8-2016

Impulsivity, Rejection Sensitivity, and Reactions to Stressors in Borderline Personality Disorder

Kathy R. Berenson
Gettysburg College

Wesley Ellen Gregory
Gettysburg College

Erin Glaser
Barnard College

See next page for additional authors

Roles

Class of 2015: Wesley Ellen Gregory

Impulsivity, Rejection Sensitivity, and Reactions to Stressors in Borderline Personality Disorder

Abstract

This research investigated baseline impulsivity, rejection sensitivity, and reactions to stressors in individuals with borderline personality disorder compared to healthy individuals and those with avoidant personality disorder . The borderline group showed greater impulsivity than the avoidant and healthy groups both in a delay-discounting task with real monetary rewards and in self-reported reactions to stressors; moreover, these findings could not be explained by co-occurring substance use disorders. Distress reactions to stressors were equally elevated in both personality disorder groups (relative to the healthy group). The borderline and avoidant groups also reported more maladaptive reactions to a stressor of an interpersonal versus non-interpersonal nature, whereas the healthy group did not. Finally, self-reported impulsive reactions to stressors were associated with baseline impulsivity in the delay-discounting task, and greater self-reported reactivity to interpersonal than non-interpersonal stressors was associated with rejection sensitivity. This research highlights distinct vulnerabilities contributing to impulsive behavior in borderline personality disorder.

Keywords

Borderline personality disorder, Avoidant personality disorder, Impulsivity, Delay discounting, Rejection sensitivity

Disciplines

Experimental Analysis of Behavior | Personality and Social Contexts | Psychology

Authors

Kathy R. Berenson, Wesley Ellen Gregory, Erin Glaser, Aliza Romirowsky, Eshkol Rafaeli, Xiao Yang, and Geraldine Downey

Delay-Discounting and Reactions to Stressors

in Borderline and Avoidant Personality Disorders

Kathy R. Berenson[1], Wesley Ellen Gregory[1]

Erin Glaser[2], Aliza Romirowsky[2]

Eshkol Rafaeli[2,3]

Xiao Yang[4], Geraldine Downey[4]

[1] Department of Psychology, Gettysburg College, Gettysburg, PA.

[2] Department of Psychology, Barnard College, Columbia University, New York, NY.

[3] Department of Psychology and Gonda Multidisciplinary Neuroscience Center, Bar-Ilan

University, Ramat-Gan, Israel.

[4] Department of Psychology, Columbia University, New York, NY.

Please direct correspondence to:
Kathy R. Berenson
Department of Psychology, Gettysburg College, Box 407
Gettysburg PA, 17325
E-mail: kberenso@gettysburg.edu

Delay-Discounting and Reactions to Stressors

in Borderline and Avoidant Personality Disorders

Abstract

In this research we investigated the degree to which individuals with borderline and avoidant personality disorders react to stressors with impulsivity and distress compared to healthy individuals. Consistent with impulsive reactions being characteristic of borderline (and not avoidant) personality disorder, the borderline group showed greater impulsivity than the avoidant and healthy groups both in a delay-discounting task with real monetary rewards and in self-reported reactions to stressors. Elevated distress responses to stressors, on the other hand, were reported by both personality disorder groups (relative to the healthy group). Consistent with the high rejection sensitivity that characterizes both disorders, the borderline and avoidant groups reported more maladaptive reactions to a stressor of an interpersonal vs. noninterpersonal nature, whereas the healthy group did not. Finally, self-reported impulsive reactions to stressors were associated with impulsivity in the delay-discounting task, and greater self-reported reactivity to interpersonal than noninterpersonal stressors was associated with rejection sensitivity. (150)

Delay-Discounting and Reactions to Stressors

in Borderline and Avoidant Personality Disorders

Individuals with personality disorders often have a difficult time handling stress in

everyday life, and diagnoses of borderline personality disorder (BPD) and avoidant personality

disorder (APD) are associated with particularly maladaptive responses to interpersonal stressors.

These disorders entail a heightened sensitivity to interpersonal rejection, and consistent with this

shared vulnerability, show substantial rates of comorbidity (American Psychiatric Association,

2013). Nevertheless, the disorders present distinctively, with diverging behavioral profiles.

Whereas APD is associated with high levels of inhibition, BPD is characterized by impulsivity,

difficulty resisting behaviors that bring immediate reward or relief. The combination of

experimental tasks used in this research highlights both the ways in which BPD and APD are

similar (intense distress reactions to stressors and sensitivity to rejection) and how they are

different (impulsivity).

Reactions to stressors and impulsivity in BPD

BPD is characterized diagnostically by an enduring pattern of instability in multiple

facets of an individual's life including the self-concept, interpersonal relationships, and affect. In

addition, individuals with BPD often present with marked impulsivity -- manifesting itself in

reckless behavior, self-injurious and suicidal behavior, and temper outbursts -- often precipitated

by interpersonal stress (American Psychiatric Association, 2013; Skodol, et al., 2002). These are

especially devastating BPD symptoms because they may involve risk of death, serious health

problems, or legal problems. Even the less risky of these symptoms take a high toll, as they

undermine relationships, occupational functioning, and overall stability. High levels of

impulsivity also affect the individual's ability to make thoughtful decisions. During a task in

which participants were required to predict the outcome of a dice roll at the risk of losing

hypothetical money, participants with BPD were more likely than others to make risky decisions,

and also made less effective use of the feedback given to them during the task (Svaldi, Philipsen,

& Matthies, 2014).

Several studies have linked impulsive behavior with distress among individuals with

BPD. Alexander et al. (2010) found that individuals high in BPD features were more impulsive

after a fear induction than in a no-induction condition, suggesting that impulsivity in BPD is

influenced by emotional states and the stressful circumstances that evoke them. In a study

examining the relationship between impulsivity and dysfunctional beliefs of individuals with

BPD, Gagnon, Daelman, and McDuff (2013) found that dysfunctional beliefs were associated

with *Negative Urgency*, defined as difficulty resisting the urge to engage in maladaptive actions

when under emotional distress (Whiteside & Lynam, 2001). In a study exploring the link

between emotion dysregulation and impulsivity in a non-clinical sample of individuals with BPD

features, Chapman, Leung, and Lynch (2008) found that borderline traits were associated with

greater reported difficulty inhibiting impulsive responses, accepting emotions, and accessing

emotional regulation strategies. Similarly, borderline traits have been associated with reports of

attempting to reduce distress with maladaptive strategies, including impulsive responses

(Bijttebier & Vertommen, 1999). Powers, Gleason, and Oltmanns (2013) found that individuals

with BPD were more likely to experience interpersonal stressful life events, and that impulsivity

was one of the key symptoms related to higher numbers of stressful life events.

