Trait dissociation and commission errors in memory reports of emotional events

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In 2 studies we examined whether trait dissociation is related to spontaneous commission errors (reports of events that did not occur) in free recall of emotional events. We also explored whether the functional locus of the dissociation-commission link is related to repeated retrieval or shallow encoding. In Experiment 1 participants were exposed to a staged incident and were repeatedly asked to add more information to their written accounts of the event. Dissociation levels were related to commission errors, indicating that people who report many dissociative experiences tend to make more commission errors. However, it was not the case that the overall increase in commission errors over successive retrieval attempts was typical for high dissociative participants. In Experiment 2 participants saw a video fragment of a severe car accident. During the video, half the participants performed a dual task, and the other half did not. Participants performing the dual task made more commission errors than controls, but this effect was not more pronounced in those with high trait dissociation scores. These studies show that there is a link between dissociation and spontaneous commission errors in memory reports of emotional events, but the functional locus of this link remains unclear.

Over the past 5 years or so, numerous studies have shown that it is easy to elicit false memories or, as we prefer to call them, commission errors in normal participants. Most of these studies relied on intentional efforts to introduce memory distortions such as imagination exercises (Nourkova, Bernstein, & Loftus, 2004) or misleading feedback about autobiographical memory (Hyman & Billings, 1998; Porter, Birt, Yuille, & Lehman, 2000; Ost, Foster, Costall, & Bull, 2005). Researchers using these manipulations noted that participants differ widely in the extent to which they develop commission errors. With this in mind, researchers have begun to look at personality traits that may account for participants' susceptibility to commissions. One obvious candidate is a trait known as dissociation. Trait dissociation is a chronic failure to integrate thoughts, feelings, and experiences into the stream of consciousness. Some authors believe that this failure would be functional in the sense that it would help people to block emotional memories from consciousness (Bernstein & Putnam, 1986). Others have argued that this integration failure is a manifestation of absentmindedness (Merckelbach, Muris, & Rassin, 1999).

Dissociation encompasses a set of related characteristics, some of which are common in the population (e.g., daydreaming, absentmindedness), whereas others have a low base rate and are believed to be associated with psychopathology (e.g., derealization, depersonalization, amnesia; Van IJzendoorn & Schuengel, 1996). A number of studies have shown that participants who have many dissociative characteristics tend to have a high rate of commission errors (Eisen & Carlson, 1998; Heaps & Nash, 1999; Hyman & Billings, 1998; Clancy, Schacter, McNally, & Pitman, 2000; Geraerts, Smeets, Jelicic, Van Heerden, & Merckelbach, 2005; Ost et al., 2005; see review by Eisen & Lynn, 2001). However, in most of these studies participants were exposed to misleading feedback or suggestive questions and manipulations (e.g., imagination exercises). This might be an important point because some researchers (e.g., Platt, Lacey, Iobst, & Finkelman, 1998) have speculated that spontaneous memory commissions are not linked to dissociation. Recent work by Morgan et al. (2004) seems to support this position. In their study, healthy participants who had underwent an interrogation as part of army survival training were later asked to identify their interrogators in a live line-up or a photo spread. Especially when they had had a very stressful interrogation, participants made many false positive errors (i.e., identified the wrong person). Yet these errors were not related to participants' dissociation levels. On the other hand, one could argue that false positive eyewitness identifications represent a special type of commission error. In a recent study by Candel, Merckelbach, and Kuijpers (2003), undergraduates high or low in trait dissociation listened to an aversive story and then had to produce a free recall. Although there were no group differences in the number of correctly remembered story details, the high-dissociation group produced more commission errors than the low-dissociation group.

In the two experiments reported here, we tried to replicate the link between dissociation and spontaneous commission errors in free recall of an emotional event. We also tried to explore the functional locus of this link: Is it related to retrieval (Experiment 1) or encoding (Experiment 2)?

