctly completed word stems and mean response times are presented in Tables 5 and 6.

Table 5. Word Stem Completion: Proportions of Correct Single- and Multiple-Completion Word Stems for Dissociative Identity Disorder (DID) Patients ($n$ = 22), Controls ($n$ = 25), and Simulators ($n$ = 25)

| *Word stem type* | *DID patients* | *Controls* | *Simulators* |
|---|---|---|---|
| Single-completion stems | | | |
| Studied | .67 (.23) | .84 (.18) | .79 (.16) |
| Unstudied | .52 (.26) | .66 (.18) | .66 (.16) |
| Multiple-completion stems | | | |
| Studied | .89 (.12) | .92 (.08) | .92 (.09) |
| Unstudied | .87 (.16) | .92 (.07) | .94 (.07) |

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

Consider first the proportions of correctly completed single-completion word stems. A repeated measures analysis revealed a significant word repetition effect, $F(1, 69) = 63.01$, $MS_e = 0.013$, $p < .001$. The interaction of Word Repetition x Diagnosis, however, did not prove significant, $F(2, 69) = 0.82$, $MS_e = 0.013$, $p = .45$, indicating that the repetition effect did not differ between diagnosis groups. There was a significant main effect of diagnosis, $F(2, 69) = 5.24$, $MS_e = 0.032$, $p = .008$. Pairwise comparisons indicated that patients completed significantly fewer studied and unstudied word stems

than did controls ($p$ = .009) or simulators ($p$ = .038). Simulators did not differ from controls ($p$ = .84). For single-completion mean response times, a repeated measures analysis revealed a significant word repetition effect, $F$(1, 69) = 15.62, $MS_e$ = 59,429.22, $p$ < .001. The interaction of Word Repetition x Diagnosis, was not significant, $F$(2, 69) = 1.18, $MS_e$ = 59,429.22, $p$ = .31, indicating that the repetition effect did not differ between diagnosis groups. There was a significant main effect of diagnosis, $F$(2, 69) = 4.31, $MS_e$ = 80,569.46, $p$ = .017. Pairwise comparisons indicated that response times of patients were significantly increased compared with those of controls ($p$ = .014)**.** Simulators did not differ significantly in response time from patients ($p$ = .55). The difference in response time between simulators and controls also did not reach significance ($p$ = .15).

Table 6. Word Stem Completion: Response Times (in Milliseconds) for Correctly Completed Single- and Multiple-Completion Word Stems for Dissociative Identity Disorder (DID) Patients ($n$ = 22), Controls ($n$ = 25), and Simulators ($n$ = 25)

| *Word stem type* | *DID patients* | *Controls* | *Simulators* |
|---|---|---|---|
| Single-completion stems | | | |
| Studied | 1234 (354) | 985 (218) | 1206 (394) |
| Unstudied | 1428 (422) | 1199 (295) | 1281 (280) |
| Multiple-completion stems | | | |
| Studied | 1304 (348) | 958 (151) | 1122 (251) |
| Unstudied | 1286 (354) | 1051 (192) | 1242 (324) |

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

For proportions of correctly completed multiple-completion word stems, a repeated measures analysis revealed no significant word repetition effect, $F$(1, 69) = 0.02, $MS_e$ = 0.0062, $p$ = .89. The interaction between word repetition and diagnosis was not significant either, $F$(2, 69) = 1.04, $MS_e$ = 0.0062, $p$ = .36. There was no significant main effect of diagnosis, $F$(2, 69) =

2.50, $MS_e$ = 0.0071, $p$ = .09. Additionally, *t* tests were performed to compare multiple-completion proportions of word stems completed to a *studied* word to a chance rate of .10. This chance level of .10 reflects the 10 or more possible completions in this set of word stems (e.g., Nissen et al., 1988). The mean proportions of studied word stems that were completed to a studied word (i.e., excluding word stems completed to another correct completion) indicated evidence of repetition ($M$ = .26, $SD$ = .14 for controls; $M$ = .18, $SD$ = .12 for patients; $M$ = .17, $SD$ = .094 for simulators). *T* tests comparing the scores with the chance proportion of .10 indicated evidence of repetition in all participants ($t(21)$ = 3.25, $p$ = .004, for patients, $t(24)$ = 5.91, $p < .001$, for controls, and $t(24)$ = 3.85, $p$ = .001, for simulators). An ANOVA revealed that diagnosis groups differed significantly in the proportion of studied word stems completed to a studied word, $F(2, 69)$ = 4.19, $MS_e$ = 0.014, $p$ = .019. Pairwise comparisons revealed that simulators scored significantly lower than controls ($p$ = .026). Although patients also scored lower than controls, this did not reach significance ($p$ = .066). Patients did not differ from simulators ($p$ = .96). A repeated measures analysis on mean studied and unstudied multiple-completion response times revealed a significant repetition effect, $F(1, 69)$ = 5.85, $MS_e$ = 26,001.91, $p$ = .018**.** Although response times for patients were equivalent for studied and unstudied words, the interaction of Word Repetition x Diagnosis proved nonsignificant, $F(2, 69)$ = 2.35, $MS_e$ = 26,001.91, $p$ = .10. There was a significant main effect of diagnosis, $F(2, 69)$ = 7.91, $MS_e$ = 64,137.09, $p$ =.001. Pairwise comparisons indicated that patients had significantly longer response times than controls ($p$ = .001). The difference between simulators and controls also was significant ($p$ = .041); patients did not differ from simulators ($p$ = .29).

In summary, although participants did not complete more studied than unstudied multiple-completion word stems with a *correct* completion in the word stem completion task, they did complete more multiple-completion stems with *studied* words than would be expected on a chance level of 10%. Also, they showed decreased response times to studied words relative to unstudied word stems. On the single-completion stems, priming was also evident from the increased proportion of correct completions for

studied words and the decreased response times of studied words in comparison with unstudied words. Participants thus showed clear evidence of priming on both types of word stems.

## Discussion

The present study aimed to assess the transfer of implicit memory between identities in DID. In agreement with studies performed by Eich et al. (1997a, 1997b) and Nissen et al. (1988), we obtained evidence of priming for DID patients comparable to that of controls on a data driven task (the perceptual encoding task) and on a task allowing for only a single response on each trial (word stem completion task). Moreover, and in contrast to studies by Eich et al. (1997b), Nissen et al. (1988), and Peters et al. (1998), we also observed priming effects on a conceptually driven task and a task allowing for a range of responses (word stem completion task). Patients thus showed evidence of transfer of information between identities on all implicit memory tasks employed. It should be noted that despite not differing from controls with respect to implicit memory effects, patients did show a generally impaired performance on the conceptual encoding task and the word stem completion task, as is evident from their significantly longer response times to both studied and unstudied items. They also produced fewer correct word stem completions. The DID patients' less efficient and slower performance could have been the result of their having fewer processing resources available for memory tasks because of an emotional preoccupation, as also reported in depressed and anxious patients (Baddeley, Wilson, & Watts, 1995).

It can be argued that interidentity amnesia was not expected in the first place on the word stem completion task with multiple completions due to its data driven encoding (i.e., the counting of "sticks" and "tails"). However, both the related and unrelated conceptually driven tasks also allowed for multiple—although only two—response alternatives while requiring conceptual encoding of an object's sensory and functional attributes. Although the identity-specific interpretation of material at the

time of encoding and the identity-specific selection of responses during retrieval has been considered the crucial distinctive factor in finding interidentity amnesia in DID (Eich et al., 1997b; Nissen et al., 1988), we did not obtain evidence for this. At the perceptual stage of information processing, the formation of new structural object representations and the activation of existing word representations in the encoding phase appears to extend to the retrieval phase performed by another identity in DID patients. Similarly, at the conceptual stage, the representation of objects' sensory attribute information seems to transfer to another identity, indicating that very specific encoding and retrieval operations persist even when DID patients switch between identities.

The different findings of this study to previous studies of priming in DID (Eich et al., 1997a, 1997b; Nissen et al., 1988; Peters et al., 1998) could be due to the higher power resulting from the larger sample in this study (31 patients tested with results pertaining to a mean of 24 patients reporting no recall for encoding phases). Further, we added measures of response times to index priming, whereas all previous studies on implicit memory performance in DID have relied only on accuracy scores. Response times may be a more sensitive measure of priming, as is indicated by our results on the impossible objects perceptual encoding task, where priming is indicating by response times but not by the proportions of correct object decisions.

A third factor that may account for the different findings is that in all of the previous studies of implicit memory functioning in DID that obtained evidence of interidentity amnesia, explicit references were made to the studied stimulus material encoded by another identity. In the study by Peters et al. (1998), the test identity was instructed to complete word stems to words that had been learned by another identity. Eich et al. (1997b) presented a free recall task to the test identity of the words encoded by another identity immediately preceding the word stem completion task. In the study by Nissen et al. (1988), no direct reference was made to the studied material, but the task was performed in the context of other tasks that did. Explicit reference to the study phase and the material studied may

have caused patients to misconceive the implicit memory task as an explicit measure of memory and complete the task as such.

In the present study, however, no explicit reference was made to the studied material. Also, by incorporating a group of DID simulators, it was shown that whatever explicit knowledge was available in the test phase, it could not be put to use to influence implicit memory performance and simulate a pattern of interidentity amnesia. Simulators did differ from controls in the proportion of stem completions and the response times of the multiple word stem completion task; that is, they showed generally impaired performance both on studied and unstudied word stems. This may have been because they had to divide attention between role playing and performing the memory task. Importantly, however, *priming* scores of simulators were comparable to those of controls, indicating that task performance could not be influenced by strategies using explicit recollections of studied material, even after specific instructions regarding how to simulate interidentity amnesia in DID. This inability to simulate amnesia seemingly contrasts with findings in other studies using participants instructed to simulate amnesia (e.g., Davis et al., 1997; Eich et al., 1997a; Horton, Smith, Barghout, & Connolly, 1992).

Our primary goal, however, in designing the memory tasks used in this study was not to *detect* but to *exclude* malingering. To this end we used a 1-week interval between the encoding and retrieval phases in the perceptual encoding task. Also, in all tasks, we instructed participants to react as fast as possible. This direction was given in the initial instruction and repeated after the practice trials. This instruction contrasts with instructions used in studies designed to *detect* malingering, in which no high-speed response instructions were given. We should note that in a word stem completion task performed by Davis et al. (1997), participants were instructed to immediately say aloud the first word that popped into mind and that would complete the word stem. However, given the mean response times of 2 to 4 s reported in this study, these instructions should not be considered high-speed instructions. Noteworthy is that when simulators in the present study were asked about their simulation strategy, they stated that they found it hard to simulate because they either felt they did not recognize any material from the study

phase or that they did recognize material, but felt unable to simulate due to the time constraint. Note that it cannot be inferred that explicit memory traces were absent. It can, however, be concluded that whatever explicit knowledge was available in this study, it could not be put to use to influence implicit memory performance. Also note that it cannot be inferred whether patients have tried to simulate or not. It can only be said that had they tried to simulate interidentity amnesia, they would not have succeeded.

We replicated Vriezen et al. (1995) in demonstrating that the simple repetition of stimulus material at study and test was not a sufficient condition for priming. A priming effect was found on the related question, and no evidence of priming was found on the unrelated question. We obtained evidence of attribute-specific priming (i.e., when encoding and retrieval both pertained to sensory attributes). Conceptual priming thus seems to require the formation of domain-specific semantic representations. As noted by Vriezen et al., these findings of domain-specific priming call for a refinement of existing theoretical accounts of conceptual priming. Performance on conceptual priming tasks is not completely accounted for by the memory systems view because priming was not found on all tasks pertaining to a specific underlying memory system (i.e., the semantic memory system). Instead, memory performance appears to depend on both the involvement of the critical memory system and the overlap between encoding and retrieval processing operations. The observed domain-specific priming calls for the specification of the semantic memory system, characterized by attribute-specific processing operations at encoding and retrieval (see also Cabeza, 1994). Domain-specific conceptual priming requires the specification of separate semantic memory subsystems characterized by either mainly sensory or mainly functional processing.

