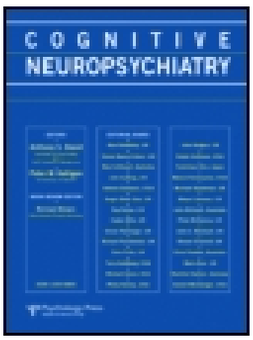

Cognitive Neuropsychiatry

ISSN: 1354-6805 (Print) 1464-0619 (Online) Journal homepage: http://www.tandfonline.com/loi/pcnp20

Interidentity amnesia in dissociative identity disorder

John Morton

To cite this article: John Morton (2017): Interidentity amnesia in dissociative identity disorder, Cognitive Neuropsychiatry, DOI: 10.1080/13546805.2017.1327848

To link to this article: http://dx.doi.org/10.1080/13546805.2017.1327848

Published online: 25 May 2017.

Submit your article to this journal

Article views: 1

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at
http://www.tandfonline.com/action/journalInformation?journalCode=pcnp20

Download by: [The UC San Diego Library] **Date:** 28 May 2017, At: 07:51

COGNITIVE NEUROPSYCHIATRY, 2017
https://doi.org/10.1080/13546805.2017.1327848

Routledge
Taylor & Francis Group

Check for updates

Interidentity amnesia in dissociative identity disorder

John Morton

Institute of Cognitive Neuroscience, University College, London, UK

ABSTRACT

Introduction: Patients diagnosed with dissociative identity disorder (DID) usually present with alternative personality states (alters) who take separate control of consciousness. Commonly, one alter will claim they have no awareness of events which took place when another alter was in control. However, some kinds of material are transferred across the alter boundary. Huntjens et al. devised an objective method of demonstrating such transfer.

Methods: In the main study, following Huntjens et al., for three patients, two alters were taught different sets of nouns. The following week, one of the alters was given a recognition memory test including both sets plus distractor words. The patients in the Huntjens experiment responded in the same way to words in both sets.

Results: In the present experiemnt, two of the patients tested had pairs of alters where there was no interference from the material which was presented to the other alter. In one of these cases, there was breakthrough with one pairing of alters, a pattern matched in a subsidiary experiment.

Conclusions: The population of individuals with DID are not homogeneous with respect to the depth of the blocking of episodic material from one alter to another.

ARTICLE HISTORY
Received 8 April 2016
Accepted 26 April 2017

KEYWORDS
DID; memory; inter-alter amnesia

Introduction

This paper reports two individuals who have been diagnosed with dissociative identity disorder (DID) who appear to have a degree of processing separation between alters which exceeds that of other reported patients.

The DSM-V diagnostic criteria for DID has two main criteria:

> A. Disruption of identity characterized by two or more distinct personality states …
>
> B. Recurrent gaps in the recall of everyday events, important personal information, and for traumatic events that are inconsistent with ordinary forgetting. (American Psychiatric Association, 2013, p. 292)

Other criteria include the ruling out of cultural factors and general medical conditions.

In this paper I will restrict myself to exploring the nature of the amnesia which is commonly reported between alters in people who have received a diagnosis of DID. As the

CONTACT John Morton j.morton@ucl.ac.uk
© 2017 Informa UK Limited, trading as Taylor & Francis Group

commentary in DSM-5 makes clear, when one alter takes over from another, they have no idea what happened just before. They report having lost time, and sometimes report not knowing where they are or how they got there.

A feature of interidentity amnesia is that it appears to be restricted to certain kinds of material. In a review paper, Dorahy (2001) summarises the available research as suggesting that amnesic barriers between alter personalities are typically impervious to explicit stimuli, such as autobiographical memory, as well as conceptually driven implicit stimuli. This is a conclusion also drawn by Nissen, Ross, Willingham, Mackenzie, and Schacter (1988) in their case study which reported an influence of implicit material between alters. For example, their DID subject showed, across alters, repetition priming of perceptual identification of words, repetition priming of word fragment completion and facilitation of sequence learning in a serial reaction time task. There was little or no transfer in situations employing semantically rich materials.

The stimulus for the present paper is one by Huntjens, Postma, Peters, Woertman, and van der Hart (2003). Huntjens et al. argue that the patients' denying knowledge of stimulus material learned by another alter 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 (p. 291). To explore this, they designed an interference paradigm. In their experiment, one alter, X, was taught a list of 24 nouns, List A. (Details of the experimental method are given below.) Then, a second list, List B, was taught to another alter, Y, who claimed no knowledge of the first list. The second part of the experiment took place a week later without warning. It involved the second alter, Y, being presented with a recognition list of single words and being asked whether or not they thought the words had occurred the previous week, by responding to them as "old" or "new" The recognition list was made up of all the words from Lists A and B and an equal number of distractor words (new words from the same semantic categories).

Now, let us consider what might happen with DID patients. In the first part of the experiment, alter X learned List A and alter Y learned list B. For the second part of the experiment, if the relationship between alters is deeply dissociative then alter Y should treat the words she learned, the B list, as being *old* but should treat the A words as being *new*. In other words, there should be no differences seen in the responses to the A words and the distractor words.

Huntjens et al. (2003) ran the test on 20 patients with a diagnosis of DID, where at least one of the alters claimed to be completely amnesic for the events experienced during the experiment by the other participating alter. In addition, the experiment was run on 50 normal participants. Half of these were a simple control group and the other half were instructed about dissociative amnesia, and asked to simulate that condition in the experiment by trying to forget they had seen list A.

