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## False memories and memory confidence in borderline patients



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### ABSTRACT

**Background and objectives:** Mixed results have been obtained regarding memory in patients with borderline personality disorder (BPD). Prior reports and anecdotal evidence suggests that patients with BPD are prone to false memories but this assumption has to be put to firm empirical test, yet.

**Methods:** Memory accuracy and confidence was assessed in 20 BPD patients and 22 healthy controls using a visual variant of the false memory (Deese-Roediger-McDermott) paradigm which involved a negative and a positive-valenced picture.

**Results:** Groups did not differ regarding veridical item recognition. Importantly, patients did not display more false memories than controls. At trend level, borderline patients rated more items as new with high confidence compared to healthy controls.

**Conclusions:** The results tentatively suggest that borderline patients show uncompromised visual memory functions and display no increased susceptibility for distorted memories.

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## 1. Introduction

Various studies have found deficits in the nonverbal memory functioning in BPD patients (e.g. Beblo et al., 2006; Beblo et al., 2011; Fertuck, Lenzenweger, & Clarkind, 2006; Irlé, Lange, & Sachsse, 2005; Stevens, Burkhardt, Hautzinger, Schwarz, & Unkel, 2004). However, the current literature on this topic is still limited by, for example, small sample sizes, different inclusion criteria and contradictory findings (e.g. Kunert, Druecke, Saß, & Herpertz, 2003; Sprock, Rader, Kendall, & Yoder, 2000). In addition, the emotional content of some memory tests could have influenced performance either in a positive (e.g. by mood-congruent recall) or in a negative way, for example via interference (Mensebach et al., 2009; Williams, Mathews, & MacLeod, 1996). In accordance with the mood-congruent effect, some studies report that borderline patients have a preference for the encoding of borderline relevant words (Korfine & Hooley, 2000) as well as negative material (Domes et al., 2006). In contrast, however, heightened stress levels could render memory in BPD particularly susceptible for interferences (Krause-Utz et al., 2012). This would

be in line with studies in which BPD patients have been judged by clinicians to be prone to inaccurate perceptions and to memory errors for events (Bailey & Shriver, 1999; Reid, 2009; Snyder, 1986). To rule out increased susceptibility for false memories in BPD could be important for the treatment of BPD as it gives credit to the (autobiographical) reports of patients. Hence, the present study aimed to shed light on the question whether or not BPD patients are more susceptible to produce so-called false memories.

An experimental paradigm to investigate false memories is the Deese-Roediger-McDermott illusion (DRM; Deese, 1959; Roediger, Watson, McDermott, & Gallo, 2001). In the classical paradigm, participants study lists of words (e.g. 'nurse', 'medicine', 'sick'...), which are all related to a so-called critical lure item ('doctor') which, however, is not part of the learning list. The paradigm seduces participants to falsely memorize nonstudied but semantically (strongly) associated items. The DRM illusion is a robust phenomenon and has been replicated in a plethora of studies (for review see Gallo, 2006; Gallo, 2010). Disturbed memory processes and a heightened tendency to produce false memories have been related to dissociative symptoms (e.g. Clancy, McNally, Schacter, Lenzenweger, & Pitman, 2002; Dehon, Bastin, & Laroi, 2008), traumatic experiences (e.g. Zoellner, Foa, Brigidi, & Przeworski, 2000) and posttraumatic stress disorder (Brewin, 2011). However, some authors failed to confirm these findings (e.g. Bremner, Shobe, & Kihlstrom, 2000; Geraerts, Smeets, Jelicic, an Heerden, &

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Merckelbach, 2005; Jelinek, Hottenrott, Randjbar, Peters, & Moritz, 2009; Wright, Startup, & Mathews, 2005).

No study has yet experimentally explored visual false memories in borderline patients using the DRM paradigm. Several (indirect) arguments hint to the possibility that BPD patients show heightened susceptibility to the DRM effect. For example, many borderline patients have experienced (childhood) trauma (Laporte, Paris, Guttman, & Russell, 2011) and PTSD (Pagura et al., 2010). In addition, up to 75% of BPD patients suffer from dissociative experiences (for a review see Barnow et al., 2010). As mentioned before, these (comorbid) symptoms seem to be associated with increased false memories and could impede the encoding and retrieval of objective events (Bailey & Shriver, 1999).

Hence, we expected that patients diagnosed with BPD show worse visual memory performance and, in particular, a heightened susceptibility for false memories on the DRM paradigm compared to healthy controls. Further, we anticipated that the number of false memories is related to the severity of dissociative symptoms. In addition, we controlled for depressive symptoms which are very common in BPD (Lenzenweger, Lane, Loranger, & Kessler, 2007; Zanarini et al., 1998) and have been found to impair memory performance in other populations (e.g. Moritz, Kloss, Jahn, Schick, & Hand, 2003). To test these hypotheses, we assessed a visual version of the DRM paradigm. In addition, the emotional content of the learning material was manipulated. We expected that patients would show enhanced encoding of negatively valenced emotional material relative to positive material (mood- or schema-congruent effect). Finally, we wanted to explore whether the subjective evaluation of the own performance differs from the measured performance accuracy. Memory confidence was explored in view of a prior finding that patients with BPD showed overconfidence in an emotion recognition task (Schilling et al., 2012). We expected that overconfidence represents a general cognitive bias in BPD. A heightened memory confidence might contribute to conflicts as the subject does not question his or her judgement as would be the case with responses attached with doubt.

