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Emotional Conditions Disrupt Behavioral Control among Individuals with Dysregulated Personality Traits

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Abstract

The current study directly examined emotion-induced behavior dyscontrol among individuals scoring high on dysregulated tendencies, represented by impulsive-antisocial and borderline personality traits, using an emotional go/no-go laboratory paradigm (Goldstein et al., 2007). We specifically examined the effects of these personality traits and emotional context on (a) overall behavior dyscontrol (slower RTs to emotional relative to neutral blocks) and (b) the duration of the dyscontrol (persistence or habituation of the effect of emotional context on behavior across blocks). We hypothesized that individuals high on borderline-antisocial traits would exhibit greater behavioral dyscontrol (slower RTs or lack of habituation across blocks) when responding during blocks of negative emotional cues. We also examined whether this emotional effect on behavioral control would be exacerbated by exposure to particularly salient emotional stimuli ("diagnostically-relevant" negative affective words; e.g., abandon). Results indicated that high borderline-antisocial individuals showed initial behavioral control difficulties (slower RTs) to general negative affective words relative to other word contents during the first block of trials, but this effect habituated by the second block. Importantly, slowed responses to diagnostically-relevant word blocks persisted across time among high borderline-antisocial individuals, whereas low scorers showed habituated behavioral responses to emotional words across time.

Keywords

impulsive-antisocial; borderline; personality; emotion; behavior

Existing research has demonstrated that certain personality traits predict deficits in behavioral control that are particularly exacerbated under emotional conditions. This emotion-induced dyscontrol has been observed in individuals with both impulsive-antisocial and borderline personality traits (referred collectively here as dysregulated tendencies or personality traits) (Silbersweig et al., 2007; Skeem, Johansson, Andershed, Kerr, & Louden, 2007; Tragesser, Solhan, Schwartz-Mette, & Trull, 2007). Neuroscience research particularly implicates corticolimbic dysfunction across individuals with hallmark symptoms of dysregulation, including impulsive-antisocial (Bechara, Damasio, & Damasio, 2000) and borderline personality traits (Brendel, Stern, & Silbersweig, 2005). Indeed, there is evidence to suggest that high levels of borderline and impulsive-antisocial traits share a common neurobiological

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link (Verona & Patrick, 2000), tend to co-occur in the same individuals (Becker, Grilo, Edell, & McGlashan, 2000), and share mutual tendencies towards negative affective reactivity and impulsivity (Paris, 1997). Importantly, the substantial overlap between these Cluster B personality traits suggests that they are markers of a latent factor which represents a common vulnerability towards dysregulation (James & Taylor, 2008; Paris, 1997).

Given this evidence, the current study examined the modulating role of emotional context on behavioral control in individuals with dysregulated personality traits, represented by high levels of *both* borderline and impulsive-antisocial traits. Our decision to operationalize dysregulated personality traits in terms of combined borderline and impulsive-antisocial traits was based on our attempt to adequately index the full range of dysregulated tendencies relevant to the study of personality disorders. We investigated the specificity and time course of emotional context effects on behavior by examining whether: (a) high borderline-antisocial individuals would show impaired behavioral responses to emotional contexts relative to low scorers, especially under diagnostically-relevant negative contexts, (b) the effects of negative emotional context would manifest in terms of initial behavioral dyscontrol to negative emotional stimuli or persistence of this behavioral effect across time (e.g., lack of habituation), and (c) emotional context effects on behavior would be observed across both men and women with high borderline-antisocial traits.

Emotional Context Effects on Behavior

Until recently, much of the literature concerning individuals with dysregulated tendencies has tended to focus on either the emotional or behavioral component of dysregulation, rather than investigating the interrelationship between them. Specifically, research concerning affective instability has tended to focus predominantly on individuals with Borderline Personality Disorder (BPD; e.g., Conklin, Bradley, & Westen, 2006; Herpertz, Kunert, Schwenger, & Sass, 1999), with findings providing evidence for greater startle reactivity relative to controls in response to emotionally-salient words (e.g., abandon, suicidal; Hazlett et al., 2007) and pure tones (Ebner-Priemer et al., 2005; but see Herpertz et al. 1999, 2002, for null findings). In contrast, behavioral dyscontrol has been the principal focus with regard to Antisocial Personality Disorder (APD) or impulsive-antisocial traits, as research in this area has generally involved laboratory go/no-go paradigms intended to measure response inhibition in mostly non-emotional contexts (e.g., Barkataki et al., 2008; Sellbom & Verona, 2007; Swann, Lijffijt, Lane, Steinberg, & Moeller, 2009). The divergence in these fields of research is compounded by the fact that BPD and APD are disproportionately observed in women and men, respectively (American Psychiatric Association, 2000), complicating the examination of gender differences in affective or behavioral correlates of these traits.

While research exists which has examined behavioral disinhibition as characteristic of borderline traits (e.g., Nigg, Silk, Stavro, & Miller, 2005; Hochhausen, Lorenz, & Newman, 2002) and affective dysregulation as also relevant to impulsive-antisocial traits (e.g., Zlotnick, 1999), these studies have neglected to examine the effects of emotional processing on behavioral control across these traits. Rather, most research which has attempted to study the links between negative emotional state and behavioral responses across these syndromes has done so indirectly, without the experimental manipulation of emotional state or context (e.g., Chapman, Leung, & Lynch, 2008; Krakowski, 2003). The few laboratory studies that do exist in this area have experimentally confirmed that negative mood induction can exacerbate impulsive or aggressive responses among patients diagnosed with BPD (e.g., Dougherty et al., 1999; Silbersweig et al., 2007). However, further work is necessary to understand the robustness and specificity of these effects, such as the time course of these effects and the salience of the emotional context, among individuals who have combined borderline and impulsive-antisocial traits.

The necessity for additional research on emotion-based behavioral control – particularly among individuals characterized by dysregulated tendencies – is highlighted by recent work on affect-related behavior or, more specifically, the construct of "mood-based rash action" (Cyders & Smith, 2007, 2008). Researchers have conceptualized this construct as comprising individual tendencies towards positive or negative urgency, which involve the propensity to engage in impulsive behaviors under conditions of high positive or negative affect, respectively. This conceptualization is based on the contention that emotions are motivational systems which govern behavior and mobilize the body for action (Lang, Bradley, & Cuthbert, 1990). In this respect, disinhibited behaviors can be both activated and exacerbated by positive and negative affective states. Research in this domain would prove particularly fruitful in individuals who possess both impulsive-antisocial and borderline traits, as these participants would serve to most adequately index the full range of dysregulated tendencies, as well as capture both male and female manifestations of dysregulation. Indeed, a recent theory paper concerning the neurobiology of affective dyscontrol suggests that the tendency to act impulsively under conditions of high positive or negative affect is the common feature linking impulsive-antisocial and borderline personality and, importantly, may be most salient among those who meet criteria for *both* syndromes (Howard, 2009). No work has tested this concept in non-psychiatric individuals scoring high on dysregulation represented by both borderline and impulsive-antisocial traits or has investigated whether emotional contexts impact the ability to control behavior across time.

Time Course and Salience of Emotional Context on Behavior

Linehan (1993) has suggested that in addition to experiencing problems involving lower threshold for emotional activation and higher peak emotional intensity, individuals with vulnerabilities towards affective dysregulation also experience a slower return to emotional baseline. Interestingly, recent research by Davidson and colleagues (1998; Davidson, Jackson, & Kalin, 2000a) suggests that individual differences in prefrontal activation contribute to this time course of emotional responding, or "affective chronometry." Although most emotion research has tended to focus on the initial intensity of the affective experience, Jackson et al. (2003) have underscored the importance of the time course of this experience, as prolonged emotional activation best implicates individual differences in affective vulnerability. Indeed, deficits in emotion regulation, as opposed to emotional reactivity during initial exposure to the stimulus, have been linked to psychopathological states, including negative affect in anxiety and mood disorders (Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Rottenberg, Kasch, Gross, & Gotlib, 2002), nicotine withdrawal (Hogle & Curtin, 2006), and posttraumatic stress disorder (Morgan, Grillon, Southwick, Davis, & Charney, 1996). The present study extended prior research by examining whether emotional context could produce prolonged behavioral effects among individuals high on dysregulated tendencies.