Reactions to stressors and inhibition in APD

APD is characterized diagnostically by a persistent pattern of social inhibition, feelings of

inadequacy, and high sensitivity to interpersonal rejection. Though it has been studied far less

than BPD, APD is comparable to BPD in terms of prevalence, chronicity, and psychosocial impairment (Torgersen, Kringlen, & Cramer, 2001; Wilberg, Karterud, Pedersen, & Umes, 2009). Studying a non-clinical sample of individuals high in APD traits, Meyer, Ajchenbrenner, & Bowles (2005) found that participants were highly sensitive to stimuli and exerted great effort to control and avoid overstimulation. They also interpreted ambiguous social situations with a rejection-oriented bias associated with strongly negative expectancies, as well as anxious and avoidant responses.

The delay-discounting task as a measure of impulsivity

Behavioral measures of impulsivity such as the delay-discounting procedure assess an individual's propensity to delay reward at any given time by asking participants to choose between small immediate monetary rewards and larger delayed monetary rewards. Impulsivity is measured by the tendency to choose the immediate rewards over the delayed rewards, suggesting that the perceived value of the future reward is diminished or *discounted* as a result of the delay (Rachlin, 1974; see also Reynolds & Schiffbauer, 2005; Kirby, Petry & Bickel, 1999). Mischel and colleagues (e.g., Mischel & Ebbesen, 1970) had used a similar behavioral task designed for children; children were told they could either eat one treat immediately or have two treats after an unspecified duration of time. Children who successfully completed the second option were considered to have greater ability to delay rewards (Mischel et al., 1989).

Developed for studies of adults with substance use disorders, the delay-discounting task is likely to be a valid index of impulsivity in adults with BPD as well. For example, Crean, de Wit, & Richards (2000) found that participants with a combination of BPD and substance abuse valued the delayed rewards significantly less than those in a low-risk comparison group. In addition, Ayduk et al. (2007) found that poor delay ability, as measured behaviorally during

childhood, was associated with BPD features in adulthood. However, no previous research has examined how the delay-discounting task relates to the symptoms of BPD and to impulsive reactions to stressors exhibited by individuals with this disorder.

Maladaptive reactions to interpersonal stressors

Performance on the delay-discounting task reflects a general propensity toward impulsivity, but it does not capture the contextualized nature of impulsive patterns in BPD. Both clinical observations and empirical studies suggest that the maladaptive impulsive behaviors shown in individuals with BPD often arise in the context of perceived rejection/abandonment and interpersonal stressors more generally (Berenson et al., 2011; Brodsky et al., 2006; Coifman et al., 2013; Welch & Linehan, 2002; Yen et al., 2006). Those with APD, by contrast, are not known for impulsive behavior, but like their BPD counterparts experience high levels of reactivity to interpersonal stressors in the form of distressing cognitions and affects (Meyer & Ajchenbrenner, 2005). Indeed, experience-sampling research shows that relative to a healthy comparison group, simply being in the presence of at least one other person elicits significant distress for individuals with BPD and APD (Gadassi et al., 2014).

To the extent that BPD and APD are associated with limited coping skills for handling negative affect, as well as limited social support, perhaps individuals with these disorders may also show heightened reactions to noninterpersonal stressors relative to healthy individuals. Whereas mounting evidence supports the DSM-5 depiction of BPD and APD symptoms as largely triggered by interpersonal stressors (American Psychiatric Association, 2013), empirical research has not considered whether this phenomenon is truly specific to stressors of an interpersonal (vs. noninterpersonal) nature. The present study therefore included an additional experimental task to address this gap in the literature.

The Present Study

In this study we used two experimental tasks to investigate the differences in impulsivity and distress expected to characterize BPD, APD, and a healthy comparison group. We first used the delay-discounting task (Kirby et al., 1999) with both hypothetical and real monetary rewards, and examined the association of discounting rates (an index of impulsivity) with diagnoses and symptom profiles. We then assessed the self-reported likelihood of impulsive reactions and distress reactions to two hypothetical scenarios involving an interpersonal and non-interpersonal stressor, respectively.

We hypothesized that the BPD group would show greater impulsivity than the APD and HC groups both in the delay-discounting task and in self-reported impulsive reactions to stressful events. We expected that relative to controls, both the BPD and APD groups would report elevated distress in reaction to stressful events. Moreover, consistent with the high sensitivity to rejection that characterizes both disorders, we expected that relative to controls both the BPD and APD groups would report more maladaptive reactions to the interpersonal than the noninterpersonal stressor. Finally, we predicted that self-reported impulsive reactions to stressors would be associated with the impulsivity index obtained in the delay-discounting task, and that greater self-reported reactivity to interpersonal than noninterpersonal stressors would be associated with rejection sensitivity.

Method

Participants and recruitment

Adult participants in a metropolitan area were recruited for a larger study on personality and mood in daily life. Advertisements published in newspapers and posted on Internet forums were designed to reach people with BPD or APD by describing symptoms of the disorders (e.g., mood

swings, shyness). Flyers were also posted at treatment clinics, and disorder-specific support groups.

Interested individuals completed a telephone screening based on the Structured Clinical Interview for

DSM-IV Personality Disorders (SCID-II-Q; First, Gibbon, Spitzer, Williams, & Benjamin, 1997).

Those likely to meet criteria for one of the study groups were invited to the lab for a diagnostic

interview, which included the Structured Interview for the Diagnosis of Personality Disorders (SID-

P-IV; Pfohl, Blum & Zimmerman, 1997) and the Structured Clinical Interview for DSM-IV Axis I

Disorders (SCID-I; First, Gibbon, Spitzer, & Williams, 1996). Conducted or supervised by doctoral-

level clinical psychologists, the interviews demonstrated good inter-rater reliability at the criterion

and diagnostic level for personality disorders (.83) and at the diagnostic level for Axis-I disorders

(.86).

Participants who met criteria for BPD were included in the BPD group. APD was selected as

a clinical comparison condition because the two disorders share rejection sensitivity and

interpersonal impairment but differ with respect to impulsivity. To be eligible for the APD group,

participants were required to meet criteria for APD and to not meet criteria for diagnosis with any

cluster B personality disorder. Those meeting criteria for both BPD and APD were included in the

BPD group because when they occur together, BPD is the more salient of the two disorders and

more likely to be the direct focus of treatment (Gunderson et al., 2000). Dividing the groups this

way may have made it more difficult for us to detect the differences we predicted between the

BPD and APD groups. Yet, as both diagnosable and subclinical levels of comorbidity are the

rule rather than the exception for personality disorders, it is impossible to select truly non-

overlapping BPD and APD groups without a substantial cost to external validity.

Participants eligible for the healthy comparison (HC) group met no more than two criteria

for any specific personality disorder and no more than 10 criteria in total; they had no psychiatric

diagnoses nor use of psychotropic medication for at least one year prior to the interview, and had a Global Assessment of Functioning score of at least 80. Primary psychotic disorder, current substance intoxication or withdrawal, and cognitive impairment or illiteracy were exclusion criteria for all three groups.