For our purposes, the significant part of the data is the recognition performance. In particular, we are interested in whether or not the A words are deemed *new*, as they should be if the DID patients are fully amnesic. In fact, on average, the DID group recognised 65% of the B words and 50% of the A words from the previous week. This compares with a mere 14% false positives with the distractor (D) words. For the simulators, the figures were B 80%, A 69% and D 18% respectively. For the controls the figures were B 94%, A 91% and D 22% respectively. For all groups the B words were accepted more often than the A words and there were no differences among the groups in this respect.

The important result is that, with the DID group, the level of recognition hits on the list A words was considerably above the level for the distractor words. If there had been a strong amnesia between the alters, then the A words and distractor words would have been at the same level. It was also the case that the mean values accurately represented the individual scores. There were no individual patients who responded to the A words in the same way as the distractor words (Huntjens, personal communication). Equally, there was no simulator who was able to achieve the equivalent goal.

Huntjens et al. (2003) comment:

> Our results contrast with the reasoning of Eich, Macaulay, Loewenstein, and Dihle (1997a) and Peters, Uyterlinde, Consemulder, and Van der Hart (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. (p. 295)

Thus, Eich et al. reported an absence of priming with word-stem completion between alters, a result which could be achieved by patients inhibiting an immediately available response. However, "priming in picture-fragment completion was as robust between different identities as it was within the same identity" (Eich, Macaulay, Loewenstein & Dihle, 1997b). In the latter paper, Eich et al. (1997b) report data for simulators for the picture-fragment completion experiment. The data showed that there was reliable priming within the same (simulated) personality state but showed no significant priming between different personality states, unlike the DID patients. This must be because the simulators are suppressing the correct responses.

> (T)he results suggest that, whatever else is involved in DID, interpersonality amnesia is more than simply a matter of deliberate response suppression. Were that the case, no test of retention—including picture-fragment completion—would have revealed evidence of leakage across personality states. (Eich et al., 1997b, p. 421)

Silberman, Putnam, Weingartner, Braun, and Post, (1985) carried out an experiment similar to Huntjens et al., with the original learning being from a spoken list. Recognition performance an hour later was similar between patients and simulators. However, the authors report "there were qualitative differences between the cognitive performance of patients and that of controls attempting to role-play alter personalities. Our results suggest that simple confabulation is not an adequate model for the MPD syndrome" (Silberman et al., 1985, p. 253).

Kong, Allen, and Glisky (2008) obtained similar results to Huntjens et al. (2003) with seven DID patients with an interval of minutes between learning and test. Similar results were also obtained using a physiological response by Allen and Movius (2000) who had alter X learn six words, then switched to alter Y, who also learned six words. Then these 12 words and some others were presented to alter Y whereas electrical activity in the brain (ERP) was measured. The ERP activity which followed presentation of the A words was consistent with them having been recognised, although alter Y had no conscious recollection of having seen them. This last experiment differs from the Huntjens design in that the lists were very short and the time-scale was immediate, but the result is the same.

Huntjens et al. (2003) thought that the lack of compartmentalisation which they found may have been due to the fact that their stimuli were emotionally neutral. Accordingly they ran another, similar, experiment which included words with a sexual or threatening connotation such as "vagina" and "pain" but, again, found no evidence for interidentity amnesia (Huntjens, Peters, Woertman, van der Hart, & Postma, 2007). Their conclusion was that the deficit in DID was one of a disturbance in meta-memory functioning instead of an actual retrieval inability. Put otherwise, their idea is that access to the memory records of the alternative alter succeeds, though the material does not reach consciousness. These authors conclude that "dissociators … seem to be characterised by the *belief* of being unable to recall information instead of an actual retrieval inability" (p. 788, their italics). This group has also published a variety of experiments showing leakage of different kinds of information between alters. This work is summarised in Huntjens, Verschuere, and McNally (2012).

Replication

Huntjens' experimental design seemed robust and a possible way of discriminating between DID patients with differing levels of amnesia between alters. Accordingly, an English version of the first of these experiments was produced, and initially run on control subjects, largely from the undergraduate population of University College London, in order to check the materials and the procedure.

Materials

Following Huntjens et al. (2003), two word lists, named A and B, were constructed. List A contained eight names of vegetables, eight names of animals and eight names of flowers. List B contained eight new names of vegetables and of animals, and eight names of pieces of furniture. 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) giving a total of 96 words. The words are given in Appendix 1. The lists were of the same mean length (5.83, 6.00 and 5.77 letters; 1.92, 2.00 and 1.94 syllables) but not balanced for word frequency. As the words were all concrete nouns from common semantic categories the consequences of possible imbalance would be minor and would be visible in the control data.

Participants

The control participants were 24 female residents of a University of London hall of residence, aged 19–25, who responded to a poster. Note that the controls were largely younger and better educated than the patients. These are conservative controls, as memory functions are known to be worse with increasing age (Park & Festini, 2017) and better with higher intelligence (Conway, Kane, & Engle, 2003). The controls were not screened in any way. Subjects were assigned at random to one of two groups: Simulators and directed forgetting (DF). The DF group was added instead of a simple control group as a possible alternative way of simulating dissociation. The DID subjects, who I will call KR, JO and

DT, were patients at the Centre for Dissociative Studies, London. None of the names used below are the patients' or their alters' real names.