We replicated Schacter et al. (1990; Schacter et al., 1991; Schacter et al., 1992) and Cooper et al. (1992) by demonstrating evidence of perceptual priming selectively on possible objects when considering proportions of correct object decisions. Importantly, however, we extended their findings by demonstrating priming for both possible and impossible objects by including response times, a priming index thye did not include. Because the task developed by Schacter et al. included novel, unfamiliar objects,

perceptual priming was argued not to depend on, or reflect, the activation of preexisting memory representations, but rather to rely on the formation of new representations in the encoding phase (Schacter et al., 1990). They reasoned that the absence of priming for impossible objects was due to participants' inability to encode the three-dimensional object structure of impossible objects. However, the results of the present study show that it might be possible to form global mental representations of impossible objects. Priming of these representations may be visible only in the more sensitive priming measure of response times. Alternatively, priming of unfamiliar objects may be brought about by the repetition of lower level nodes of object characteristics. In that case, representations of unfamiliar objects that produce priming need not form a coherent global, three-dimensional object structure, but instead need only consist of lower-level representations formed in an earlier stage of information processing.

In conclusion, the main findings of the present study are that DID patients displayed normal implicit memory performance on both data driven and conceptually driven tasks. These findings have theoretical significance for current views on memory dysfunction in DID. One possible implication is that amnesia for implicit information between the two identity states does not extend to neutrally valenced material, but, if it exists, is involved only in emotional information processing. This possibility seems to make sense given the etiology of DID as a pathological reaction to childhood trauma. In other words, the particular coping mechanisms that create identity-isolated implicit memory traces only work for information considered to be emotionally threatening or directly linked to past traumatic experiences. Future research thus should attempt to include trauma-related stimuli in implicit memory tests.

An alternative implication of the present results is that the presumed amnesic symptoms in DID never include implicit memory, neither emotionally significant nor emotionally neutral, but are limited to explicit memory. In other words, the hypothesized coping mechanisms work to isolate conscious recollection of traumatic experiences, but fail to prevent information transfer between identities at an implicit level. The current study does not bear on the distinction between explicit and implicit memory

functioning, since we did not include an objective explicit memory task. However, in other work (Huntjens et al., 2003), we have obtained evidence of normal explicit memory performance in DID patients for neutral material, which argues against the possibility of amnesic symptoms being limited to explicit memory. What we did find in both our implicit and explicit memory studies was a dissociation between objective memory performance and patients' subjective reports; that is, although patients indicated no subjective recollection of the encoding phase performed by a different identity state at all, their test scores indicated normal memory functioning.

A third possible implication is thus that the reported amnesic symptoms in DID include neither implicit nor explicit memory, for either emotionally significant or emotionally neutral material. Instead, the reported amnesic symptoms are related to an identity's lack of subjective awareness of events experienced by another identity. Patients' subjective reports of interidentity amnesia may reflect their genuine phenomenological experiences, but their intact memory traces for an event may go without their being aware of ownership of that memory; that is, they suffer a lack of so-called meta-awareness. *Dissociative amnesia* may thus not be the correct term to describe perceived memory problems in DID (e.g., Read & Lindsay, 2000). Instead, the presence of intact memory performance combined with the absence of memory meta-awareness may be at the core of dissociative amnesia.

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Chapter

4

# Procedural Memory in Dissociative Identity Disorder: When Can Interidentity Amnesia Be Truly Established?


## Abstract

In a serial reaction time task, procedural memory was examined in dissociative identity disorder (DID). Thirty-one DID patients were tested for interidentity transfer of procedural learning and their memory performance was compared with 25 normal controls and 25 controls instructed to simulate DID. Results of patients seemed to indicate a pattern of interidentity amnesia. Simulators, however, were able to mimic a pattern of interidentity amnesia, rendering the results of patients impossible to interpret as either a pattern of amnesia or a pattern of simulation. It is argued that studies not including DID-simulators or simulation-free memory tasks, should not be taken as evidence for (or against) amnesia in DID.



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## Introduction

Overactive, underactive, obsessive, or avoidant utilizations of memory characterize numerous psychopathologies (Spiegel, Frischholz, & Spira, 1988). A disorder in which a functional failure of memory is considered to be a core phenomenon is dissociative identity disorder (DID), previously referred to as multiple personality disorder (MPD). In the Diagnostic and Statistical Manual of Mental Disorders (4th ed., *DSM-IV*; American Psychiatric Association, 1994), DID is characterized by the presence of two or more distinct identities or personality states, who recurrently take control of the person's behavior and who each have their own relatively enduring pattern of perceiving, relating to, and thinking about the environment and self. DID patients very frequently report episodes of interidentity amnesia**,** in which an identity claims amnesia for events experienced by other identities (Boon & Draijer, 1993; Coons, Bowman, & Milstein, 1988; Putnam, Guroff, Silberman, Barban, & Post, 1986; Ross et al., 1990; for a review see Gleaves, May, & Cardeña, 2001). However, this does not mean that patients report a dense amnesia between all identities. Different degrees of amnesia may exist between various identities and reported amnesia may either be mutual or one-way, i.e., identity A reports awareness of the experiences of identity B, whereas B reports no knowledge of the experiences of identity A (Ellenberger, 1970; Janet, 1907; Peters, Uyterlinde, Consemulder, & Van der Hart, 1998).

Whereas most clinical DID experts agree that DID is accompanied by a disturbance in episodic memory, they seem to disagree as to whether identities share implicit memory, such as priming and procedural memory (cf. Merckelbach, Devilly, & Rassin, 2001), i.e., the expression of information without conscious recollection (Schacter, 1987). Putnam (1997), for example, stated that "fluctuations in the level of basic skills, in habits, and in recall of knowledge are classic forms of memory dysfunction in dissociative patients" (p. 82) and "paradoxically, it seems as if overlearned information and skills are especially susceptible to intermittent failures of memory retrieval" (p. 83). On the other hand, Cardeña (2000) stated "in

dissociative amnesia, the individual loses explicit memory for personal experience, whereas implicit memory for general knowledge, skills, habits, and conditioned responses is unimpaired" (p. 57).

Six experimental studies have examined implicit memory transfer between identities, most of them focusing on interidentity priming (Dick-Barnes, Nelson, & Aine, 1987; Eich, Macaulay, Loewenstein, & Dihle, 1997a, 1997b; Huntjens, Postma, Peters, Hamaker, Woertman, & Van der Hart, 2002; Nissen, Ross, Willingham, Mackenzie, & Schacter, 1988; Peters et al., 1998). Priming studies have yielded mixed results, which Eich et al. (1997b) and Nissen et al. (1988) ascribed to the influence of what they called identity-specific factors at the time of encoding and retrieval. In terms of encoding, evidence of amnesia in DID was obtained on conceptually driven tasks that make use of semantically rich materials that they argued was interpreted in different ways by different identities. In contrast, evidence of transfer between identities was obtained on data driven tasks, in which, according to their reasoning, encoding leaves little room for identity-specific interpretation. In terms of retrieval, transfer of information was obtained on tasks allowing for only a single response on each trial and evidence of amnesia was obtained on tasks allowing a wide range of responses. However, in the most recent study on interidentity priming in DID, which was performed by our group, we found no objective evidence for interidentity amnesia on a variety of priming tasks including both conceptually driven and perceptually driven tasks, and both tasks with single and multiple responses (Huntjens et al., 2002).

Of the above mentioned, only two studies have included tasks that pertain to the procedural memory system, i.e., the memory system that is involved is learning skills and "knowing how" to do things: riding a bicycle, typing words on a keyboard, or solving a jigsaw puzzle (Schacter, 1996).

The first study on procedural memory in DID was performed by Dick-Barnes, Nelson, and Aine (1987), who used a pursuit-rotor task designed to assess the transfer of perceptual-motor training. Results indicated a practice effect, i.e., transfer of procedural knowledge learning across the three identities tested. In this study, however, no information was

given about the a-priori reported amnesia between the participating identities, making the results inapt as a case against interidentity amnesia.

Nissen, Ross, Willingham, MacKenzie, and Schacter (1988) performed the second study on procedural memory in DID. Two identities were tested, both reporting amnesia for experiences of the other identity. The authors made use of the serial reaction time (SRT) task introduced by Nissen and Bullemer (1987) that has become a standard task to assess the acquisition and retention of new procedural associations. We will discuss this task in more detail because in the present study we also used a SRT task. Participants are asked to respond as quickly as possible to a stimulus (e.g., a light, an asterisk) that is presented at one of four horizontally aligned locations on a computer screen. Four keys are spatially mapped to the four locations, and participants are asked to press the key in response to the stimulus as quickly as possible without making errors. Each response triggers the presentation of the next stimulus, which in turn requires a new response, etc. The critical experimental variation lies in the sequence of stimuli. Subjects respond either to a cyclically repeating sequence (resulting also in a cyclically repeating sequence of responses) or to a random sequence, the constraint being that the same position cannot be used on successive trials.

In the Nissen et al. (1988) study, first one identity was given three blocks of trials in a random-sequence condition. Then, the other identity was given four blocks of trials in a 10-trial repeating sequence and a fifth block consisting of a random sequence instead of the repeating sequence. Response time (RT) decreases more when a repeating sequence is presented than when a random sequence is presented, and RT increases when the stimulus presentation switches from a repeating to a random sequence. These sequence-specific RT effects indicate sequential learning. This identity showed some learning of the sequence. Finally, the first identity performed three blocks of the repeating sequence blocks and then one random block. Results indicated this identity's performance was facilitated by the other identity's acquisition of the sequence.

The Nissen et al. (1988) study has some limitations. Similar to the Dick-Barnes et al. (1987) study, only 1 patient was tested. Furthermore, no

statistical tests were applied, which makes the interpretation of the data somewhat difficult. The assessment of the degree of the patient's learning was also complicated by the omission of a normal control group. Finally, no measures to prevent or detect simulation were included, which seems important given that the so-called "sociocognitive" model considers DID to be a syndrome of social creation or iatrogenesis in the treatment of suggestible individuals (Allen & Movius, 2000; Lilienfeld et al., 1999; Spanos, 1996).

The purpose of the present study was to examine procedural memory in DID, while overcoming some of the limitations of the previous two studies of procedural learning in DID, by including a relatively large sample of female DID patients ($n$ = 31) as well as a normal control group comparable on gender, mean age, and education-level ($n$ = 25).

To diminish the possibility of simulation of interidentity amnesia by conscious influencing of task performance, we took several measures to discourage explicit memory processing and encourage implicit memory processing. First, following Pascual-Leone, Wasserman, Grafman, and Hallett (1996), we told participants that the location of the stimulus on each successive trial was random and we used a 12-trial instead of a 10-trial sequence to prevent recognition of the repeating sequence of stimuli. For the same reason, we instructed participants to react as accurately, but above all, to react as quickly as possible, and we repeated this instruction several times to ensure high-speed performance. Finally, and also to prevent recognition of the sequence, we used a sequence of stimuli with less statistical structure than the sequence used by Nissen et al. (1988). As statistical structure increases, there are fewer unique runs of trials of a given size, and specific runs are repeated more often. An example of a low structure sequence is BDBCABADAC, in which no run of two or more trials is repeated.

Finally, to detect if simulation of interidentity amnesia indeed was not possible on the task use, we included a second control group instructed to simulate DID ($n$ = 25). The DID simulators were asked to make up an imaginary, "amnesic" identity and to "switch" upon request to this amnesic identity during the experiment.