This return to baseline may be especially prolonged when the affective context is particularly salient (e.g., issues related to abandonment, rejection, and chronic anger in those with borderline traits; Linehan, 1993). The fact that more salient emotionally activating events often result in disruptions that persist across time suggests that their impact may be cognitively mediated. Research has, in fact, found that individuals diagnosed with BPD exhibit a cognitive processing bias towards diagnostically-relevant stimuli, evidenced by the fact that they demonstrate a memory bias towards borderline-salient words (Korfine & Hooley, 2000) and increased startle potentiation to negative affective stimuli seemingly relevant to the syndrome (Hazlett et al., 2007) versus stimuli with a more general negative connotation (Herpertz et al., 1999). Work conducted on the emotional Stroop in BPD patients also provides evidence for an enhanced interference effect for negative schema-specific words that maintain personal salience to the individual (Sieswerda, Arntz, Mertens, & Vertommen, 2006; Wingenfeld et al.,

2009) versus words that are more generally negative (Arntz, Appels, & Sieswerda, 2000). Thus, both the time course and the salience of the emotional context may affect behavior.

Impulsive-antisocial personality traits have also been linked to emotional hyperreactivity (Verona, Patrick, & Joiner, 2001), as evidenced by research which has found increased activation among such individuals in areas governing emotion processing, particularly the amygdala and prefrontal cortex (Raine, Lencz, Bihrle, LaCasse, & Colletti, 2000; Raine & Yang, 2006; Vanman, Mejia, Dawson, Schell, & Raine 2003). Although there is other research to suggest *hypo*reactivity among antisocial populations, these findings are mostly relevant to the construct of psychopathy and not antisocial personality. Specifically, these inconsistencies are partly a result of inadequate distinctions among the core dimensions of psychopathy when operationalizing the construct of APD (Hare, 1991; Harpur, Hare, & Hakstian, 1989; Patrick, Hicks, Krueger, & Lang, 2005). In particular, the current diagnostic criteria for APD mainly reflect the antisocial deviance facet of psychopathy (Factor 2) – which is most strongly related to traits such as impulsivity and aggression (Harpur et al., 1989; Sellbom & Verona, 2007) – as opposed to the affective-interpersonal dimension (superficial charm, interpersonal manipulation; Factor 1). Only the latter is associated with deficits in emotional arousal (Hare, 1965; Lykken, 1957, 1995; Patrick, 1994), whereas the former is associated with heightened physiological reactions to negative or aversive emotional stimuli (Beauchaine et al., 2001; Lorber, 2004; Vanman et al., 2003).

Despite reviews implicating the fundamental role of emotion dysregulation in the development of impulsive-antisociality and aggression (e.g., Davidson, Putnam, & Larson, 2000b; Patrick & Verona, 2007), there is a surprising lack of research in this area regarding the time course or context specificity effects of emotion on behavior. However, research conducted on individuals with high levels of negative emotional and hostile traits (involving stress reactivity, hostility, and aggression) found that they differed not only in the intensity, but also in the *duration*, of their aggressive responding under conditions of high stress but not low stress (Verona, Patrick, & Lang, 2002). In particular, initial stress exposure primed subsequent increases in negative affect and aggression that persisted over time among participants high, but not low, in negative emotional and hostile traits. These findings confirm the impact of negative emotional activation on behavior dyscontrol in individuals predisposed to dysregulation and, importantly, also demonstrate how the time course of these emotions can ultimately impact behavior.

The Present Study

Despite substantial work on the emotional and behavioral correlates of dysregulated tendencies, there is a paucity of research examining whether emotional contexts impact the ability to control behavior over time. Thus, the first goal of the current study was to directly examine the effects of negative emotional cues on behavior among individuals scoring high on both impulsive-antisocial and borderline traits using an emotional-linguistic go/no-go laboratory paradigm (Goldstein et al., 2007). We investigated the specificity of emotional context effects by examining whether high scorers would exhibit similar behavioral dyscontrol to “general” negative versus more “diagnostic-specific” negative cues. The second goal involved examining the time course of the effects of emotional context on behavioral control. We examined whether the effects of negative emotional context on behavior would manifest in terms of initial behavioral differences or sustained effects of emotion on behavior across time. Based on previous work reporting a memory bias toward diagnostically-salient stimuli among borderline individuals (Korfine & Hooley, 2000; Selby et al., 2008), we hypothesized that more salient cues would result in prolonged disruptions in behavioral responses across time. The third goal was to examine whether any of these effects would demonstrate significant interactions with gender. Given the lack of work regarding gender differences in the behavioral

correlates of emotion-modulated behavioral control across individuals with *both* syndromes, our analyses regarding gender were exploratory in nature.

Method

Participants

Undergraduate students (156 males and 162 females) enrolled in introductory psychology courses at a large midwestern university were recruited to participate in a mass testing session, where they completed a set of relevant questionnaires. A subset of participants (i.e., those scoring in the upper 65th or lower 35th percentile on composite measures of impulsive-antisocial and borderline personality traits, as described below) were called back to participate in a second session, where they completed a laboratory task. Among eligible participants from the mass testing session who agreed to be contacted (N = 105), 22 declined to participate and 2 were excluded due to unusable data, resulting in a total sample of 81 participants (56% female) for the laboratory study. The demographic characteristics of the laboratory sample were similar to the complete assessment sample. Participants were between the ages of 18 and 21 (93%), and most identified as Caucasian (64%), followed by Asian (20%), Hispanic (7%), other (6%), and African-American (3%). Those from the mass testing session who declined to participate in the laboratory study did not differ in terms of demographic characteristics or measures of borderline or impulsive-antisocial traits.

Measures

Borderline Traits—The Borderline Features Scale of the Personality Assessment Inventory (PAI; Morey, 1991) contains 31 items measuring affective instability, identity problems, negative relationships, and self-harm. Sample items from the questionnaire include “I worry a lot about other people leaving me” and “When I’m upset, I typically do something to hurt myself,” which were rated from 1 (*false, not true at all*) to 4 (*very true*). The PAI Borderline scale has exhibited acceptable reliability and validity in assessing borderline traits (Morey, 1991, 1996; Trull, 1995) and demonstrated high internal consistency in the present sample as well (Cronbach’s α = .88).

Participants also completed the Short Coolidge Axis II Inventory (SCATI; Coolidge, 2001), a short version of the original Coolidge Axis II Inventory (CATI; Coolidge, 1993). The SCATI is a 70-item self-report measure of 12 personality disorders, and the 5-item Borderline scale of the SCATI was used in this study. A sample statement for the Borderline scale includes, “I tend to have intense but unstable relationships,” rated from 1 (*strongly false*) to 4 (*strongly true*). A normative study which examined the psychometric properties of the SCATI found that it retained many of the same properties as the original measure and demonstrated good internal reliability and validity (Watson & Sinha, 2007). Cronbach’s α for the Borderline scale in the present sample was .66.

Impulsive-Antisocial Traits—In order to adequately capture the construct of impulsive-antisociality, we used the antisocial deviance subscales of the following psychopathy measures.[1] These scales were used, instead of a measure of APD in particular, given our attempt to focus solely on impulsive-antisocial traits and not the interpersonal-affective deficits of the primary psychopath (for whom the current hypotheses would not be relevant) (Edens, Petrila, & Buffington-Vollum, 2001;Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003).

