

Overview of studies where researchers report **increased false memory** in participants with some symptoms that characterize BPD (trauma, PTSD, and depression)

Author	Participants	Procedure	Memory test	Results
Korfine & Hooley [1]	Adults Patients & healthy controls	<p>Participants:</p> <ol style="list-style-type: none"> 1. BPD patients from a hospital 2. BPD patients from the community 3. Normal controls <p>Instruments:</p> <ol style="list-style-type: none"> 1. The Omnibus Personality Disorder Inventory 2. International Personality Disorder Examination 3. Structured Clinical Interview for DSM-III-R-Non-patient (SCID) 4. Beck Depression Inventory 5. Shipley Test (IQ) 6. Wechsler Adult Intelligence Scale-Revised 	<p>Free recall, Cued recall and Recognition memory task:</p> <ul style="list-style-type: none"> • 42 experimental words • 42 distractor words <p>Directed forgetting task</p> <ul style="list-style-type: none"> • 42 experimental words including Borderline, negative non-borderline words, positive, and neutral words. • Half of the words were to be remembered (R-cued) • Half of the words were to be forgotten (F-cued) 	<p>They found no group differences on the free-recall task for words in the remember condition. However, compared to healthy controls, individuals with BPD reported significantly more of the borderline words from the forget condition. In other words, borderline participants reported borderline words that they had been instructed to forget.</p>

Author	Participants	Procedure	Memory test	Results
Clancy et al. [2]	Adults Normal	<p>Participants:</p> <ol style="list-style-type: none"> Individuals who hve reported recovered memories of alien abduction (Group 1); Individuals who believe that they have abducted by aliens but have no memories (Group 2); Individuals who deny having been abducted by aliens (Group 3). <p>Instruments:</p> <ul style="list-style-type: none"> Typical DRM paradigm (0-, 3-, 6-, 9-, 12-, or 15-item word lists) Mississippi Scale for Combat-Related Posttraumatic Stress Disorder Beck Depression Inventory Dissociative Experiences Scale Absorption subscale of Tellegen’s Multidimensional Personality Questionnaire 400-item Attitudes, Feelings, and Experiences Survey 	<ul style="list-style-type: none"> The words were presented aurally every 30s Distractor: Math problem <p style="text-align: center;">Recall</p> <ul style="list-style-type: none"> Recall period: 1.5 min Recall responses were handwritten <p style="text-align: center;">Recognition</p> <ul style="list-style-type: none"> 40 studied words 40 non-studied words (20 critical lures, 20 control words) Make new/old response 	<p>Group 1 were more prone than were the other 2 groups to exhibit false recall and recognition.</p> <p>Hypnotic suggestibility, depressive symptoms, and schizotypic features were shown to be significant predictors of false recall and false recognition.</p>

Author	Participants	Procedure	Memory test	Results
Zoellner et al. [3]	Adults Traumatised individuals & Healthy controls	<p>Participants:</p> <ol style="list-style-type: none"> 1) Traumatised individuals with PTSD 2) Traumatised individuals without PTSD 3) Non-traumatised healthy controls <p>Instruments:</p> <ul style="list-style-type: none"> ▪ Modified DRM procedure (24 word-lists with 15 items in each) ▪ Beck Depression Inventory ▪ State-Trait Anxiety Inventory ▪ Dissociative Experiences Scale 	<ul style="list-style-type: none"> ▪ The words were presented on a tape recorder every 1.5s ▪ Distractor: 8 arithmetic tasks <p style="text-align: center;">Recall</p> <ul style="list-style-type: none"> ▪ Recall period: 2 mins ▪ 8 lists were followed by an immediate free-recall test (study + recall); ▪ 8 by arithmetic problems (study + arithmetic); and 8 non-studied lists ▪ Recall responses were handwritten <p style="text-align: center;">Recognition</p> <ul style="list-style-type: none"> ▪ 48 studied words, ▪ 48 non-studied words (24 critical lures and 24 control words) ▪ Remember/know judgment ▪ Distractor: 8 non-studied lists 	<p>Traumatised participants with or without PTSD exhibited more false recall of critical non-presented words than did non-traumatised participants.</p> <p>False recall was related to trait anxiety and PTSD severity.</p>