## Method

*Participants*

Thirty-one female DID patients participated in the study. Patients were recruited with the help of clinicians in the Netherlands and Belgium. To be eligible for participation, patients had to meet the *DSM-IV* (American Psychiatric Association, 1994) criteria and the criteria of the Structured Clinical Interview for *DSM-IV* Dissociative Disorders (SCID-D), a semi-structured interview used to diagnose the *DSM-IV* dissociative disorders (Boon & Draijer, 1994; Steinberg, 1993). 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. Participants were informed that the aim of the study was to understand more about the memory problems often reported by DID patients. Patients self-selected two identities that would participate in the experiment. Borrowing terms prevalent in DID clinical practice, conditions for participation were described as follows: (1) at least one of the identities is completely amnesic for the events experienced by the other participating identity during the experiment; (2) the two identities are able to perform the tasks without interference from other identities; (3) the two identities are able to perform the tasks without spontaneous switches to other identities; (4) the patient is able to switch on request between the two identities. The selected identities could be either of the female or of the male perceived gender type. The switching process was assisted either by the patients' own clinician or by one of the authors (R.H. or O.V.). 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," and move out of consciousness.

In addition, 50 female control participants participated. Groups were comparable on age and education (Table 1). Control participants did not report any relevant memory, visual, or attentional problems, or psychiatric disorders. Control participants were divided into two groups, called the

"controls" and the "simulators". Simulators were instructed to imitate 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, Putnam, Weingartner, Braun, and Post (1985), 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 invested considerable effort inventing an identity. Finally, they were asked to practice during the week preceding the experiment switching to their new identity and taking on its state of mind.

Table 1. Participant Characteristics for Dissociative Identity Disorder (DID) Patients ($n$ = 31), Controls ($n$ = 25), and Simulators ($n$ = 25)

| | *Age* | *Education* | *DES* | *CEQ* |
|---|---|---|---|---|
| DID patients | 38.48 (8.68) | 5.39 (1.20) | - | - |
| Controls | 37.72 (11.29) | 5.88 (1.13) | 6.31 (4.10) | 5.48 (3.24) |
| Simulators | 32.48 (10.31) | 5.84 (1.14) | 6.54 (3.93) | 4.20 (2.58) |

*Note.* The values represent means (with standard deviations in parentheses). Education was assessed in categories ranging from 1(*low*) to 7 (*high*) (Verhage, 1964); The DES is the Dissociative Experiences Scale with score range from 0 to 100, and the CEQ is the Creative Experiences Questionnaire with score range from 0 to 25.

Both the controls and the simulators completed the Dissociative Experiences Scale (DES; Carlson & Putnam, 1993) and the Creative Experiences Questionnaire (CEQ; Merckelbach, Muris, Schmidt, Rassin, & Horselenberg, 1998) (Table 1). 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. The CEQ is a 25-item self-report questionnaire with scores ranging from 0 to 25. Scores are thought to be indicative of fantasy proneness, i.e., the inclination to be immersed in daydreams and fantasies. The controls and the simulators did not differ significantly on DES-scores and CEQ scores. Neither controls nor simulators showed pathological levels of dissociation as measured by the DES. Written informed consent was obtained from all participants prior to participation.

*Stimuli and apparatus*

Participants performed a Serial Reaction Time (SRT) task. On each trial, four locations arranged horizontally on a computer monitor were underscored, and a small rectangle appeared above one of them. The stimulus was a yellow character on a black background and 0.5 cm wide by 1 cm high. All four locations were easily discriminable and 5 cm from the bottom of the monitor screen and separated horizontally by 7 cm. Participants responded by pressing the z, x, n, and m keys on the computer keyboard, which was positioned below and in front of the monitor such that the four keys were approximately aligned with the four stimulus locations**.** The four keys were marked and the z key was the correct key for the leftmost position, the x key for the position second from left, and so on. The stimulus remained on the screen until the participant pressed the correct key, upon which the next stimulus appeared without an interstimulus delay. If the subject pressed the incorrect key, the stimulus changed color to gray and the correct key had to be pressed before the next trial was presented. No feedback was given regarding response latency.

Each block consisted of 120 trials, which was followed by a short break of 30 s, after which subjects initiated the next block by pressing a key when they were ready. The blocks consisted either of a random sequence, the only constraint being that the same event could not occur on two successive trials, or of an ordered sequence, in which the location of the stimulus followed a particular 12-trials sequence. Designating the four locations A, B, C, and D from left to right, the sequence was as follows: B-D-B-C-A-B-A-D-A-C-D-C. Each block comprised 10 repetitions of this 12-

trial sequence, but the end of one 12-trials sequence and the beginning of the next was not marked in any way. Thus, in the absence of knowledge of the sequence itself, each block would seem to be a continuous series of 120 trials.

*Procedure*

This study was part of a larger study on explicit and implicit memory functioning in DID (see Huntjens et al., 2002, and Huntjens, Postma, Peters, Woertman, & Van der Hart, 2003). The task was presented in 8 blocks of 120 trials each and two practice blocks of 12 trials, one preceding block 1 and one preceding block 5. Participants were instructed to respond by pressing the key that corresponded to the location in which the stimulus appeared. They responded to locations A, B, C, and D with their left middle, left index, right index, and right middle fingers, respectively, and were asked to rest their fingers lightly on the keys as they performed the task. Subjects were told to respond as accurately and as quickly as possible and the instruction to respond as quickly as possible was repeated at the beginning of each block. Participants were told that the location of the stimulus on each successive trial was random. However, for all participants, blocks 2 to 7 followed a repeating sequence, whereas blocks 1 and 8 followed a random sequence. Block 1 functioned as a baseline measure of performance.

Patients performed a practice block and block 1 to 4 in one identity. After this, they were requested to switch to the identity claiming amnesia for experiences in the present of the identity performing the first series of blocks. The switching process was always accomplished in less than 2 min. When the patient confirmed the presence of the second identity, this identity was directly asked if and what she knew of the learning phase and the material the other identity had seen. Patients answered with either "yes" or "no". The identity subsequently performed a practice block and blocks 5 to 8. So although at this stage, the procedure allows for the acquisition of new associations by Identity 2, what is critical is the activation (or not) of existing procedural memory structures learned by Identity 1 in the performance of Identity 2. Normal controls performed all blocks 1 to 8

including the practice blocks in the same order with a 2-min break between series of blocks to keep the procedure equal. Simulating controls performed block 1 to 4 without simulating, after which they received the following instruction: "You have now performed a task as yourself. We are now asking you to switch to your imagined identity, which will perform the same task you did just now. However, your identity doesn't know you have performed the same task so he or she doesn't know you saw small blocks on the screen and pressed corresponding keys. Your identity thus has no practice in performing this task. So try to start all over again, at the same speed and with the proportion of errors you responded when you started this task as yourself. Your identity has no other difficulties in performing the task. He or she remembers what he/she does and learns and performs as well as any other person. Your identity just doesn't profit from the practice you have had as yourself. Now take a few minutes to let your imagined identity come forward. We will then explain the task to him/her." Subjects then performed blocks 5 to 8.

At the end of the experiment, we questioned participants about the sequence. We asked them whether they had noted a repeating sequence at any point during the experiment. If they responded positively, we asked them to type the sequence on the keyboard.

## Results

Of the 31 DID patients tested, the three patients who reported some explicit knowledge of the study phase in the test phase, either of the material used or of the instructions given to the other participating identity, were left out of the analyses. Two control participants and one patient were left out of the analyses because of extreme high error scores (mean percentage correct responses lower than 80%). The results described therefore pertain to 27 DID patients, 23 control participants and 25 simulators. The subjects' mean percentage of correct responses and mean RT were calculated for each block, including only those trials in each block on which the subject

responded correctly in the RT measure. Results are presented in Figure 1 and Table 2.

Table 2. Percentages Correct Responses (with standard deviations in parentheses) in each Block for Dissociative Identity Disorder (DID) Patients ($n$ = 27), Controls ($n$ = 23), and Simulators ($n$ = 25)

| *Block* | *DID patients* | *Controls* | *Simulators* |
|---|---|---|---|
| 1 | 97.75 (2.93) | 98.37 (1.32) | 97.67 (2.38) |
| 2 | 95.59 (4.11) | 95.98 (3.58) | 94.03 (4.30) |
| 3 | 94.57(3.58) | 95.00 (2.85) | 91.80 (4.33) |
| 4 | 94.23 (5.66) | 93.44 (3.94) | 89.67 (5.79) |
| 5 | 96.67 (4.63) | 93.48 (4.91) | 98.23 (1.58) |
| 6 | 96.48 (3.21) | 92.43 (4.40) | 95.37 (4.00) |
| 7 | 95.71 (4.88) | 91.70 (5.19) | 93.50 (4.29) |
| 8 | 93.83 (6.50) | 88.99 (6.15) | 86.83 (8.93) |

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

In control subjects, the gradual decrease in mean RT over blocks 2 to 6 and the increase in RT from blocks 7 to 8 indicated learning of the sequence. Mean RT decreased from 572 ms in block 2 to 453ms in block 6. Unexpectedly, response times then increased by 9 ms in block 7, possibly reflecting a fatigue effect. As expected, mean response times increased by 52 ms to block 8, when the random sequence was introduced. The mean percentage of correct responses in controls gradually decreased from blocks 2 to 7 (except from blocks 4 to 5, Table 2) and also decreased from blocks 7 to 8. The decrease in response times compared with the increase in percentage of correct responses in blocks 2 to 6 is indicative of a accuracy-speed trade-off, i.e., participants respond faster to stimuli but trade this increase in speed for a decrease in accuracy.

In patients, response times decrease from blocks 2 to 4 by 53 ms. Then, after having made the switch to their imagined amnesic identity, their response times increased by 201 ms, after which they again decreased by 137

ms to 668 ms in block 7. Finally, response times again increased by 31 ms from blocks 7 to 8 indicating a learning effect. Mean percentages of correct responses decreased from blocks 2 to 4, then increased after the switch, and again decreased from block 5 onwards.

Simulators' RTs and percentages of correct responses showed a pattern comparable to patients. Their response pattern shows a decrease in response times in blocks 2 to 4, then an increase from blocks 4 to 5 by 168 ms and again a decrease from blocks 5 to 7. Finally, they also showed an increase from blocks 7 to 8 that is indicative of sequence learning.

A 8 Block x 3 Diagnosis [patients vs. controls vs. simulators] MANOVA on the mean response times revealed a significant block main effect $F(7, 66) = 32.15$, $p < .001$. Within-subjects contrasts, which compare the mean response times in each block except the first block to the mean response times in the preceding block, revealed that mean response times decreased significantly over blocks (all $p$'s < .001). However, the MANOVA also revealed a significant Block x Diagnosis interaction $F(14, 134) = 3.97$, $p < .001$. The interaction proved significant only in block 4 vs. block 5 ($p < .001$), block 5 vs. block 6 ($p < .001$), and block 6 vs. block 7 ($p = .001$), the blocks containing a repeating sequence after the switch. Whereas controls thus gave evidence of continuous learning over blocks, patients and simulators started all over again after their switch to the amnesic identity. The diagnosis main effect was also significant, $F(2, 72) = 13.60$, $p < .001$, indicating that diagnosis groups differed significantly in overall mean response times. Tukey's honestly significant difference (HSD) pairwise comparison procedures indicated that patients differed significantly from control participants ($p < .001$), and from simulators ($p < .001$) with slower responses overall. Controls participants did not differ from simulators ($p = .961$).

A corresponding MANOVA on the mean percentages of correct responses revealed a significant block main effect $F(7, 66) = 21.11$, $p < .001$. Within-subjects contrasts revealed that the mean percentage of correct responses significantly decreased over blocks ($p <= .002$ for all comparisons). The analysis also revealed a significant Block x Diagnosis interaction $F(14, 134) = 4.78$, $p < .001$. The Block x Diagnosis interaction

proved significant only for block 4 vs. block 5 ($p < .001$), block 5 vs. block 6 ($p = .011$), and block 7 vs. block 8 ($p = .001$), the blocks after the "switch", indicating the difference between the continuous decrease in correct responses of control subjects and the sudden increase in correct responses after the switch for patients and simulators. The diagnosis main effect did not reach significance, $F(2, 72) = 3.11$, $p = .051$.