Method

The control study consisted of two sessions separated by one week. In Session 1, members of the simulator group were informed about DID and the amnesia between alters. They were invited to adopt an alternative personality of their own choice and asked to role-play this personality for the next section of the experiment (see Appendix 2). The 24 words of List A were presented to the subjects in random order on a computer screen for 2 seconds with a 2-second 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, still in role, were tested for free recall of the studied words. The presentation and free recall test of List A were repeated twice more. After this, the simulator subjects were instructed to assume their normal personality. Then, the words of List B were presented three times in the same way as for List A.

The DF subjects were presented three times with List A followed by a standard DF protocol to the effect that they should forget all about the first set of words, List A, and concentrate on the next list. Such instructions have proved effective in inducing apparent forgetting of autobiographical memories in a number of paradigms (Barnier et al., 2007). Then, the words of List B were presented three times in the same way as for List A.

Note that there was no attempt to counter-balance the lists since the groups were intended as a control for a small number of DID patients all of whom would initially have the lists in the same order. There were no significant differences in recall performance between the lists, recall being essentially perfect by the third trial.

After roughly one week, Session 2 took place in which subjects were tested for recognition. This test had not been announced in week 1. The words of the recognition list were presented one at a time on a computer screen and the subjects had to state whether they recognised the words as having been presented in Session 1. Presentation was self-paced and the response, yes/no, was spoken. The experimenter remained behind the subject and gave no feedback. The simulator groups were instructed to remain in their own personalities, and were reminded that as they were pretending to be DID they should not respond to any of the words presented to them in their other personality (List A) during session 1. The DF groups were instructed only to report words they had seen in the second list. Note that this is a more directive instruction than is usually given to DF subjects, as we wanted to maximise a separation of the lists.

The procedure for the DID patients was similar. In Session 1, the 24 words of List A were taught to the patient's alter X. After this, patients were requested to switch to alter Y. When the presence of alter Y was confirmed by the patient, she was directly asked if and what she knew of the learning phase and the material alter X had seen. Then, the words of List B were taught to alter Y. (Note that none of the three patients showed interference from list A during the free recall.)

After one week, Session 2 took place in which alter Y was tested for recognition of the stimulus words. In all cases, this alter only remembered having learned one list the previous week. The recognition test had not been announced in week 1. The words of the recognition list (A, B and distractor words) were presented one at a time and the patients had

to state whether or not they recognised the words as from Session 1. Presentation of the stimuli was self-paced, and the patient simply responded with either "yes" or "no" to each word. The experimenter sat behind the patient and gave no feedback.

Results

Control groups

On average, the simulator group responded "yes" to the words in List B 61% of the time, with list A 48%. The distractor words (D) were only accepted 13% of the time. The DF instructions had no effect, the respective figures being 59%, 52% and 14%. This could be for a variety of reasons (cf. Bjork & Bjork, 1996) and will not be discussed further. There were no significant differences between the groups on any measure so the data were pooled. The difference between hits on the two lists was marginally significant in favour of the target list (Wilcoxon W = 118; $Z = 1.79$; p(one-tail) = 0.037). The difference between responses to List A and distractor words was highly significant, with only two subjects having equivalent responses in the two categories. Both had low hit rates compared with the group, being B 38%, A 17%, D 21% and B 41%, A 0%, D 6%. For the former of these, there was no significant difference between the detectability of the target list and that of List A as measured by d-primes ($z = 1.323$). The second of these subjects clearly had extraordinary memory skills even by university standards. Apart from this subject, however, this group of university students were unable to keep the items from the two lists separate from each other.

DID patients

Subject 1. KS—female, age 40

The experiment was run according to the protocol above. There were two alters, who we will call Barbara and Katherine, who denied all direct knowledge of the other, though they had communicated by email. Barbara learned list A and Katherine learned list B. There were no intrusions from List A whereas Katherine was learning List B. The following week Katherine was tested in the recognition protocol. She scored 46% on list B, 58% with list A and 4% on the distractor words. Thus, like the Dutch patients, she was unable to discriminate between the two lists.

Subject 2. JO—female, age 45 (these data have been reported previously in Morton, 2012)

To start with I had the cooperation of two of JO's alters, Ruth and Cathy, who denied all direct knowledge of each other [they had exchanged emails]. On the first day, Ruth learned List A and Cathy, who claimed no knowledge of the first list, learned List B immediately afterwards. There were no intrusions from List A whereas Cathy was learning List B. No mention was made of any recognition memory test (RMT). The following week, following the Huntjens et al. design, the RMT was run with Cathy. The data were List B 71%; List A 13%; distractor words 0/48. As can be seen, Cathy treated the list A words very differently from the list B words and almost in the same way as the distractor words. It should be noted that this result came as a great surprise. I had no reason to suppose that the

Huntjens et al. result would not generalise. However, I had the opportunity to replicate the experiment on the same individual. To start with, the following week, again without warning, Ruth was given the RMT. Recall that she had seen the list A words two weeks previously. In the test, she behaved as though she had never seen the B words [0/24], accepting the A words, which she had seen, 63% of the time. Two of the 48 distractor words were accepted.

