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The current study examined the moderating effect of social rejection on the association between borderline personality disorder (BPD) traits, assessed dimensionally, and risk-taking behavior. Undergraduate participants (n = 195) were randomly assigned to a social rejection or academic failure task in which they were asked to write about a time when they felt intensely socially rejected, or a time they experienced an academic failure, respectively. Participants then reported whether they engaged in risk-taking behavior (e.g., alcohol use, drug use, risky sexual behavior) immediately after or within a few days after the event they wrote about. In addition, behavioral risk-taking was indexed by performance on computerized analogue risk-taking tasks—the Balloon Analogue Risk Task (BART), and the Iowa Gambling Task (IGT). A main effect of BPD traits was found for alcohol use, risky sexual behavior, drug use, other risk-taking behavior (e.g., reckless driving, self-injury), total risk-taking behavior (a composite sum of all self-reported risk-taking behavior scales), BART performance, and emotional reactions to the relived event. An interaction between rejection condition and level of BPD traits was found to predict alcohol use, risky sexual behavior, total self-reported risk-taking behavior, and the importance of the relived event. All IGT results were nonsignificant. Lastly, and contrary to expectation, a significant interaction between BPD traits and rejection in predicting Profile of Mood States Total Mood Disturbance was not found.

BORDERLINE PERSONALITY DISORDER TRAITS, SOCIAL REJECTION,

AND RISKY BEHAVIOR

by

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ii

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Borderline Personality Disorder (BPD) is a severe mental disorder characterized by dysfunction across emotional, interpersonal, behavioral, and cognitive domains (Skodol et al., 2002). It is one of the most commonly diagnosed personality disorders, and accounts for 10% to 20% of treatment-seeking patients (Skodol et al., 2002; Skodol, Oldham, & Gallagher, 1999). Individuals diagnosed with BPD typically have difficulty regulating their thoughts and emotions—deficits that contribute to marked identity disturbance, unstable relationships, negative affectivity, and general interpersonal difficulties.

Linehan's (1993) biosocial theory of BPD conceptualizes heightened emotional reactivity, defined as augmented emotional intensity following the presence of an emotionally salient stimulus (Kuo & Linehan, 2009), as a core feature of BPD. Although other theoretical conceptualizations of BPD exist (e.g., the Emotional Cascades model; Selby & Joiner, 2009), nearly all hold emotional reactivity as a key dimension of dysregulation that characterizes the disorder. This emotional dysregulation is thought to arise as a result of both an innate biological tendency toward intensely experiencing emotions, and an invalidating environment in childhood (Crowell, Bauchaine, & Linehan, 2009). More specifically, an invalidating environment refers to frequently occurring

situations in which the personal experiences and emotional responses of a growing child are invalidated by significant others in his or her life. Stated another way, the child is taught that her communications about her experiences and emotions are not an accurate indication of her true feelings and that such feelings, if true, are not a valid response to a given experience. Together, these intrapersonal and environmental factors impede the acquisition of emotional regulatory skills and effective coping strategies. The inability to regulate and effectively cope with intense emotional experiences, in turn, contributes to symptoms of the disorder such as identity disturbance, self-injury, and other risky behavior (Linehan, 1993; Stepp et al., 2013).

Borderline Personality Disorder and Risk-Taking Behavior

People with BPD typically are also impulsive, and frequently engage in risky and maladaptive behavior such as risky sexual behavior and substance use as a means of coping with negative affect (Tull, Gratz, & Weiss, 2011). Indeed, one *DSM-5* (APA, 2013) diagnostic criterion for BPD is "impulsivity in at least two areas that are potentially self-damaging (e.g., spending, sex, substance abuse, reckless driving, binge eating)" (p. 663). Supporting these notions is recent research that has shown that women with BPD are more likely to be sexually impulsive (Mangassarian, Sumner, & O'Callaghan, 2015); individuals with BPD are more likely to abuse substances and incur legal charges related to substance use; are more likely to commit both moving and nonmoving traffic offenses (Sansone, Lam, & Weiderman, 2010); are more likely to drive recklessly (Sansone, Lam, & Weiderman, 2010); and are more likely to engage in non-suicidal self-injury, as well as threats of self-harm (Stroehmer, Edel, Pott, Juckel, & Haussleiter, 2015). Although

2

individuals with BPD have been shown to frequently engage in risk-taking behavior, it is unclear whether this tendency is specific to certain maladaptive coping related behaviors (e.g., substance use, risky sexual behavior, nonsuicidal self-injury, etc.) or also reflects a tendency toward engaging in more generalized risk-taking behavior—such as that indexed by laboratory tasks like the Balloon Analogue Risk Task (BART; Lejuez et al., 2002) and Iowa Gambling Task (IGT; Bechara, Damasio, Damasio & Anderson) (Svaldi, Philipsen, & Matthies, 2012).