EXPERIMENT 1

The first experiment examined whether a correlation between trait dissociation and commission would emerge under conditions that resemble real-life situations. Participants were exposed to a staged incident and then gave memory reports of the incident. Participants' memory of the incident was probed repeatedly, as repeated attempts to recall an event are typical for many real-life situations (e.g., psychotherapy, police interrogations). Repeated retrieval attempts may increase the frequency of commission errors (Henkel, 2004). More specifically, commission errors are most likely to occur during final retrieval attempts. Schwartz, Fisher, and Hebert (1998) noted that relaxing response criteria is the driving force behind this phenomenon. These authors argued that over the course of repeated retrieval attempts, people might change their output criterion such that "the rememberer may produce a response that he or she might have withheld earlier in the output, with a more conservative criterion" (Schwartz et al., 1998, p. 271). To the extent that the link between trait dissociation and commission errors has to do with relaxing retrieval criteria, one would expect that dissociation is particularly strongly related to commission errors emerging during later retrieval attempts.

METHOD

Participants

The sample consisted of 36 psychology undergraduates (30 women, 6 men) who volunteered to participate in exchange for course credits. Their mean age was 19.7 years (SD = 2.03). Participants were told that they had to fill in several questionnaires during a mass testing session. The study was approved by the standing ethical committee of our faculty.

Materials

Students were seated in a large lecture room and given a booklet containing a self-report scale about dissociative experiences and some filler questionnaires. Participants completed the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986), a widely used scale for measuring dissociative experiences in clinical and nonclinical samples. The psychometric properties of the DES in terms of its stability, coherence, and clinical usefulness are good (for a review, see van IJzendoorn & Schuengel, 1996). The DES measures primarily what has been called trait dissociation, that is, the extent to which people habitually experience dissociative phenomena. Examples of such phenomena include disturbances in memory (e.g., not sure whether a remembered event happened or was a dream), perception (e.g., hearing voices inside one's head), and awareness (e.g., finding oneself in a place but unaware of how one got there). The DES contains 28 items that ask about the frequency of such disturbances (e.g., "Some people have the experience of driving a car and suddenly realizing that they don't remember what has happened during all or part of the trip. Mark the line to show what percentage of the time this happens to you."). Respondents use 100-mm visual analog scales (VASs: anchors 0 = not at all, 100 = very much) to indicate the percentage of time they have experienced dissociative phenomena. Scores are averaged across items

to obtain a total DES score, with higher DES scores indicating a higher frequency of dissociative experiences. In the current sample, Cronbach's alpha of the total DES was .91.

Procedure

After participants completed the DES, they completed filler scales, which will not be discussed further here. The filler scales pertained to issues such as food preferences. After about 8 min, one participant, who was a confederate of the experimenter, stood up and angrily confronted the experimenter with a story about his friend who had committed suicide a few weeks ago. The confederate was an actor from the local theater school and was a stranger to the participants. The confederate said that he was therefore unable to complete the questionnaires. He then left the room, shouting that the experimenter could keep her course credit points. After he had left the room, participants rated on 100-mm VASs how their mood had been before and after the incident they had just watched (anchors: 0 =very bad, 100 = very good). Participants were also asked to indicate on 100-mm VASs how emotional and how realistic they thought the incident had been (anchors: 0 = not at all upsetting or realistic, 100 = extremely upsetting or realistic). By this time,participants understood that the incident had been staged. Next, participants were given a surprise memory test, which involved a written free format account of the incident. They were instructed to list all the details they remembered about the incident, including the clothes of the confederate and what he had said. After a 10-min rest period, during which participants were not allowed to talk to each other, participants were told that as time passes by, people sometimes have new memories about an event. Again, they were invited to write down additional details if they remembered such details. They were not supposed to repeat previously reported information. Participants then were asked to complete new filler scales. Instructions to retrieve and write additional material were repeated two more times. Each retrieval trial lasted for 5 min. The whole session took about 1 hr. At the end, participants were thoroughly debriefed.