The experiment was begun a second time a week later with two different alters who also claimed no direct knowledge of each other and, indeed, rejected the very existence of DID. Karen learned list A and Erica, who claimed no knowledge of the first list, learned list B. There were no intrusions from List A whereas Erica was learning list B. The following week, again, without prior warning, Erica was presented with the recognition list. She accepted 21/24 = 88% of the list B words, but only 1 of the List A words. She accepted 6/48, 13%, of the distractor words. The Christmas break then intervened and it was 6 weeks later before Karen could be given the recognition words. She scored 83% with the A words, and accepted 13% of the B words and 21% of the D words. The larger score with the D words could probably be ascribed to the extra time between the learning and the RMT. Unlike the Dutch patients, the control subjects, and patient JO, all 4 alters of this patient were able to discriminate between the two lists.

Subject 3. DT—female age 28 (none of the data from DT have been previously reported)

There were two alters who claimed no direct knowledge of each other, Kathy and Derek. In session 1, Kathy was taught list A and Derek, who claimed no knowledge of the first list, was taught list B. There were no intrusions from List A whereas Derek was learning List B. In session 2, Derek was tested for recognition memory. He had 22/24 hits (92%) [list B], 1/24 on list A and 0/48 distractors. The following week Kathy was tested and scored 22/24 hits [list A], zero errors and 1/48 distractors.

Because of the low error rates I designed a slightly more difficult task using four categories, birds, food, body parts and clothing. There were four lists of 32 words, A–D, each with 8 words from each of the 4 categories. One of these lists would be the target words, one would be the competing target set and the other two would be distractor words. These words are given in Appendix 3. For this experiment I was able to use two more alters, Denise and Lorna. In the first session Denise was taught the words in List A and Lorna the words in list B. Two weeks later, Denise was tested on the total 128 words for recognition. She had 14/32 hits (45% list A), 1/32 errors and 0/64 distractors. Thus Denise was unaffected by the material presented to Lorna. Lorna was then tested and her scores were 16/32 hits (list B), 15/32 errors and 4/64 distractors. From these scores we can conclude that Lorna was unable to keep the two lists distinct, indicating that she accessed information which had been presented to Denise or that she had access to Denise's responses. With patient DT, then, it seems that this pair of alters are asymmetrical in relation to the amnesia. A review of the data is presented in Table 1. The d-prime values for the detectability of words in the two lists against the distractors are also given together with the *z*-scores of the differences between those d-primes. These differences are significant, in most cases highly significant, for the alters of JO and DT, with the exception of Lorna. There are no differences for controls or other subjects.

Table 1. Probability of "YES" response in two-choice recognition memory.

	Huntjens et al. (2003)		Current results										
			controls		KS	JO				DT			
	DID	*sim*	*sim*	*DF*		Cathy	Ruth	Erica	Karen	Derek	Kathy	Denise	Lorna
target - t	0.65	0.80	0.61	0.59	0.46	0.71	0.63	0.88	0.83	0.92	0.92	0.43	0.47
other - o	0.50	0.69	0.48	0.52	0.58	0.13	0	0.04	0.13	0.02	0	0.03	0.50
distractor – d	0.14	0.18	0.13	0.14	0.04	0	0.04	0.13	0.21	0	0.02	0	0.06
d': t vs. d	1.47	1.76	1.41	1.31	1.65	2.88	2.08	2.3	1.76	3.73	3.46	2.15	1.48
d': o vs. d	1.08	1.41	1.08	1.13	1.95	1.21	0	0	0	0	0	0	1.56
d': t vs. o	0.39	0.35	0.33	0.18	−0.3	1.68	4.63	2.93	2.08	3.46	5.71	1.7	−0.08

Unlike the Dutch patients or the simulators in the Huntjens et al. (2003, 2007) experiments, the alters of JO and DT have been able to distinguish between the two lists. Note that these data cannot be accounted for in terms of a conservative strategy. The two control subjects who had equivalent responses had hit rates of 38% and 41%. JO's alters had hit rates between 63% and 88%.

Let us first discuss JO. There are two possible explanations for her performance. The simplest is that in her case an individual alter has no access at all to material presented to other alters. Thus, it is as if the words from the other list have not been presented. The alternative explanation is that JO has a most extraordinary memory. Let us consider what would be the pure memory (and confabulation) achievement. By the time Karen was given her RMT, JO (the physical entity) had seen both the A and B lists six times each in the course of the free recall learning. Then she had responded twice positively and once negatively to the B words and once positively and twice negatively to the A list. All this had happened between 6 and 10 weeks previously. In contrast, none of the Dutch subjects and only two of the London controls have been able to discriminate the two lists just one week after the initial presentations on their one and only recognition test.

With DT the situation is more complex. The amnesic barrier between alters Derek and Kathy seems to be as dense as that among the alters of JO in that words presented to either alter were rejected by the other in the Huntjens test. Equally, Denise was unaffected by the list that had been presented to Lorna. However, the barrier between Lorna and Denise was permeable and led to a response pattern similar to the subjects described by Huntjens et al. (2003). The two alters of KS who were tested had the same pattern.

Note that in Huntjens et al. (2003), subjects rated their responses as "remember" or "know" and there were no significant differences in these ratings between words from the two lists. The simplest conclusion from these data is that when, in the recognition phase, the Dutch patients and KS are presented with a word from the list learned by the other alter, they retrieve the record of the previous experience of that word. Accordingly, they respond as though the word is familiar in the context of the experiment. However, this material is not allowed into consciousness. The proposal that the material is retrieved and repressed is similar to the explanation put forward to account for interference found in post-hypnotic amnesia by Smith, Morton, and Oakley (2013) and to the account of certain DF results (e.g., Bjork & Bjork, 1996). With JO, and for three of DT's alters, the simplest account is that the potentially interfering material is just not accessed.