Rejection Sensitivity and Borderline Personality Disorder

Another trait central to BPD is an intense fear of rejection or abandonment that pervades and colors interaction with others. In fact, the *DSM-5*, which lists criteria in numerical order according to their importance to the diagnosis, list its first criterion as "Frantic efforts to avoid real or imagined abandonment." In conjunction with the emotional instability characteristic of BPD, this fear of rejection can lead to engagement in risky behavior following an instance of real or perceived rejection. Research suggests that all humans possess an innate need to form and maintain close interpersonal relationships as a part of a larger need to belong (Baumeister & Leary, 1995), but individuals with BPD often are particularly sensitive to social rejection (Staebler, Helbing, Rosenbach, & Renneberg, 2011). Rejection sensitivity, defined as the tendency to anxiously expect, perceive, and react intensely to rejection, is thought to vary dimensionally between low and high levels of borderline traits (Downey, Mougios, Ayduk, London, & Shoda, 2004). Individuals with BPD are typically high in rejection sensitivity, although individuals relatively low in BPD traits can be highly rejection

sensitive as well (Romero-Canyas, Anderson, Reddy, & Downey, 2009). In fact, a study by Skinner (2014) found that degree of BPD traits interacted with rejection to predict certain types of negative affect on the POMS (e.g., anger-hostility), and that rejection sensitivity was not a significant variable within the model.

Although there are similarities between rejection sensitivity and borderline personality disorder, there also are significant distinctions that evidence them to be related yet distinct constructs. Both are conceptualized, for example, to involve exaggerated responses to actual or perceived cues of rejection in the behavior of others. Until relatively recently, however, few studies have directly investigated the relation between rejection sensitivity and BPD. Following this gap in the literature, Staebler and colleagues (2011) became among the first researchers to examine this association. Specifically, they were interested in the association between rejection sensitivity in patients with BPD and patients with other clinical disorders. Their results showed that patients with BPD reported significantly higher levels of rejection sensitivity compared to both healthy controls and patients with differential diagnoses. In addition, the authors investigated potential differences in rejection sensitivity between in-patients and out-patients with BPD, but found no significant differences. Importantly, Staebler and colleagues' study was one of the first to directly examine associations between rejection sensitivity and BPD; however, conceptual overlap between the two constructs begs the question: Are rejection sensitivity and borderline personality disorder truly two distinct entities?

Although it may be argued that the two are synonymous, past research has evidenced them to be related, yet distinct constructs (e.g., Skinner, 2014). As noted above, one of the defining features of BPD is frantic efforts to avoid real or imagined abandonment. However, BPD is a disorder characterized by a constellation of symptoms whose manifestations among multiple individuals often result in heterogeneous presentations of the disorder. For example, other prevalent features of the disorder include unstable and intense relationships, unstable self-image or sense of self, and affective instability, among others (APA, 2013). Thus, although BPD and rejection sensitivity both share a defining fear of rejection, there are numerous characteristics unique to BPD that serve to differentiate the two constructs, as well as how those high in each construct react to rejection. For those with BPD or who are high in BPD traits, impulsivity, affective instability, and inappropriately intense anger may contribute to more intense affective responses to social rejection than in individuals who are simply high in rejection sensitivity. Importantly, though, only one study to date has specifically examined how levels of BPD traits influence responses to social rejection differentially compared to rejection sensitivity (Skinner, 2014).

Social Rejection and Borderline Personality Disorder

In general, individuals who experience social rejection can respond either in prosocial ways, increasing the likelihood of future inclusion, or in negative ways which can lead to further rejection (Baker & Baumeister, in press). Research has shown that in many instances, people react aggressively to social rejection (Bourgeois & Leary, 2001), and this is generally true of those with BPD (Staebler, Helbing, Rosenbach, &

Renneberg, 2010). Indeed, individuals with BPD typically react to real or perceived threats of social rejection with feelings of rage and hostility (Linehan, 1993). These reactions are often intense and can lead perpetually to further rejection by others. Extreme reactivity to interpersonal stress in general is a defining feature of BPD, and Stiglmayr and colleagues (2005) found that, for these individuals, extreme reactivity is especially likely in response to feeling rejected. Specifically, the authors found that feeling rejected elicits intense aversive tension in those with BPD, and that these individuals' experiences of aversive tension are more frequent, stronger, and longer lasting than individuals without BPD. Together, the high emotion dysregulation and high sensitivity to rejection seen in those with BPD often lead to impulsive and risk-taking behavior following experiences of rejection (Peters, Upton, & Baer, 2013). Although rejection manipulations have been shown to be effective at eliciting negative affect, the following studies illustrate that for individuals with BPD or who are high in BPD traits, findings have been mixed.

Laboratory-based tasks, for example, have been employed in previous research to examine the effects of rejection on those with BPD. One such task is Cyberball (Williams, Cheung, & Choi, 2000), a computerized social rejection paradigm that involves telling a participant that they are going to play a computer game in which they will pass a virtual ball to other participants using computers in different rooms. As the game progresses, the participant receives the ball less and less frequently, implying that he or she is being excluded by the other participants. The task was used in a study by Wirth, Lynam, and William (2010) that examined how personality disorder traits are

6

related to responses to social rejection. The authors were interested in whether participants from each of the three clusters of personality disorders, A (e.g., schizotypal personality disorder), B (e.g., borderline personality disorder), and C (e.g., avoidant personality disorder), would show differential responses to social rejection. No differences in negative affect were found among the three personality disorder clusters. There are, however, several limitations to the study that are important to note: Participants were pulled from a university undergraduate subject pool and were not oversampled for personality disorder traits, limiting the number of participants with high levels of those traits. Furthermore, the measure used to assess for personality disorders was very brief, with only 30 total items assessing for 10 different personality disorders. Lastly, and possibly a consequence of the short personality disorders measure, cluster-related traits rather than specific personality disorders were analyzed, limiting generalizability to those with BPD traits, specifically.