Data analysis

The incident with the confederate was videotaped, and the 52-s video fragment was shown to two independent judges, who also evaluated free recall protocols. A conservative criterion was used for identifying commission errors in free recall. Only the reported details that the two independent judges saw as wrong counted as commission errors (e.g., "the guy laughed" when in fact the confederate did not laugh, "the guy was wearing a red tie" when in fact he was wearing a gray tie, and "the guy was seeing a therapist because his friend committed suicide" when in fact he did not mention a therapist).

Bernstein and Putnam (1986) recognized that DES data typically are skewed (see also Wright & Loftus, 1999), and they recommended the use of nonparametric statistics. Accordingly, we computed Spearman rank correlations between DES and free recall parameters. To examine whether increases in commissions per retrieval round were steeper in people scoring high on the DES, we performed a median split on DES data, with those having DES scores of 14 or less (n = 18)

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being assigned to the low-DES group and those with DES scores exceeding 14 (n = 18) being assigned to the high-DES group. Because analyses of variance (ANOVAS) are largely unaffected by nonnormality (Snedecor & Cochran, 1980), we carried out a 2 (low vs. high DES)× 4 (retrieval trials) ANOVA on commission errors.

RESULTS AND DISCUSSION

Participants indicated that before the incident, their mood had been better than after the incident, with mean VAS ratings of 83.7 (SD = 9.9) and 42.8 (SD = 25.2), respectively, t(35) = 9.37, p < .01. Their mean emotionality and realism ratings were 53.1 (SD = 26.4) and 54.5 (SD = 29.8), respectively.

Table 1 summarizes DES and free recall data. The average DES score in our sample comes close to mean scores that previous studies reported for undergraduate samples (e.g., Van IJzendoorn & Schuengel, 1996). Spearman rank correlations between the various parameters are also shown in Table 1. There was no correlation between dissociation and correctly recalled details. In contrast, there was a significant correlation between DES and total number of commissions. Thus, the higher their dissociation levels, the more commission errors participants made. This significant association was also obtained when traditional Pearson product–moment correlations were computed and when DES scores were related to the percentage rather than absolute number of commissions.

Table 2 shows the mean commission errors of the two groups for each retrieval trial.¹ Overall, commission errors increased from 0.22 in the first retrieval round to 0.43 in the fourth retrieval round, although the increase was not linear. The numbers of commission errors were subjected to a 2 (low-DES versus high-DES) × 4 (retrieval rounds) ANOVA with repeated measures on the last factor. The main effect of retrieval round was significant, reflecting the overall increase in commission errors, F(3, 32) = 3.03, p < .05. The main effect of group was borderline significant, F(1, 34) = 3.54, p = .07, whereas the critical group × retrieval round interaction fell short of significance, F(3, 32) = 0.89, p = .46. Thus, we found no evidence

Table 1. Mean Dissociative Experiences Scale (DES) score and mean numbers of correctly reported details and commissions, Experiment 1 (N= 36)

			Spearman rank	
	Mean (SD)	Range	correlation with DES	
DES	15.92 (9.70)	0-41		
Correct details	13.03 (3.71)	7-21	.02	
Commissions	1.38 (1.09)	0-5	.34*	

**p* < .05, one-tailed.

Table 2. Mean commission errors (SD) per retrieval trial for participants with
high and low Dissociative Experiences Scale (DES) scores (both groups $n = 18$),
Experiment 1

	Trial 1	Trial 2	Trial 3	Trial 4
Low DES	0.21 (0.35)	0.21 (0.41)	0.32 (0.58)	0.37(0.59)
High DES	0.22(0.42)	0.22(0.42)	0.72 (0.83)	0.50(0.62)

that late output of commissions is typical for those who score high on dissociation.