The measures that are the focus of this investigation were added to the study procedures midway through data collection; hence the sample is smaller than the sample completing the broader study. All participants who completed both versions of the delay-discounting task and the reactions to stressors questionnaire are included in these analyses. The current study sample (N=104) includes 35 (30 female) meeting DSM-IV-TR criteria for a diagnosis of BPD (9 of them meeting criteria for APD as well), 24 (13 female) who met DSM-IV-TR criteria for a diagnosis of APD (without BPD), and 45 (31 females) meeting eligibility criteria for our healthy control (HC) group.

Participants were 18-64 years old, $M = 30.69$, $SD = 9.63$. They identified their racial/ethnic backgrounds as White (48.1%) Black (22.1%) Latino/a (12.5%) Asian (12.5%) Native American (1%) and multiracial (3.8%). They had completed between 10 and 20 years of education $M = 16.10$, $SD = 2.58$. Fourteen participants in the BPD group and six in the APD group were currently taking medication for a psychiatric condition. Seventeen in the BPD group, nine in the APD group, and two in the HC group were currently in psychotherapy or counseling. Table 1 presents Axis I diagnoses for the BPD and the APD groups.

Procedure

Following the diagnostic interview, eligible participants returned for a second lab visit in which they completed a battery of social-cognitive tasks and questionnaires, including the hypothetical delay-discounting task and the questionnaire assessing reactions to an interpersonal stressor. After three weeks, participants returned to the lab for a third visit, where they completed

the delay-discounting task with the possibility of a real monetary reward, and completed the questionnaire about reactions to a noninterpersonal stressor. During each lab session participants also took part in other tasks and in the weeks between them completed an experience-sampling diary; these are all beyond the scope of this paper but have been reported elsewhere. (MASKED REFERENCES). Participants provided written informed consent and were compensated for their time. All study procedures were approved by applicable Institutional Review Boards.

Delay-discounting task – Hypothetical rewards version. Once participants arrived for their second lab visit, a trained research assistant escorted them into a soundproof room, and instructed them to sit directly in front of a computer and response box. For the delay-discounting task, the top and bottom button of the response box were labeled with the numbers "1" and "2" respectively. Participants were asked to place the first finger of their dominant hand on the top button and the first finger of their other hand on the bottom button. Participants read the following instructions on the computer screen: "Next you will see a pair of options. For each pair, please indicate which of the two options you'd prefer by pressing the button that corresponds to it (either "1" or "2")" (Kirby et al., 1999). Participants were told that they should make their selections at a pace that was comfortable for them and should not rush.

During the task, participants were presented with a series of 27 hypothetical pairs of smaller immediate and larger delayed monetary rewards, for example: 1) $11 today or 2) $30 in 7 days (Kirby et al., 1999). The 27 reward pairs were presented in the same order for each participant. At the beginning of each trial the top of the computer screen read: "Which of the following options would you prefer?" Beneath this question, the two reward options were centered on the computer screen, with Option 1 (the smaller immediate reward) displayed above

Option 2 (the larger delayed reward) separated by the word "or." The computer recorded the

participants' responses.

Delay-discounting task –Real reward version. During their third lab visit, participants

completed the same task again but with an important difference: as in Kirby et al., (1990) they

were told that they had a one-in-six chance of actually receiving one of the reward options that

they chose. Specifically, participants were told that after they selected their preferences, the

experimenter would roll a six-sided die to determine whether or not they would receive a reward.

If they were to receive a reward, the experimenter would roll a 30-sided die to determine which

of the 27 selected reward options they would receive. If they selected the immediate reward they

would receive cash before leaving the session. If they selected the delayed reward, it would be

mailed to them on the specified date or they could arrange to pick it up in person on or after that

date. The choices were presented on paper, in the same order as they had been presented during

the hypothetical version of the task, and participants were asked to circle their preferred options.

They were told: "Remember, one of these may turn out to be a real monetary reward, so you

should answer every question as if it were going to be the one you will win."

Reactions to interpersonal and noninterpersonal stressors. Participants completed

questionnaires regarding the self-reported likelihood of particular reactions to an interpersonal

and non-interpersonal stressor, administered 3 weeks apart.

The interpersonal condition began with instructions to identify by name a person who is

important to them: "For this questionnaire, we would like you to think about a specific person

who is very important to you and close to you, preferably your romantic partner or closest

friend." Participants were then instructed to visualize and answer questions about a hypothetical

scenario involving the identified individual: "Imagine if you thought that [important person]

might be losing interest in you, or be about to let you down. What thoughts, feelings, and behaviors would you be likely to have? Please indicate how likely you would be to react in the ways listed below." The questionnaire then proposed a series of possible reactions and the participant was asked to rate the likelihood of engaging in each one. Participants responded on a Likert scale ranging from 1 - 6, with 1 being *very unlikely* and 6 being *very likely*.

The directions for the non-interpersonal condition were similar: Participants were first asked to identify an expensive piece of equipment that is particularly important to them: "Imagine if you thought that your important piece of equipment might be malfunctioning or about to stop working at all. What thoughts, feelings, and behaviors would you be likely to have? Please indicate how likely you would be to react in the ways listed below." Again, participants rated the likelihood of responding in various ways on a scale of 1 - 6, with 1 being *very unlikely* and 6 being *very likely*.

Impulsive reactions were assessed using six items (interpersonal impulsivity, α=.88, noninterpersonal impulsivity, α=.77). The items were: "*do something that could be harmful to me e.g., binge eating, getting drunk or high, risky sex, shoplifting, etc.*"; "*impulsively do or say something I shouldn't*"; "*do or say something without considering the consequences*"; "*smash or otherwise destroy something important to me*"; "*be unable to keep my temper from exploding*"; "*take time to reflect on the situation and/or cool down so I don't overreact*" (reverse scored).

Distress reactions included unpleasant cognitive/affective responses without any explicitly impulsive components (interpersonal distress, α=.90, noninterpersonal distress, α=.82). The six items on this scale were: "*feel helpless*"; "*feel worthless*"; "*experience intense despair or panic*"; "*think about how much worse the situation could become*"; "*believe there is nothing I*

can do to help myself feel better"; "*think about how the situation might not be as bad as it*

seems" (reverse scored).

Social Desirability. We assessed the tendency to answer questions in a socially

acceptable way using the Social Desirability Scale (Crowne & Marlowe, 1960). The scale

consists of 33 yes-no questions that ask about desirable but uncommon behaviors and

undesirable, but common behaviors. Measures of socially desirable responding are frequently

used as covariates in studies where desirability or undesirability of response options may be an

important influence on the data. Participants completed this measure during their initial lab visit;

its internal consistency for this sample was .86.