Renneberg, Herm, Hahn, Staebler, Lammers, and Roepke (2011) also conducted a quasi-experimental study that examined how BPD influences perceptions of participation in the Cyberball task, predicting that BPD patients would show increased perception of being excluded during the game compared to healthy controls regardless of whether they were assigned to an exclusion or inclusion condition. Further, they predicted that the exclusion condition would result in greater negative affect for BPD patients than healthy controls. As hypothesized, the study found a biased perception of participation in the Cyberball task for BPD patients with BPD patients reporting greater exclusion. Interestingly, BPD patients also reported less sadness than controls, regardless of the

condition, and the authors suggested that this finding may have been a result of simply being included in a social task at all. Contrary to expectation, there was no difference in ratings of anger between BPD patients and controls in the exclusion condition. This finding is less surprising when considering its small sample size, which was underpowered for detecting small differences among the groups.

A study by Lawrence, Chanen, and Allen (2001) similarly examined the influence of social rejection on mood in BPD patients. The study comprised patients who met criteria for BPD ($n = 30$) and healthy controls ($n = 22$). In contrast to Renneberg et al. (2011), BPD patients were not found to have a biased perception of participation in the Cyberball task. Lawrence and colleagues also found no difference in negative emotions between BPD patients and controls following a rejection manipulation. The authors note that exclusion from a task such as Cyberball may be a fairly benign form of social rejection for those with BPD, and that a more salient rejection manipulation may be needed. Participants for this study were also in-patients in a specialized treatment program, and 18 of the 30 participants included in the study were prescribed one or more psychotropic medications.

Taken together, previous studies of BPD and social rejection that used Cyberball as a rejection manipulation have yielded mixed results. Of the three studies conducted to date, two found no differences in negative affect between individuals with BPD and healthy controls (Lawrence et al., 2001; Wirth et al., 2010), while one study did find differences (Renneberg et al., 2011). In addition, Renneberg and colleagues found differences in perceptions of participation between individuals with BPD and healthy

controls. The interpretation of these findings, however, is complicated by small sample sizes and the use of both in-patient and university student participants.

The mixed findings from the foregoing studies are surprising, given that individuals with BPD theoretically should respond to rejection with intense negative affect. The clinical basis of "frantic efforts to avoid real or imagined abandonment" noted in the *DSM-5*, in conjunction with theoretical bases grounded in attachment theory and Linehan's biosocial theory of BPD, suggests that individuals with BPD or high BPD traits should be especially reactive to social rejection. In response to mixed findings within the literature, researchers have put forth explanations as to why some studies have not found a significant difference between those with BPD and healthy controls. Lawrence and colleagues (2011), for example, note that some social rejection manipulations may be a relatively unmoving experience for BPD participants, and they emphasize a need for more poignant manipulations in order to elicit intense and long-lasting emotional responses.

In line with this notion, some research has provided support for the differential efficacy of social rejection manipulations. Idiographic emotion induction (e.g., reliving tasks, participant-relevant imagery) has recently been found to be more effective (i.e., resulted in the greatest difference between pre-induction mood and post-induction mood) than standardized mood induction paradigms (e.g., emotional films, Cyberball) for individuals high in BPD traits (Kuo, Neasiu, Fitzpatrick, & MacDonald, 2013). Specifically, Kuo and colleagues (2013) found that an idiographic emotion induction task in which participants were asked to write about a time when they felt sad, afraid, or

angry, elicited greater self-reported anger and sadness, galvanic skin conductance response, and increases in respiratory sinus arrhythmia, than did a standardized induction task that involved viewing an emotionally salient film. In the first study to compare the poignancy of different rejection paradigms, Bernstein and Claypool (2012) compared responses to a "future alone/future belonging" manipulation and responses to Cyberball. Results revealed that participants perceived the "future alone" condition to be significantly more negative than the exclusion experienced during Cyberball.

Although Cyberball's utility as a social rejection manipulation for participants with BPD remains unclear, only two studies to date have utilized an alternative manipulation in their investigation of BPD and rejection. One study conducted by Tragesser, Lippman, Trull, and Barrett (2008), for example, examined how BPD traits, assessed dimensionally, influence responses to a written teasing scenario. Participants were asked to imagine themselves in four different social situations that depicted teasing, and then indicate their emotional responses to those situations on a measure intended to assess their current emotional state. Importantly, participants higher in BPD traits were more likely to experience both anger and sadness in response to imagining a written teasing scenario—findings that provide some preliminary support to Lawrence and colleagues' (2011) suggestion that more meaningful manipulations are needed to elicit intense and long-lasting emotional responses for those high in BPD traits.