Platt and co-workers (1998, p. 86) speculated that "those who score high on the DES may be particularly susceptible to memory suggestion . . ., while not showing any reduced accuracy in everyday memory." With this in mind, we examined the relationship between dissociation and temporal patterning of commissions in a situation that comes close to everyday life. Unlike in previous studies, participants were not exposed to a video fragment or a word list but witnessed a real-life incident and then received a surprise memory test. During this test, participants were repeatedly asked to provide additional information. VAS ratings indicated that the staged incident lowered participants' mood and was evaluated as moderately upsetting and realistic. Although participants were not exposed to misleading information, individual differences in dissociation were found to be related to the overall level of commission errors. Thus, our results concur with those of Candel et al. (2003), who also found a connection between DES scores and spontaneous memory commission (i.e., commission in the absence of suggestive manipulations). What remains unclear is the origin of this connection. Perhaps higher levels of dissociation are related to a chronic rather than temporary (i.e., at the end of successive free recalls) relaxation of the accuracy criterion. This speculation fits with one of our previous studies, in which we found higher dissociation scores to be related to a general tendency to overendorse items on autobiographical memory tasks (Merckelbach, Muris, Horselenberg, & Stougie, 2000).

EXPERIMENT 2

Another interpretation of the dissociation–commission link can be found in the work of those who emphasize the encoding aspects (i.e., input) of dissociation (e.g., Brewin & Saunders, 2001). Drawing on a long tradition in psychiatry, these authors argued that dissociation leads to fragmented and disorganized encoding of memory material. Also, studies looking at normal participants' free recall of neutral stories suggest that poor encoding of these stories may result in commission errors (Dalla Barba et al., 2002). On the other hand, if dissociation leads to poor encoding one would expect that higher dissociation scores are accompanied by a lower number of correctly recalled details. Yet this is not what we found in Experiment 1 (for similar findings, see Candel et al., 2003). One could counter that the sample in this experiment was too small to detect a correlation between dissociation and poor encoding. With these considerations in mind, we had a larger sample of participants in Experiment 2 watch a stressful video fragment of a car accident. Some participants watched the fragment under dual task conditions, whereas others were not given a dual task. Next, we obtained free recalls in several rounds. We tested the idea that the link between trait dissociation and commission errors would be especially strong under dual task conditions, high levels of trait dissociation would be related to lower levels of correctly recalled details and higher levels of commission errors.

METHOD

Participants

The sample consisted of 60 undergraduate volunteers (48 women, 12 men). Their mean age was 20.6 years (SD = 3.84). Participants were instructed that they would see a video fragment about a serious car accident. Participants who had been involved in a car accident were advised to withdraw from the study. The study was approved by the standing ethical committee of our faculty.

Procedure and measures

Participants were tested individually in a quiet lab room. They were assigned to either the control or the dual task group. One participant withdrew from the study, leaving 30 participants in the control group and 29 in the dual task group. As was the case in Experiment 1, participants in Experiment 2 completed the DES (Bernstein & Putnam, 1986). In the current sample, Cronbach's alpha for the DES was .90. Participants were instructed to watch an emotional video fragment depicting a severe but nonfatal automobile accident. The fragment was a 1-min film of a car rollover and had been used by the Dutch police as evidence in a court case. The video fragment was presented on a Dell Optiplex computer screen. All participants saw it for the first time. Participants in the control group were instructed just to sit and watch the video fragment. Participants in the dual task group were instructed to perform a distractor task while watching the video fragment. The task consisted of a random series of 23 500-Hz and 38 100-Hz clearly audible (60-dB) tones presented over loudspeakers. Participants were instructed to count the low-frequency tones. They were told that they had to specify the number of low-frequency tones after they had watched the video. Before and after the video fragment, participants completed a 10-point mood scale (anchors: 1 = feel very depressed, 10 = feel very happy).

After they had watched the video fragment, participants completed a filler questionnaire. Next, they were asked to provide a written free recall of everything they had seen in the video fragment. Then participants completed more filler questionnaires, after which they were instructed to write down additional details about the fragment if they remembered any. As in Experiment 1, there were four free recall rounds, each lasting 5 min, with approximately 10-min intervals between them. Written free recalls were evaluated by one of the experimenters on the basis of a checklist that described 92 details in the video fragment.² The checklist was based on pilot studies in our lab in which this video fragment had been used. Correctly recalled details. Commissions were defined as elements that could in no way be related to the listed details (e.g., "there was a police officer on the scene," which was not the case; "there was a biker involved in the accident," which was not the case).