## 2. Methods

### 2.1. Participants

A total of 20 subjects fulfilling criteria for BPD according to DSM-IV as well as 22 nonclinical subjects participated in the study. Borderline patients were recruited at the Department of Psychosomatic Medicine and Psychotherapy, University Medical Center Hamburg-Eppendorf and Schön Klinik Hamburg-Eilbek (Germany). Healthy controls were drawn from an existing subject pool. All subjects had an age between 18 and 65 years and showed an intelligence level (IQ) above 70. Substance dependence (last 6 months), current or lifetime presence of bipolar disorder I, schizophrenia or schizoaffective disorder as well as any neurological disorder had led to study exclusion for patients. Written informed consent was obtained from all subjects.

### 2.2. Instruments

#### 2.2.1. Psychopathology

The BPD psychopathology was measured with the German version of the Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II; First, Gibbon, Spitzer, Williams, & Benjamin, 1997) and the short-version of the Borderline Symptom List (BSL-23; Bohus et al., 2009). The presence of major axis I diagnoses in patients (and the absence in healthy controls, respectively) was determined with the Mini Neuropsychiatric Interview (MINI; Sheehan et al., 1998). Furthermore, the German version of the Beck

Depression Inventory (BDI; Beck & Steer, 1993) was administered to assess the severity of depressive symptoms. Pathological dissociation was measured with a German version of the 8-item subscale of the Dissociative Experiences Scale, the DES-Taxon (Spitzer et al., 2006; Waller, Putnam, & Carlson, 1996). Intelligence was measured with the Multiple choice vocabulary test (MWT-B; Lehrl, Triebig, & Fischer, 1995).

#### 2.2.2. Visual false memory paradigm: material and procedure

We used an abbreviated computer-based visual false memory paradigm that has been previously administered in schizophrenia patients (Moritz, Woodward, & Rodriguez-Raecke, 2006) and traumatized individuals (Jelinek et al., 2009). The material for encoding consists of manually drawn black-and-white scenes (see Moritz et al., 2006). We used a visual version of the paradigm to offer a strong contextual cue as pictures are more salient than word lists. One picture displays a beach scene (emotional positive) while the other picture depicts a surveillance scene (hostile, delusional). The latter was chosen as BPD patients often believe others have hostile and malevolent intentions (Arntz, 1994, 2004; Pretzer, 1990). This cognitive schemata was thought to influence information (memory) processing (Arntz, Weertman, & Salet, 2011). In our study we expected a superior encoding for the mood- respectively schema-congruent negative scene in BPD patients relative to controls.

The two scenes were successively presented in random order for each 40 s. Subjects were instructed that they later would be asked to recognize details from the pictures. Between the encoding and recognition phases, participants had to complete the Multiple choice vocabulary test (MWT-B; Lehrl et al., 1995) to attenuate a possible primacy- and recency-effect (Crowder, 1976). Subsequently, the recognition phase was initiated: 24 items per scene (i.e. a total of 48 items) were presented in written form on the screen in full random order. Twelve of the items per scene represented prototypical (i.e. strong) 'old' items (e.g. display of a 'sun' in the beach scene). In addition, 12 new (i.e. nonstudied) items were presented: eight of them were strongly related to the scene but in fact not presented before (critical lures, e.g. 'towels' for the beach scene). Another four items per picture were also not presented before but unrelated to the scene or even implausible (e.g. 'traffic lights' for the beach scene). Subjects were instructed to rate each item on a scale of 1–4 (1 = 'old and confident', 2 = 'old and not confident', 3 = 'new and confident', 4 = 'new and not confident'). Responses were considered as confident if rated as 1 = 'old confident' or 3 = 'new and confident'. There were no time restrictions. At the end of the trial, participants evaluated each picture with regard to its emotional valence (from 1 = 'very positive' to 9 = 'very negative') and arousal (from 1 = 'very exciting' to 9 = 'not exciting at all').

## 3. Results

### 3.1. Participants

Participants did not differ on age. However, the BPD group included somewhat more women than men compared to the control group (see Table 1). Verbal intelligence was higher in the healthy control group. Twelve BPD subjects fulfilled criteria for current major depression, 11 for an anxiety disorder and five patients suffered from a comorbid eating disorder. Nine patients reported traumatic experiences in the past. Sixteen patients were treated with psychotropic medication, mainly with antidepressants, so that the study did not have sufficient power to examine this factor more thoroughly.

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