*Awareness of the sequence*

To the question whether they had noted a repeating sequence at any point during the experiment, 17 out of 23 controls, 10 out of 25 simulators, and 10 out of 27 patients responded "yes". However, participants were not able to describe the procedure used. They differed very much in the number and designation of blocks they thought consisted of sequences. For example, one participant said she thought every block contained a different sequence and another participant thought the first block contained a sequence, while actually this block consisted of a random sequence. Also, several participants thought the sequence only consisted of 2 or 3 trials that were repeated amongst random trials. Two control participants were able to type in a maximum substring of 6 trials in a row out of the 12-trials sequence in among other incorrect trials. Four controls, 5 simulators, and 3 patients were able to type in a maximum substring of four correct trials in a row; 7 controls, 5 simulators, and 2 patients were able to type in 3 trials in a row; and 4 controls and 5 patients were only able to type in 2 trials.

## Discussion

The purpose of this study was to objectively test procedural memory functioning in DID. Results of control subjects in this study showed the expected decrease in response times over blocks containing a repeating sequence and the expected increase in response times when the stimulus presentation switched from a repeating to a random sequence. Admittedly, it is somewhat difficult to establish what exactly was learned due to a possible

accuracy-speed tradeoff. Rather than revealing the learning of better predictions of the expected stimulus and response in a repeating sequence trial, a distinctive feature of procedural learning, the pattern may reflect the learning of a faster motor response to the stimulus.

The results of patients showed they responded slower overall as is evident from their increased response times when compared to normal controls and simulators. Secondly, the results of patients seemed to indicate a pattern of interidentity amnesia, i.e., a decrease in response times after their "switch" to their amnesic identity. However, the most important finding in this study is that despite of their lack of explicit processing of the sequence learned in the SRT task, simulators were able to mimic the patient's pattern. The measures we took to promote implicit memory processing, i.e., the speeded performance instruction, telling the participants the sequence of the trials was random, the 12-trial sequence instead of the more usual 10-trial sequence, and the increased statistical structure of the sequence, did result in making most of the participants unaware of the nature of the repeating sequence. And those participants who did report noticing a sequence, did not even come close to typing in the correct sequence. Explicit knowledge of the nature of the repeating sequence was thus often completely absent. Importantly, even without this explicit knowledge, simulators were able to slow down their responses comparable to the pattern of interidentity amnesia that was explained to them as expected in DID. Because of the ability of simulators to mimic interidentity amnesia, the results of patients cannot be interpreted unambiguously. Their pattern of performance can both indicate interidentity amnesia or simulation of interidentity amnesia.

In our previous study on implicit memory functioning in DID (Huntjens et al., 2002), which contained simulation-resistant implicit memory tasks, no objective evidence of interidentity amnesia was found. The results of this previous study concur with the two previous studies on procedural memory in DID performed by Dick-Barnes et al. (1987) and Nissen et al. (1988). It would thus be unlikely to expect amnesia on the SRT task use in this study, also because the SRT task is data driven and therefore, given the reasoning of Eich et al. (1997b) and Nissen et al. (1988), the least

expected memory system for amnesia in DID. Speaking against the possibility of amnesia-simulation by patients is a study performed by Eich et al. (1997a), in which simulation of interidentity amnesia was possible on a picture fragment completion task. On this task, results indicated that patients did *not* try to simulate interidentity amnesia.

In sum, this study shows that even if measures are taken to reduce or exclude explicit stimulus knowledge, simulation on implicit memory tasks is possible. This conclusion is very important in interpreting results of previous studies and for designing new studies on the subject. Results of all studies on memory in DID not including tasks which are known to be simulation-resistant or not including a control group of DID simulators, cannot be taken as evidence for or against interidentity amnesia in DID. Simply providing statements that simulation is unlikely on the tasks used certainly does not constitute convincing evidence.

Future studies should thus include memory tasks which are simulation-resistant in order to be able to make definite claims about interidentity amnesia in DID. Furthermore, tasks on which simulation is easy, and therefore allow a clear simulation profile to be established, should be used in future studies to shed light on the question as to whether patients with DID are simulating their reported memory phenomena. The present results indicate that even without awareness of exactly what is learned procedurally, simulation is possible if subjects possess an advanced enough simulation strategy, that is, detailed knowledge about the amnesia profile that is expected of patients.

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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.



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## 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.

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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.

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# Chapter 6

# Transfer of Newly Acquired Stimulus Valence between Identities in Dissociative Identity Disorder


## Abstract

Patients with dissociative identity disorder (DID) frequently report episodes of interidentity amnesia, i.e., amnesia for events experienced by other identities. The goal of the present experiment was to test the implicit transfer of trauma-related information between identities in DID. We hypothesized that whereas declarative information may transfer from one identity to another, the emotional connotation of the memory may be dissociated, especially in the case of negative, trauma-related emotional valence. An evaluative conditioning procedure was combined with an affective priming procedure, both performed by different identities. In the evaluative conditioning procedure, previously neutral stimuli come to refer to a negative or positive connotation. The affective priming procedure was used to test the transfer of this acquired valence to an identity reporting interidentity amnesia. Results indicated activation of stimulus valence in the affective priming task, that is, transfer of emotional material between identities.



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## Introduction

Dissociative identity disorder (DID) is a psychiatric disorder that is described in the Diagnostic and Statistical Manual of Mental Disorders (4th ed., *DSM-IV*; American Psychiatric Association, 1994) as involving the presence of two or more distinct identities or personality states, each with its own relatively enduring pattern of perceiving, relating to, and thinking about the environment and the self. The disorder is believed to originate from a self-protecting reaction to severe childhood abuse, which the child cannot escape from, nor can control or predict (e.g., Putnam, 1997; Ross, 1997). Essentially, DID is thought to involve the split between identities in which patients experience trauma over and over again and identities in which they experience partial or total amnesia for the abuse (cf., Nijenhuis & Van der Hart, 1999). The extent to which the personality becomes fragmented into more identities depends on the severity of the traumatization in terms of developmental age at trauma onset, chronicity and intensity of the traumatization, and factors such as the relationship to the perpetrator and lack of support and social recognition of the trauma (Nijenhuis, Van der Hart, & Steele, 2002).

In adult DID patients, reports of amnesia between identities generally not only include amnesia for traumatic events, but also pertain to daily experiences varying from amnesia for specific events to amnesia for all events experienced by other identities. The number of experimental studies on these reported memory problems is very limited (for a review see Dorahy, 2001; see also Allen & Movius, 2000) and besides, only neutral stimulus material has been included. Results of previous studies were interpreted by Nissen, Ross, Willingham, Mackenzie, and Schacter (1988) and Eich, Macaulay, Loewenstein, and Dihle (1997) as indicating interidentity amnesia on explicit memory tasks and on conceptual priming tasks, and interidentity transfer of information on perceptual priming tasks. However, in a recent series of experiments on memory functioning in DID, including objective memory tasks on which simulation of interidentity amnesia was not possible, we found that patients showed evidence of

interidentity memory transfer equal to controls on explicit memory tasks as well as conceptual and perceptual priming tasks (Huntjens, Postma, Peters, Hamaker, Woertman, & Van der Hart, 2002; Huntjens, Postma, Peters, Woertman, & Van der Hart, 2003).

It can be argued that failures to establish amnesia are due to the fact that all previous studies have not used emotional stimuli. Given the fact that dissociation is supposed to serve as a self-protective reaction to overwhelming traumatic experiences to ward off intense emotional feelings with which the individual cannot cope, interidentity amnesia would especially be expected to occur for negative emotional stimuli, and in particular trauma-related stimuli. Therefore, in a recent experiment we tested amnesia for trauma related words in DID patients using an explicit memory task in which one identity learned a set of words and the other, amnesic, identity was tested for knowledge of these words (Huntjens, Postma, Peters, Woertman, & van der Hart, submitted). Again we found no objective evidence for the total interidentity amnesia that subjectively was reported by DID patients.

The present experiment seeks to extend our previous work regarding transfer of trauma-related material. It may be proposed that interidentity amnesia does not pertain so much to the content of material, but more to its associated emotional valence. Thus, whereas declarative information may transfer from one identity to another, the associated emotional connotation of the memory may be dissociated, especially in the case of negative, trauma-related emotional valence. In other words, we argue that patients may retrieve trauma-related material in a detached way in amnesic identities, while experiencing (the full) emotional quality in non-amnesic identities.

Following De Houwer, Hermans, and Eelen (1998), the present experiment consisted of two phases, a learning phase consisting of an evaluative conditioning procedure, and a test phase, consisting of an affective priming procedure. The two phases were performed by different identities. In order to establish an amnesic barrier for the emotional—or more specifically trauma-related—valence of the words, it was essential that stimuli with a neutral emotional connotation were used that newly acquired

their emotional valence, as existing emotional material may already have a different valence in the different identity states.

In the first phase, stimuli that were originally neutral were given an emotional connotation by repeatedly pairing them with distinctly negative, i.e., trauma-related, and positive words. The term evaluative conditioning refers to the observation that the mere spatio-temporal co-occurrence of a neutral stimulus X with a valenced stimulus Y may result in the originally neutral stimulus X itself acquiring an evaluative meaning that is congruent with the valence of Y. The acquired valence is not subject to extinction, as is the case in classical conditioning procedures (Hermans, Baeyens, & Eelen, in press). Nonwords (e.g., BAYRAM) served as neutral stimuli X and existing positive, negative, and neutral words served as valenced stimuli Y. The negatively valenced stimuli were chosen to refer to traumatic experiences of sexual or physical abuse and emotional neglect reported by DID patients.

Next, it was tested whether this newly acquired emotional valence transferred from one identity to another identity reporting amnesia for the learning phase. In priming studies, the effect of one stimulus (the prime) on the processing of a second stimulus (the target) is determined (De Houwer et al., 1998). In affective priming, the priming effect of an affective association between prime and target is examined. Responses to target words are facilitated if both prime and target have the same valence, and inhibited if they are of opposite valence, as compared to the control trials, which consist of trials using primes with neutral valence. The affective priming procedure thus indexes the stimulus valence that is acquired by prior evaluative learning (see also Glautier & De Houwer, 2000; Hermans, Baeyens, & Eelen, 2003; Hermans, Baeyens, & Lamote, 2000). In this study, the stimuli with newly acquired emotional valence served as primes and the existing valenced words used in the learning phase as the targets. In the priming phase, there were four possible relations between the nonword (prime) and the word (target): (1) the word could have been associated with the nonword during the learning phase (identity congruent); (2) it could have the same affective connotation as the word that was associated with the nonword (affectively congruent); (3) it could have a different affective

connotation than the word that was associated with the nonword during the learning phase (incongruent); (4) it could have been paired with a neutral word in the conditioning phase and thereby act as a control trial in the priming phase. Affective priming is demonstrated when response times on affectively congruent trials are faster than on incongruent trials. The term "episodic identity priming" is preserved for faster responses in trials when a nonword precedes the specific word with which it was associated during the learning phase, i.e., faster response times on identity congruent trials than on affectively congruent trials. If patients are amnesic not for the declarative content but for the emotional content of the material, trauma-related primes should be processed as neutrally valenced, i.e., no facilitation or inhibition in target categorization for trials with trauma-related primes is expected. In other words, patients are expected to show a preserved episodic identity priming effect while lacking an affective priming effect.

We included a control group matched on age and education. Moreover, we included a second control group instructed to simulate DID. Affective priming is supposed to be an automatic process in the sense that it can occur independently of an evaluative intention and of awareness of the instigating stimulus (e.g. Hermans, De Houwer, & Eelen, 2001). Consequently, affective priming is not (easily) influenced by demand effects and response strategies. This makes it a suitable procedure in situations were demand effects might otherwise influence responding (Hermans, Spruyt, & Eelen, 2003). The simulators were included to ascertain that participants were indeed unable to actively suppress the priming effect.