Data analysis

We first performed manipulation checks in order to establish that the video was experienced as an emotional stimulus and that the dual task condition resulted in shallow encoding. Next, we calculated Spearman rank correlations between DES scores and commission errors across both groups and for each group separately. Finally, using a median split, we performed a 2 (control vs. dual task) × 2 (low vs. high DES) × 4 (retrieval trials) ANOVA on the commission errors.

RESULTS AND DISCUSSION

The mean mood rating before the video fragment was 6.55 (SD = 1.47) and dropped to 6.04 (SD = 1.90) after participants had watched the video fragment, F(1, 57) = 11.29, p < .01. Although this overall decrease is significant, its associated effect size is modest (Cohen's d = 0.30). The decline in mood ratings was steeper in the control than in the dual task group. Accordingly, the group × testing interaction was significant, F(1, 57) = 6.15, p = .02. However, the main effect of group remained nonsignificant, F(1, 57) = 1.42, p = .24.

The number of correctly recalled details, summed over all four retrieval rounds, differed markedly between controls and dual task participants. The mean total number of correctly recalled details in the control group was 54.62 (SD = 16.84), whereas that in the dual task group was 34.97 (SD = 15.22), t(57) = 4.66, p < .01. In sum, then, the video fragment had a significant but modest effect on participants' mood. The dual task was effective in that participants in the dual task group reported fewer correctly remembered details, which indicates shallow encoding.

In Experiment 2, the mean DES level (M = 21.97, SD = 11.05) in both groups was higher than that in Experiment 1. We have no ready explanation for this difference, but it should be noted that DES levels such as

those in Experiment 2 are by no means exceptional for undergraduate samples (Van IJzendoorn & Schuengel, 1996). Table 3 shows DES and free recall data of the control and the dual task group, respectively. As can be seen, Table 3 replicates the results of Experiment 1. That is, in the control group DES scores were significantly associated with total number of commission errors but not with total number of correctly remembered details. However, this correlational pattern was absent in the dual task condition, suggesting that the dual task condition overshadowed rather than boosted the dissociation–commission link.

Table 4 shows number of commission errors of low- and high-DES participants in both groups for each retrieval trial, separately.³ A 2 (control vs. dual task) $\times 2$ (low vs. high DES) $\times 4$ (retrieval trials) repeated-measures ANOVA vielded a main effect of tasks, F(1, 55) = 4.88, p = .03, indicating that participants in the dual task group made more commission errors than did control participants. Furthermore, the main effect of DES reached significance, F(1, 55) = 4.56, p = .04, indicating that high-DES participants had more commissions than low-DES participants. The main effect of trials was also significant, F(3, 162) = 16.41, p = .01, showing that commission errors increased over successive retrieval trials. However, the critical task × DES interaction effect failed to attain significance, F(3, 162) = 0.58, p = 0.58.62. Thus, we found no evidence that participants with high DES scores are particularly vulnerable to commission errors when a dual task interferes with their encoding. Similarly, the trials × DES interaction effect was nonsignificant, F(1, 55) = 0.44, p = .51, showing that multiple retrieval attempts did not produce more commission errors in high-DES than in low-DES participants. The three-way interaction of task × DES × trials was also nonsignificant, F(3, 162) = 0.84, p = .57.

				Spearman rank correlation
		Mean (SD)	Range	with DES
Control group	DES	22.95 (11.70)	5-49	
	Correct details	54.62 (16.84)	21-88	0.17
	Commissions	6.59 (4.82)	0 - 18	0.32^{*}
Dual task group	DES	20.98 (10.44)	5-46	
	Correct details	34.97 (15.22)	16-68	0.07
	Commissions	9.00 (7.10)	0-32	0.17

Table 3. Mean Dissociative Experiences Scale (DES) scores and mean numbers of correctly reported details and commissions in the control group (n = 30) and the dual task group (n = 29), Experiment 2