Recognition memory

The complex relationships among DT's alters were explored further using several different RMTs. The objective was to test whether the same kind of inter-alter access would be found with different kinds of material. The general design is that one alter is presented with the stimulus material and then another alter is called out. On questioning, the second alter would claim to have no knowledge of the stimulus material which had just been presented to the first alter. The second alter was then presented with the response options and asked to make a preference. This procedure was not carried out in as balanced a fashion as would have been ideal, since, mid-way in the planned schedule, DT decided she did not wish to switch any more in the experimental situation.

For the Warrington RMT (Warrington, 1984), 50 printed words are presented at the rate of one word every 3 seconds, and for each word the subject is required to judge the presented stimulus as "pleasant" or "unpleasant". In the usual version, the patient is then presented with a series of word pairs, and the task is to identify which of the two words came from the target list. The identical procedure can be followed for a set of 50 faces. In the present study, a second alter was then presented with the response options, being asked to "say which one of them seems more familiar or which one you prefer, even if you don't think you have seen any of them". If the second alter indeed had no access to the stimulus materials, then her performance should be random. It is notoriously difficult for typical subjects to generate random responses in such tasks (Baddeley, 1990, p. 132). If the second alter did have access to the stimulus materials but was simulating amnesia by rejecting the familiar stimulus then we could anticipate below chance responding.

For the Warrington words, Derek was trained, and Kathy was tested, these being two alters who were mutually amnesic. She was "correct" on 21/50, consistent with responses which were random with respect to the original presentation. For the Warrington faces, Kathy was trained, and Derek was tested. He was correct on 28/50, again no better (or worse) than chance. Performance here thus matched performance on the Huntjens design. Some weeks later, Denise was trained on the same face stimuli and Lorna was tested. She was correct on 46/50, highly significantly better than chance. This matched the previous experiment, where Lorna responded to words presented to Denise.

The short face recognition memory test was also used (Warrington, 1996). This consists of 25 training faces followed by 25 pairs of faces, one of which came from the original presentation. This was used twice. Denise was presented with the training faces and Lorna was then tested with familiarity instructions. She was correct on 23/25 trials indicating access to the training material, without awareness. A week later, Kathy was trained and Derek was tested, scoring 12/25.

The Camden topographical recognition memory test involves a three-way forced-choice recognition test of previously presented scenes (Warrington, 1996). Derek was shown the stimuli and Kathy was tested, scoring 8/30. Derek was tested shortly afterwards and scored 30/30. A week later, Denise saw the stimuli and Lorna was tested, scoring 29/30.

In the doors test (Baddeley, Emslie, & Nimmo-Smith, 1994), participants are presented with a set of 12 coloured photographs of doors for 3 seconds each and later presented with a forced 4-choice recognition task. There are two parts to this test, set A and set B, with the latter being more difficult. Set A was presented to Derek. The test stimuli were then presented to Denise, who scored 3/12, a chance performance with 12 trials involving four-choice. Set B was presented to Lorna and tested on Kathy who scored 2/12.

Finally, the stimuli from an animal recognition memory test were shown to Denise and tested on Derek. This is a two-choice test on which Derek scored 18/40.

These recognition memory scores have been summed up in Table 2. In the final column the results have been categorised as positive, that is, material has been transferred, or negative, that is, there is a barrier between the alters. In Figure 1, these data are shown diagrammatically. Each line represents a trained-tested pair of alters. The heads of the arrows are annotated with a +, or − for each study. The figure highlights the finding that only the Denise-to-Lorna transition shows any influence of the training on the testing. The results of this series of tests exactly matched the result of the main study (see Table 1)

Table 2. Results of short term recognition memory experiments showing breakthrough (+ve) or no breakthrough (−ve) between alters.

TEST [choices]	Alter trained	Alter tested	Result	
RMT words [2]	Derek	Kathy	−ve	21/50
RMT faces [2]	Kathy	Derek	−ve	28/50
	Denise	Lorna	+ve	46/50
Short faces [2]	Denise	Lorna	+ve	23/25
	Kathy	Derek	−ve	12/25
Topographical [3]	Derek	Kathy	−ve	8/30
	Denise	Lorna	+ve	29/30
Doors A [4]	Derek	Denise	−ve	3/12
Doors B [4]	Lorna	Kathy	−ve	2/12
Animals [2]	Denise	Derek	−ve	18/40

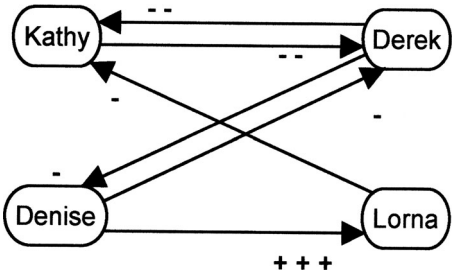

Figure 1. Summary of recognition memory test results for DT. The ± signs indicate success/failure of transfer of information between alters.

where material presented to the alters Kathy and Derek did not affect the other, and material presented to Lorna did not affect Denise, whereas Lorna was affected by material presented to Denise. In none of the tests was there any indication of below chance responding. This is an additional argument against the subject simulating amnesia between alters.