Rejection sensitivity. To examine predicted group differences in reactions to

interpersonal versus noninterpersonal stressors, we assessed anxious expectations for rejection

by people who are important to the self, using the Adult Rejection Sensitivity Questionnaire

(ARSQ). Similar in structure and scoring to the college student RSQ from which it was adapted

(Downey & Feldman, 1996), the adult version presents nine hypothetical interpersonal situations

involving possible acceptance or rejection by important others. For each situation, respondents

rate the anxiety/concern they would feel about the outcome, as well as the likelihood that the

other would respond with rejection. Scores are calculated by first multiplying the expected

likelihood of rejection for each situation by the degree of anxiety/concern, and then averaging

these weighted scores across the nine situations (see Berenson et al., 2009 for more information

on this measure). Participants completed this measure during their initial lab visit; its internal

consistency for this sample was .91.

Results

Estimating Discounting Rates (k values)

A preference for immediate rewards over delayed ones can be thought of as a discounting

of future rewards because of the delay. The higher the discounting rate k is, the more intensely

the value of a future reward is discounted relative to the value of a reward received today. This

rate therefore reflects impulsivity, the tendency to discount and forgo greater future rewards in

favor of smaller, more proximal ones. The discounting rate is defined by the following equation,

where V is the present value of the delayed reward A, D is the length of delay (days, in this case)

and k is the discounting rate:

$$V = \frac{A}{1+k \times D}$$

We followed the procedures used by Kirby et al. (1999) to estimate the value of each

individual's discounting rate (denoted by k_{subj}) from the 27 choices they made during the task.

Each of these choices specifies a smaller immediate reward (SIR), a larger delayed reward

(LDR) and a number of days of delay (D). The 27 choices involve a combination of nine levels

of discounting rate and three levels of reward size (small, medium, large). Each trial has its own

discounting rate, denoted by k_{trial} and defined as:

$$k_{trial} = \frac{\frac{LDR}{SIR}-1}{D}$$

The estimation procedure for k_{subj} is based on the logic that if the participant chooses the

LDR, then his/her actual discounting rate must be lower than the discounting rate of the trial,

whereas if the participant chooses the SIR, his/her discounting rate must be higher than k_{trial}.

The upper and lower bounds of k_{subj} can be estimated by examining each participant's 27

choices. For example, if a person chooses the SIR in the first four levels of discounting rate

(which means $k_{subj} > 0.0025$) and chooses the LDR for the remaining five levels (which means

$k_{subj} < 0.006$), we could estimate that k_{subj} is within the range of [0.0025, 0.006]. As in Kirby

et al. (1999), we would estimate this individual's discounting rate by taking the geometric mean

of 0.0025 and 0.006 (since the discounting rates were designed to have approximately equal

intervals after a logarithmic transform). Therefore, the nine levels of discounting rate form ten

ranges, each having two consecutive levels of discounting rate as its upper or lower bounds

except for the first and last range. The estimated discounting rate of the middle eight ranges is

the geometric mean of their upper and lower bounds. The lowest range has a discounting rate of

0.00016 and the highest range has a discounting rate of 0.25.

Of course, participants are not always perfectly consistent in their choices. For example, a

participant may choose SIR on the first four levels, LDR on level five; SIR on level six, and

LDR on levels seven though nine. As in Kirby et al. (1999), we identified the range for k_{subj} as

the one selected most frequently. When two or more ranges were selected equally frequently,

k_{subj} was estimated as the geometric mean of these ranges.

The distribution of k_{subj} values for our sample was positively skewed initially, but it

became normal after applying a natural log transform.

Diagnostic group differences in hypothetical and real discounting rates

Discounting rates were analyzed in a series of repeated measures General Linear Models

(GLM) with task type (hypothetical, real) as a within-subject variable and diagnostic group

(BPD, APD, HC) as the between subjects variable. Sex, age, and social desirability scores were

included as covariates. There was no main effect of task type, $F(1,98) < 1$, ns, $\eta_p^2 = .01$, and no

main effect of group $F(2,98) = 2.98$, ns, $\eta_p^2 = .05$, but results revealed a significant task type by

diagnostic group interaction $F(2,98) = 3.09$, $p < .05$, $\eta_p^2 = .06$, depicted in Figure 1.

In the real reward condition, the BPD group manifested a significantly higher discounting rate $M(SE)$ = -3.816 (.26) than the HC group, $M (SE)$ = -5.011 (.23), $t(98)$ = 3.08, $p < .01$ η_p^2 = .09, and a marginally higher discounting rate than the APD group, $M(SE)$ = -4.504 (.29), $t(98)$ = 1.78 $p < .08$, η_p^2 = .03. There was no significant difference between the APD and the HC groups in discounting rate $t(98)$ = 1.35 ns, η_p^2 = .02. Parallel analyses in the hypothetical task condition did not reveal any statistically significant differences. The BPD group $M (SE)$ = -4.011 (.34) did not differ from HC $M (SE)$ = -4.32 (.29) $t < 1$, ns, η_p^2 = .00, or from APD $M (SE)$ = -4.72 (.36) $t(98)$ = 1.46, ns, η_p^2 = .02. Additionally, the APD group did not differ from the HC group, $t < 1$, ns, η_p^2 = .01.

To further analyze the task type x group interaction, we conducted follow-up analyses on the difference between the two task conditions (real minus hypothetical) with group as the between-subjects variable and the same covariates. The results showed that both PD groups differed from the HC group in how they responded to the addition of a real monetary reward, BPD $t(98)$ = -2.08, $p < .05$, η_p^2 = .04; APD $t(98)$ = 2.20, $p < .05$, η_p^2 =.05. The HC group was significantly less impulsive in the real task than in the hypothetical task, $M(SE)$ = -.69 (.26). In contrast, both PD groups showed a nonsignificant increase in impulsivity (i.e., in discounting rates) with the addition of a real reward; BPD $M(SE)$ = .20 (.29) ; APD $M(SE)$ = .22 (.32), and did not differ from one another, $t < 1$, ns, η_p^2 =.00.

Discounting rates and symptom profiles

We examined the association of discounting rates in the real monetary reward task with each BPD criterion separately, expecting the largest associations to emerge for criteria that are characterized by impulsivity. These analyses are shown in Table 2. As expected, the largest effect was found for criterion 4 of BPD (impulsive behavior problems), and significant effects

were also found for the criteria involving self-injury/suicidality (criterion 5) and rage (criterion

8). Significant associations also emerged for the interpersonal criteria involving unstable

relationships (criterion 2), and frantic responses to perceived abandonment (criterion 1),

highlighting the role of impulsivity in the extent to which perceptions of significant others would

trigger such extreme behavioral reactions. Finally, a significant association was also found with

emptiness (criterion 7), a symptom often described as preceding and potentially motivating

problematic impulsive behaviors such as self-injury or pursuit of intense stimulation (e.g.,

Klonsky, 2008; Rallis, Deming, Glenn, & Nock). The BPD criteria involving identity

disturbance, affective instability, and paranoia/dissociation were not significantly related to

discounting rates. Importantly, no APD criteria were significantly related to discounting rates,

and no criteria for either disorder were significantly related to the discounting rate obtained in

the hypothetical version of the task.