Author	Participants	Procedure	Memory test	Results
Brennen et al. [4]	Adults Traumatised individuals	<p>Participants:</p> <ol style="list-style-type: none"> 1) Traumatised participants with PTSD 2) Traumatised participants without PTSD <p>Instruments:</p> <ul style="list-style-type: none"> ▪ Modified DRM procedure (20 word-lists with 10 items in each: 10 trauma-related and 10 non-trauma lists) ▪ Impact of Event Scale ▪ Beck Depression Inventory 	<ul style="list-style-type: none"> ▪ The words were read aloud by the experimenter <p style="text-align: center;">Recall</p> <ul style="list-style-type: none"> ▪ Recall responses were handwritten ▪ After the 20th list, they were asked to make a Remember/Know/Guess judgment about the phenomenological quality of the recall. 	Compared to healthy controls, individuals with PTSD had significantly higher trauma-related false memory levels, but there was no difference for neutral false memories.
Moradi et al. [5]	Adults Military personnel who had participated in Iran-Iraq war	<p>Participants:</p> <ol style="list-style-type: none"> 1) Individuals with PTSD 2) Individuals without PTSD 3) Healthy controls <p>Instruments:</p> <ul style="list-style-type: none"> ▪ The Scenic False Memory (SFM) paradigm; neutral (electrician at work), positive (child's birthday), negative (surveillance), and trauma-related (real-life war) video scenes ▪ Impact of Event Scale–Revised ▪ Beck Depression Inventory-II ▪ Beck Anxiety Inventory ▪ Wechsler Adult Intelligence Scale–Revised 	<ul style="list-style-type: none"> ▪ No distractor task <p style="text-align: center;">Recall</p> <ul style="list-style-type: none"> ▪ Free-recall task associated with the videos ▪ The videos were presented in randomized order ▪ Recall responses were handwritten ▪ Each response was categorized as either a hit, new-related item (i.e. false memory) or new-unrelated item. ▪ Recall time: 2 minutes <p style="text-align: center;">Recognition</p> <ul style="list-style-type: none"> ▪ Recognition test for each scene comprised verbal descriptions: (a) 12 old objects, (b) 9 critical lures, and (c) 3 unrelated items 	Participants with PTSD recalled and recognized a significantly lower percentage of hits and a significantly higher percentage of false memories for both trauma-related and non-trauma-related video scenes, than healthy controls and participants without PTSD.

Author	Participants	Procedure	Memory test	Results
Baugerud et al. [6]	Children Patients & healthy controls	<p>Participant:</p> <ol style="list-style-type: none"> 1) Non-maltreated children ($n = 31$) 2) Maltreated children ($n = 26$) <p>Instruments:</p> <ul style="list-style-type: none"> ▪ Modified DRM procedure (15 word-lists with 10 items in each: neutral and negative emotional words) ▪ Wechsler Abbreviated Scale Intelligence 	<ul style="list-style-type: none"> ▪ Word lists were presented at a rate of 3s per word ▪ A simple 15s distractor task <p style="text-align: center;">Recall</p> <ul style="list-style-type: none"> ▪ The 15 lists were randomized into 3 groups of 5 lists each ▪ These three groups were conjoined to create three different 10-list block combinations ▪ Each child listened to one block of 10 lists: 6 neutral and 4 negative 	They found that it was easier to induce emotionally-negative false memories in maltreated children than in non-maltreated children.