Another potentially promising social rejection manipulation is a reliving task developed by Pickett, Gardner, and Knowles (2004). Undergraduate participants were assigned to one of three reliving conditions (exclusion, failure-control, or neutral-

control), and asked to recall and write about a time when they felt socially rejected or excluded, a time in which they experienced academic failure, or their commute to campus that day, respectively. Participants in both the rejection and failure-control conditions rated the event as significantly more negative. Moreover, participants indicated they felt significantly worse about themselves and had greater negative mood compared to those in the neutral-control condition. The second study to utilize a novel social rejection manipulation in its investigation of BPD traits (Skinner, 2014) used a reliving task based on the one developed by Pickett and colleagues (2004). The findings showed that participants high in BPD traits reported significantly higher anger-hostility, depression-dejection, and overall negative mood after writing about a rejection experience compared to participants lower in BPD traits (Skinner, 2014). Taken together, the aforementioned studies highlight the differential efficacy and promising potential of self-relevant, idiographic paradigms for individuals with BPD.

Behavioral Risk-Taking and BPD

Although there have been several lines of research investigating affective responses to social rejection, investigation of performance on laboratory-based analogue risk-taking tasks such as the Iowa Gambling Task (Bechara, Damasio, Damasio & Anderson, 1994) and Balloon Analogue Risk Task (Lejuez et al., 2002) has been scarce. Moreover, few behavioral risk-taking studies exist and no previous studies have utilized these tasks in combination with a social rejection manipulation. A study by Haaland and Landor (2007), for example, assessed risk-taking in a group of BPD patients ($n = 20$) and healthy controls ($n = 15$) using the Iowa Gambling Task and found that BPD patients

made less advantageous choices during the task compared to the healthy controls. In a similar study, female patients with BPD ($n = 41$) were compared to healthy controls ($n = 41$) across several neuropsychological tasks and the Iowa Gambling Task (LeGris, 2014). Of all the tasks administered, only Iowa Gambling Task performance distinguished BPD patients from healthy controls. Again, BPD patients were more likely to choose cards from disadvantageous decks that yielded larger immediate rewards but also greater likelihood of large net losses.

Turning to the other laboratory-based analogue risk-taking task, Balloon Analogue Risk Task, only one study has examined risk-taking in individuals with BPD using this measure. The study involved participants with BPD only ($n = 19$), participants with BPD and a past or current substance use disorder ($n = 32$), and a matched comparison control group ($n = 28$) (Coffey, Schumacher, Baschnagel, Hawk, & Holloman, 2011). No differences were found among the three groups in risk-taking as indexed by performance on the Balloon Analogue Risk Task. It is important to note, however, that the small sample sizes did not allow adequate power for detecting small differences among the groups. Furthermore, this study assessed baseline differences in performance rather than differences following a mood manipulation. Together, these are the only three studies to date that have examined associations among BPD and behavioral risk-taking.

As noted above, although there has been much research on self-reported risk-taking behavior and BPD, data from laboratory-based studies of risk-taking that employ a social rejection manipulation are nonexistent. Indeed, a PsycInfo search using

combinations of the terms "borderline," "BPD," "risk," and "risk-taking" returned zero

studies that involved both a laboratory-based risk-taking task and a social rejection

manipulation. Studies that used a social rejection manipulation have instead investigated

outcomes such as negative affect, threats to perceived control, belonging, self-esteem and

meaningful existence, and social problem-solving (e.g., see Dixon-Gordon, Chapman,

Lovasz, & Walters, 2011; Gratz, Dixon-Gordon, Breetz, & Tull, 2013). Moreover, the

majority of studies assessing either risk-taking or social rejection have involved

comparing groups of individuals with diagnoses of BPD to groups of individuals with

little to no BPD traits, thus limiting generalizability to individuals who may experience

impairment in their lives as a consequence of possessing BPD related traits but do not

meet criteria for a diagnosis of BPD. Importantly, this dearth of research does not allow

for the direct comparison of reported and observed behavior. Lang's (1968) triple

response system—first proposed in the context of anxiety—illustrates how motor,

emotions, and cognitive behavior can be relatively independent of one another, and

highlights the utility of multiple means of assessment. Situation specificity can lead to

differential behavior in varied settings, and it is thus imperative that both types of

measures (i.e., self-report and behavioral) are included in research such as the current

study. The self-report measure consisted of reports of what the participant did in the real-

world setting, following her relived experience. In contrast, the behavioral measure

consisted of lab-based behavior. Due in part to situation specificity, participants may

respond differentially in real-world and laboratory settings, and these differences can

inform the study of behaviors of interest.