Reactions to stressful events questionnaire

Self-reported responses to the interpersonal and noninterpersonal stressor were analyzed

in a series of repeated measures General Linear Models (GLMs) with stressor type (non-

interpersonal, interpersonal) as a within-subject variable and diagnostic group (HC, BPD, APD)

as a between subjects variable. Sex, age, and social desirability scores were included as

covariates in each analysis.

Self-reported impulsive reactions. The group means from our analysis are depicted in

Figure 2. A significant main effect of stressor type, $F(1,98) = 6.43$, $p < .05$, $\eta_p^2 = .06$, indicated

that when averaging across group, the interpersonal stressor elicited more impulsive reactions M

(SE) = 3.04 (.09) than the non-interpersonal stressor, $M (SE) = 2.40$ (.09). There was also a main

effect of diagnostic group $F(2,98) = 34.82$, $p < .001$, $\eta_p^2 = .42$ and a marginally significant

stressor by diagnostic group interaction $F(2,98) = 2.80, p < .07, \eta_p^2 = .05$. Averaging across the two stressor types, the BPD group reported significantly higher likelihood of impulsive reactions $M (SE) = 3.54 (.14)$ compared to the APD group $M (SE) = 2.81 (.16), t(98) = 3.50 p < .001, \eta_p^2 = .11$ and compared to the HC group, $M (SE) = 1.80 (.13), t(98) = 8.28, p < .001 \eta_p^2 = .41$. The APD group also reported more impulsive reactions on average than the HC group $t(98) = 4.95 p < .001, \eta_p^2 = .20$.

To further analyze the marginal stressor type x group interaction, we conducted univariate follow-up analyses of the change in impulsive reactions associated with the two stressors. Difference scores (interpersonal minus noninterpersonal) were the dependent variable, and we included the same between-group factor and covariates. When facing a stressor of an interpersonal (vs. noninterpersonal) nature, the BPD group $M (SE) = 1.0 (.18)$ reported a significantly greater increase in impulsive reactions compared to the HC group, $M (SE) = .41 (.16), t(98) = -2.21 -, p < .05, \eta_p^2 = .05$, and a marginally greater increase in impulsive reactions compared to the APD group, $M (SE) = .50 (.20), t(98) = 2.21, p < .07, \eta_p^2 = .04$. The APD and HC groups did not differ in the extent to which impulsivity was associated with interpersonal stress $t < 1, ns, \eta_p^2 = .00$. In other words, although all three groups reported significantly more impulsivity in the interpersonal condition than the noninterpersonal condition, the BPD group was distinguished from the others by a larger magnitude of this effect.

Self-reported distress reactions. The group means from our analysis of the distress scale are depicted in Figure 3. A significant main effect of stressor type, $F(1,98) = 4.61, p < .05, \eta_p^2 = .05$, indicated that when averaging across group, the interpersonal stressor elicited more distress than the noninterpersonal stressor. There was also a main effect of diagnostic group

$F(2,98) = 70.50$, $p < .001$, $\eta_p^2 = .57$. These effects are both qualified, however, by a significant

stressor by diagnostic group interaction $F(2,98) = 5.78$, $p < .01$, $\eta_p^2 = .11$.

In the interpersonal stressor condition, the BPD group reported significantly higher

distress $M\ (SE) = 4.73$ (.16) compared to the HC group, $M\ (SE) = 2.12$ (.14), $t(98) = 11.00$, $p <$

.001 $\eta_p^2 = .55$. The APD group $M\ (SE) = 4.51$ (.17), also reported more distress than the HC

group $t(98) = 10.39$, $p < .001$, $\eta_p^2 = .52$. The BPD and APD groups, however, did not

significantly differ from one another $t(98) < 1$ *ns*, $\eta_p^2 = .01$. The same pattern of results also

emerged in the noninterpersonal stressor condition. That is, the BPD group reported significantly

higher distress 3.50 (.20) than the HC group, $M\ (SE) = 1.97$ (.18) , $t(98) = 5.20$, $p < .001$ $\eta_p^2 =$

.22, and the APD group, $M\ (SE) = 3.54$ (.22), also reported more distress than the HC group $t(98)$

$= 5.52$ $p < .001$, $\eta_p^2 = .24$. Again, the BPD and APD groups did not differ in their level of self-

reported distress, $t < 1$, *ns*, $\eta_p^2 = .00$.

To further analyze the stressor type x group interaction, we conducted univariate follow-

up analyses of the change in distress associated with the two conditions, with difference scores

(interpersonal minus noninterpersonal) as the dependent variable and with the same between-

group factor and covariates. The BPD group reported significantly more likelihood of distress in

the interpersonal stress scenario than the noninterpersonal scenario, $M\ (SE) = 1.23$ (.23), as did

the APD group, $M\ (SE) = .96$ (.24). In contrast, the HC group showed no significant increase in

distress in the interpersonal condition; $M\ (SE) = .16$ (.20). Relative to the HC group, each of the

PD groups reported significantly larger increases in distress as a function of the interpersonal

nature of the stressor, BPD vs. HC: $t(98) = 3.23$, $p < .01$, $\eta_p^2 = .10$; APD vs. HC: $t(98) = 2.51$, p

$< .05$, $\eta_p^2 = .06$. There were no significant differences between the size of this effect in the BPD

vs. APD groups $t < 1$, *ns*, $\eta_p^2 = .01$.

Association of impulsive reactions to stressors with discounting rates

To test the prediction that discounting rates would be associated with self-reported

impulsive reactions (but not distress reactions) to stressors, we computed the partial correlation

between the log-transformed k value for the real discounting task with the impulsivity and

distress reactions scales (averaged across the interpersonal and noninterpersonal conditions),

controlling for sex, age, and social desirability. As expected, discounting rates were significantly

correlated with self-reports of impulsive reactions to stress, r (99) = .24, p <.05, but were not

significantly correlated with self-reported distress reactions, r (99) = .15, ns.

Association of heightened reactions to the interpersonal stressor with rejection sensitivity

As expected, rejection sensitivity scores were significantly higher in the BPD group M =

15.84 SD = 6.74 than the HC group M = 6.47 SD = 2.77, t = 7.52, p < .001; scores were also

significantly higher in the APD group M = 17.35 SD = 7.25, than in the HC group, t = 7.78, p <

.001. The BPD and APD groups did not significantly differ from one another t = -1.03, ns.

We predicted that rejection sensitivity should be associated with more intense self-

reported impulsive and distress reactions to the interpersonal than the noninterpersonal stressor.