Discussion

It should be remembered that in the present study the English controls did not match the DID subjects, and one of them had a performance level that mimicked deep amnesia. However, they were younger and better educated than the present DID subjects which would lead one to expect better memory skills. Huntjens et al. (2003, 2007) tested 35 DID patients and 100 controls with a very similar procedure to that used here without finding any objective evidence of inter-alter amnesia. It seems justifiable, then, to accept that the patients JO and DT are manifesting a real and rare phenomenon.

Previous work has shown that alters of DID patients appear to have no conscious recollection of words presented in a list to another alter. On the other hand, in a RMT a week later, they cannot distinguish between such words and words they had seen themselves. It seems that we have to conclude, that, for stimuli of this type, the material is retrieved from the memory records and is then processed. Why are they not conscious of the origin of such material? Huntjens et al. (2007) suppose this to be attributable to the patient's belief concerning their own memory. They would need to add that the belief itself is not necessarily conscious. Similarly, Kong et al. (2008) suggest that DID participants in

their experiment "suffer from metamemory problems in that they are convinced that they truly do not have memory for the experiences of another identity" (p. 691). Neither of these two papers suggest any cognitive mechanism to account for the results. One possible framework is outlined in Smith et al. (2013) in the context of post-hypnotic amnesia. In their experiment, subjects are asked to produce free associations to a list of words. Then, under hypnosis, they are asked to forget about the task they have just performed, but then are given the task again. After this instruction, hypnotically susceptible subjects report no recollection of the first task, but nevertheless take much longer over their responses than would be expected. In addition, they repeat the response they made the first time round far less than would be expected by chance. Smith et al. concluded that the executive processes of these hypnotised subjects are programmed to avoid producing the same response as before. If such a response is retrieved, it would take time to reject it. Smith et al. (2013) suggest that the executive processes are responsible for controlling the initial access to material and then for controlling whether retrieved information is allowed into consciousness.

In this cognitive framework, for almost all the people with DID who have been tested with various versions of the word list experiment, the material was retrieved from memory and not allowed into consciousness. Retrieval would, however, trigger the processes of recognition memory. The exceptions are JO and DT. For JO, the four alters used did not seem to be at all affected by material presented to others. The conclusion in this case is that the material from other alters is not retrieved at all. In this case, then, we find dissociation between alters, even with word lists. The same would be true for at least two of DT's alters. In the Smith et al. framework, this would be accounted for in terms of state-dependent restrictions on retrieval (see also Morton, 2012).

Lastly, we should consider the status of JO and DT whose inter-alter amnesia is stronger than that reported by Huntjens et al. The simplest hypothesis is that the difference derives from their history. The existence of DID is commonly accepted to be preceded by early childhood abuse (e.g., Gleaves, 1996; Van der Hart, Nijenhuis, & Steele, 2006). Gleaves comments: "The abuse reported by individuals with DID is often severe, extensive, and sadistic" (Gleaves, 1996, p. 52). One hypothesis to be explored is that the two patients described in this paper are extreme in the extent of abuse suffered. Now, one of the consequences of dissociation is that one or more alters has no recall of the abuse and thus is protected against the trauma (see also Hart et al., 2006). This has been confirmed in a brain study by Reinders et al. (2003). In their study, DID patients were studied either in a trauma-related identity state or a neutral identity state. The former generated an autobiographical traumatic memory which the latter failed to recognise as relating to themselves. These memories were contrasted to neutral memory scripts which both states accepted as autobiographical. The two scripts were put into the third person and read in a neutral tone to the patients whereas they were in a PET scanner. There were large differences in patterns of cerebral blood flow when the trauma-related identity states listened to the trauma script. For the neutral identity state, however, there were no significant differences in blood flow in response to the scripts. Not only did the neutral identity states claim they did not recognise the trauma story as relevant to themselves, but their brain response backed that up; there was an amnesic barrier between the alters.

The Reinders et al. (2003) study establishes the relationship between early trauma and inter-alter amnesia. Now, suppose that JO and DT had experienced particularly serious or

long-lasting early trauma. It would be reasonable to suppose that there would have to be more extreme inter-state amnesia in order to protect the neutral identity state from the trauma memories. Within the cognitive model, this would be achieved through state-dependent restrictions on retrieval, where the identity of the alter would serve as a state marker. Thus, only memory records which were associated with a particular alter would be retrieved when that alter was in control. In the case of DT, the fact that Lorna could access material experienced by Denise would reflect the particular executive control instructions associated with Lorna and the particular trauma experiences of that alter. To follow such proposals, future work will target the relationship between aspects of patients' history and the nature of their inter-alter amnesia.

The non-trauma-related account of DID, also referred to as the sociocognitive model (e.g., Spanos, 1994, 1996), holds that DID is a simulation enabled by high suggestibility and/or fantasy proneness, in combination with suggestive psychotherapy and sociocultural influences (e.g., the media and/or the church). This view has stimulated robust debate (e.g., Brand et al., 2016; Gleaves, 1996; Lilienfeld et al., 1999). One summary view is by Kihlstrom (2005) "As complex as [dissociative disorders] surely are, they deserve to be studied in a spirit of open inquiry that avoids both the excessive credulity of the enthusiast and the dismissal of the determined skeptic" (Kihlstrom, 2005, p. 244). Whichever view is held, it will have to account for the heterogeneity of amnesic phenomena both between individuals diagnosed with DID and, in the case of DT described above, within an individual.