## Method

### *Participants*

Twenty-two DID patients participated. They were recruited in 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 and Draijer, 1993); (2) at least one of the identities report a complete amnesia 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. Patients self-selected two identities that would participate in the experiment. The mean number of years since diagnosis of DID for patients in the present study 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).

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], $M$ = 36.48, $SD$ = 8.17 for normal controls [n = 25], and $M$ = 36.72, $SD$ = 7.88 for simulators [n = 25]) and education, which was assessed in categories ranging from 1(*low*) to 7 (*high*) (Verhage, 1964), ($M$ = 5.36, $SD$ = 1.59 for patients, $M$ = 5.76, $SD$ = 1.13 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, Putnam, Weingartner, Braun, & Post's (1985) procedure, they were given a 17-item data sheet for the identity on which they were asked to assign name, age, sex, 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 in switching to their "identity" and taking on its state of mind. Participants in the normal control group were 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 [n = 22], $M$ = 9.81 ($SD$ = 8.11) 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 [n = 22], $M$ = 6.52 ($SD$ = 3.29) for normal controls, and $M$ = 6.64 ($SD$ = 4.02) for simulators. Control participants did thus 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, $t(48) = 0.91$, $p = .37$. They also did not differ significantly on CEQ, $t(48) = -0.12$, $p = .91$. Patients on the other hand differed significantly from normal controls both on the DES, $t(45) = 11.44$, $p < .01$, and the CEQ, $t(45) = 2.79$, $p = .01$. Written informed consent was obtained from patients as well as all control participants prior to participation.

*Materials*

The material in the evaluative conditioning task and the affective priming task consisted of 10 Turkish words (e.g., BAYRAM) and 10 Dutch words. The Turkish words were unknown to the participants and thus can be regarded as nonwords. They were selected from the materials used by Yazuv (1963) and were also used in a study by De Houwer et al. (1998). Of the Dutch words, four were trauma-related (RAPE, FEAR, KNIVES, and INCEST), four were positive (PEACE, HUMOR, RAINBOW, and BEAUTY), and two were neutral (MOTOR-BUS and SOCCER). They were selected from a study performed by Hermans and De Houwer (1994), in which affective and subjective familiarity ratings of 740 Dutch words were determined on seven-point visual analogue scales. Scales ranged from negative (1) to positive (7) and from unfamiliar (1) to familiar (7). The mean affective rating for the trauma-related words was 1.82, for the positive words 6.11, and for the neutral words, 3.84. The mean subjective familiarity rating for the trauma-related words was 4.36, for the positive words 4.95, and for the neutral words, 4.84. The mean number of letters per word for the trauma-related words was 7.25, for the positive words 7.25, and for the neutral words 7.00. All words and nonwords were presented in white uppercase letters.

*Procedure*

The study consisted of an evaluative conditioning phase and an affective priming phase, performed by different identities. The evaluative conditioning phase consisted of an evaluative rating task, an evaluative conditioning task, a cued recall task, and a second evaluative rating task. In the first evaluative rating phase, the participants rated words on valence to provide a base rating. All 20 (nonwords as well as existing words) words were rated 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).

In the evaluative conditioning task, nonword-word pairs were learned. Participants were told that words from a non-Dutch language would be presented together with their Dutch translations, and they were instructed to memorize the translation of each word. They were told that we wanted to investigate how quickly they could learn the meaning of non-Dutch words. For each participant, the computer program randomly assigned each nonword to a different (trauma-related, positive, or neutral) Dutch word. All resulting 10 nonword-word pairs were then presented six times in a randomized order. Each subject received a different randomized order. Also, the presentation of a pair could only be repeated after all other pairs had been presented for an equal number of times. On each trial, a dash was presented in the middle of the screen together with a nonword that was located at the left side of the dash. After 1 s, the so-called translation appeared on the right side of the dash. The word and nonword were presented together for 5 s. The inter-trial interval was 3 s.

When all pairs were presented six times, a cued recall test was administered in order to see how well participants had learned the pairs. On each trial, a nonword was presented in the middle of the screen and participants were instructed to try to recall the correct translation and write it down. If they could not remember the correct translation, they had the opportunity to guess but could also proceed without giving a response. The next word appeared 3 s after a response had been entered. Nonwords were presented in a randomly determined order.

In the second evaluative rating phase, the participants again rated the words on valence using the Self-Assessment Manikin to provide an index of evaluative conditioning.

In the affective priming phase, the nonwords served as primes and the trauma-related words and positive words served as targets. The neutral words did not appear in the priming phase. On each trial, a nonword was presented, followed by an existing word with a positive or negative affective connotation. The task consisted of naming the affective connotation of the existing word as quickly as possible. For half of the subjects, the m-key on the keyboard was the "NEGATIVE" key and the z-key was the "POSITIVE" key. For the other half, the correspondence between key and

response was reversed. We stressed that the existing word was important and that the non-Dutch word was added to make the task resemble conditions in normal text reading. Participants were asked not to divert their eyes from the presentation of the prime.

The priming phase consisted of two blocks of 80 trials, that is 32 affectively congruent trials (of which 8 identity congruent), 32 incongruent trials, and 16 control trials. A brief break appeared after the first block of 80 trials. Presentation order was randomized separately for each participant. A trial consisted of the following sequence: a fixation cross (500 ms), a blank screen (200 ms), the prime for 200 ms, and the target. The delay between the onset of the prime and target (stimulus onset asynchrony; SOA) thus was 200 ms. The target was presented until a response was registered. Both stimuli were presented in the center of the screen. The inter-trial interval was 2 s.

Patients were asked to switch identities between the evaluative conditioning phase and the test phase. 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" and move 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.). The switching process was always accomplished in less than 2 min.

Participants in the simulating control group performed the evaluative conditioning phase while being in their normal identity state and the affective priming after having "switched" to their imagined "amnesic" identity. Before "switching" to their other identity, they were instructed to pretend that they did not know their normal identity had seen foreign words and their translation. They were also asked not to respond faster to Dutch words when it was preceded by it's translation, while still trying to respond as quickly as possible. 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. The study was part of a larger investigation on memory (dis)abilities in DID.

## Results

Of the 22 DID patients tested, one patient reported, after her switch to Identity 2, knowledge of the learning phase. This patient was not included in the analysis. Two patients did not complete the tasks because the procedure proved too taxing for them. The data thus pertain to 19 DID patients who subjectively reported complete one-way amnesia for the learning phase including the words presented. 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.

### *Cued recall*

Patients correctly recalled 74% of the trauma-related word-nonword pairs, 71% of the positive word-nonword pairs, and 82% of the neutral word-nonword pairs. Normal controls recalled 83% of the trauma-related word-nonword pairs, 86% of the positive word-nonword pairs, and 90% of the neutral word-nonword pairs, and simulating controls recalled 91% of the trauma-related word-nonword pairs, 82% of the positive word-nonword pairs, and 92% of the neutral word-nonword pairs. Analysis was accomplished by repeated measures analysis of variance with word category [trauma-related vs. positive vs. neutral] as within-subjects factor, and diagnosis [patients vs. controls vs. simulators] as between-subjects factor. The analysis revealed a significant word category main effect, $F(2, 65) = 3.76$, $p = .03$, reflecting a significant higher neutral word recall when compared to positive words, $F(1, 66) = 7.48$, $p = .01$. The diagnosis main effect was not significant, $F(2, 66) = 1.75$, $p = .18$, and neither was the Diagnosis x Word Category interaction, $F(4, 132) = 0.94$, $p = .45$.

### *Manipulation check*

Mean patient base ratings on the SAM of existing words were 8.34 ($SD = 0.91$) for trauma-related words, 2.82 ($SD = 1.60$) for positive words, and 5.03 ($SD = 1.42$) for neutral words. Normal controls' mean ratings were

8.13 (*SD* = 1.07) for trauma-related words, 1.84 (*SD* = 1.15) for positive words, and 4.72 (*SD* = 1.60) for neutral words. Simulating controls' mean ratings were 8.29 (*SD* = 0.75) for trauma-related words, 1.76 (*SD* = 0.69) for positive words, and 5.34 (*SD* = 1.40) for neutral words. An analysis of variance revealed a significant main effect of word category, $F(2, 65) = 407.30$, $p < .01$. Within-subjects contrasts indicated that trauma-related words were rated significantly more negative/unhappy than positive words, $F(1, 66) = 820.09$, $p < .01$, and neutral words, $F(1, 66) = 207.55$, $p < .01$. Positive words were rated more positive/happy than neutral words, $F(1, 66) = 206.81$, $p < .01$. The diagnosis main effect did marginally reach significance, $F(2, 66) = 3.09$, $p = .05$, with patients rating words more negative/unhappy than normal controls, $p = .05$. The Word Category x Diagnosis interaction was not significant $F(4, 132) = 2.02$, $p = .10$.

*Evaluative conditioning*

Participants' mean base ratings of nonwords on the SAM and mean ratings in the second rating, after nonwords had been paired with existing words, are presented in Table 1. An ANOVA on the base ratings of the nonwords revealed that diagnosis groups did not differ significantly in base ratings, $F(2, 66) = 0.84$ $p = .43$. A repeated measures analysis of variance on the second ratings indicated a significant main effect for word category, $F(2, 65) = 81.17$, $p < .01$. Within-subjects contrasts revealed that trauma-related words differed significantly from positive words, $F(1, 66) = 156.52$, $p < .01$, and from neutral words, $F(1, 66) = 101.47$, $p < .01$. Positive words also differed significantly from neutral words, $F(1, 66) = 42.18$, $p < .01$. This effect did not differ between diagnosis groups, $F(4, 132) = 0.07$, $p = .99$. Also, the diagnosis main effect was not significant, $F(2, 66) = 1.18$, $p = .31$. Evaluative conditioning thus seemed successful to an equal degree in DID patients, normal controls and simulators.

Table 1. Evaluative Conditioning: SAM (Self-Assessment Manikin) Ratings for Nonwords for Dissociative Identity Disorder (DID) Patients ($n$ = 19), Controls ($n$ = 25), and Simulators ($n$ = 25)

| | *DID patients* | *Controls* | *Simulators* |
|---|---|---|---|
| First rating | 5.29 (0.60) | 5.25 (0.86) | 5.04 (0.58) |
| Second rating | | | |
| Nonwords paired with trauma-related words | 7.53 (1.66) | 7.11 (1.29) | 7.37 (1.31) |
| Nonwords paired with positive words | 3.57 (2.26) | 3.23 (1.46) | 3.27 (1.66) |
| Nonwords paired with neutral words | 5.29 (1.73) | 4.78 (1.25) | 4.88 (1.56) |

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

### *Affective priming*

Mean errors on identity congruent, affective congruent, incongruent, and control trials differed between 5% and 9% for patients, between 3% and 7% for controls, and between 2% and 4% for simulators. An analysis of variance yielded no significant main effects or interactions, except for a significant diagnosis main effect, $F(2, 66) = 4.81$, $p = .01$, with multiple-comparison showing that patients made significantly more errors than simulators, $p = .01$, but not significant more errors than normal controls, $p = .56$. Simulators also did not differ significantly from normal controls, $p = .20$.

In calculating mean response times, we excluded incorrect responses and response times below 250 ms and response times that were three or more standard deviations from the mean per item and per participant from the data analyses. Mean response times for DID patients, controls, and simulators can be found in Table 2. A repeated measures analysis of variance on mean response times showed a significant congruence effect,

$F(3, 64) = 7.87$, $p < .01$. Within-subjects contrasts showed that subjects responded significantly faster to identity congruent trials in comparison with affective congruent trials, $F(1, 66) = 4.38$, $p = .04$, and significantly faster to affective congruent trials than to incongruent trials, $F(1, 66) = 6.26$, $p = .02$. Reaction times on incongruent trials did not differ significantly from control trials, $F(1, 66) = 0.39$, $p = .54$. Affective congruent trials also did differ significantly from control trials, $F(1, 66) = 4.49$, $p = .04$.