Participants completed the Psychopathic Personality Inventory Short Form (PPI-S; Lilienfeld & Andrews, 1996), a 56-item self-report questionnaire designed to measure psychopathic characteristics in noncriminal populations. The questionnaire measures global psychopathy and also contains eight factor analytically derived subscales, seven of which can be grouped

to form two factors that reflect the interpersonal-affective and antisocial deviance facets of psychopathy (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003). These are referred to as the Fearless Dominance (21 items) and Impulsive Antisociality (28 items) facets on the PPI-S, with the latter representing our measure of impulsive-antisocial traits. Sample items from the Impulsive Antisociality facet include "I've always considered myself to be something of a rebel" and "I generally prefer to act first and think later," rated from 1 (*false*) to 4 (*true*). Lilienfeld and Andrews demonstrated good internal consistency of the original PPI (α's ranging from .90-.93) and its subscales (α's ranging from .70-.91). The Impulsive Antisociality scale demonstrated high internal consistency in this sample as well (Cronbach's α = .77).

Participants also completed the Self-Report Psychopathy Scale (SRP-II; Hare, 1991), a well-validated self-report measure of psychopathy. The SRP-II contains 60 items presented in a 7-point Likert-type format, with responses ranging from 1 (*disagree strongly*) to 7 (*agree strongly*), coalescing into two subscales intended to parallel Factor 1 (9 items) and Factor 2 (13 items) of the Psychopathy Checklist-Revised (PCL-R; Hare, 1991). The SRP-II shows moderate correlations with the PCL-R in prison inmates (r = .54; Hare, 1991) and college students (r = .62 in men and r = .55 in women; Forth et al., 1996). In our sample, Cronbach's α for the Factor 2 scale, our second measure of impulsive-antisocial traits, was .78.

Dysregulated Personality Group Selection

Given that correlations between the PPI-S and SRP-II antisocial deviance facets, and between the PAI and SCATI borderline scales, were moderate to large in magnitude (rs = .57 and .74, respectively), composite variables representing continuous scores on these respective personality traits were created in order to provide more reliable measures. Individual scores were first standardized and then averaged in order to create an overall index of impulsive-antisocial or borderline personality traits. The borderline and impulsive-antisocial composites were highly correlated (r = .76), further justifying creating combined borderline-antisocial trait groups to represent dysregulated tendencies. Men and women scoring high (N = 42; 52% women) or low (N = 39; 59% women) on *both* impulsive-antisocial and borderline traits (i.e., those scoring in the upper 65% or lower 35% percentile on both standardized composite measures, respectively) participated in the laboratory study. We calculated separate cut-off scores within gender for each of these measures given that we wanted adequate gender representation. Men and women in the original mass-testing sample differed significantly on both composite borderline (M = −.11 [SD = .80] for men; M = .12 [SD = 1.03] for women), F (1, 314) = 4.24, p = .04, and impulsive-antisocial traits (M = .23 [SD = .78] for men; M = −.18 [SD = .91] for women), F (1, 314) = 19.62, p < .000.

It is notable that the descriptive statistics for the high and low borderline-antisocial groups on the individual borderline and antisocial deviance measures adequately reflect upper and lower extremities, respectively, of mean scores on these measures demonstrated in other college,

[1]With regard to impulsive-antisocial traits, the descriptive statistics reported here reflect moderately extreme groups compared with other college samples on the social deviance scales of the SRP-II (M = 20.9 [SD = 8.5] for Hicklin & Widiger, 2005; and M = 31.87 [SD = 7.81] for Lilienfeld & Hess, 2001) and the PPI-S (M = 40.71 [SD = 7.97]; Lilienfeld & Hess, 2001). Specifically, mean scores for the high borderline-antisocial group in our sample were approximately 20 points higher than those reported in these other college samples. Additionally, mean scores of our high borderline-antisocial group on these same scales were also higher than those obtained in a forensic population by Cale and Lilienfeld (2006; M = 44.94 [SD = 15.22] for the SRP-II; and M = 47.07 [SD = 8.27] for the PPI-S). With regard to borderline traits, participants' scores in the current study also reflect moderately extreme groups relative to other college and community samples which have used the PAI Borderline Scales (M = 26.71 [SD = 14.70] for Gardner & Qualter, 2009; and M = 27.23 [SD = 10.87] for Trull, 1995), as well as the SCATI Borderline Scales (M = 9.67 [SD = 2.64] for Schmeelk, Sylvers, & Lilienfeld, 2008; and M = 8.77 [SD = 2.95] for Sylvers, Brubaker, Alden, Brennan, & Lilienfeld, 2008). Indeed, the high borderline-antisocial group mean in the current study was above Trull's (1995) recommended cut-off score for presence of significant borderline features (raw score ≥ 38). Although mean scores on the PAI Borderline Scales in forensic populations (M = 54.76 [SD = 11.84]; Douglas, Guy, Edens, Boer, & Hamilton, 2007) and psychiatric inpatients (M = 45.89 [SD = 6.55]; Evershed et al., 2003) are higher than those in the current sample, this is not surprising given the differentiation between clinical and nonclinical populations.

community, and forensic populations.[1] To validate our groups, participants were also administered the UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001) and the Mood and Anxiety Symptom Questionnaire (MASQ; Watson, Weber, Assenheimer, & Clark, 1995). Mean differences between the two groups on constructs of interest are presented in Table 1, confirming that the high and low borderline-antisocial groups differed in expected ways.

Laboratory Procedure

Following informed consent, participants completed a single laboratory session lasting approximately 45 minutes in which they completed a modified version of Goldstein et al.'s (2007) emotional-linguistic go/no-go task. In the task, participants are instructed to press a button after silently reading a word presented in normal font ("go" trial) and to inhibit this button response after reading a word presented in italicized font ("no-go" trial).

Word Categories—The task consisted of 96 words selected from the Affective Norms for English Words (ANEW; Bradley & Lang, 1999), as well as from Korfine and Hooley (2000). The total word list included 32 emotionally neutral (NEU; e.g., umbrella, lamp), 32 general negative (GNEG; e.g., poison, rabies), and 32 diagnostic-specific negative words (DX-NEG; e.g., abandon, violent, hate). The latter two word categories were matched on normative ratings of valence and arousal, and all word categories were matched on word length and frequency of use in the English language. The diagnostic-specific word category was included to determine whether cognitive biases toward more salient emotionally activating words, as per Hazlett et al. (2007), would be demonstrated by prolonged disruptions of behavioral control during DX-NEG word blocks.

Of the DX-NEG words, 11 words were chosen to be specifically relevant to borderline personality ("BOR-only"; e.g., abandon), 11 to impulsive-antisocial personality ("ANT-only"; e.g., violent), and 10 to both ("Both"; e.g., anger). These diagnostic-specific words were chosen by generating a longer list of words that individuals high on impulsive-antisocial and borderline traits would potentially find salient. Eight clinical psychology doctoral students competently trained in the diagnosis of personality disorders and the DSM first rated a long list of words from the ANEW (Bradley & Lang, 1999) and Korfine and Hooley (2000) on a 3-point scale (1 = positive; 2 = neutral; 3 = negative). They then indicated the assumed relevance of *negatively valenced* words to patients with DSM-prototypical borderline, impulsive-antisocial, and psychotic symptoms on a 4-point scale (1 = *relevant* to 4 = *not relevant*). The final set of 32 DX-NEG words was chosen from these ratings and our attempts to match them to the GNEG words on valence, arousal, word length, and frequency of use based on ANEW norms (see Table 2 for normative ratings and mean ratings of diagnostic relevance for each word category list).

Trial Blocks—The task was presented in a blocked word category format (e.g., all GNEG words were presented consecutively in the same block) in order to maximize the impact of emotional processing on behavioral control. The task consisted of 3 blocks of each word category (NEU, GNEG, DX-NEG), for a total of 9 experimental blocks. Thus, each word category block was presented 3 times across the experiment to allow for the examination of time course effects of emotional context on behavior. The presentation of the 3 word category blocks was counterbalanced across participants and groups using a Latin-squares design, resulting in a total of 6 different presentation orders. Participants received a 7s rest period following each block in order to minimize any potential carry-over effects from the previous block. Within each word category block, words were presented in a randomized order, and the combination of words selected to be "go" versus "no-go" stimuli differed across valence category blocks as well. In order to establish a pre-potent response set, each valence category

block consisted of more "go" trials (22 total) than "no-go" trials (10 total), creating a total of 66 "go" trials and 30 "no-go" trials within each valence category block. Participants were instructed to respond as quickly as possible, while still maintaining a high level of accuracy. Similar to the design of Goldstein et al. (2007), word stimuli were presented in light gray font on a dark background for 1400 milliseconds, followed by a 75s interstimulus interval. Participants received instructions regarding the task at the start of the experiment and performed a practice version of the experiment prior to the start of the experimental blocks.