Statement of Purpose

The current study sought to address a notable gap in the literature by examining the effects of social rejection on both self-report and behavioral indices of risk-taking across a continuum of BPD traits. Assessing BPD traits in a continuous rather than dichotomous manner is advantageous over past work because substantial research suggests that personality is most appropriately conceptualized dimensionally (see Widiger, 2011 for a comprehensive review). A dimensional evaluation of BPD allows for the assessment of risk-taking across varying levels of BPD traits, addressing an important problem with the diagnosis of BPD: Five of the nine traits listed in the *DSM-5* must be present in order to diagnose the disorder (APA, 2013). Current criticism within the literature suggests that five traits is an arbitrary and clinically meaningless cutoff (Widiger & Trull, 2007) and, importantly, individuals may not meet criteria for a diagnosis yet still possess BPD traits that cause significant impairment in their lives. By limiting participants to only those who meet a full diagnosis, researchers may be erroneously excluding individuals who could otherwise help to further elucidate implications of disorder-related traits across varying degrees of severity. A dimensional measure of BPD traits was therefore used in the current study to address this issue, and individuals high in BPD traits were oversampled to allow for a continuum of BPD trait levels across participants.

Considering the aforementioned research showing differential efficacy of social rejection manipulations for those low versus high in BPD traits, the current study aimed to manipulate mood with the use of a reliving task. Participants thought of and wrote

about a time in which they felt intensely rejected, or, for those in the negative experience

control condition, a time when they experienced an academic failure. This task was

thought to be potentially more sensitive to differentiating BPD related negative mood

than standardized stimuli due to the robust effects of, for example, Cyberball, seen in

most people regardless of level of BPD traits. The Profile of Mood States – Short Form

(Schacham, 1983) was administered before and after the reliving task to verify whether

mood was successfully manipulated.

Furthermore, most of the extant research on BPD and risk-taking has investigated

specific types of behavior (e.g., drug use, alcohol use, risky sexual behavior; Tull, Gratz,

& Weiss, 2011) rather than generalized risk-taking behavior (for an exception, see Coffey

et al., 2011; LeGris, 2014). In addition to a self-report measure of risk-taking behavior,

the current study involved computerized analogue risk-taking tasks (i.e., Iowa Gambling

Task and Balloon Analogue Risk Task) in order to provide further empirical investigation

into whether risk-taking in those higher in BPD traits reflects specific coping-related

behavior (e.g., substance use, overspending, risky sexual behavior) or more general risk-

taking.

The current study aimed to address three overarching goals: (1) to determine

whether the degree of BPD traits, assessed dimensionally (defined as the number of items

endorsed on the Personality Assessment Inventory - Borderline Features scale; Morey,

1991), predicts level of risk-taking on both computerized analogue risk-taking tasks and

self-reported risk-taking; (2) to determine whether the interaction between degree of BPD

traits and the experimental manipulation condition (i.e., social rejection or academic

15

failure) predicts greater self-reported and behavioral risk-taking; and (3) to determine whether these relations hold after partialling out variance explained by rejection sensitivity.

First, it was hypothesized that participants higher in BPD traits in the rejection condition would show the greatest mood disturbance on the POMS Total Mood Disturbance scale relative to lower BPD trait participants. Second, it was hypothesized that there would be a main effect of rejection on total reported risk-taking, given that rejection is considered to be a negative experience for most people (Baumeister & Leary, 1995). Third, it was hypothesized that there would be a main effect of BPD traits on self-reported risk-taking and behavioral risk-taking tasks. Fourth, it was hypothesized that individuals higher in BPD traits in the rejection condition would engage in greater self-reported and behavioral risk-taking relative to lower BPD trait individuals as a result of their emotional reactivity to rejection and their tendency to cope with negative affect by engaging in risky behavior. Fifth, it was hypothesized that participants higher in BPD traits in the rejection condition would rate the relived rejection experience as more important to them, and would report a stronger emotional reaction when the event took place, relative to participants lower in BPD traits. Lastly, it was hypothesized that these associations would hold after partialling out variance explained by rejection sensitivity, and that rejection sensitivity would not significantly contribute to explained variance in risk-taking outcomes.

CHAPTER II

METHODS

Participants

Participants were 195 undergraduate female students ($M_{age} = 18.86$, $SD_{age} = 2.93$; 42.6% African American, 40.5% White/Caucasian, 5.6% Biracial or Multiracial) who were recruited from the University of North Carolina at Greensboro introductory psychology participant pool during two semesters of data collection. Some participants were invited to participate based on their score of .5 standard deviations or greater above the mean on the Personality Assessment Inventory-Borderline Features (PAI-BOR; Morey, 1991) which is included as part of a larger data collection effort in online mass-screening. This process resulted in inviting 82 people in total—36 of whom participated in the study. Of the final sample, 10.3% met the clinically significant raw score of 38 on the PAI-BOR recommended by Tull (1995). To obtain a sample of participants with an adequate distribution of BPD traits, the study was also open to all female participants who signed up for the study through Experimetrix or SONA, regardless of their score on the PAI-BOR. In all, 13 participants were excluded for having greater than 8% missing data. Two additional participants were excluded due to technical errors that did not allow the data to be matched to a participant number. The decision to recruit only females for this study is a reflection of the fact that 75% of BPD diagnoses occur in females (APA,

2013), as well as the gender composition of undergraduate psychology students at the university.