Table 2. Response Times (in Milliseconds) for Trauma-Related and Positive Identity Congruent, Affective Congruent, Incongruent, and Control Trials for Dissociative Identity Disorder (DID) Patients ($n = 19$), Controls ($n = 25$), and Simulators ($n = 25$)

| | *DID patients* | *Controls* | *Simulators* |
|---|---|---|---|
| Trauma-related | | | |
| Identity congruent trials | 725 (142) | 558 (71) | 610 (94) |
| Affective congruent trials | 739 (137) | 576 (68) | 625 (97) |
| Incongruent trials | 744 (124) | 588 (65) | 628 (95) |
| Control trials | 755 (142) | 588 (66) | 630 (96) |
| Positive | | | |
| Identity congruent trials | 747 (182) | 573 (79) | 614 (118) |
| Affective congruent trials | 770 (158) | 570 (75) | 620 (95) |
| Incongruent trials | 779 (160) | 579 (68) | 631 (98) |
| Control trials | 753 (155) | 581 (68) | 631 (107) |

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

Most important, the three-way interaction Congruence x Valence x Diagnosis was far from significant, $F(6, 130) = 1.17$, $p = .33$, indicating patients did not show a trauma-related specific lack of affective priming, which would be expected in case of interidentity amnesia for emotional valence for trauma-related material. Also, the two-way interaction Congruence x Diagnosis proved nonsignificant, $F(6, 130) = 0.53$, $p = .79$,

indicating that the pattern of congruence did not differ between diagnosis groups, although response times show a lack of episodic identity priming for positive trials in normal controls.

A nonsignificant interaction Congruence x Valence, $F(3, 64) = 1.18$, $p = .33$, indicated the congruence effect did not differ between trauma-related and positive trials. Also, the valence main effect was not significant, $F(1, 66) = 1.53$, $p = .22$, and neither was the Valence x Diagnosis interaction, $F(2, 66) = 1.53$, $p = .22$.

Again, we found a significant diagnosis effect, $F(2, 66) = 16.91$, $p < .01$. A multiple-comparison procedure indicated DID patients were significantly slower than normal controls, $p < .01$, and simulators, $p < .01$. Normal controls did not differ significantly in mean reaction time from simulators, $p = .31$.

## Discussion

The neutral ratings on the SAM (Self-Assessment Manikin) showed that the Turkish words used in this study as neutrally valenced nonwords could indeed be regarded as such. Furthermore, we can conclude that the nonwords, initially being rated as neutral by all diagnosis groups, acquired the valence of the trauma-related and positive words they were paired with in the cued recall task, as is evident from their significantly different positive and negative ratings on the SAM in the second rating. There was no difference in ratings in the second rating between diagnosis groups, so evaluative conditioning proved successful to an equal degree in both control groups as well as in DID patients. Also, participants did not differ in cued recall of the 'meaning' of the nonwords.

Crucial for the phenomenon of interidentity amnesia in DID was the word categorization task performed in the affective priming phase that was used to determine the transfer of the newly acquired valence between identities. All subjects showed evidence of a significant episodic priming effect for trauma-related material, and patients as well as simulating controls revealed a significant episodic priming effect for positive material, as is

evident from their faster responses on identity congruent trials compared to their responses on affective congruent trials. All subjects had an affective priming effect for both trauma-related as well as positive words, as is evident from their faster responses on affectively congruent trials compared to their responses on incongruent trials. In the patient group, one patient reported knowledge of the learning phase, after her switch to Identity 2. All patients, but one, reported a complete amnesia for the words learned in the evaluative conditioning phase. In case of amnesia for the trauma-related content of the material, we expected trauma-related primes to be processed as neutrally valenced, i.e., no facilitation or inhibition in target categorization for trials with trauma-related primes. We found patients, however, not to differ significantly from normal controls and simulating controls in the congruence effect. The study thus shows evidence of patients' transfer of declarative content, as evidenced by an identity priming effect, as well as of emotional connotation, as indicated by an affective priming effect, of trauma-related words between identities. Thus, in contrast to patients' reports, we found evidence of intact memory functioning in DID.

Several differences between our study and the De Houwer et al. (1998) study may be noted. De Houwer et al. found that responses were significantly faster to positively valenced targets compared to negatively valenced targets. The positive and negative targets used in that study were, however, not matched on word frequency and they argued this might have caused the difference in response times. In the present study, positive and negative target words were matched on frequency, subjective familiarity, as well as on number of letters per word. We did not find a significant valence effect in word categorization, confirming their reasoning that incomparability of stimuli rather than word valence caused the faster responses to positive targets found in their study. Other additions to the procedure used by De Houwer et al. (1998) were the inclusion of pre- and post-learning evaluative rating tasks to measure evaluative conditioning and the inclusion of neutral words in the cued recall task to generate neutrally valenced nonwords as control primes in the affective priming task. We did not find a significant difference between incongruent trials and control trials, thus no significant evidence of inhibition in target categorization, but

we did find a significant difference between affective congruent trials and control trials, reflecting facilitation in categorization.

In conclusion, in this study not only the declarative content of the stimulus material transferred between identities, but also stimulus valence newly acquired by one identity transferred to another, amnesic identity, as evidenced by the presence of an affective priming effect. This occurred for both positive as well as negative, trauma-related, emotional valence. Together with observations of explicit and implicit memory transfer of neutral material and explicit memory transfer of trauma-related material found in previous studies (Huntjens et al., 2002; Huntjens et al., 2003; Huntjens et al., submitted), the present study clearly indicates that there is no objective evidence of amnesic barriers between identities. Fragmentation in DID seems not to have a bearing on memory functioning in DID.

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Chapter

# 7 Discussion

The aim of this thesis was to provide a systematic exploration of interidentity amnesia in dissociative identity disorder (DID) for both neutral as well as trauma-related information. Based on clinical reports, amnesia on explicit memory tasks, i.e., memory tasks requiring conscious retrieval of previously learned information, was expected, and possibly also amnesia on implicit memory tasks, i.e., memory tasks that do not require conscious retrieval. However, combining the results of all the memory tests used, the conclusion that can be drawn is, that on the tasks on which simulation by instructed controls proved impossible, the patients' results indicated complete transfer of information between the identities tested.

On the episodic memory test with neutral stimulus material described in chapter two, the patients' results concerning interidentity amnesia proved comparable to controls. Patients recognized words that had been presented within the same identity as well as words that had been presented to another identity, but incorrectly claimed the latter were presented within the same identity. Patients did not show significant evidence of qualitatively different ways of retrieving information learned by the same versus another identity, as indexed by the remember-know measures. No evidence was thus found for the idea that the retrieval of events experienced in the same state is characterized by an autonoetic state of consciousness, whereas the retrieval of events experienced in other identities is characterized by a noetic state of awareness or lack of personification (cf. Van der Hart & Nijenhuis, 2001). On the implicit priming tasks with neutral stimulus material described in chapter three, patients also scored equally to controls. Both on data driven tasks, that are relatively 'low-level' priming tasks, in that they do not require semantic interpretation of the material, and on conceptually driven tasks, information transferred from the identity performing the learning phase to the identity that claimed amnesia performing the test phase.

The patient performance on one task, the serial reaction time task described in chapter four, seems to indicate evidence of interidentity amnesia, i.e., a lack of transfer of procedural learning between identities. However, the simulators' ability to feign amnesia on the task renders it impossible to interpret the patients' scores as either interidentity amnesia or simulation. It is important to note that if controls instructed to simulate

DID had not been included, the results would have been taken as evidence of interidentity amnesia. This study thus was important in demonstrating the necessity for using simulation-free memory tasks and/or including DID-simulators in order to make definite claims about amnesia in DID.

Although the absence of interidentity amnesia on the tasks described above can be ascribed to the neutral valence of the stimulus material, the results of the tasks discussed in chapters five and six cannot. In these tasks, words concerning sexual and physical abuse were included, like the words "incest" and "pain". In the episodic task (chapter five), patients' results revealed that they were able to consciously retrieve trauma-related information learned by another identity. The results of this study coincide with the only other study that tested interidentity memory transfer in DID for trauma-related material, performed by Elzinga, Phaf, Ardon, and Van Dyck (2003). In this study, 12 DID patients were included, who switched from one identity to a second identity claiming amnesia between presentation and memory testing, a procedure comparable to the studies presented in this thesis. The results indicated that, in their amnesic identity, patients did not show a reduced recall of emotional words relative to neutral words, which would have been expected if switching from one identity to another has the function to avoid emotionally charged memories.

Based on these findings, it was then argued that whereas amnesia in DID does not seem to pertain to the declarative meaning of stimulus material, the transfer of emotional connotation may be blocked between identities. The evaluative conditioning / affective priming procedure employed in chapter six, however, did not support this hypothesis. The results of patients did not differ significantly from normal controls and simulating controls in the affective priming effect, indicating transfer of emotional connotation between identities.

Taken together, no evidence of identity state-specific memory encoding and/or retrieval was found in the studies discussed in this thesis. Neither the memory system and memory processes involved nor the emotional valence of the material seem critical factors in establishing evidence of interidentity amnesia in DID. In terms of mood dependent memory, the temporary mood states characterizing identities in DID did not

cause any significant context dependent memory effects on all the memory indicators used, both on tasks of free recall and recognition and on tasks that are perceptually driven as well as on tasks that are conceptually driven. In terms of the Headed Records model (Morton, 1991, 1994), tasks that did require self-verification were included, as well as tasks that did not require self-verification. An example of a task that did require self-verification is the episodic task, where patients were asked to retrieve words they *themselves* had learned and assign them to their *own* list, whereas an example of a task that did not require self-verification is the word-stem completion tasks (chapter three), where patients were asked to complete word stems with the first word that popped into mind. The heading of records thus seems not identity-dependent, as seems the formation of descriptions that guide the search process.

## External Validity

Why did we fail to find evidence of amnesia between identities given the consistent clinical presentation of this symptom in the DID therapists' office? There are two possible answers to this question: (1) failure to find evidence of interidentity amnesia results from the lack of external validity, or generalization, of the patient sample, stimulus material, or procedure employed, or (2) interidentity amnesia actually is not an objective verifiable feature of DID. These two possibilities will now be discussed in detail, beginning with the possible lack of generalizability of our findings.

One type of generalizability is population generalizability, i.e., the question of whether the test results of the patient samples can be generalized to the target population of all DID patients. The patients in the studies all had spent considerable time in therapy and they were able to switch between identities upon request, and perform tasks without spontaneous switches to other identities and without interference of other identities. It may well be the case that these abilities, partly learned in therapy, have lessened prior existing symptoms of amnesia.

A crucial issue that has to be taken into account in establishing the validity of the current study is that patients did repeatedly *report* interidentity amnesia during the test procedures and data of patients who reported even the slightest knowledge of either the material learned or the learning procedure itself were discarded from analyses, rendering the sample homogenous for reporting dense interidentity amnesia. Also, the present patient sample was the largest sample ever included in experimental memory research with this population.