**p* < .05, one-tailed.

	* *			
	Trial 1	Trial 2	Trial 3	Trial 4
		Control group		
Low DES $(n = 15)$	1.03 (0.90)	1.23 (1.00)	1.54 (1.24)	1.69 (1.24)
High DES $(n = 14)$	1.02 (0.96)	1.81 (1.54)	2.31 (1.76)	2.38 (1.98)
		Dual task group		
Low DES $(n = 15)$	1.07 (1.00)	1.87 (2.13)	2.27 (2.54)	2.67 (3.24)
High DES $(n = 14)$	1.57 (1.38)	2.43 (1.59)	3.07 (1.93)	3.14 (1.81)

Table 4. Mean commission errors (*SD*) per retrieval trial for participants with low and high Dissociative Experiences Scale (DES) scores in the control and dual task groups, Experiment 2

GENERAL DISCUSSION

Numerous studies have shown that when participants are confronted with suggestive information or misleading feedback about an event they have witnessed, some of them will develop commission errors in their memory reports of the event (e.g., Eisen & Carlson, 1998; Porter et al., 2000). Furthermore, many researchers have noted that under these conditions, the personality trait of dissociation is a predictor of commission errors (see review by Eisen & Lynn, 2001). However, few studies have looked at whether dissociation is related to memory accuracy when no efforts have been made to introduce distortions. The two studies that have been done so far had mixed results, with one study finding that dissociation does not predict commission errors in eyewitness identifications of suspects (Morgan et al., 2004) and the other reporting that dissociation is related to spontaneous commission errors in people's narrative reports (Candel et al., 2003).

The current studies found evidence that higher DES scores are related to spontaneous commission errors in participants' free recall of emotionally relevant events. In fact, when DES and commission data of Experiments 1 and 2 are pooled, the Spearman rank correlation between variables is .31 (N= 95, p < .01). We are not claiming that this link is impressive in terms of effect sizes. Rather, our findings along with those of Candel et al. (2003) demonstrate that it is replicable. This is important because although commission errors generally are rare in normal adults' memory reports (Schwartz et al., 1998), they might have far-reaching consequences. Understanding of the personality correlates of such commission errors might shed light on their origins. Germane to this issue is work showing that people with recovered or repressed memories of childhood abuse have high scores on the DES (Clancy et al., 2000; McNally, Clancy, Pitman, & Schacter, 2000; Geraerts et al., 2005). We do not want to suggest that all these memories are full-blown commission errors, but the possibility that some of these people tend to make such errors and that their dissociative trait contributes to this tendency should not be dismissed.

We found no relationships between dissociative tendencies and correctly reported details. This is difficult to reconcile with the defensive function that many authors (e.g., Bernstein & Putnam, 1986; Gershuny & Thayer, 1999) ascribe to dissociation. If trait dissociation helps people to block out affective memories from their stream of consciousness, one would expect that participants scoring high on the DES would give less complete memory reports about an upsetting event (Experiment 1) or an emotionally relevant video fragment (Experiment 2) than participants scoring low on the DES. Yet this is not what we found. Like Candel et al. (2003), we did not find a link between dissociation and incomplete memory reports about an emotionally relevant event. One could argue that from a signal detection point of view, it is curious to have a trait that seems to lower the threshold for commission errors while leaving correct recall unaffected. One distinct possibility is that trait dissociation overlaps with an impulsive style of reasoning and decision making (e.g., Merckelbach, a Campo, Hardy, & Giesbrecht, 2005). During a free recall task this may manifest itself in higher levels of commissions but not correct recall. Future studies should combine free recall, recognition, and confidence measures to address this issue more fully.

Our attempts to identify the functional locus of the dissociation-memory commission link were largely disappointing. In Experiment 1, commission errors increased over the course of multiple retrieval attempts, but late output of commissions was not especially pronounced in participants with high dissociation scores. In Experiment 2, the dual task interfered with encoding, as evidenced by the lower number of correctly remembered details, but we found no indications that high-DES participants were especially likely to react with commission errors to competing task distraction. In fact, under dual task conditions, the dissociation-commission link became nonsignificant. This is reminiscent of a Stroop study by DePrince and Freyd (1999), who found that low-DES people are more susceptible to the attention disrupting effects of dual task conditions than high-DES people.