Index of Behavioral Control—During the experimental trials, reaction time (RT) and accuracy ratings were recorded. Participants' RTs served as the primary dependent measure in this task, given research which has demonstrated that behavioral control deficits are not a result of prepotent responses which occur too quickly (e.g., errors) but, rather, a result of the slowed inhibitory processing (e.g., RT) necessary to compensate for these accelerated prepotent responses (Logan, Schachar, & Tannock, 1997). Indeed, our data show that RT was correlated specifically with the UPPS Lacks Premeditation scale (r = .22) and not with the MASQ depression or anxiety scales (rs = −.02 and .02, respectively), suggesting that RT assesses behavioral control in particular.

Data Analyses

RTs in the task were analyzed with a Block × Word Category × Gender × Borderline-Antisocial Group mixed model analysis of variance (ANOVA) with participant gender (male vs. female) and borderline-antisocial group (high vs. low) as between-subjects factors and word category (NEU, GNEG, and DX-NEG) and trial block (1-3) as a within-subject factors. Due to the low error rate in both the low and high borderline-antisocial groups, analyses of error rates is not reported.[2] Planned orthogonal comparisons were utilized to provide a more powerful index of word category effects across blocks. Specifically, word category was decomposed into orthogonal Valence (GNEG/DX-NEG vs. NEU) and Negative Specificity (GNEG vs. DX-NEG) contrasts to examine whether (a) there was an overall response difference to negatively valenced (vs. NEU) words (Valence Contrast), and (b) there was a specific response difference between the two negatively valenced word categories (Negative Specificity Contrast). Additionally, block was decomposed into orthogonal quadratic (Block 2 vs. Block 1 & 3) and linear (Block 1 vs. Block 3) components. The *linear* effect of block was the primary focus of data analyses, given research which has demonstrated that individuals high on dysregulated traits are characterized not only by disturbances in initial reactivity but also by an inability to regulate the *duration* of their responses (Howard, 2009).

Results

Word Category and Group Effects on Reaction Time

Means and standard deviations for RTs across blocks are provided by word category and borderline-antisocial group in Table 3. Mixed model ANOVAs revealed a significant quadratic effect of block, F (1, 77) = 11.01, p = .001, suggesting an overall decrease in participants' RTs from the first to the second block – partly reflecting practice effects – that stabilized in the third block producing a quadratic effect (see Figure 1). Results also indicated a significant Valence Contrast of Word Category, linear F (1, 77) = 13.26, p < .001, with the overall sample showing slower responses to all negative word blocks relative to neutral, as well as a main effect of borderline-antisocial group, F (1, 77) = 4.25, p = .04, although the latter main effect was only present in the first block of trials, F (1, 77) = 5.00, p = .03.

[2]The mean number of errors in the NEU, GNEG, and DX-NEG conditions in the low borderline-antisocial group was as follows: *Ms* = 2.68, 2.46, and 2.56; *SDs* = 2.38, 1.86, and 2.01, respectively. Overall error rates did not differ significantly between borderline-antisocial groups in the NEU (F_{53}= 2.09, p = .15), GNEG (F_{57}= .03, p = .87), or DX-NEG (F_{53}= 2.38, p = .13) conditions.

These main effects were qualified by a significant interaction of linear Block × Word Category (Negative Specificity Contrast) × Borderline-Antisocial group interaction, F (1, 77) = 5.40, p = .02. A follow-up Block × Word Category ANOVA within each group revealed that changes in RTs across blocks differed across the two negative word categories as a function of borderline-antisocial status. Specifically, the low borderline-antisocial group did not evidence an interaction between block and word category and only demonstrated a main effect of the Valence Contrast of Word Category, F (1, 37) = 11.95, p = .001. This indicated that the low group responded more slowly overall to blocks of negative words (both GNEG and DX-NEG) relative to NEU (see Figure 1).

In the high group, however, there was a significant linear Block × Negative Specificity Contrast of Word Category, F (1, 40) = 6.91, p = .01, as well as a significant quadratic Block × Negative Specificity Contrast interaction, F (1, 40) = 5.59, p = .02, indicating that responses to GNEG vs. DX-NEG words changed differentially across blocks. Follow-up simple effect tests of block within word category revealed that participants scoring high on borderline-antisocial traits demonstrated a quadratic effect of block and a linear effect of block for GNEG words, Fs (1, 40) = 11.27 and 9.30, respectively, ps < .004. These two block effects suggest that behavioral responses to GNEG words decreased significantly from the first to the second block, although responses stabilized by the third block (see Figure 1). However, among DX-NEG words, there was neither a linear (p = .75) nor quadratic (p = .69) effect of block. As indicated by Figure 1, those scoring high on borderline-antisocial tendencies exhibited slowed behavioral responding to the DX-NEG words, relative to GNEG words, that persisted across blocks.

To supplement the above analyses, we examined simple word category effects within each block in the high group. Analyses revealed a Negative Specificity Contrast of Word Category in the first block, F (1, 40) = 7.88, p = .008, with initially slower responses to GNEG than DX-NEG. However, high borderline-antisocial participants quickly habituated to the effects of these GNEG words, as RTs for GNEG words were at NEU levels and significantly faster than DX-NEG words by Block 2 (see Figure 1). In contrast, responses to DX-NEG words remained stable across blocks, showing no evidence of habituation and an overall slower response to these words relative to GNEG words in subsequent blocks – as demonstrated by a Negative Specificity Contrast of Word Category in Block 2 *in the opposite direction*, F (1, 40) = 4.35, p = .04, with much slower responses to DX-NEG versus GNEG words.

Finally, across all participants, neither block nor word category interacted significantly with gender, indicating that the observed results were comparable across men and women. These analyses collectively reveal that individuals high in borderline-antisocial traits were initially more reactive to general negative words (as evidenced by their slowed behavioral responses in the first block), although they habituated quickly to this effect on behavior by the second block of trials. In contrast, these high-scoring participants failed to habituate to the effects of DX-NEG words across blocks in their behavioral responding.[3, 4]

[3]In order to determine which diagnostic-specific word category (BOR-only, ANT-only, Both) was accounting for the effects of word category on RT, we performed additional analyses using each of the individual DX-NEG word groupings in separate analyses of the omnibus ANOVA. Examination of simple block effects within each diagnostic-specific word category revealed that the high borderline-antisocial group failed to habituate to the ANT-only, linear Block F (1, 40) = .13, p = .72, BOR-only, linear Block F (1, 40) = .17, p = .68, and Both words, linear Block F (1, 37) = 1.32, p = .23, indicating that no individual diagnostic-specific word category was accounting for our findings.

[4]In order to ensure that initial mood did not have a significant impact on participants' performance, we re-conducted analyses while controlling for pre-task negative affect as measured by the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Results did not change substantially and are thus not reported here.

Discussion

The current study provides evidence for the nature of the modulating effects of emotional context on behavioral control in individuals with high self-reported levels of affective and behavioral dysregulation, represented by borderline and impulsive-antisocial traits. Specifically, our findings demonstrated that individuals high on *both* these traits exhibited impaired behavioral responses for both general negative (initial behavioral differences) and diagnostically-relevant negative words (duration differences). In particular, the interaction between group, word category, and block indicated that while high scorers demonstrated an initial slowed response to the GNEG words – which declined by the second block of trials – they continued to exhibit slow behavioral responding to the DX-NEG words in subsequent blocks. These differences in initial versus prolonged responding suggest that the behavioral effects of GNEG words were immediate, whereas the more salient DX-NEG words resulted in a slightly delayed but prolonged effect across time.