The second type of generalizability is ecological validity, i.e., whether the research findings can be generalized to other situations. Clearly, because of ethical reasons, traumatic experiences should not be induced in the laboratory. All experimental research in the area of traumatic stress thus is limited in its generalizability to real-life. The studies presented in this thesis are no exception in this regard and the material and procedure used may certainly be questioned for its generalizability. Although the trauma-related material included words specifically related to sexual and physical abuse, the use of single words might not reflect the multifaceted, highly emotional events of abuse reported by patients. These may be better indexed by trauma-scripts consisting of patients' verbal accounts of personally experienced events to heighten emotional re-experiencing of the trauma during testing (e.g., Tucker et al., 2000). Also, the exclusive reliance on verbal stimuli to index transfer of trauma-related information between identities may have lowered the ecological validity. Pictorial stimuli of traumatic cues may more directly tap the patients' experiences. Also, the time between the presentation and the testing of material, ranging from minutes to a week, may have been too short for dissociation processes to occur. Finally, the restricted use of anterograde memory tests in this thesis, testing memory for newly learned events, in comparison with retrograde memory tests, determining memory for events experienced in the (distant) past, may have lowered the ecological validity.

Importantly, however, the use of more standardized stimuli and procedures in tests of anterograde amnesia instead of the use of semantically more comprehensive material in retrograde tests did enable us to *objectively* test amnesia in DID, an important aim given mixed results of previous

studies in this area and the fierce discussion in the field. Also, the material used was checked for face validity by two therapists treating patients with DID, and all trauma-related stimuli were rated by subjects for emotional valence.

## The Discordance between Objective Test Results and Subjective Patient Reports

As noted, an alternative explanation for the failure to find objective evidence for amnesia between identities in the studies discussed in this thesis, is that interidentity amnesia actually is not an objective symptom of DID. But how can the discrepancy between patient's reports of interidentity amnesia and the lack of objective test results be reconciled? One possible answer to this question is that patients were consciously feigning symptoms of amnesia, possibly encouraged by a need to assume a sick role [cf. the factitious disorder mentioned in the Diagnostic and Statistical Manual of Mental Disorders (4th ed., *DSM-IV*; American Psychiatric Association, 1994)]. One should be extremely careful, however, in drawing such conclusion, since other explanations of the patients' behavior are possible, in which a more unconscious origin of the patients' reports of amnesia is assumed and in which their reports of subjectively experienced amesia are taken as sincere. Examples of discrepancies between sincere reports about what subjects are experiencing, and what their objective behavior suggests they are experiencing, can be found both inside and outside the field of dissociation. Cardeña (1994) mentioned examples in the study of conversion disorder, in which voluntary motor or sensory function is affected which cannot be explained by a medical condition (see also Roelofs et al., 2001; Roelofs, Van Galen, Keijsers. & Hoogduin, 2002), and in the condition of "blindsight", a neurological syndrome resulting from visual-cortical lesions, in which patients can respond to visual stimuli in the blind field without their conscious acknowledgement (see also De Gelder, De Haan, & Heywood, 2001; Schacter, 1996). More examples of the same phenomenon

can be found in the clinical literature, as in the case of body dysmorphic disorder, in which the patient is preoccupied with an imagined defect in appearance (Jerome, 1980, 1992), and anorexia nervosa, characterized by an overestimation in body image. The latter disorder will now be described in more detail.

Anorexia nervosa is described in the *DSM-IV* (American Psychiatric Association, 1994) as a disturbance in the way in which one's body weight or shape is experienced. A patient with anorexia feels and judges herself as fat and claims to "see" herself as fat, despite the fact that she is underweight. The disturbance in body image is not due to any visual perceptual deficit. Originally, the body is thus not perceived as fatter. Rather, the distorted image results from the influence of the patient's idea of what an ideal body looks like, and the discontent that results from the comparison between her own body and this overexaggerated ideal body. It is thus the inaccurate cognitive-evaluative appraisal of an intact perceptual body size that results in the distorted body image. Needless to say, patients engage in harmful, further dieting based on this distorted body image (Gardner & Bokenkamp, 1996; Skrzypek, Wehemeier, & Reschmidt, 2001; Smeets, Ingelby, Hoek, & Panhuysen, 1999).

Analogous to the intact visual perception in anorexia nervosa, the results of this thesis show an intact interidentity memory transfer in DID. This grossly contrasts, however, with the patients' reports of interidentity amnesia. Akin to the process in anorexia, the DID patients' experience of amnesia may result from a faulty cognitive evaluation of a recollection after intact memory retrieval. Although amnesia has been considered to be the cause of identity problems in DID, actually it may be the other way around. In contrast to non-patients, who experience the self as having a relative coherence and cohesion, a sense of I, which persists through varying and conflicting experiences and which has continuity over time, DID patients suffer from extreme identity confusion. They experience themselves as having multiple identities, with separate bodies, sometimes of opposite gender, and differing in age and predominant affect (American Psychiatric Association, 1994; Boon & Draijer, 1993; Kluft, 1991; Putnam, 1997). Patients also report hearing the voices of other identities talking out loud to

them inside their heads, which, in a particular identity, are experienced as fully ego-dystonic, as not-self (Ross, 1999). Because patients are convinced of having different identities, they may construct an image of their memories being compartmentalized in these separate identities. This distortion may lead them not to use those retrieved memories that they are convinced "belong" to other identities. Deciding not to use correctly retrieved information then lies at the basis of the amnesia-like behaviors described in the DES-T (Waller, Putnam, & Carlson, 1996) and the SCID-D (Steinberg, 1993), like finding new things among their belongings that they do not remember buying, and not recognizing friends or family members. These behaviors may thus reflect the patient's appraisal of retrieved memories as ego-dystonic or ego-syntonic rather than a memory encoding and/or retrieval impairment.

There is one finding that needs explanation in the light of the hypothesized behavior in DID made here, and that is that patients, in the episodic memory task with neutral material (chapter one), assigned retrieved material that originated from the list learned by the other identity to their own list (chapter two). It is argued that patients' beliefs might lead them not to use material "belonging" to other identities, whereas in this test they did retrieve material learned by another identity, but denied the source of the information. However, important to note in this regard is that the simulators in this study also were unable to selectively retrieve information learned in their "amnesic" state or discriminate the material from both lists on the list assignment task. Comparably, patients may have been unable to categorize material as ego-dystonic or ego-syntonic. Patients assigned the majority of retrieved words to their own list, probably reasoning that if they had retrieved the items, the items belonged to their own list.

Based on the results of this thesis, some tentative recommendations for therapy may be provided. In psychotherapy, the patient's subjective experience is the starting-point for treatment. This is not altered by the lack of objective findings for interidentity amnesia in this thesis. However, it does seem important to reckon with the evidence of an intact, shared functional memory system in DID found in this thesis. As explained, patients may decide at some point not to use information that they have

correctly retrieved, based on their appraisal of the material as ego-dystonic. In the therapeutic contact, the patient's subjective experience of fragmentation and compartmentalization of memory can be acknowledged as an authentic, genuine experience. At the same time, however, it may be explained to the patients that their belief may in fact be a distortion that was functional in the past, but no longer is in the present.

## Evaluation of the sociocognitive model

A question that follows from our explanation of reported symptoms of amnesia in DID is how our results relate to the sociocognitive model's claims. As argued above, an unequivocal claim of conscious simulation cannot be made based on the results of this thesis. Proponents of the sociocognitive model would claim, however, that although role enactment is goal-directed, the concept does not imply that role-related behaviors are necessarily the products of conscious deception. Instead, they claim that role enactments "tend to flow spontaneously and are carried out with little or no conscious awareness and with a high degree of 'organismic involvement' such that the role and the 'self'… coalesce so as to become essentially indistinguishable" (Lilienfeld et al., 1999, p. 508). Following this conceptualization of role enactment, the results of transfer of information instead of amnesia between identities found in this thesis could be regarded as evidence for the sociocognitive model. However, such a conclusion would not be warranted because the distinction between the sociocognitive model and the posttraumatic model basically is one of etiology: the posttraumatic model assumes dissociation to involve some kind of fragmentation or splitting in reaction to childhood trauma. The posttraumatic model considers dissociation to start in adulthood with patients endorsing an image of themselves having multiple identities. The studies presented here were not studies of etiology, but studies of symptoms reported by patients.

It should be noted that some recent studies have found collaborative evidence for the childhood abuse reported by DID patients

(Coons, 1994; Hornstein & Putnam, 1992; Lewis, Yeager, Swica, Pincus, & Lewis, 1997). An objective verification of reported childhood abuse in DID is, however, not sufficient to falsify the sociocognitive model. To name but one reason, patients with factitious disorder simulating DID are also thought to have suffered from severe caretaker dysfunction and possibly childhood trauma (Brown & Scheflin, 1999; Putnam, 1999). This lead Marmer (1999) to postulate the possibility of factitious identity disorder itself being a trauma disorder. Ultimately, the sociocognitive model can only be falsified by demonstrating that dissociation, in the sense of a fragmentation of dissociative identities, is a reaction to abuse and that identities do not emerge as a consequence of iatrogenesis or exposure to other knowledge concerning the expected features of DID available to patients.

## Conclusion and future research

The studies assembled in this thesis all provide evidence of an intact, shared functional memory system in DID. Reported amnesia between identities in DID thus seems not to be an impairment in encoding and/or retrieval of information, but may rather reflect the patient's distorted beliefs about her memory functioning. Based on the appraisal of material as ego-dystonic, patients may decide not to use information that they have correctly retrieved. Future research might focus on the patient's faulty appraisal of retrieved events in DID. Instruments should be developed that assess the patient's conscious evaluation of retrieved memories in more depth clarifying their meta-memory and their awareness thereof. Both the nature and degree of cognitive distortions should be addressed.

Furthermore, although no evidence was found of separate functional memory systems in DID in this thesis, this does not preclude that in future research, objective evidence may be found for other memory disturbances in DID. Putnam (1997) mentioned DID patients' deficits in source amnesia, i.e., the difficulty in determining whether a given memory reflects an actual event or information acquired through a nonexperiential

source (e.g., reading or hearing about the event), and deficits in retrieval of retrograde autobiographical knowledge. On the latter subject, some case-studies have been performed (see Bryant, 1995; Schacter, Kihlstrom, Kihlstrom, & Berran, 1989), but since these studies do not qualify as objective memory studies, additional research is required.

What do the results of this thesis learn us about the process of dissociation? Steinberg (1995) distinguishes five core dissociative symptoms: amnesia, depersonalization, derealization, identity confusion, and identity fragmentation. She describes depersonalization as feeling detached from the self, feeling that the self is strange or unreal, feeling detached from your emotions, or feeling that you are an automaton or robot. Derealization includes feelings of estrangement or detachment from the environment, or a sense that the environment is unreal. Identity confusion is defined as a subjective feeling of uncertainty, puzzlement, or conflict about one's own identity. Finally, identity alteration is described as a patient's shift in identity, which is observed by others through changes in the person's behavior.

The results of this thesis predominantly bear on the symptom of amnesia. The symptom of amnesia is, however, intrinsically linked with the symptom of identity alteration, since shifts in identity often involve amnesic episodes in which a person is unable to remember events that occurred before undergoing an identity switch (Steinberg, 1995). Moving the discussion a bit further, it can be argued, that observed separate functional memory systems would be supportive of the existence of separate, fragmented identities. The results of transfer found in this thesis then indicate the reverse, namely that possibly, DID patients are not characterized by a fragmentation of identity. This is not to say that patients do not suffer from severe identity confusion. Indeed, the *subjective* experience of identity confusion may lie at the root of their experienced memory problems, as discussed above. Raising doubts about the existence of identity fragmentation also does not preclude these patients to have experienced severe childhood abuse and/or neglect. Rather, it is questioning their (dissociative) reaction. While their reaction to childhood trauma may involve experiences of depersonalization, derealization, and may result in identity confusion, it may not involve dissociation in the meaning of actual,

*objective* splitting of identity into separate functional systems with patients alternating between these separate systems.

It seems wise to use the terms "compartmentalization", "fragmentation", and also "dissociation" with caution since they imply a literal "splitting" of mental contents, whereas it may actually be cognitive distortions that guide subjective experience of patients with DID. Also, the label "amnesia" may be best set aside for memory problems which have been confirmed in objective memory tests. Finally, it seems wise not to limit our understanding of DID as either the result of a process of dissociative fragmentation or the result of role-enactment, as there are other ways of elucidation of the experiences and behavior reported by these patients.