To test this hypothesis, we examined the partial correlations of rejection sensitivity with the

difference between reactions to the two stressors (interpersonal minus noninterpersonal)

controlling for the corresponding reactions to the noninterpersonal stressor as well as sex, age,

and social desirability. As predicted, rejection sensitivity was significantly associated with

stronger self-reported maladaptive reactions to the interpersonal stressor than the

noninterpersonal stressor, for both types of reactions (impulsivity r(98) = .32, p < .001; distress

r(98) =.60, p < .001).

Discussion

As predicted, individuals with BPD showed greater impulsivity than those with APD and a healthy comparison group, both in a delay-discounting task and in a self-report measure of reactions to stressors. Moreover, the delay-discounting measure of impulsivity was related to both self-reported impulsive reactions to stress and diagnostic criteria involving impulsivity as assessed by clinical interview. Whereas impulsive reactions to stressors were uniquely elevated in the BPD group relative to the other groups, distress reactions were equally intense in both the BPD and APD groups. Notably, the maladaptive reactions to stressors characteristic of each disorder (impulsivity in BPD and distress in both disorders) were reported for a hypothetical noninterpersonal stressor (failure of important equipment) as well as for an interpersonal stressor (unresponsiveness of an important other). These reactions, however, were stronger in the interpersonal than the noninterpersonal condition, a pattern that did not occur in the healthy comparison group. As predicted, the heightening of maladaptive reactions to interpersonal compared to noninterpersonal stressors was associated with rejection sensitivity, a vulnerability common to both BPD and APD. Our study is unique in combining performance-based and self-report measures to examine different forms of impulsivity and reactions to stressors under different contexts.

Limitations and directions for future research

Although both the delay-discounting and reactions to stressors tasks involved two within-person conditions, the order of these conditions was not randomized, and order effects cannot be ruled out.

Interestingly, results were only found for the delay-discounting task when the monetary rewards were real; the hypothetical delay-discounting task yielded no meaningful group differences or associations. Whereas the BPD group made inflexibly impulsive choices across

both task conditions, the HC group made quite impulsive choices when the rewards were only

hypothetical, becoming significantly less impulsive when the rewards were real. This pattern is

in contrast with several prior studies that have found no significant difference between

hypothetical and real rewards in the delay-discounting task (Johnson & Bickel, 2002; Lagorio &

Madden, 2005; Lawyer, Schoepflin, Green, & Jenks, 2011; Madden, Begotka, Raiff, & Kastern,

2003; Matusiewicz, Carter, Landes, & Yi, 2013). However, like the present study, Hinvest and

Anderson (2010) found that healthy participants were significantly less impulsive in a real versus

hypothetical reward condition.

Another limitation of our study design concerns the nature of the noninterpersonal

stressor that we chose. Having noticed during the experience-sampling portion of our research

that participants with BPD and APD expressed attachment to their palm-pilot diaries, we began

to administer an adaptation of the Parasocial Interaction Questionnaire (Rubin et al., 1985) and

confirmed that indeed, those with personality disorders reported significantly stronger parasocial

bonds to their palm-pilot diaries than did members of the HC group (MASKED REFERENCE –

POSTER PRESENTATION). This finding raises the possibility that equipment failure may not

be experienced by all groups as equally "noninterpersonal," and the elevations of maladaptive

reactions for the BPD and APD groups under that condition may have reflected, in part,

disruption of a parasocial attachment bond. Future research to test the idea that individuals with

these disorders show heightened reactions to noninterpersonal stressors relative to healthy

individuals could employ a noninterpersonal stressor scenario with less potential for a parasocial

component, such as poor work/school performance.

Another limitation to this investigation is that we did not further examine the nature of

the relationships with the significant others that participants were envisioning in the interpersonal

stressor condition. For example, it is possible that different types of relationships (e.g., romantic partner, close friend, or family member) are more strongly associated with maladaptive reactions to signs of disengagement and that the types of significant others selected may have differed across diagnostic groups. Further, the quality of the relationship with the significant other may also play a role in how that individual's disengagement is interpreted and reacted to, and relationship quality may also vary with diagnostic group. Indeed, research on rejection sensitivity in nonclinical samples suggests that maladaptive reactions to potential rejection cues and poor relationship quality may each contribute to one another in a cyclical process (Downey, Freitas, Michaelis, & Khouri, 1998). It would be important to consider the extent to which individuals with BPD and APD may have more maladaptive reactions to interpersonal stressors, in part, because the relationships in which they experience these stressors may provide less support and more reasons for concern.

Compliance with Ethical Standards

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Written informed consent was obtained from all individual participants included in this study.

References

American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders (5*[th]*ed).* Washington, DC: Author.

Ayduk, O., Zayas, V., Downey, G., Cole, A. B., Shoda, Y., & Mischel, W. (2008). Rejection sensitivity and executive control: Joint predictors of borderline personality features. *Journal of Research in Personality, 42,* 151-168.

Berenson, K.R., Downey, G., Rafaeli, E., Coifman, K.G, & Leventhal Paquin, N. (2011). The rejection-rage contingency in borderline personality disorder. *Journal of Abnormal Psychology*, *120*, 681-690.

Berenson, K. R., Gyurak, A., Ayduk, Ö., Downey, G., Garner, M. J., Mogg, K., & ... Pine, D. S. (2009). Rejection sensitivity and disruption of attention by social threat cues. *Journal of Research in Personality*, *43*, 1064-1072.

Bijttebier, P., & Vertommen, H. (1999). Coping strategies in relation to personality disorders. *Personality and Individual Differences*, *26*, 847-856.

Brodsky, B. S., Groves, S. A., Oquendo, M. A., Mann, J., & Stanley, B. (2006). Interpersonal Precipitants and Suicide Attempts in Borderline Personality Disorder. *Suicide and Life-Threatening Behavior*, *36*(3), 313-322.

Chapman, A. L., Dixon-Gordon, K. L., Layden, B. K., & Walters, K. N. (2010). Borderline personality features moderate the effect of a fear induction on impulsivity. *Personality Disorders: Theory, Research, and Treatment*, *1*, 139-152.

Chapman, A. L., Leung, D. W., & Lynch, T. R. (2008). Impulsivity and emotion dysregulation in borderline personality disorder. *Journal of Personality Disorders*, *22*, 148-164.

Coifman, K.G., Berenson, K.R., Rafaeli, E., & Downey, G. (2012). From negative to positive and back again: Polarized affective and relational experience in borderline personality disorder. *Journal of Abnormal Psychology*, *121*, 668-679.

Crean, J. P., de Wit, H., & Richards, J. B. (2000). Reward discounting as a measure of impulsive behavior in a psychiatric outpatient population. *Experimental and Clinical Psychopharmacology*, *8*, 155-162.

Crowne, D.P., & Marlow, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology, 24,* 349-354.