These findings regarding the immediate versus prolonged impact of negative emotional contexts correspond with existing research regarding arousal and the allocation of attention. Several findings across the literature (e.g., Bacon, 1974; Ellis & Zanna, 1990) have demonstrated that emotional arousal increases the impact of salient information and decreases the impact of non-salient information. In this respect, while the GNEG words may have had an immediate effect on the high group's responses, cognitive processing of the DX-NEG words resulted in a narrowing of attention towards these presumably more salient stimuli and, accordingly, contributed to their continued impact on behavior across time. The present study is the first to provide empirical evidence that the effects of negative contexts among those high in borderline-antisocial traits lie not only in the immediate impact on behavior but, also, on the prolonged impact across time.

The fact that these more salient emotional words resulted in prolonged disruptions among those high in borderline-antisocial traits suggests that their impact may be cognitively mediated, consistent with "top-down" models of behavioral regulation deficits implicated in personality disorders (Brendel et al., 2005; Herpertz et al., 2001; Siever, 2008). One potentially fruitful model to help explain these findings is represented by the emotional cascade model of BPD (Selby et al., 2008; Selby, Anestis, Bender, & Joiner, 2009), which suggests that negative emotional cues trigger cognitive rumination, which ultimately maintains elevated levels of negative affect across time. Affected individuals, in turn, engage in dysregulated behaviors (e.g., self-harm) as a means of diverting attention from and coping with this vicious cycle. In the current study, we did not examine impulsive behaviors but, rather, behavioral control more broadly, as represented by slowed reaction time to emotional cues. Nonetheless, this model may explain why high borderline-antisocial individuals in the current study continued to exhibit slowed responding to the DX-NEG words across time. In particular, the DX-NEG words may have triggered distressing and ruminative thoughts associated with these word cues, which consequently interfered with high scoring individuals' ability to perform optimally on the task. Indeed, the blocked category design of our task increases the impact of emotional processing across time, and the repetition of the same valenced words across blocks increases the possibility of rumination or repetitive thinking over time. Importantly, this interference effect for DX-NEG stimuli has also been observed among BPD patients in the emotional Stroop task, with evidence of greater interference to word stimuli related to personally relevant negative life events (Sieswerda et al., 2007; Wingenfeld et al., 2009). The consistency of results across these independent studies increases confidence in the robustness of the present findings.

Gender and Behavioral Dyscontrol

Although we included approximately equal numbers of men and women in our study, we did not detect any gender differences or interactions. There are several possible reasons for this.

First, although our sample size was large enough to detect complex interactions, we had limited statistical power to detect a potential four-way interaction between gender, borderline-antisocial status, word category, and trial block. However, the examination of block effects separately within each gender revealed that the direction of effects was the same across both men and women, suggesting that the observed lack of gender differences was not due to low power. Second, the cut-off scores utilized to classify individuals into high and low borderline-antisocial groups in this college sample were calculated within each gender, which may have affected our ability to detect gender interactions that may be found in samples of men and women with naturally extreme manifestations of these traits.

A third alternative is that our decision to operationalize dysregulated tendencies in terms of *combined* borderline and impulsive-antisocial traits may have eliminated any gender differences that represent differential behavioral manifestations of these tendencies. There is evidence that emotional dysregulation can lead to different behavioral profiles in non-clinical men and women (e.g., more depression in women, more aggression in men; Verona & Curtin, 2006; Verona & Kilmer, 2007), although women with extreme forms of dysregulation may show similar behavioral profiles as men (Casillas & Clark, 2002; Trull, Sher, Minks-Brown, Durbin, & Burr, 2000). Since we selected individuals high on both borderline and impulsive-antisocial traits, these would represent men and women who show the greatest problems in regulation across both emotional and behavioral domains, thus attenuating potential gender differences.

Strengths and Limitations

One limitation of the current study is that the sample consisted of a college population, which is largely homogenous with respect to ethnicity, socioeconomic status, and age. This is a concern as it not only limits the generalizability of our findings but also decreases our ability to study clinical levels of psychopathology. While the symptomatology associated with these syndromes is present within this population to varying degrees – as it has been suggested that such syndromes are likely organized dimensionally (e.g., Krueger, Markon, Patrick, & Iacono, 2005) – few individuals actually met critical threshold for a diagnosis of APD or BPD. Indeed, only four participants in the present study met criteria for a “probable” diagnosis of BPD based on Morey’s (1991) recommended cut-off criterion (raw score > 59), although 24 showed clinically significant symptoms (raw score ≥ 38), which is a typical proportion for college samples of this sort (Trull, 1995). Thus, future extensions of this research would benefit from utilizing structured clinical interviews to assess for DSM-IV diagnostic symptoms in more disturbed samples.

Additionally, this study did not include any measures of the psychophysiological processes implicated in various forms of affective and behavioral dysregulation. Specifically, Davidson and colleagues (2002b) have proposed that limbic regions are involved in initial emotional activation (i.e., immediate reactivity), whereas the orbital and ventromedial regions of the prefrontal cortex are responsible for implementing the cognitive control processes necessary to engage in the appropriate inhibitory control behaviors following this affective activation (i.e., prolonged regulation). Given the implications that our findings have for these prefrontal systems, future extensions of this work would benefit from incorporating measures that index these neural processes (e.g., the startle probe as an index of negative affective activation; ERPs to index cognitive control; fMRI to examine functional connectivity between frontal and limbic regions).

Another potentially important limitation of the present study was our decision to combine borderline and impulsive-antisocial traits into one group. Although these personality features fall within the spectrum of dysregulated traits, combining them precluded us from determining whether our findings were largely unique to one of the two variants. Studying borderline and

impulsive-antisocial traits separately would have been particularly illuminating in allowing us to examine their independent or moderating effects on behavioral control. On the other hand, by selecting individuals across genders with elevated scores on *both* traits, we were able to adequately represent both men and women in our sample. Nonetheless, future work would benefit from examining these traits separately to determine if results remain comparable across two behaviorally distinct manifestations of dysregulation.

Despite these limitations, the current study supplements a mounting body of research concerned with gaining a more comprehensive understanding of the processes that lead to dysregulated behaviors. In particular, this is the first study to examine the impact of emotional context on behavioral dyscontrol in individuals sharing the same dispositional vulnerabilities towards dysregulation. Importantly, our results highlight the significance of the *salience* of the emotional context in predicting dysregulated behaviors among individuals high in borderline and impulsive-antisocial tendencies, as well as the possible time course of this emotion-induced behavioral dyscontrol. Increasing our understanding of deficits in emotion-modulated behavioral control across these syndromes bears critical implications for elucidating the processes that lead to problems in aggression, suicidality, and other forms of impulsive coping across various forms of psychopathology.

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References

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed., text rev.. Author; Washington, DC: 2000.

Arntz A, Appels C, Siewswerda S. Hypervigilance in borderline personality disorder: A test with the emotional Stroop paradigm. Journal of Personality Disorders 2000;14:366–373. [PubMed: 11204344]

Bacon SJ. Arousal and the range of cue utilization. Journal of Experimental Psychology 1974;102:81–87. [PubMed: 4809659]

Barkataki I, Kumari V, Das M, Sumich A, Taylor P, Sharma T. Neural correlates of deficient response inhibition in mentally disordered violent individuals. Behavioral Sciences and the Law 2008;26:51–64. [PubMed: 18327832]

Beauchaine TP, Katkin ES, Strassberg Z, Snarr J. Disinhibitory psychopathology in male adolescents: Discriminating conduct disorder from attention-deficit/hyperactivity disorder through concurrent assessment of multiple autonomic states. Journal of Abnormal Psychology 2001;110:610–624. [PubMed: 11727950]

Bechara A, Damasio H, Damasio AR. Emotion, decision making and the orbitofrontal cortex. Cerebral Cortex 2000;10:295–307. [PubMed: 10731224]

Becker DF, Grilo CM, Edell WS, McGlashan TH. Comorbidity of borderline personality disorder with other personality disorders in hospitalized adolescents and adults. American Journal of Psychiatry 2000;157:2011–2016. [PubMed: 11097968]

Benning SD, Patrick CJ, Hicks BM, Blonigen DM, Krueger RF. Factor structure of the Psychopathic Personality Inventory: Validity and implications for clinical assessment. Psychological Assessment 2003;15:340–350. [PubMed: 14593834]

Bradley, MM.; Lang, PJ. Affective norms for English words (ANEW). The NIMH Center for the Study of Emotion and Attention, University of Florida; Gainesville, FL: 1999.