Acknowledgements

I am grateful to Raphaele Huntjens for advice, and to Guinevere Tufnell for support.

Disclosure statement

No potential conflict of interest was reported by the author.

References

Allen, J. B., & Movius, H. L. (2000). The objective assessment of amnesia in dissociative identity disorder using event-related potentials. *International Journal of Psychophysiology*, *38*, 21–41. doi:10.1016/S0167-8760(00)00128-8

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders, Fifth Edition (DSM-V)*. Arlington, VA: Author. doi:10.1176/appi.books.9780890425596

Baddeley, A. D. (1990). *Human memory: Theory and practice*. London: Lawrence Erlbaum Associates.

Baddeley, A.D., Emslie, H., & Nimmo-Smith, I. (1994). *Doors and people*. Bury St Edmunds: Thames Valley Test.

Barnier, A. J., Conway, M. A., Mayoh, L., Speyer, J., Avizmil, O., & Harris C. B. (2007). Directed forgetting of recently recalled autobiographical memories. *Journal of Experimental Psychology: General*, *136*, 301–322. doi:10.1037/0096-3445.136.2.301

Bjork, E. L., & Bjork, R. A. (1996). Continuing influences of to-be-forgotten information. *Consciousness and Cognition*, *5*, 176–196. doi:10.1006/ccog.1996.0011

Brand, B. L., Sar, V., Stavropoulos, P., Krüger, C., Korzekwa, M., Martínez-Taboas, A., & Middleton, W. (2016). Separating fact from fiction: An empirical examination of six myths about

Dissociative Identity Disorder. *Harvard Review of Psychiatry*, *24*, 257–270. doi:10.1097/HRP.0000000000000100

Conway, A., Kane, M. J., & Engle, R. W. (2003). Working memory capacity and its relation to general intelligence. *Trends in Cognitive Sciences*, *7*, 547–552. doi:10.1016/j.tics.2003.10.005

Dorahy, M. J. (2001). Dissociative identity disorder and memory dysfunction: The current state of experimental research and its future directions. *Clinical Psychology Review*, *21*, 771–795. doi:10.1016/S0272-7358(00)00068-4

Eich, E., Macaulay, D., Loewenstein, R. J., & Dihle, P. H. (1997a). Memory, amnesia, and dissociative identity disorder. *Psychological Science*, *8*, 417–422. doi:10.1111/j.1467-9280.1997.tb00454.x

Eich, E., Macaulay, D., Loewenstein, R. J., & Dihle, P. H. (1997b). Implicit memory, interpersonality amnesia, and dissociative identity disorder. In J. Don Read & D. Steve Lindsay (Eds.), *Recollections of trauma: Scientific evidence and clinical practice* (pp. 469–474). New York: Springer.

Gleaves, D. H. (1996). The sociocognitive model of dissociative identity disorder: A reexamination of the evidence. *Psychological Bulletin*, *120*, 42–59. doi:10.1037/0033-2909.120.1.42

Huntjens, R. J., Peters, M. L., Woertman, L., van der Hart, O., & Postma, A. (2007). Memory transfer for emotionally valenced words between identities in dissociative identity disorder. *Behaviour Research and Therapy*, *45*, 775–789. doi:10.1016/j.brat.2006.07.001

Huntjens, R. J. C., Postma, A., Peters M. L., Woertman L., & van der Hart, O. (2003). Interidentity amnesia for neutral episodic information in dissociative identity disorder. *Journal of Abnormal Psychology*, *112*, 290–297. doi:10.1037/0021-843X.112.2.290

Huntjens, R. J. C., Verschuere, B., & McNally, R. J. (2012). Inter-identity autobiographical amnesia in patients with dissociative identity disorder. *PLoS ONE*, *7*, e40580. doi:10.1371/journal.pone.0040580

Kihlstrom, J. F. (2005). Dissociative disorders. *Annual Review of Clinical Psychology*, *1*, 227–253. doi:10.1146/annurev.clinpsy.1.102803.143925

Kong, L. L., Allen, J. J. B., & Glisky E. L. (2008). Interidentity memory transfer in dissociative identity disorder. *Journal of Abnormal Psychology*, *117*, 686–692. doi:10.1037/0021-843X.117.3.686

Lilienfeld, S. O., Lynn, S. J., Kirsch, I., Chaves, J. F., Sarbin, T. R., Ganaway, G. K., & Powell, R. A. (1999). Dissociative identity disorder and the sociocognitive model: Recalling the lessons of the past. *Psychological Bulletin*, *125*(5), 507–523.

Morton, J. (2012). Memory and the dissociative brain. In V. Sinason (Ed.), *Trauma, dissociation and multiplicity* (pp. 65–78). London: Routledge.