Three limitations of the current studies deserve some comment. First, in Experiment 1 we did not look at the content of the commission errors. It may well be the case that the late output phases of high-DES participants' free recall are characterized by confabulations rather than distortions, whereas the opposite is true for low-DES participants. This point warrants further study. Second, in Experiment 2 we used one type of interference, namely an auditory dual task. However, recent work by Holmes, Brewin,

and Hennessy (2004) showed that depending on their precise features (visual vs. verbal), dual tasks may or may not affect emotional memory. In an impressive series of studies, these authors demonstrated that verbal but not visual activity interfered with encoding processes in such way that it promoted subsequent emotional intrusions. However, Holmes et al. did not address commission errors in emotional memory, so it would be interesting to examine how different dual tasks (e.g., auditory vs. verbal tasks) may interact with trait dissociation in producing commission errors.

A third limitation is that our studies relied on the full DES. Some researchers have argued that the DES items cover a broad range of dissociative phenomena, but only some of these are clinically relevant (Waller & Ross, 1997). Accordingly, Eisen and Lynn (2001) recommended the use of a subset of eight DES items, the so-called DES-T items, which are thought to index a more pathological form of dissociation (see also Eisen & Carlson, 1998). Although the psychometric evidence for the existence of a pathological dissociative taxon is weak (Watson, 2003), future studies in this domain could look at how DES-T scores relate to memory failures.

To sum up, then, our findings show that high trait dissociation goes hand in hand with a tendency to make spontaneous commission errors in memory reports. The precise functional locus of this association—input or output—remains unclear but is worth pursuing given the consequences that such errors may have in everyday life.

Notes

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1. For the sake of brevity, we included only commissions in Table 2. A table showing number of correct details for each retrieval trial in both groups can be obtained from the first author.

2. The video material and the checklist can be obtained from the first author upon request.

3. A table showing number of correct details for each retrieval trial in both groups can be obtained from the first author.

References

Bernstein, D. P., & Putnam, F. W. (1986). Development, reliability, and validity of a dissociation scale. *Journal of Nervous and Mental Disease*, 174, 727–735.

Brewin, C. R., & Saunders, J. (2001). The effect of dissociation at encoding on intrusive memories for a stressful film. *British Journal of Medical Psychology*, 74, 467–472.