Brendel GR, Stern E, Silbersweig DA. Defining the neurocircuitry of borderline personality disorder: Functional neuroimaging approaches. Development and Psychopathology 2005;17:1197–1206. [PubMed: 16613437]

Cale EM, Lilienfeld SO. Psychopathy factors and risk for aggressive behavior: A test of the "threatened egotism" hypothesis. Law and Human Behavior 2006;30:51–74. [PubMed: 16729208]

Campbell-Sills L, Barlow DH, Brown TA, Hofmann SG. Acceptability and suppression of negative emotion in anxiety and mood disorders. Emotion 2006;6:587–595. [PubMed: 17144750]

Casillas A, Clark LA. Dependency, impulsivity, and self-harm: Traits hypothesized to underlie the association between cluster B personality and substance use disorders. Journal of Personality Disorders 2002;16:424–436. [PubMed: 12489309]

Chapman AL, Leung DW, Lynch TR. Impulsivity and emotion dysregulation in borderline personality disorder. Journal of Personality Disorders 2008;22:148–164. [PubMed: 18419235]

Conklin CZ, Bradley R, Westen D. Affect regulation in borderline personality disorder. The Journal of Nervous and Mental Disease 2006;194:69–77. [PubMed: 16477183]

Coolidge, FL. Short-form of the Coolidge Axis II Inventory (SCATI): Manual. Colorado Springs, CO.; 2001.

Cyders MA, Smith GT. Mood-based rash action and its components: Positive and negative urgency. Personality and Individual Differences 2007;43:839–850.

Cyders MA, Smith GT. Emotion-based dispositions to rash action: Positive and negative urgency. Psychological Bulletin 2008;134:807–828. [PubMed: 18954158]

Davidson RJ. Affective style and affective disorders: Perspectives from affective neuroscience. Cognition and Emotion 1998;12:307–320.

Davidson RJ. Anxiety and affective style: Role of prefrontal cortex and amygdala. Biological Psychiatry 2002;51:68–80. [PubMed: 11801232]

Davidson RJ, Jackson DC, Kalin NH. Emotion, plasticity, context, and regulation: Perspectives from affective neuroscience. Psychological Bulletin 2000a;126:890–909. [PubMed: 11107881]

Davidson RJ, Putnam KM, Larson CL. Dysfunction in the neural circuitry of emotion regulation – A possible prelude to violence. Science 2000b;289:591–594. [PubMed: 10915615]

Dougherty DM, Bjork JM, Huckabee HC, Moeller FG, Swann AC. Laboratory measures of aggression and impulsivity in women with borderline personality disorder. Psychiatry Research 1999;85:315–326. [PubMed: 10333383]

Douglas KS, Guy LS, Edens JF, Boer DP, Hamilton J. The Personality Assessment Inventory as a proxy for the Psychopathy Checklist-Revised: Testing the incremental validity and cross-sample robustness of the Antisocial Features Scale. Assessment 2007;14:255–269. [PubMed: 17690382]

Ebner-Priemer UW, Badeck S, Beckmann C, Wagner A, Feige B, Weiss I, et al. Affective dysregulation and dissociative experience in female patients with borderline personality disorder: A startle response study. Psychiatric Research 2005;39:85–92.

Edens JF, Petrila J, Buffington-Vollum JK. Psychopathy and the death penalty: Can the Psychopathy Checklist-Revised identify offenders who represent "a continuing threat to society?". Journal of Psychiatry and Law 2001;29:433–481.

Ellis RJ, Zanna MP. Arousal and causal attribution. Canadian Journal of Behavioural Science 1990;22:1–12.

Evershed S, Tennant A, Boomer D, Rees A, Barkham M, Watsons A. Practice-based outcomes of dialectical behaviour therapy (DBT) targeting anger and violence, with male forensic patients: A pragmatic and non-contemporaneous comparison. Criminal Behaviour and Mental Health 2003;13:198–213. [PubMed: 14654871]

Gardner K, Qualter P. Reliability and validity of three screening measures of borderline personality disorder in a nonclinical population. Journal of Personality and Individual Differences 2009;46:636–641.

Goldstein M, Brendel G, Tuescher O, Pan H, Epstein J, Beutel M, et al. Neural substrates of the interaction of emotional stimulus processing and motor inhibitory control: An emotional linguistic go/no-go fMRI study. NeuroImage 2007;36:1026–1040. [PubMed: 17509899]

Hare RD. Temporal gradient of fear arousal in psychopaths. Journal of Abnormal Psychology 1965;70:442–445. [PubMed: 5846428]

Hare, RD. The Hare Psychopathy Checklist-Revised. Multi-Health Systems; Toronto: 1991.

Harpur TJ, Hare RD, Hakstian AR. Two-factor conceptualization of psychopathy: Construct validity and assessment implications. Psychological Assessment: A Journal of Consulting and Clinical Psychology 1989;1:6–17.

Hazlett EA, Speiser LJ, Goodman M, Marcela R, Carrizal M, Wynn JK, et al. Exaggerated affect-modulated startle during unpleasant stimuli in borderline personality disorder. Biological Psychiatry 2007;62:250–255. [PubMed: 17258691]

Herpertz SC, Dietrich TM, Wenning B, Krings T, Erberich EG, Willmes K, et al. Evidence of abnormal amygdala functioning in borderline personality disorder: A functional MRI study. Biological Psychiatry 2001;50:292–298. [PubMed: 11522264]

Herpertz SC, Dietrich T, Werth U, Qunaibi M, Lukas G, Schuerkens A, et al. Affective regulation in borderline personality disorder: Experimental findings from psychophysiology and functional neuroimaging. Acta Neuropsychiatrica 2002;14:71–75.

Herpertz SC, Kunert HJ, Schwenger UB, Sass H. Affective responsesiveness in borderline personality disorder: A psychophysiological approach. American Journal of Psychiatry 1999;156:1550–1556. [PubMed: 10518165]

Hicklin J, Widiger TA. Similarities and differences among antisocial and psychopathic self-report inventories from the perspective of general personality functioning. European Journal of Personality 2005;19:325–342.

Hochhausen NM, Lorenz AR, Newman JP. Specifying the impulsivity of female inmates with borderline personality disorder. Journal of Abnormal Psychology 2002;111:495–501. [PubMed: 12150425]

Hogle JM, Curtin JJ. Sex differences in negative affective response during nicotine withdrawal. Psychophysiology 2006;43:344–356. [PubMed: 16916430]

Howard, RC. The neurobiology of affective dyscontrol: Implications for understanding ‘dangerous and serve personality disorder.’. In: McMurran, M.; Howard, RC., editors. Personality, personality disorder and risk of violence. John Wiley and Sons; New York: 2009. p. 157-174.

Jackson DC, Mueller CJ, Dolski I, Dalton KM, Nitschke JB, Urry HL. Now you feel it, now you don’t: Frontal brain electrical asymmetry and individual differences in emotion regulation. Psychological Science 2003;14:612–617. [PubMed: 14629694]

James LM, Taylor J. Associations between symptoms of borderline personality disorder, externalizing disorders, and suicide-related behaviors. Journal of Psychopathology and Behavioral Assessment 2008;30:1–9.