Measures

        Personality Assessment Inventory-Borderline Features. The Personality Assessment Inventory-Borderline Features (PAI-BOR; Morey, 1991) is a 24-item self-report measure of borderline personality disorder traits. Participants are asked to rate the accuracy of each item for themselves on a 4-point scale ranging from "*False*" to "*Very True*." This measure was used to select some participants for over-sampling of BPD traits, as well as a measure of BPD traits for all participants. Cronbach's alphas are for all study variables are presented in Table 1.

        Profile of Mood States-Short Form. The Profile of Mood States-Short Form (POMS-SF; Schacham, 1983) is a 37-item self-report measure of mood comprised of mood related adjectives that were used as a manipulation check to assess mood change following the rejection manipulation. The six mood state subscales that comprise the POMS are Tension-Anxiety, Anger-Hostility, Fatigue-Inertia, Depression-Dejection, Vigor-Activity, and Confusion-Bewilderment. Participants are asked to rate how they are currently feeling in response to each of the 36 adjectives on a 5-point Likert scale ranging from "*Not at All*" to "*Extremely*." For the current study, only items from the negative mood subscales were used in analyses by creating a total score and subtracting the non-relevant subscale items, resulting in the Total Mood Disturbance scale. More specifically, a difference score between pre- and post-mood was used for all analyses.

Social Rejection Manipulation. Participants were randomly assigned to one of two conditions: a rejection condition in which participants wrote about a time when they felt intensely socially rejected, or a negative control condition in which participants wrote about an academic failure. Each participant was asked to type into an on-screen textbox for approximately 10 minutes. Participants in the rejection condition received the prompt "Write for 10 minutes about a time in which you felt intensely socially rejected in some way. This rejection can be by an individual (e.g., a time in which someone broke up with you, or no longer wanted to be your friend) or can be a rejection from a group (e.g., a time in which you were excluded). Choose a situation that occurred during or after high school. In addition to describing the incident, think about and describe how it made you feel." Participants in the academic failure condition receive the prompt "Write for 10 minutes about a time in which you experienced an intense academic failure (e.g., you failed an exam, forgot to complete an assignment, received a poor grade, etc.) Choose a situation that occurred during or after high school. In addition to describing the incident, think about and describe how it made you feel." This reliving task is based on a task developed by Pickett, Gardner, and Knowles (2004) that has been shown to be effective at manipulating affective responses to social rejection (DeWall, 2010; Knowles & Gardner, 2008; Pickett et al., 2004; Skinner, 2014).

Rating of Importance and Emotional Reaction. Following the reliving task, participants were asked to rate the importance of the event they wrote about during the reliving task on a 4-point Likert scale from *"Very Unimportant"* to *"Very Important."* In addition, participants were asked to use a scale (ranging from 1 to 10), depicted onscreen

as a slideable bar with labels above it (ranging from *"Not Strong at all,"* to *"Moderately Strong,"* to *"Very Strong"*) to indicate the strength of their emotional reaction to the event they wrote about. These ratings were both included as dependent variables in separate hierarchical multiple regression analyses.

Balloon Analogue Risk Task. The Balloon Analogue Risk Task (BART; Lejuez et al., 2002) is a computerized analogue risk-taking task. In this task, participants sit in front of a computer screen whereon they see a small red balloon accompanied by a balloon pump, a reset button labeled "Collect $$$," and a "Total Earned" display. To complete the task, participants click on the pump, inflating the balloon and increasing the accumulated money in an on-screen temporary bank. If a balloon is pumped past its individual and unique bursting point, a "pop" sound is generated by the computer, all money in the temporary bank is lost, and the next uninflated balloon appears on the screen. Participants can stop pumping the balloon at any point and click the "Collect $$$" button, transferring all the play money earned from the temporary bank to a permanent on-screen bank. Balloon breakpoints range from 1-8, 1-32, or 1-128 pumps. As recommended by the creator of the task (Lejuez et al., 2002), the amount of risk-taking is indexed by the weighted average number of pumps on balloons that did not burst, with fewer pumps indicating less risk-taking. The BART is a widely used analogue measure of risk-taking behavior. Participants were told that the number of entries they would receive for the Amazon.com gift card would be based on their performance on both the BART and the following task, the Iowa Gambling Task.

Iowa Gambling Task. The Iowa Gambling Task (IGT; Bechara, Damasio, Damasio & Anderson, 1994) is a computerized card game task commonly used to measure risk-taking. Participants are provided with four decks of cards (A, B, C, D) to choose from across 50 trials, with the goal of earning as much money as possible based on the cards they choose. Two of these decks (A and B) provide high monetary rewards per card draw, but also high risk (i.e., high net losses over time). The other two decks (C and D) yield lower rewards per card but also much lower losses over time. Therefore, in the long run, decks C and D are advantageous over decks A and B. Participants who choose primarily from the high reward decks will end up losing money while those who choose from the smaller rewards decks will end up gaining money. Similar to the BART, no real money is actually involved. Risk-taking is indexed by the proportion of advantageous decks chosen (i.e., where the choice of decks is likely to yield small rewards but minimize large losses) as well as the proportion of cards selected from decks that result in infrequent but greater losses.