Author	Participants	Procedure	Memory test	Results
Goodman et al. [7]	Adolescents & adults Participants with CSA histories & healthy controls	<p>Participants:</p> <ol style="list-style-type: none"> 1) 14- to 17-year-olds ($n = 49$) 2) 18- to 37-year-olds ($n = 44$) <ul style="list-style-type: none"> ▪ In each age group, half of the participants had CSA histories and half of them were healthy controls. <p>Instruments:</p> <ul style="list-style-type: none"> ▪ DRM paradigm (40 word-lists, with 10 items in each: childhood sexual abuse, positive, negative, and neutral) ▪ Traumatic Events Screening Inventory for Children (TESI-C) ▪ Trauma Assessment for Adults ▪ Wechsler Adult Intelligence Scale ▪ Wechsler Intelligence Scale for Children ▪ Dissociative Experiences Scale (DES) ▪ Adolescent Dissociative Experiences Scale (ADES). ▪ Trauma symptom checklists ▪ Posttraumatic Stress Disorder Scale (PDS) ▪ Child Posttraumatic Stress Disorder Symptom Scale (CPSS) ▪ Child Behavior Checklist (CBCL) ▪ Young Adult Self-Report (YASR) ▪ State–Trait Anxiety Inventory (STAI) ▪ STAI for Children (STAIC) ▪ Experiences in Close Relationships Questionnaire ▪ Children’s Trauma Questionnaire (CTQ) 	<p>Recall</p> <ul style="list-style-type: none"> ▪ Participants heard the 40 DRM word lists ▪ Free recall after approximately half of the word lists (9 to 11 of the 20 lists) <p>Recognition</p> <ul style="list-style-type: none"> ▪ 240 words: 80 studied words, 40 critical lure, and 120 unrelated words. 	Participants with a history of trauma had higher rates of false memory, especially for the negatively-valenced lists than did healthy controls.

Author	Participants	Procedure	Memory test	Results
Moritz et al. [8]	Adult Patients & healthy controls	<p>Participants:</p> <ol style="list-style-type: none"> 1) Depressed patients ($n = 25$) 2) Healthy controls ($n = 28$) <p>Instruments:</p> <ul style="list-style-type: none"> ▪ Modified DRM procedure (4 word-lists with 12 items in each: depression-relevant, delusion-relevant, positive, and neutral). 	<ul style="list-style-type: none"> ▪ The words were read aloud by the experimenter ▪ Responses were recorded by the experimenter ▪ No distractor task <p style="text-align: center;">Old/New Recognition</p> <ul style="list-style-type: none"> ▪ 24 “old” and 24 “new” items ▪ Old/new judgment and whether they were confident or not in their response. 	They found a mood-congruence effect in that false memories for emotionally-charged words, especially depression-related items, were more likely to be produced by depressed patients than by healthy controls.
Joormann et al. [9]	Adult Patients & healthy controls	<p>Participants:</p> <ol style="list-style-type: none"> 1) Depressed patients ($n = 25$) 2) Healthy controls ($n = 27$) <p>Instruments:</p> <ul style="list-style-type: none"> ▪ Modified DRM procedure (40 word-lists with 15 items in each; negative, positive, and neutral). ▪ Structured Clinical Interview for the DSM–IV ▪ Beck Depression Inventory ▪ Ruminative Response Scale 	<ul style="list-style-type: none"> ▪ Word lists were presented at a rate of 250 ms per word ▪ No distractor task <p style="text-align: center;">Recall</p> <ul style="list-style-type: none"> ▪ Test period: 45s ▪ Recall responses were handwritten 	Depressed individuals recalled more emotionally-charged false memories than did healthy controls.

Author	Participants	Procedure	Memory test	Results
Yeh & Hua [10]	Adults Patients & healthy controls	<p>Participants:</p> <ol style="list-style-type: none"> 1) Depressed patients ($n = 22$) 2) Healthy controls ($n = 30$) <p>Instruments:</p> <ul style="list-style-type: none"> ▪ Modified DRM procedure (27 word-lists with 13 items in each: negative, positive, and neutral). ▪ Beck Depression Inventory 	<ul style="list-style-type: none"> ▪ Items were presented visually ▪ Distractor: mathematics problems (10 min) <p style="text-align: center;">Recognition</p> <ul style="list-style-type: none"> ▪ 81 items: 36 studied items, 18 critical lures, 18 new items, and 9 new unrelated lures. ▪ Emotional values of 81 items (very positive to slightly positive). 	Negative false memories were more easily evoked in depressed patients than in healthy controls.