Korfine L, Hooley JM. Directed forgetting of emotional stimuli in borderline personality disorder. Journal of Abnormal Psychology 2000;109:214–221. [PubMed: 10895559]

Krakowski M. Violence and serotonin: Influence of impulse control, affect regulation, and social functioning. Journal of Neuropsychiatry and Clinical Neuroscience 2003;15:294–305.

Krueger RF, Markon KE, Patrick CJ, Iacono WG. Externalizing psychopathology in adulthood: A dimensional-spectrum conceptualization and its implications for DSM-V. Journal of Abnormal Psychology 2005;114:537–550. [PubMed: 16351376]

Lang PJ, Bradley MM, Cuthbert BN. Emotion, attention, and the startle reflex. Psychological Review 1990;97:377–395. [PubMed: 2200076]

Lilienfeld SO, Andrews BP. Development and preliminary validation of a self-report measure of psychopathic personality traits in noncriminal populations. Journal of Personality Assessment 1996;66:488–524. [PubMed: 8667144]

Lilienfeld SO, Hess TH. Psychopathic personality traits and somatization: Sex differences and the mediating role of negative emotionality. Journal of Psychopathology and Behavioral Assessment 2001;23:11–24.

Linehan, MM. Cognitive-behavioral treatment of borderline personality disorder. Guildford; New York: 1993.

Logan GD, Schachar RJ, Tannock R. Impulsivity and inhibitory control. Psychological Science 1997;8:60–64.

Lorber MF. Psychophysiology of aggression, psychopathy, and conduct problems: A meta-analysis. Psychological Bulletin 2004;130:531–552. [PubMed: 15250812]

Lykken DT. A study of anxiety in the sociopathic personality. Journal of Abnormal & Social Psychology 1957;55:6–10.

Lykken, DT. The antisocial personalities. Erlbaum; Hillsdale, NJ: 1995.

Morey, LC. Personality Assessment Inventory: Professional manual. Psychological Assessment Resources; Odessa, FL: 1991.

Morey, LC. An interpretative guide to the Personality Assessment Inventory (PAI). Psychological Assessment Resources; Odessa, FL: 1996.

Morgan CA, Grillon C, Southwick SM, Davis M, Charney DS. Exaggerated acoustic startle reflex in Gulf War veterans with posttraumatic stress disorder. American Journal of Psychiatry 1996;153:64–68. [PubMed: 8540594]

Nigg JT, Silk KR, Stavro G, Miller T. Disinhibition and borderline personality disorder. Development and Psychopathology 2005;17:1129–1149. [PubMed: 16613434]

Paris J. Antisocial and borderline personality disorders: Two separate diagnoses or two aspects of the same psychopathology? Comprehensive Psychiatry 1997;38:237–242. [PubMed: 9202881]

Patrick CJ. Emotion and psychopathy: Startling new insights. Psychophysiology 1994;31:319–330. [PubMed: 10690912]

Patrick CJ, Hicks BM, Krueger RF, Lang AR. Relations between psychopathy facets and externalizing in a criminal offender sample. Journal of Personality Disorders 2005;19:339–356. [PubMed: 16178678]

Patrick, CJ.; Verona, E. The psychophysiology of aggression: Autonomic, electrocortical, and neuro-imaging findings. In: Flannery, D.; Vazsonyi, A.; Waldman, I., editors. The Cambridge handbook of violent behavior and aggression. Cambridge University Press; New York: 2007. p. 111-150.

Raine A, Lencz T, Bihrle S, LaCasse L, Colletti P. Reduced prefrontal gray matter volume and reduced autonomic activity in antisocial personality disorder. Archives of General Psychiatry 2000;57:119–27. [PubMed: 10665614]

Raine A, Yang Y. Neural foundations to moral reasoning and antisocial behavior. Social Cognitive and Affective Neuroscience 2006;1:203–213. [PubMed: 18985107]

Rottenberg J, Kasch KL, Gross JJ, Gotlib IH. Sadness and amusement reactivity differentially predict concurrent and prospective functioning in major depressive disorder. Emotion 2002;2:135–146. [PubMed: 12899187]

Schmeelk KM, Sylvers P, Lilienfeld SO. Trait correlates of relational aggression in a nonclinical sample: DSM-IV personality disorders and psychopathy. Journal of Personality Disorders 2008;22:269–283. [PubMed: 18540799]

Selby EA, Anestis MD, Bender TW, Joiner TE. An exploration of the emotional cascade model in borderline personality disorder. Journal of Abnormal Psychology 2009;118:375–387. [PubMed: 19413411]

Selby EA, Anestis MD, Joiner TE. Understanding the relationship between emotional and behavioral dysregulation: Emotional cascades. Behaviour Research and Therapy 2008;46:593–611. [PubMed: 18353278]

Sellbom M, Verona E. Neuropsychological correlates of psychopathic traits in a non-incarcerated Sample. Journal of Research in Personality 2007;41:276–294.

Sieswerda S, Arntz A, Mertens I, Vertommen S. Hypervigilance in patients with borderline personality disorder: Specificity, automaticity, and predictors. Behaviour Research and Therapy 2007;45:1011–1024. [PubMed: 17045566]

Siever LJ. Neurobiology of aggression and violence. American Journal of Psychiatry 2008;165:429–442. [PubMed: 18346997]

Silbersweig D, Clarkin JF, Goldstein M, Kernberg OF, Tuescher O, Levy KN, et al. Failure of frontolimbic inhibitory function in the context of negative emotion in borderline personality disorder. American Journal of Psychiatry 2007;164:1832–1841. [PubMed: 18056238]

Skeem J, Johansson P, Andershed H, Kerr M, Louden J. Two subtypes of psychopathic violent offenders that parallel primary and secondary variants. Journal of Abnormal Psychology 2007;116:395–409. [PubMed: 17516770]

Skeem JL, Poythress N, Edens JF, Lilienfeld SO, Cale EM. Psychopathic personality or personalities? Exploring potential variants of psychopathy and their implications for risk assessment. Aggression and Violent Behavior 2003;8:513–546.

Swann AC, Lijffijt M, Lane SD, Steinberg JL, Moeller FG. Trait impulsivity and response inhibition in antisocial personality disorder. Journal of Psychiatric Research 2009;43:1057–1063. [PubMed: 19345957]

Sylvers P, Brubaker N, Alden SA, Brennan PA, Lilienfeld SO. Differential endophenotypic markers of narcissistic and antisocial personality features: A psychophysiological investigation. Journal of Research in Personality 2008;42:1260–1270.

Tragesser SL, Solhan M, Schwartz-Mette R, Trull TJ. The role of affective instability and impulsivity in predicting future BPD features. Journal of Personality Disorders 2007;21:603–614. [PubMed: 18072862]

Trull TJ. Borderline personality disorder features in nonclinical young adults: I. Identification and validation. Psychological Assessment 1995;7:33–41.

Trull TJ, Sher KJ, Minks-Brown C, Durbin J, Burr R. Borderline personality disorder and substance use: A review and integration. Clinical Psychology Review 2000;20:235–253. [PubMed: 10721499]

Vanman EJ, Mejia VY, Dawson ME, Schell AM, Raine A. Modification of the startle reflex in a community sample: Do one or two dimensions of psychopathy underlie emotional processing? Personality and Individual Differences 2003;35:2007–2021.

Verona E, Curtin JJ. Gender differences in the negative affective priming of aggressive behavior. Emotion 2006;6:115–124. [PubMed: 16637755]

Verona, E.; Patrick, CJ. Suicide risk in externalizing syndromes: Temperamental and neurobiological underpinnings. In: Joiner, TE.; Rudd, D., editors. Suicide science: Expanding the boundaries. Kluwer Academic Publishers; Boston: 2000. p. 137-173.