Downey, G., & Feldman, S. I. (1996). Implications of rejection sensitivity for intimate relationships. *Journal of Personality and Social Psychology*, *70*, 1327-1343.

Downey, G., Freitas, A., Michaelis, B. & Khouri, H. (1998). The self-fulfilling prophecy in close relationships: Rejection sensitivity and rejection by romantic partners. *Journal of Personality and Social Psychology, 75*, 545-560.

First, M., Gibbon, M., Spitzer, R.L., & Williams, J.B.W.,(1996). *User's guide for the Structured Clinical Interview for the DSM-IV Axis I Research Version*. Washington, DC: American Psychiatric Press.

First, M., Gibbon, M., Spitzer, R.L., & Williams, J.B.W., & Benjamin, L.S. (1997). *User's guide for the Structured Clinical Interview for the DSM-IV Axis II Personality Disorders (SCID-II)*. Washington, DC: American Psychiatric Press.

Gadassi R., Snir, A., Berenson, K.R., Downey, G., & Rafaeli, E. (2014). Out of the frying pan, into the fire: Mixed affective reactions to social proximity in borderline and avoidant personality disorders in daily life. *Journal of Abnormal Psychology*, *123,* 613-522.

Gagnon, J., Daelman, S., & McDuff, P. (2013). Correlations of impulsivity with dysfunctional beliefs associated with borderline personality. *North American Journal of Psychology*, *15*, 167-178.

Gunderson, J. G., Shea, T., Skodol, A. E., McGlashan, T. H., Morey, L. C., Stout, R. L., & ... Keller, M. B. (2000). The Collaborative Longitudinal Personality Disorders Study: Development, aims, design, and sample characteristics. *Journal of Personality Disorders*, *14*, 300-315.

Hinvest, N. S., & Anderson, I. M. (2010). The effects of real versus hypothetical reward on delay and probability discounting. *The Quarterly Journal of Experimental Psychology, 63*, 1072-1084

Johnson, M. W., & Bickel, W. K. (2002). Within-subject comparison of real and hypothetical money rewards in delay discounting. *Journal of the Experimental Analysis of Behavior*, *77*, 129-146.

Kirby, K. N., Petry, N. M., & Bickel, W. K. (1999). Heroin addicts have higher discount rates for delayed rewards than non-drug-using controls. *Journal of Experimental Psychology: General*, *128*, 78-87.

Klonsky, E.D. (2008). What is emptiness? Clarifying the 7th Criterion for borderline personality disorder. *Journal of Personality Disorders, 22*, 418-426.

Lagorio, C. H., & Madden, G. J. (2005). Delay discounting of real and hypothetical rewards III: Steady-state assessments, forced-choice trials, and all real rewards. *Behavioural Processes*, *69*, 173-187.

Lawyer, S. R., Schoepflin, F., Green, R., & Jenks, C. (2011). Discounting of hypothetical and potentially real outcomes in nicotine-dependent and nondependent samples. *Experimental and Clinical Psychopharmacology*, *19*, 263-274.

Madden, G. J., Begotka, A. M., Raiff, B. R., & Kastern, L. L. (2003). Delay discounting of real and hypothetical rewards. *Experimental and Clinical Psychopharmacology*, *11*, 139-145.

Matusiewicz, A. K., Carter, A. E., Landes, R. D., & Yi, R. (2013). Statistical equivalence and test–retest reliability of delay and probability discounting using real and hypothetical rewards. *Behavioural Processes*, *100,* 116-122.

Meyer, B., Ajchenbrenner, M., & Bowles, D. P. (2005). Sensory sensitivity, attachment experiences, and rejection responses among adults with borderline and avoidant features. *Journal of Personality Disorders*, *19*, 641-658.

Mischel, W., & Ebbesen, E. B. (1970). Attention in delay of gratification. *Journal of Personality and Social Psychology*, *16*, 329-337.

Mischel, W., Shoda, Y., & Rodriguez, M. L. (1989). Delay of gratification in children. *Science*, *244*(4907), 933-938.

Pfohl B, Blum N, Zimmerman M. (1997). *Structured interview for DSM-IV personality (SIDP-IV).* Washington DC: American Psychiatric Press.

Rachlin, H. (1974). Self-control. *Behaviorism, 2,* 94-107.

Powers, A. D., Gleason, M. J., & Oltmanns, T. F. (2013). Symptoms of borderline personality disorder predict interpersonal (but not independent) stressful life events in a community sample of older adults. *Journal of Abnormal Psychology*, *122*, 469-474.

Rallis, B.A., Deming, C.A., Glenn, J.J., & Nock, M.K. (2012). What is the role of dissociation and emptiness in the occurrence of nonsuicidal self-injury? *Journal of Cognitive Psychotherapy: An International Quarterly, 26*, 287-298.

Reynolds, B., & Schiffbauer, R. (2005). Delay of Gratification and Delay Discounting: A Unifying Feedback Model of Delay-Related Impulsive Behavior. *The Psychological Record*, *55*, 439-460.

Rubin, A. M., Perse, E. M., & Powell, R. A. (1985). Loneliness, parasocial interaction, and local television news viewing. *Human Communication Research*, *12*, 155-180.

Skodol, A.E., Gunderson, J.G., Pfohl, B., Widiger, T.A., Livesley,W.J., & Siever, L.J. (2002). The borderline diagnosis I: Psychopathology, comorbidity, and personality structure. *Biological Psychiatry, 51,* 936-950.

Svaldi, J., Philipsen, A., & Matthies, S. (2012). Risky decision-making in borderline personality disorder. *Psychiatry Research*, *197*, 112-118.

Torgersen, S., Kringlen, E., & Cramer, V. (2001). The prevalence of personality disorders in a community sample. *Archives of General Psychiatry*, *58*, 590-596.

Welch, S., & Linehan, M. M. (2002). High-risk situations associated with parasuicide and drug use in borderline personality disorder. *Journal of Personality Disorders*, *16*, 561-569.

Whiteside, S. P., & Lynam, D. R. (2001). The Five Factor Model and impulsivity: Using a structural model of personality to understand impulsivity. *Personality and Individual Differences*, *30*, 669-689.

Wilberg, T., Karterud, S., Pedersen, G., & Umes, Ø. (2009). The impact of avoidant personality disorder on psychosocial impairment is substantial. *Nordic Journal of Psychiatry, 63,* 390-396.

Yen, S., Pagano, M., Shea, M.T., Grilo, C., Gunderson, J., Skodol, A., McGlashan, T., Sanislow, C., Bender, D., & Zanarini, M. (2005). Recent life events preceding suicide attempts in a personality disorder sample: Findings from the Collaborative Longitudinal Personality Disorders Study. *Journal of Consulting and Clinical Psychology*, *73*, 99-105.

Table 1. Current DSM-IV Axis I diagnoses.