Overview of the studies where researchers **failed to report** the link between false memories and BPD symptoms (trauma, PTSD, and depression)

Author	Participants	Procedure	Memory test	Results
Schilling et al. [11]	Adult Patients & healthy controls	<p>Participants:</p> <ol style="list-style-type: none"> 1) BPD patients ($n = 20$) 2) Healthy controls ($n = 22$) <p>Instruments:</p> <ul style="list-style-type: none"> ▪ Visual DRM paradigm ▪ Dissociative Experiences Scale ▪ Depression Inventory ▪ Verbal Intelligence vocabulary test 	<p>Recognition</p> <ul style="list-style-type: none"> ▪ 24 items per scene were presented in written form on the screen in random order. ▪ Test words included 12 studied words, and 12 items “new” (8 critical lures; 4 unrelated words) ▪ Distractor: Multiple choice vocabulary test 	They found no difference between groups regarding veridical item recognition. Moreover, patients did not show more false memories than healthy controls.
Triantafyllou et al. [12]	Adult Patients & healthy controls	<p>Participants:</p> <ol style="list-style-type: none"> 1) Individuals with PTSD 2) Individuals without PTSD <p>Instruments:</p> <ul style="list-style-type: none"> ▪ Modified DRM procedure (4 word-lists with 15 items in each; only neutral wordlists) ▪ Fully structured diagnostic interview ▪ Systematic assessment of specific disaster-related experiences 	<p>Recognition</p> <ul style="list-style-type: none"> ▪ Words were verbally presented at the rate of about 1 to 1.5 seconds ▪ No distractor task ▪ Test words included 2 words from each of the 4 lists, 4 critical lures, and 12 unrelated items ▪ Participants were asked to circle the words they remembered in a written list of 24 words 	They found no significant difference between two groups in false memory propensity.

Author	Participants	Procedure	Memory test	Results
Jelinek et al. [13]	Adult Patients & healthy controls	<p>Participants:</p> <ol style="list-style-type: none"> 1) Traumatized individuals with PTSD 2) Traumatized individuals without PTSD 3) Non-traumatized participants <p>Instruments:</p> <ul style="list-style-type: none"> ▪ Visual variant of the DRM paradigm ▪ Structured Clinical Interview for DSM-IV ▪ Post-traumatic Diagnostic Scale ▪ MINI neuropsychiatric interview ▪ Beck Depression Inventory ▪ Hamilton Depression Rating Scale ▪ Dissociative Experiences Scale ▪ Verbal Intelligence vocabulary test ▪ Self-Assessment Manikin 	<p>Recognition</p> <ul style="list-style-type: none"> ▪ 4 scenes were presented each for 40 s in randomized order ▪ For recognition test: 12 old items; 12 new items (distractor); 4 unrelated items; 8 critical lures ▪ Distractor task: vocabulary test (10 min) ▪ In the recognition trial, these items (48 old and 48 new items) were presented in written form. 	<p>They found no difference between groups with regard to memory performance and memory confidence. False memory propensity was not related to PTSD status. False memories were correlated with depression.</p>

Author	Participants	Procedure	Memory test	Results
Howe et al. [14]	Children Maltreated & non- maltreated	<p>Participants:</p> <ol style="list-style-type: none"> 1) Middle-socioeconomic-status (SES; $n = 60$) 2) Low-SES maltreated ($n = 48$) 3) Low-SES non-maltreated ($n = 51$) children <p>Instruments:</p> <ul style="list-style-type: none"> ▪ DRM procedure (12 word lists of 14 items) 	<p>Recall and Recognition</p> <ul style="list-style-type: none"> ▪ Each list was presented on an audio recording ▪ After some of the lists the children asked to recall words and for other lists they asked to engage in a symbol-mapping task (distractor) ▪ Yes / No recognition test on an audio tape and the participants answered verbally ▪ Recognition test: 72 words: (a) 36 targets (b) 12 critical distractors for the presented lists, (c) 12 other semantically related distractors, (d) 6 unrelated distractors and (e) 6 unrelated critical distractors. 	<p>There was found no correlation between maltreatment in children and false memory susceptibility when using neutral DRM lists.</p>