Risky Behaviors Questionnaire. A measure assessing alcohol use, drug use, risky sexual behavior, and "other risk-taking behavior" was developed and tested during a pilot study. Some of the items used in this questionnaire were adapted from the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) and the Sexual Risk Survey (SRS; Turchik & Garske, 2009). This 28-item survey asks participants to report whether they engaged in a given behavior immediately after, or within a few days after, the social rejection event or academic failure that they wrote about in the reliving task. In addition, a Total Risk-Taking Behavior score was

21

created by creating a sum of the four risk-taking scales, for a total of five scales. Possible responses were 0 "*No*" or 1 "*Yes*". Pilot work has shown the measure to have adequate internal consistency (*Mean* Cronbach's alpha = .78). Internal consistency was similar for the current study (ranging from .70 to .84 per individual scale)

Rejection Sensitivity Questionnaire. Rejection Sensitivity Questionnaire (RSQ; Downey & Feldman, 1996) is a questionnaire that asks participants about their expectations of rejection in hypothetical situations in which it is possible that an acquaintance, significant other, or family member refuses their request for help, advice or companionship. Responses to these situations vary along two dimensions: (A) degree of anxiety and concern about the outcome and (B) expectations of acceptance or rejection. Participants are asked to rate their degree of concern or anxiety about the outcome of each situation on a six-point Likert scale ranging from "*Very Unconcerned*" to "*Very Concerned*". Participants are then asked to rate their expectation of rejection in each situation on a six-point Likert scale ranging from "*Very Unlikely*" to "*Very Likely*". The RSQ scales have demonstrated good internal consistency. A study conducted with a sample of undergraduates yielded alpha coefficients ranging from .78 to .83 (Downey & Feldman, 1996). The RSQ was used as the measure of rejection sensitivity.

Procedure

Participants were invited to participate in the study based on their scores on the PAI-BOR that they completed online via Qualtrics during mass-screening. The mass-screening subject pool is used to help introductory psychology students fulfill requirements for research participation and contribute to university research. Students

22

logged into Experimetrix, or during the following semester, SONA, and chose an experiment they would like to participate in based only on time, date, and credit information. In order to form a continuum of BPD traits ranging from low to high, additional participants were able to sign up for the study through Experimetrix or SONA, regardless of their scores on the PAI-BOR, until two semesters of data collection were completed.

When participants arrived to the study, they were asked to read a consent form that provided a description of the study. The study description stated its purpose as examining whether factors such as personality are related to social experiences. The researcher then explained to the participants that their performance on some computerized games would determine whether they would qualify to have their name entered into a raffle for a $100 Amazon.com gift card. Participants first completed a demographics form, followed by the Personality Assessment Inventory-Borderline Features and the Profile of Mood States-Short Form (Time 1) in Qualtrics. Of note is that the original Personality Assessment Inventory-Borderline Features data collected during mass screening was only used to invite participants and was not included in data analysis.

Next, participants were quasi-randomly assigned to one of two levels of the reliving task (i.e., the rejection or academic failure condition) using stratified randomization to ensure an approximately equal distribution of individuals high in BPD traits between the two conditions, based on automatic scoring that was completed in Qualtrics in real-time. As mentioned above, participants assigned to the rejection condition were asked to write about a time in which they felt intensely rejected;

participants assigned to the academic failure condition were asked to write about a time

in which they experienced an academic failure. Following completion of the reliving task,

participants once again completed the Profile of Mood States-Short Form (Time 2).

Participants then completed both the Balloon Analogue Risk Task and the Iowa

Gambling Task in counterbalanced order, followed by the importance of event and

emotional reaction to event ratings. Lastly, they completed the Risky Behaviors

Questionnaire. After completing the study, participants were debriefed and given a list of

mental health referrals in case they were experiencing any distress. In order to establish

interrater agreement for participants' responses to the reliving task, two independent

researchers coded the responses (1 = academic failure, 2 = rejection). Interrater

agreement was calculated and found to be 96.1%.

CHAPTER III

RESULTS

Preliminary Analyses

Descriptive statistics for all current study variables are presented in Table 1. To account for positive skewness, self-reported risk-taking behavior was logarithmically (i.e., log10) transformed prior to analyses (Howell, 2007) and, following transformation, all variables except drug use were found to be approximately normal (i.e., skewness $< \pm$ 1). Cronbach's alpha was calculated in order to examine the internal consistency of each scale, and all fell within the acceptable to excellent range.

First, zero-order correlations were conducted to examine associations among all study variables. Next, independent samples t-tests were conducted in order to determine if there were any significant differences between participants in the academic failure and rejection conditions. Descriptive statistics of t-tests for equality of means for all study variables are presented in Table 2. Participants in the two groups did not significantly differ from each other on any study variables, with one exception: Overall, participants in the rejection condition ($M = 3.43$, $SD = .93$) rated the relived experience as more important to them, t (193) = -2.47, $p < .05$, than those in the academic failure condition ($M = 3.06$, $SD = 1.16$). Finally, hierarchical multiple linear regression analyses were conducted to investigate unique contributions of BPD traits, the manipulation, their

importance rating for the reliving task, as well as the intensity of their emotional reactions.