Verona E, Patrick CJ, Joiner TE. Psychopathy, antisocial personality, and suicide risk. Journal of Abnormal Psychology 2001;110:462–470. [PubMed: 11502089]

Verona E, Patrick CJ, Lang AR. A direct assessment of the role of state and trait negative emotion in aggressive behavior. Journal of Abnormal Psychology 2002;111:249–258. [PubMed: 12003447]

Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: The PANAS scales. Journal of Personality and Social Psychology 1988;54:1063–1070. [PubMed: 3397865]

Watson D, Sinha B. A normative study of the Coolidge axis-II inventory, short form. Psychology and Psychotherapy: Theory, Research, and Practice 2007;80:437–441.

Watson D, Weber K, Assenheimer JS, Clark LA. Testing a tripartite model: I. Evaluating the convergent and discriminant validity of anxiety and depression scales. Journal of Abnormal Psychology 1995;104:3–14. [PubMed: 7897050]

Wingenfeld K, Mensebach C, Rullkoetter N, Scholsser N, Schaffrath C, Woermann FG, et al. Attential bias to personally relevant words in borderline personality disorder is strongly related to comorbid posttraumatic stress disorder. Journal of Personality Disorders 2009;23:141–155. [PubMed: 19379092]

Whiteside SP, Lynam DR. The Five Factor Model and impulsivity: Using a structural model of personality to understand impulsivity. Personality and Individual Differences 2001;30:669–689.

Zlotnick C. Antisocial personality disorder, affect dysregulation and childhood abuse among incarcerated women. Journal of Personality Disorders 1999;13:90–95. [PubMed: 10228930]

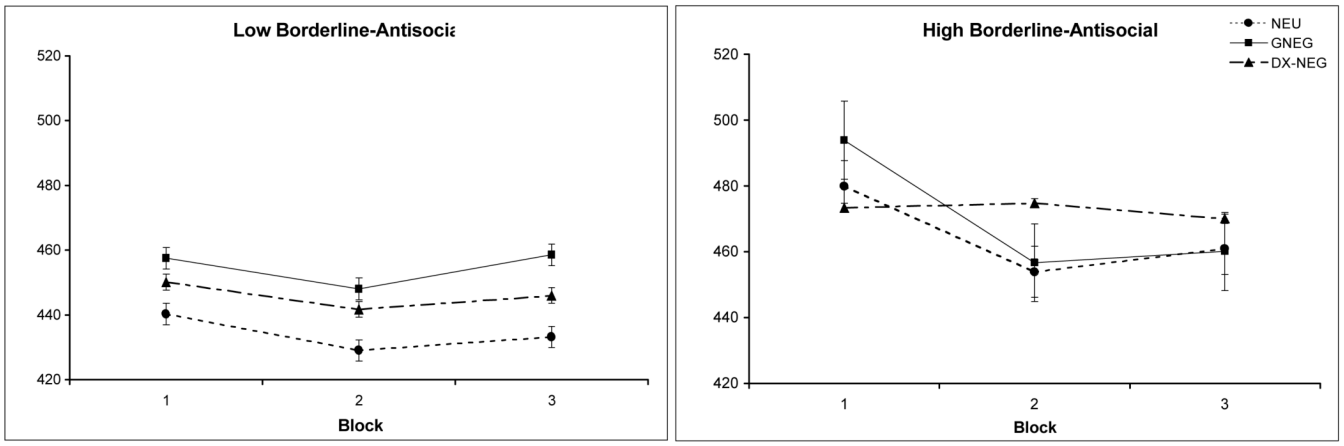

Figure 1.

Reaction Times Across Blocks as a Function of Word Category and Borderline-Antisocial Status. The graph to the left represents the low borderline-antisocial group (n = 39). The graph to the right represents the high borderline-antisocial group (n = 42).

Note: NEU = Neutral. GNEG = General Negative. DX-NEG = Diagnostic-Specific Negative.

Table 1

Mean Differences Between High and Low Borderline-Antisocial Groups on Constructs of Interest

Variables	Low Group (*n* = 39) *M* (*SD*)	High Group (*n* = 42) *M* (*SD*)	*F*
PAI - Borderline Subscales			
PAI Affective Instability	2.42 (.49)	9.95 (.47)	**123.51** **
PAI Identity Disturbance	5.05 (.54)	11.32 (.52)	**70.05** **
PAI Negative Relationships	2.87 (.50)	10.46 (.48)	**119.58** **
PAI Self-Harm	2.40 (.49)	8.17 (.47)	**72.28** **
SCATI - Borderline Total	6.10 (.40)	12.32 (.39)	**123.77** **
PPI-S Factors			
PPI-S Fearless Dominance	54.37 (1.77)	56.63 (1.71)	.85
PPI-S Impulsive Antisociality	45.18 (1.11)	65.93 (1.07)	**182.07** **
SRP-II Factors			
SRP-II Factor 1	32.37 (1.35)	33.20 (1.30)	.19
SRP-II Factor 2	30.95 (1.47)	57.59 (1.42)	**169.75** **
UPPS Impulsivity Subscales			
UPPS Lacks Premeditation	1.67 (.09)	2.55 (.09)	**48.91** **
UPPS Urgency	1.58 (.09)	2.66 (.08)	**83.15** **
UPPS Sensation Seeking	2.57 (.12)	2.99 (.11)	**6.66***
UPPS Lacks Perseverance	1.60 (.08)	2.30 (.08)	**42.54** **
MASQ			
MASQ Anxiety	27.18 (2.03)	38.07 (1.98)	**14.83** **
MASQ Depression	43.03 (1.84)	57.66 (1.79)	**32.49** **

Note. PAI = Personality Assessment Inventory (Morey, 1991). SCATI = Short Coolidge Axis II Inventory (Coolidge, 2001). PPI-S = Psychopathic Personality Inventory-Short Form (Lilienfeld & Andrews, 1996). SRP-II = Self-Report Psychopathy Scales (Hare, 1991). UPPS = UPPS Impulsive Behavior Scale (Whiteside & Lynam, 2001). MASQ = Mood and Anxiety Symptom Questionnaire (Watson et al., 1995).

* $p<.05$

** $p<.01$

Table 2

Mean Ratings Across Word Categories on Matching Variables of Interest

	NEU	GNEG	DX-NEG			
Matching Variables			**BOR-only**	**ANT-only**	**Both**	**Overall**
Valence	5.25	1.99	1.86	2.32	2.11	2.09
Arousal	3.66	5.80	5.76	6.07	6.45	6.09
Word Length	5.84	6.00	6.45	5.91	6.1	6.15
Frequency	52.81	31.34	33.33	17.5	34.5	28.44
BOR Relevance	--	3.24	1.33	2.75	1.78	1.79
ANT Relevance	--	3.15	2.48	1.25	1.92	2.00
PSY Relevance	--	2.93	2.29	2.55	2.65	2.48

Note. NEU = Neutral. GNEG = General Negative. DX-NEG = Diagnostic-Specific Negative. BOR = Borderline personality traits. ANT = Impulsive-antisocial personality traits. PSY = Psychotic disorders. Only GNEG and DX-NEG words were rated for diagnostic relevance to BOR, ANT, and PSY on a scale from 1 to 4. Lower scores represent more relevance. There were a total of 32 NEU, 32 GNEG, and 32 DX-NEG (comprised of 11 BOR, 11 ANT, and 10 Both) words.

Table 3

Mean Reaction Times across Blocks as a Function of Word Category and Borderline-Antisocial Status

	Low Borderline-Antisocial Group (*n* = 39)			High Borderline-Antisocial Group (*n* = 42)		
	NEU	GNEG	DX-NEG	NEU	GNEG	DX-NEG
Block	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
1	440.23 (10.93)	457.44 (10.12)	450.10 (8.60)	479.84 (13.27)	493.82 (13.25)	473.30 (11.42)
2	429.02 (7.45)	448.00 (9.48)	441.65 (9.08)	453.83 (9.60)	456.65 (9.76)	474.71 (11.05)
3	433.15 (7.51)	458.51 (11.58)	445.93 (9.35)	460.89 (11.25)	460.07 (8.73)	469.97 (10.93)

Note. Reaction times are measured in milliseconds. NEU = Neutral. GNEG = General Negative. DX-NEG = Diagnostic-Specific Negative.