Preliminary work: Constructing BPD-relevant DRM Word lists

Studies on false memory have mainly focused on methodological paradigms and experimental conditions that can induce false memory in the general population [15, 16], however, there is a growing interest in studying the effect of personality and individual differences on false memory [17]. Despite inconsistent patterns of findings, recent evidence shows that certain cognitive factors, psychological status, and personality features are associated with greater likelihood of producing false memories [16, 18, 19]. For example, in many studies, researchers have found a positive correlation between false memories and low cognitive abilities [16], personality traits [20], depression [2], anxiety [3], dissociation [21], delusions [22], PTSD [23], and history of trauma [7].

In another line of research, researchers have constructed thematic DRM word lists, such as depression-relevant, trauma-relevant, and delusion-relevant word lists to study trait-congruent false memories (e.g. [7, 8, 24]. In these studies, researchers have examined the extent to which the formation of false memories is influenced by one's past experiences (e.g. traumatic experiences), or one's mental condition (e.g. depressive symptoms). For example, Brennen et al. [4] found that participants with a history of trauma had significantly higher false memory for trauma-relevant word lists than did a comparison group. In a similar kind of study, Howe and Malone [24] found that participants with depression had significantly higher false memory for depression-relevant word lists than did a control group. See Table 1 for a full summary of studies in which researchers have constructed and used thematic word lists to study trait-congruent false memories.

In our main study, we wanted to use the same approach to investigate the effect of borderline personality features on the creation of false memories. To do this, first, we conducted two preliminary experiments to construct BPD-related DRM word lists and we then used these word lists to examine the effect of BPD on false memory. In these

supplementary materials, we will describe the experimental procedure and results of this preliminary work.

Table 1 Overview of studies to construct emotional and thematic DRM word lists

Author	Participants	Procedure	Results
Zhang et al. [25]	Adults Normal	<p>2 Experiments:</p> <p>1) Establishing emotional word lists</p> <p>a) Participants were presented with a total of 233 words and for each word, asked to write down a single word that came to mind.</p> <p>b) The emotional valence and arousal of the words were assessed by participants using Self-Assessment Manikin (SAM).</p> <p>2) Investigating the effect of mood on false memory for emotional DRM word lists</p> <p>a) Participants were randomly assigned to positive, negative, or neutral mood conditions.</p> <p>b) Positive and negative moods were induced using music and self-imagery.</p> <p>c) Neutral mood was induced by reading a collection of basic facts about New Zealand.</p> <p style="text-align: center;">DRM paradigm</p> <ul style="list-style-type: none"> ▪ Study Phase: 12 word-lists of 10 items were chosen based on Experiment 1: 4 negative, 4 positive, 4 neutral. ▪ Distraction Task: 5-min subtraction exercise. ▪ Recognition Test: 36 studied words and 36 non-studied words (12 critical lures and 24 unrelated lures) – make Old/New response to each. 	<p>They developed 4 negative (critical lures: <i>anger, sick, lie, sad</i>), 4 positive (critical lures: <i>beautiful, nice, love, happy</i>), and 4 neutral word lists (critical lures: <i>foot, car, mountain music</i>).</p> <p>Words on the lists had the assigned emotive content (i.e. positive, negative, or neutral), and the lists were matched in terms of arousal and backward association strength.</p> <p>They found a mood-congruent effect in the negative mood condition for both true and false memory.</p>