- Candel, I., Merckelbach, H., & Kuijpers, M. (2003). Dissociative experiences are related to commissions in emotional memory. *Behaviour Research and Therapy*, 41, 719–725.
- Clancy, S. A., Schacter, D. L., McNally, R. J., & Pitman, R. K. (2000). False recognition in women reporting recovered memories of sexual abuse. *Psychological Science*, 11, 26–31.
- Dalla Barba, G., Mantovan, M. C., Traykov, L., Rieu, D., Laurent, A., Ermani, M., & Devouche, E. (2002). The functional locus of intrusions: Encoding or retrieval. *Journal of Clinical and Experimental Neuropsychology*, 24, 633–641.
- DePrince, P. A., & Freyd, J. J. (1999). Dissociative tendencies, attention, and memory. *Psychological Science*, 10, 449–452.
- Eisen, M. L., & Carlson, E. B. (1998). Individual differences in suggestibility: Examining the influence of dissociation, absorption, and a history of childhood abuse. *Applied Cognitive Psychology*, 12, 47–61.
- Eisen, M. L., & Lynn, S. J. (2001). Dissociation, memory, and suggestibility in adults and children. *Applied Cognitive Psychology*, *15*, s49–s73.
- Geraerts, E., Smeets, E., Jelicic, M., Van Heerden, J., & Merckelbach, H. (2005). Fantasy proneness, but not self-reported trauma is related to DRM performance of women reporting recovered memories of childhood sexual abuse. *Consciousness and Cognition*, 14, 602–612.
- Gershuny, B. S., & Thayer, J. F. (1999). Relations among psychological trauma, dissociative phenomena, and trauma-related distress: A review and integration. *Clinical Psychology Review*, 19, 631–637.
- Heaps, C., & Nash, M. (1999). Individual differences in imagination inflation. *Psychonomic Bulletin & Review, 6,* 313–318.
- Henkel, L. A. (2004). Erroneous memories arising from repeated attempts to remember. *Journal of Memory and Language*, *50*, 26–46.
- Holmes, E. A., Brewin, C. R., & Hennessy, R. G. (2004). Trauma films, information processing, and intrusive memory development. *Journal of Experimental Psychology: General*, 133, 3–22.
- Hyman, I. E., & Billings, F. J. (1998). Individual differences and the creation of false childhood memories. *Memory*, 6, 1–20.
- McNally, R. J., Clancy, S. A., Pitman, R. K., & Schacter, D. L. (2000). Personality profiles, dissociation, and absorption in women reporting repressed, recovered or continuous memories of childhood sexual abuse. *Journal of Consulting* and Clinical Psychology, 68, 1033–1037.
- Merckelbach, H., a Campo, J., Hardy, S., & Giesbrecht, T. (2005). Dissociation and fantasy proneness in psychiatric patients: A preliminary study. *Comprehensive Psychiatry*, 46, 181–185.
- Merckelbach, H., Muris, P., Horselenberg, R., & Stougie, S. (2000). Dissociation, reality monitoring, and response bias. *Personality and Individual Differences*, 28, 49–58.
- Merckelbach, H., Muris, P., & Rassin, E. (1999). Fantasy proneness and cognitive failures as correlates of dissociative experiences. *Personality and Individual Differences*, 26, 961–967.
- Morgan, C. A., Hazlett, G., Doran, A., Garrett, S., Hoyt, G., Thomas, P., Baranoski, M., & Southwick, S. M. (2004). Accuracy of eyewitness memory for persons

encountered during exposure to highly intense stress. International Journal of Law and Psychiatry, 27, 265–279.

- Nourkova, V., Bernstein, D. M., & Loftus, E. F. (2004). Biography becomes autobiography: Distorting the subjective past. *American Journal of Psychology*, 117, 65–80.
- Ost, J., Foster, S., Costall, A., & Bull, R. (2005). False reports of childhood events in appropriate interviews. *Memory*, *13*, 700–710.
- Platt, R. D., Lacey, S. C., Iobst, A. D., & Finkelman, D. (1998). Absorption, dissociation, and fantasy proneness as predictors of memory distortion in autobiographical and laboratory-generated memories. *Applied Cognitive Psychology*, 12, s77–s89.
- Porter, S., Birt, A. R., Yuille, J. C., & Lehman, D. R. (2000). Negotiating false memories: Interviewer and rememberer characteristics relate to memory distortions. *Psychological Science*, 11, 507–510.
- Schwartz, B. L., Fisher, R. P., & Hebert, K. S. (1998). The relation of output order and commission errors in free recall and eyewitness accounts. *Memory*, 6, 257–275.
- Snedecor, G., & Cochran, W. (1980). *Statistical methods* (7th ed.). Ames: Iowa State University Press.
- Van IJzendoorn, M. H., & Schuengel, C. (1996). The measurement of dissociation in normal and clinical populations: Meta-analytic validation of the Dissociative Experiences Scale (DES). *Clinical Psychology Review*, 16, 365–382.
- Waller, N. G., & Ross, C. A. (1997). The prevalence and biometric structure of pathological dissociation in the general population: Taxometric and behavior genetic findings. *Journal of Abnormal Psychology*, 106, 499–510.
- Watson, D. (2003). Investigating the construct validity of the dissociative taxon: Stability analyses of normal and pathological dissociation. *Journal of Abnormal Psychology*, 112, 298–305.
- Wright, D. B., & Loftus, E. F. (1999). Measuring dissociation: Comparison of alternative forms of the dissociative experiences scale. *American Journal of Psychology*, 112, 497–519.