	BPD (35)	APD (24)	χ^2	p
Major depressive disorder	18	5	5.60	<.05
Bipolar disorder	3	0	2.17	ns
Dysthymic disorder	8	7	0.30	ns
Social anxiety disorder	16	25	19.22	<.001
Post-Traumatic stress disorder	13	1	8.55	<.01
Panic disorder	3	1	0.44	ns
Agoraphobia without history of panic	2	1	0.07	ns
Obsessive-compulsive disorder	1	1	0.08	ns
Generalized anxiety disorder	14	7	2.22	ns
Bulimia	1	0	0.70	ns
Binge eating disorder	0	2	3.02	ns
Substance dependence	9	0	7.28	<.01
Substance abuse	5	0	3.75	ns

Table 2.

Means and standard deviations of discounting rates (log transformed k) in the real reward

condition by DSM-IV-TR criteria for BPD, controlling for sex, age, and social desirability
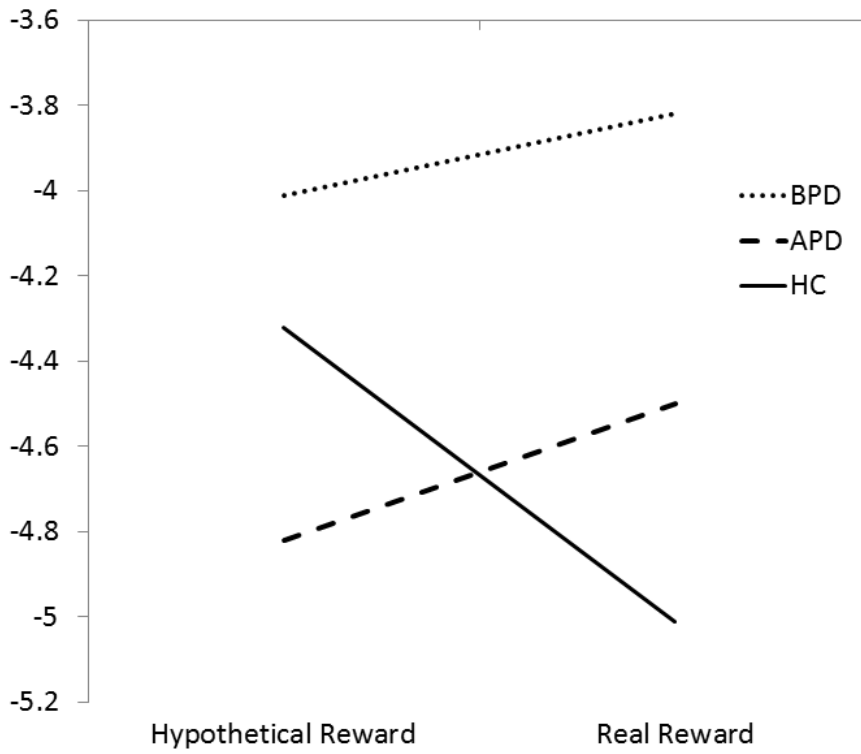
scores.

	Met criterion				
Criterion	No	Yes			
	M (SE)	*M (SE)*	*F* (1, 99)	η_p^2	*p*
1. Abandonment reactions	- 4.69 (.16)	- 3.90 (.30)	4.96	.05	<.05
2. Interpersonal instability	- 4.85 (.17)	- 3.71 (.26)	11.67	.11	<.001
3. Identity disturbance	- 4.46 (.16)	- 4.63 (.36)	< 1	.00	*ns*
4. Impulsive behavior problems	- 4.90 (.17)	- 3.62 (.27)	13.64	.12	<.001
5. Suicidality or self-injury	- 4.72 (.17)	- 3.93 (.29)	4.79	.05	<.05
6. Affective instability	- 4.70 (.19)	- 4.07 (.29)	2.68	.03	*ns*
7. Emptiness	- 4.74 (.18)	- 4.09 (.23)	4.68	.05	<.05
8. Rage	- 4.70 (.17)	- 3.97 (.28)	4.43	.04	<.05
9. Transient dissociation or paranoia	- 4.62 (.16)	- 4.12 (.29)	2.24	.02	*ns*

Figure 1

Discount rates (log transformed) by diagnostic group, controlling for sex, age, and social

desirability scores.

Figure 2

Self-reported impulsive reactions to stressors by diagnostic group, controlling for sex, age, and

social desirability scores.

The figure shows a line graph with the y-axis ranging from 1 to 5 and the x-axis labeled "Noninterpersonal" and "Interpersonal." Three lines are plotted: BPD (dotted), APD (dashed), and HC (solid). The BPD line rises from about 3.05 to 4.0, the APD line rises from about 2.6 to 3.05, and the HC line rises from about 1.6 to 2.0.

Figure 3

Self-reported distress reactions to stressors by diagnostic group, controlling for sex, age, and social desirability scores.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
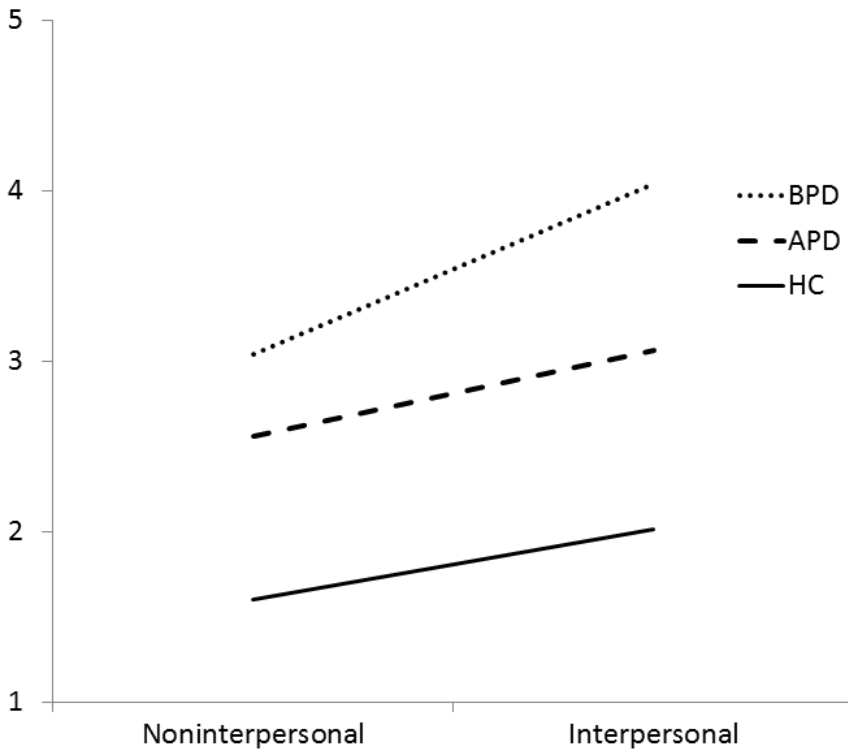46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65