Author	Participants	Procedure	Results
Baugerud et al. [6]	Children Maltreated & non-maltreated	<p>Modifying the adult version of the DRM task for children</p> <ol style="list-style-type: none"> Selected 150 words on the basis of word age-norms. 40 8- and 9-year-olds and 46 11- and 12-year-olds. They were instructed to write down the first word that come to mind for each of 150 words that were read out to them. <p>Selection of word associations</p> <ol style="list-style-type: none"> Critical lures: the words with the greatest number of associations. List words: the most frequently-associated words with each critical lure. The words placed in decreasing order of associative frequency. 	They developed 15 word-lists with 10 items each: 9 neutral and 6 negative.
Howe & Malone [24]	Adults Non-clinical	<p>Constructing depression-relevant word lists</p> <ul style="list-style-type: none"> Created depression-relevant lists using standard word-association norms. Recruited a group of 68 non-depressed participants to rate the words in terms of their relevance to depression (from very irrelevant to very relevant). The final depression-relevant word lists were chosen once 70% or more of the participants rated the critical targets and at least 6 of the 10 words in the lists as very relevant to depression. 	They developed 3 depression-relevant word lists with 10 items in each list (critical lure depression, alone, failure).
Moritz et al. [8]	Adults Non-clinical	<p>Constructing depression-relevant and delusion-relevant word lists</p> <ul style="list-style-type: none"> Created a set of 30 thematic words for depression, delusion, and positive and neutral themes. 75 healthy participants provided up to five spontaneous associations to each thematic word. 	They developed 4 thematic word-lists with 10 items in each list: critical lures were <i>loneliness</i> (depression-relevant), <i>betrayal</i> (delusion-relevant), <i>holidays</i> (positive), and <i>window</i> (neutral).

Author	Participants	Procedure	Results
Goodman et al. [7]	Adults Non-clinical	<p data-bbox="751 248 1247 285">Constructing trauma-related word lists</p> <ul data-bbox="558 305 1423 657" style="list-style-type: none"> <li data-bbox="558 305 953 337">▪ 18-31-year-old undergraduates <li data-bbox="558 342 1255 375">▪ Participants provided free associations to potential items. <li data-bbox="558 380 1415 493">▪ The 10 best associates for each critical lure were selected based on the BAS ratings and frequency, age of acquisition, concreteness, and familiarity ratings. <li data-bbox="558 498 1415 531">▪ 30 participants rated the valence (1 = very negative; 5 = very positive), <li data-bbox="558 535 1423 657">▪ 30 participants rated the lists in terms of arousal (1= not at all arousing, exciting, stimulating, and interesting; 5 = very arousing, exciting, stimulating, and interesting). 	They developed 10 trauma-related word lists with 10 items in each list: critical lures were touch, fondle, kiss, rape, hurt, secret, sex, strip, cry, and shame.

Method

We developed the BPD-related word lists in two experiments. All participants were recruited via online advertisement websites; they provided written, informed consent; and were tested either individually or in groups using online Qualtrics (www.qualtrics.com). All the participants had normal or corrected to normal vision. The research was reviewed and approved by the University's Human Ethics Committee (Health).

Experiment 1: Obtaining critical lures

The first step in our research was to obtain BPD-related critical lures.

Participants

We recruited 60 undergraduate students (39 females; M age = 24.74 years; SD = 5.47; range = 18 to 39) to take part in Experiment 1. Participants identified as New Zealand European (43%), Māori (4%), or "Other" (53%).¹ The inclusion criterion was that participants met a minimum level of English proficiency as per the entry requirement to the University: 65% of participants were native speakers of English and the remainder had met the minimum English proficiency level. Participants were reimbursed \$15 for their participation.

Procedure

We used Qualtrics to present participants with the following brief description of BPD. We wrote the description of BPD based on our reading of a number of layperson summaries of BPD (e.g. <https://www.mentalhealth.org.nz>).

Borderline personality disorder (BPD) is a serious mental illness that centres on the inability of people to manage emotions effectively. The disorder occurs in the context of relationships: sometimes all relationships are affected, sometimes only one. People

¹ Participants who selected 'Other' were not asked to further specify their ethnicity.

with BPD may experience intense episodes of anger, depression, anxiety, intense and highly changeable moods, and can display uncertainty about who they are. As a result, their interests, values, and career plans can change rapidly.