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## Samenvatting

De Dissociatieve Identiteitsstoornis (DIS) is de meest ernstige vorm van de dissociatieve stoornissen. De stoornis wordt gekenmerkt door de aanwezigheid van twee of meer van elkaar te onderscheiden identiteiten of persoonlijkheidstoestanden die het gedrag van de patiënt/cliënt bepalen. De stoornis wordt verder gekenmerkt door het onvermogen om belangrijke persoonlijke informatie te herinneren en is niet het gevolg van de directe fysiologische effecten van een middel of een somatische aandoening (*DSM-IV*, APA, 1994). Voorstanders van het zogenaamde"posttraumatische" model van DIS, veronderstellen dat DIS een reactie is op lichamelijk en seksueel misbruik ervaren op jonge leeftijd. Het kind stelt zich voor het misbruik als het ware niet zelf mee te maken. In plaats daarvan stelt het zich voor dat iemand anders het misbruik ondergaat. De dissociatieve "splitsing" in DIS wordt dan ook gezien als een splitsing tussen identiteiten die wel weet hebben van ervaren traumatische gebeurtenissen en identiteiten die er geen of weinig weet van hebben en/of er geen gevoel bij hebben. Deze zogenaamde "amnestische barrière" tussen identiteiten is functioneel in die zin, dat deze het kind in staat stelt om het dagelijks leven weer op te pakken en vol te houden zonder weet van bedreigende ervaringen.

Bij zeer langdurig en ernstig misbruik wordt het "afsplitsen" van dissociatieve identiteiten veronderstelt een habituele strategie te worden, waardoor er meerdere identiteiten ontstaan met ieder hun eigen herinneringen die (soms) niet gedeeld worden met andere identiteiten. Dit betreft niet alleen traumatische ervaringen maar ook meer neutrale ervaringen uit het dagelijkse leven. Op volwassen leeftijd rapporteren tussen de 95% en 100% van de patiënten met DIS periodes van amnesie voor ervaringen opgedaan in andere identiteiten. Zo kunnen patiënten bijvoorbeeld rapporteren dat vreemden er blijk van geven hen te kennen of dat ze kleren of andere spullen vinden bij hen thuis die ze zich niet herinneren gekocht te hebben. De gerapporteerde amnesie tussen identiteiten kan symmetrisch zijn, in de zin dat twee identiteiten geen weet

hebben van elkaars kennis, of asymmetrisch, in de zin dat één identiteit wel weet heeft van de kennis van een ander, maar dat dit andersom niet geldt.

Het hierboven geschetste posttraumatische model van DIS, wat dus veronderstelt dat DIS een reactie is op misbruik ervaren in de kindertijd heeft kritiek gekregen van voorstanders van het zogenaamde "sociocognitief" model, dat veronderstelt dat DIS pas op volwassen leeftijd ontstaat en niet als reactie op trauma, maar dat de patiënt zichzelf het ziektebeeld DIS eigen maakt als zingeving voor de eigen conflicterende ervaringen en gevoelens. Dit beeld zou gebaseerd zijn op verschillende bronnen zoals verhalen van andere patiënten, beelden in de media en "hulp" van therapeuten die zelf geloven in het posttraumatisch model.

Omdat clinici en onderzoekers het niet eens zijn over of en welke geheugensystemen en processen de amnesie in DIS betrekking heeft, hebben we in dit proefschrift gepoogd de gerapporteerde amnesie in DIS systematisch in kaart te brengen. Centraal stond de vraag of er objectief bewijs kan worden verkregen voor de gerapporteerde amnesie tussen identiteiten door DIS patiënten. We hebben gekeken naar amnesie voor neutraal en traumagerelateerd materiaal, verbale en pictorale stimuli, en ook naar de kwaliteit van herinneringen. De kwaliteit van bewuste herinneringen kan ofwel meer "noetisch" zijn, dat wil zeggen dat iets wel bekend voorkomt maar zonder zelfbewustzijn, ofwel meer "autonoetisch", waarbij er een subjectief gevoel is iets persoonlijk meegemaakt te hebben met kennis van allerlei specifieke aspecten van de originele situatie. Om simulatie van amnesie uit te schakelen zijn taken geselecteerd waarop simulatie verondersteld werd moeilijk of onmogelijk te zijn.

Aan de experimenten die in de hoofdstukken twee tot en met vier van dit proefschrift beschreven zijn, hebben 31 patiënten deelgenomen. Aan de experimenten die in de hoofdstukken vijf en zes beschreven zijn, hebben 22 patiënten meegedaan. Daarnaast hebben aan alle experimenten twee groepen controles meegedaan: een groep van 25 proefpersonen die de taken "als zichzelf"gedaan heeft en een groep van 25 proefpersonen die gevraagd is te doen alsof ze DIS hadden en dus ook om een imaginaire identiteit met amnesie te bedenken. Specifiek werd hun gevraagd om de gebruikelijke gemoedstoestand van deze identiteit aan te nemen en te doen alsof ze niets

wisten van wat ze net geleerd hadden. Deze laatste groep is meegenomen ter controle op de mogelijkheid om te simuleren op de geselecteerde taken. Alle deelnemers—patiënten en controleproefpersonen—waren vrouwen. De proefpersonen in beide controlegroepen hadden gemiddeld dezelfde leeftijd en opleiding als de patiënten.

In de hoofdstukken twee en vijf staat het episodisch geheugen centraal, het bewust herinneren van eerdere episoden die iemand zelf heeft meegemaakt, met daarbij een tijds- en plaatsbesef. In hoofdstuk drie worden taken beschreven die zowel betrekking hebben op het semantisch geheugen, de algemene, feitelijke kennis die we hebben over de wereld in brede zin, en op het zogenaamde perceptueel-representatie systeem (PRS), dat een rol speelt bij het herkennen van de vorm van woorden en objecten. In hoofdstuk vier kijken we naar het procedurele geheugen, verantwoordelijk voor het leren van motorische en cognitieve vaardigheden zoals autorijden en puzzels leggen, en in hoofdstuk zes tenslotte kijken we naar evaluatief conditioneren waarbij voorheen neutrale stimuli een positieve of negatieve waarde krijgen.

De procedures in alle taken waren vergelijkbaar: voorafgaand aan het onderzoek koos de patiënt zelf twee identiteiten die zouden deelnemen aan het onderzoek, waarvan tenminste één identiteit amnesie rapporteerde voor ervaringen van de andere deelnemende identiteit. Tijdens het onderzoek vroegen we aan de patiënt om eerst een van de identiteiten naar voren te laten komen (bij asymmetrische amnesie de identiteit zonder amnesie). Deze identiteit leerde een set stimuli, bijvoorbeeld woorden. Vervolgens werd aan de patiënt gevraagd of deze identiteit zich wilde terugtrekken en of de andere identiteit (bij asymmetrische amnesie de amnestische identiteit) naar voren wilde komen. Op dit moment werd altijd nogmaals gevraagd aan de patiënt of de amnestische identiteit iets wist van wat de ander net gedaan had. Daarna werd de kennis van de amnestische identiteit van het geleerde getest. Controles die gevraagd waren om te doen alsof ze DIS hebben, leerde de set stimuli "als zichzelf"en werden daarna gevraagd zich in te leven in hun imaginaire amnestische identiteit. Nadat ze een paar minuten de tijd hadden gekregen om zich in te leven, werden ze getest op het geleerde materiaal waarbij ze steeds moesten blijven doen alsof ze niets geleerd

hadden. De andere controles voerden de leer- en testfase uit met een pauze van twee minuten om de procedure gelijk te houden in alle groepen.

Bij de patiënten bleek dat per taak tussen de één en acht patiënten rapporteerden toch iets te weten van ofwel de stimuli ofwel de instructies die de andere identiteit gezien had. Data van deze patiënten zijn verder niet meegenomen of apart geanalyseerd. De andere patiënten rapporteerden dus ook tijdens het onderzoek complete amnesie te hebben voor de leerfase die uitgevoerd was door de andere deelnemende identiteit. De resultaten van de procedurele taak (hoofdstuk vier) leken bewijs te leveren voor amnesie tussen identiteiten. Echter, juist op deze taak bleek ook simulatie van amnesie door de geïnstrueerde controles mogelijk, waardoor het onmogelijk is de scores van patiënten te interpreteren. Wel laten de resultaten van deze taak zien dat het belangrijk is om simulanten mee te nemen in het onderzoek naar amnesie in DIS teneinde onderbouwde conclusies te kunnen trekken over het bestaan van amnesie in DIS, iets wat nog in weinig ander onderzoek is gedaan.

Op alle andere taken bleek het voorwenden van amnesie door simulerende controles niet mogelijk. Ze bleken niet in staat om kennis die ze tijdens het onderzoek geleerd hadden, te onderdrukken in hun "amnestische" identiteit. Uit de resultaten van deze geheugentaken waarop simulatie van amnesie niet mogelijk was, kwam een eenduidig beeld naar voren: in tegenstelling tot de rapportages van de deelnemende patiënten, gaven ze in hun amnestische identiteit wel blijk van kennis van het geleerde in de andere deelnemende identiteit. Er was dus geen sprake van amnesie maar juist van overdracht van informatie tussen de deelnemende identiteiten. Patiënten herkenden materiaal geleerd door de andere identiteit bewust of gaven blijk van herkenning op een meer impliciete (onbewuste) wijze. Zelfs de kwaliteit van de herkenning van stimuli geleerd door de andere identiteit was vergelijkbaar met de kwaliteit van herkenning van materiaal geleerd in dezelfde identiteit, dus woorden geleerd in dezelfde identiteit stonden de patiënt niet meer "levendig" voor ogen dan vergelijkbare woorden geleerd in de andere identiteit.

Hoe kan deze tegenstrijdigheid tussen de amnesierapportages van patiënten en de objectieve bevindingen van overdracht tussen identiteiten

geïnterpreteerd worden? In de discussie van dit proefschrift wordt verondersteld dat de *overtuiging* van patiënten dat ze niet kunnen weten wat andere identiteiten meemaken en weten een centrale rol speelt. In tegenstelling tot wat men eerder dacht, lijkt de geheugen-retrieval, het ophalen van herinneringen, intact bij deze patiënten. Mogelijk besluiten patiënten echter na het ophalen van een herinnering dat deze in een bepaalde toestand niet egosyntoon is, dat wil zeggen behorend bij de identiteit die op dat moment aanwezig is. Omdat ze ervan *overtuigd* zijn niet te kunnen weten wat andere identiteiten hebben meegemaakt en weten, gebruiken ze dus op sommige momenten niet alle informatie waarover ze beschikken. Patiënten zullen dus mogelijk informatie niet gebruiken als ze beseffen dat deze geleerd is door een andere identiteit. Als ze niet op de hoogte zijn van de herkomst van de herinnering, zullen ze deze wel gebruiken en mogelijk vaker ervaren als egosyntoon. Concluderend lijkt er dus geen sprake te zijn van objectief verifieerbare amnesie in DIS, maar lijken de gerapporteerde geheugenproblemen eerder samen te hangen met het niet gebruiken van informatie die correct is opgehaald.

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## Curriculum Vitae

Rafaële Huntjens was born on February 13, 1973, in Maastricht, The Netherlands. After completing the Gymnasium β at the St. Maartenscollege in Maastricht in 1991, she studied psychology at Utrecht University. In 1998, she started working as a Ph.D. student on the project that has resulted in the present dissertation. The research was conducted at the Department of Clinical Psychology, in close collaboration with the Psychonomic Laboratory of Utrecht University. From 1997 to 2002, she has also held a part-time position as lecturer at the Department of Methodology & Statistics. Since April 2003, she has been working as a research fellow and lecturer at the Department of Clinical Psychology, Utrecht University.