Nissen, M. J., Ross, J. L., Willingham, D. B., Mackenzie, T. B., & Schacter, D. L. (1988). Memory and awareness in a patient with multiple personality disorder. *Brain and Cognition*, *8*, 117–134. doi:10.1016/0278-2626(88)90043-7

Park, D. C., & Festini, S. B. (2017). Theories of memory and aging: A look at the past and a glimpse of the future. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, doi:10.1093/geronb/gbw066

Peters, M. L., Uyterlinde, S. A., Consemulder, J., & Van der Hart, O. (1998). Apparent amnesia on experimental memory tests in dissociative identity order: An exploratory study. *Consciousness and Cognition*, *7*, 27–41. doi:10.1006/ccog.1997.0323

Reinders, A. A. T. S., Nijenhuis, E. R. S., Paans, A. M. J., Korf, J., Willemsen, A. T. M., & den Boer, J. A. (2003). One brain, two selves. *NeuroImage*, *20*, 2119–2125. doi:10.1016/j.neuroimage.2003.08.021

Silberman, E. K., Putnam, F. W., Weingartner, H., Braun, B. G., Post, R. M. , 1985. Dissociative states in multiple personality disorder: A quantitative study. *Psychiatry Research*, *15*, 253–260. doi:10.1016/0165-1781(85)90062-9

Smith, C., Morton, J., & Oakley, D. A. (2013). Increased response time of primed associates following an "episodic" hypnotic amnesia suggestion: A case of unconscious volition. *Consciousness and Cognition*, *22*, 1305–1317. doi:10.1016/j.concog.2013.08.003

Spanos, N. P. (1994). Multiple identity enactments and multiple personality disorder: A sociocognitive perspective. *Psychological Bulletin*, *116*(1), 143–165.

Spanos, N. P. (1996). *Multiple identities & false memories: A sociocognitive perspective*. Washington, DC: American Psychological Association.
Van der Hart, O., Nijenhuis, E. R. S., & Steele, K. (2006). *The haunted self*. New York, NY: Norton.
Warrington, E. K. (1984). *Recognition memory test: Manual*. Berkshire: NFER-Nelson.
Warrington, E. K. (1996). *The Camden memory tests manual*. Hove: Psychology Press.

Appendices

Appendix 1. Word lists for experiment 1

TEST WORDS			
List A			
Bluebell	Asparagus	Bear	
Buttercup	Bean	Bull	
Crocus	Chicory	Dog	
Hyacinth	Cucumber	Lamb	
Lily	Onion	Lynx	
Pansy	Spinach	Mouse	
Rose	Sprouts	Pony	
Snowdrop	Turnip	Squirrel	
List B			
	Cauliflower	Calf	Basin
	Celery	Goat	Carpet
	Courgettes	Horse	Chair
	Leeks	Pig	Cushion
	Lettuce	Puma	Picture
	Parsley	Sheep	Sideboard
	Potato	Tiger	Sofa
	Pumpkin	Zebra	Stool
CONTROLS			
Daffodil	Beetroot	Antelope	Bath
Daisy	Broccoli	Cat	Bookcase
Gladioli	Carrot	Chicken	Cupboard
Iris	Marrow	Cow	Curtains
Lavender	Pea	Deer	Lamp
Marigold	Radish	Duck	Mirror
Poppy	Swede	Fox	Piano
Tulip	Artichoke	Hen	Table
	Avocado	Hippo	
	Cabbage	Kitten	
	Cress	Leopard	
	Fennel	Lion	
	Parsnip	Puppy	
	Salad	Ram	
	Sweetcorn	Rat	
	Tomatoes	Snake	

Appendix 2. Instructions for the DID simulators

I am going to run a memory experiment with you. What I would like you to do is pretend to be a person with dissociated identity disorder, DID, - this is more popularly known as multiple personality. The characteristic of DID is that one alter claims to be completely unaware of what happens when another alter is in control. I'm going to do two things with you right now and then I am going to test you again next week. First of all I'm going to ask you to pretend to be someone else. It's up to you to choose who this is. Think of someone you know very well but is very different from you. Tell me a little about this person, starting with their name.

(Discuss the person <NAME> and their characteristics).

While you are pretending to be <NAME> I will get you to learn a list of words. Then I'll ask you to learn another list of words as yourself. When I see you next week it will be as yourself and I want you to act as though you know nothing of what happened when you were pretending to be <NAME>.

First of all, then, let us start with <NAME>.

SECOND WEEK

Remember the words you learned last week? I'm going to see how well you can recognise them. Don't forget it is you I'm talking to and that you know nothing of what happened when you were pretending to be <NAME>.

Appendix 3 Words in alternative experiment for subject DT.

List A	List B	List C	List D
tie	sandals	trousers	shorts
boots	beads	slippers	gown
earings	vest	cap	shoes
skirt	gloves	overalls	hat
mittens	jeans	necklace	apron
shirt	coat	dress	bracelet
suit	blouse	pyjamas	overcoat
jacket	scarf	raincoat	nightgown
parrot	swan	budgie	magpie
vulture	cuckoo	penguin	pelican
turkey	skylark	pigeon	goose
sparrow	hen	rook	canary
gull	nightingale	duck	crow
peacock	robin	woodpecker	starling
wren	falcon	hawk	dove
thrush	owl	blackbird	eagle
stomach	elbow	nose	heart
waist	shoulder	knee	leg
forehead	cheek	toe	thumb
jaw	hips	eye	mouth
wrist	lip	teeth	tongue
thigh	liver	finger	ankle
hand	chin	kidney	heel
neck	foot	arm	ear
hamburger	lime	plum	pizza
biscuit	hotdog	cherries	pear
cake	porridge	doughnut	gingerbread
orange	blackberry	pie	grapes
apricot	apple	lemon	spaghetti
pasta	bagel	strawberry	bun
blueberry	brownie	noodles	raspberry
peach	banana	bread	grapefruit