Seemingly ordinary events may trigger their symptoms. People with BPD have an extreme fear of abandonment and are highly sensitive to rejection. For example, they may feel angry and distressed over minor separations—such as holidays, business trips, or sudden changes of plans—from people to whom they feel close, and react with anger and distress, above what would be considered a normal reaction to that situation. People with BPD also tend to think in very ‘black and white’ terms, for example, often switching between intense feelings of love and hate in personal relationships.

People with BPD can be impulsive and often involved in dangerous behaviours, such as spending sprees, unsafe sex, substance abuse, reckless driving, and binge eating. Around 80% of people with BPD display suicidal behaviours, including suicide attempts, cutting and/or burning themselves, and other self-destructive acts. In sum, borderline personality disorder can manifest as mood instability, difficulty with interpersonal relationships, high rates of self-injury, feelings of isolation, boredom, emptiness, intense anger, and difficulty controlling anger.

After reading the description, participants were asked to write down at least 4 words that came to mind that were related to the features of BPD. If they could not think of any responses, they were told to write “0” in the space. Finally, participants completed a demographic questionnaire that included questions about age, gender, ethnicity, and language.

Results

We corrected any spelling errors before using the same rules as Nelson et al. (2004) to pool responses that could be put together. For example, several participants wrote *anger* as a response and others wrote *angry*. Instead of treating each of these responses separately, we pooled the responses, so that in this example, the count for *angry* was pooled with the count for *anger*. Overall, we used pooling 11 times out of 239 responses.

We then calculated the frequency of each word that participants reported after they read the description of BPD and sorted the words accordingly. Table 2 shows the list of BPD-related words in order of the frequency with which they were produced and their corresponding BAS (i.e. Backward Associative Strength)² value.

² In this case, BAS refers to the rate at which participants produced BPD-related words in response to the description of BPD and is calculated by dividing the frequency of each word by the number of participants.

Table 2 Participants' responses listed in order of frequency

BPD-related words	Frequency	BAS
Anger*	17	0.283
Unstable*	14	0.233
Moody*	12	0.2
Impulsive*	12	0.2
Depression*	9	0.15
Emotional*	8	0.133
Insecure*	7	0.116
Intense	6	0.1
Loneliness*	4	0.06
Suicide*	4	0.06
Borderline	4	0.06
Changeable	4	0.06
Dangerous	4	0.06
Isolation	4	0.06
Reckless	4	0.06
Relationships	4	0.06
Uncertain	4	0.06
Self-harm*	3	0.05
Bipolar	3	0.05
Disorder	3	0.05
Change	3	0.05
Crazy	3	0.05
Personality	3	0.05
Sensitive	3	0.05
Unreliable	3	0.05

Note. *Words selected as potential critical lures to test in Experiment 2.

We chose the potential critical lures to compile the word lists in Experiment 2 based not only on their frequency, but also with the requirement that the words were not ambiguous. For this reason, although the frequency of the word “intense” was higher than “loneliness” and “suicide,” two experimenters judged that the word, intense, was ambiguous in the absence of any other information. We also chose to test the word, self-harm, as a potential critical lure instead of other words with higher frequency because based on our professional experiences, we judged self-harm to be more related to BPD.

Experiment 2: Establishing word lists

The second step in our research was to use the 10 critical lures established in Experiment 1 to construct a series of BPD-related word lists using a word association task.

Participants

We recruited an independent group of 70 undergraduate students (52 females; M age = 24.00 years; SD = 5.90; range = 18 to 51) to take part in Experiment 2. Half of the participants selected New Zealand European as their ethnicity and half selected Other. Again, the inclusion criterion was that participants met a minimum level of English proficiency as the entry requirement to the University: 73% of participants were native speakers of English and the remainder all met the minimum English proficiency level. Participants were reimbursed \$15 for their participation.

Procedure

We used Qualtrics to present participants with each of the 10 critical lures that we had selected on the basis of the results of Experiment 1 to use in the word association task. Participants were told that they would be shown a series of target words (i.e. critical lures), and for each target word, they were asked to write down at least 5 words that came to mind. If they could not think of a response, they were told to write “0” in the space. Afterwards, participants completed a demographic questionnaire that included questions about age, gender, ethnicity, and language.

Results and Discussion

Again, we corrected spelling errors and pooled any responses that could be put together—this occurred very infrequently; we used pooling in only 19 out of 1407 responses. For

each of the 10 target words, we then calculated the frequency and BAS³ of each word that had been produced in response to the target word during the word association task. Finally, to construct each word list, we chose the top 10 words for each target word (i.e. critical lure) based on their BAS values. Table 3 shows the 10 BPD-related word lists that were obtained as a result of Experiment 2 as well as the mean BAS for each list.

The main goal of this preliminary work was to develop BPD-related word lists. Based on the results of Experiments 1 and 2, we were now able to conduct our main experiment.

³ In this case, BAS refers to the rate at which the participants produced words in response to the critical lures and is calculated by dividing the frequency of each word by the number of participants.

Table 3 The constructed BPD-related word lists

Critical lure: Depression		Critical lure: Loneliness		Critical lure: Suicide		Critical lure: Self-harm		Critical lure: Moody	
List word	BAS	List word	BAS	List word	BAS	List word	BAS	List word	BAS
Sad	0.642	Sad	0.4	Death	0.328	Suicide	0.285	Emotional	0.285
Alone	0.328	Alone	0.357	Depressed	0.257	Depression	0.185	Sad	0.228
Unhappy	0.1	Empty	0.142	Sad	0.228	Hurt	0.157	Grumpy	0.142
Lost	0.1	Sadness	0.128	Loneliness	0.142	Cut	0.142	Angry	0.128
Cry	0.1	Isolation	0.085	Hopeless	0.114	Pain	0.142	Depressed	0.1
Anxious	0.085	Dark	0.085	Desperate	0.114	Depressed	0.128	Down	0.085
Down	0.071	Solitude	0.071	Dark	0.071	Knife	0.1	Gloomy	0.071
Stress	0.071	Apart	0.057	Self-harm	0.057	Blood	0.1	Up	0.071
Dark	0.071	Lost	0.057	Hurt	0.057	Lonely	0.071	Teenagers	0.071
Despair	0.071	Single	0.057	Help	0.057	Wrist	0.042	Annoyed	0.057
Mean BAS	0.163	Mean BAS	0.143	Mean BAS	0.142	Mean BAS	0.135	Mean BAS	0.123

Table 3 Continued

Critical lure: Emotional		Critical lure: Anger		Critical lure: Insecure		Critical lure: Impulsive		Critical lure: Instability	
List word	BAS	List word	BAS	List word	BAS	List word	BAS	List word	BAS
Sad	0.25	Rage	0.2	Lonely	0.185	Thoughtless	0.228	Moody	0.157
Happy	0.171	Red	0.157	Anxiety	0.171	Anger	0.114	Emotional	0.1
Cry	0.142	Frustration	0.128	Worry	0.114	Quick	0.1	Unpredictable	0.1
Moody	0.114	Annoyed	0.114	Unconfident	0.1	Unpredictable	0.085	Uncertain	0.085
Angry	0.114	Mad	0.1	Unsure	0.085	Rash	0.085	Unsure	0.085
Sensitive	0.1	Hate	0.085	Sad	0.071	Fast	0.071	Insecure	0.085
Feeling	0.071	Hurt	0.085	Shy	0.071	Fight	0.057	Worry	0.071
Unstable	0.071	Fight	0.085	Scared	0.0571	Spontaneous	0.057	Crazy	0.071
Crazy	0.071	Violence	0.071	Uncertain	0.0571	Reckless	0.057	Changeable	0.071
Tear	0.057	Fury	0.071	Afraid	0.0571	Uncontrolled	0.057	Unstable	0.071
Mean BAS	0.116	Mean BAS	0.109	Mean BAS	0.096	Mean BAS	0.091	Mean BAS	0.089

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