Prior to conducting multiple regression analyses, Variance Inflation Factor (VIF) and tolerance indices of all predictor variables were calculated to confirm that the data did not have issues related to multicollinearity (*Mean* VIF = 1.38 and *Mean* Tolerance = 2.10; Cohen, Cohen, West, & Aiken, 2003). For all regressions, the rejection manipulation was dummy coded (0 = academic failure, 1 = rejection). Additionally, all predictor variables were standardized prior to analysis (Cohen et al., 2002).

Interrelations Among Borderline Personality Traits and Other Key Study Variables

Interrelations among all study variables are presented in Table 3, with rejection condition correlations shown above the diagonal, and academic failure condition correlations shown below the diagonal. Zero-order correlations were conducted to assess bivariate associations among PAI-BOR scores, the social rejection manipulation conditions, self-reported and behavioral risk-taking behavior, rejection sensitivity, participants' rating of the importance of the relived event, and participants' emotional reaction to the relived event.

Rejection Condition

BPD traits were significantly positively associated with all study variables for the rejection condition (*Mdn r* = .35) except the POMS Total Mood Disturbance difference score and the Iowa Gambling Task scores. Regarding the self-reported risk-taking measures (self-reported as to what the participant did following the actual rejection or academic failure experience that they relived in this study), alcohol use, drug use, risky

sexual behavior, Other Risk-Taking Behavior, and total risk-taking behavior were all

positively associated with each other (*Mdn r* = .73), and drug use was significantly

correlated with BART scores. Risky sexual behavior and rejection sensitivity evidenced a

positive association. Rejection sensitivity was also positively associated with total risk-

taking behavior, participants' rating of the importance of the relived event, and

participants' emotional reaction to the relived event.

Academic Failure Condition

      In the academic failure condition, BPD traits were associated with only Other

Risk-Taking Behavior, BART performance, and rejection sensitivity (*Mdn r* = .35).

Again, all five self-reported risk-taking behavior scales were significantly positively

associated with one another (*Mdn r* = .77). Rejection sensitivity showed a negative

relation to alcohol use, drug use, and risky sexual behavior. POMS Total Mood

Disturbance was significantly negatively associated with risky sexual behavior. Finally,

participants' rating of the importance of the relived event and participants' emotional

reaction to the relived event were positively correlated.

Predicting Self-Reported Risk-Taking Behavior

      Five hierarchical multiple regressions were performed to examine the unique

contributions of rejection sensitivity, BPD traits, and rejection in the explanation of four

types of risk-taking behavior, as well as the total risk-taking composite, which was

formed by summing the other four self-reported risk-taking scales. Table 4 presents the

results of the regression analyses across all four types of risk-taking behavior (i.e.,

alcohol use, drug use, risky sexual behavior, and other risk-taking behavior), as well as

the total risk-taking composite. For all five regressions, rejection sensitivity was entered in Step 1, followed by BPD traits in Step 2, the manipulation condition in Step 3, and the interaction between BPD traits and the manipulation condition in Step 4. Rejection sensitivity was entered in the first step in order to determine whether predicted associations held after partialling out variance explained by rejection sensitivity.

Five additional hierarchical multiple regressions were performed to examine the unique contributions of rejection sensitivity, BPD traits, and rejection in the explanation of behavioral risk-taking (i.e., indexed by BART and IGT performance, separately), participants' rating of the importance of the relived event, participants' rating of the emotional reaction to the event, BART, Iowa Gambling Task performance, and the POMS Total Mood Disturbance score (see Table 5). Again, for all five regressions, rejection sensitivity was entered in Step 1, followed by BPD traits in Step 2, the manipulation condition in Step 3, and the interaction between BPD traits and the manipulation condition in Step 4.

Hypothesis 1

Hypothesis one was that participants higher in BPD traits in the rejection condition would show the greatest mood disturbance on the POMS Total Mood Disturbance scale relative to participants lower in BPD traits. The hypothesis that there would be an interaction between BPD traits and rejection in predicting the POMS Total Mood Disturbance difference score was not supported; however, there was a significant difference between pre- ($M = 34.35$, $SD = 18.07$) and post- ($M = 36.25$, $SD = 19.21$) Total Mood Disturbance scores in the rejection condition, $t(95) = 3.01$, $p < .01$.

Hypothesis 2

Hypothesis two was that that there would be a main effect of rejection on total reported risk-taking. This hypothesis was not supported; however, results showed that there was a main effect of rejection on drug use such that participants in the rejection condition reported less drug use after the actual rejection experience that they relived in this study compared to reliving an academic failure ($\beta = -.18$, $p < .05$, $\Delta R^2 = .03$).

Hypothesis 3

Hypothesis three was that there would be a main effect of BPD traits on self-reported and behavioral indices of risk-taking. As expected, analyses revealed a main effect of BPD traits, with participants higher in BPD traits relative to other participants evidencing greater self-reported risk-taking behavior on the alcohol use ($\beta = .17$, $p < .05$, $\Delta R^2 = .02$), risky sexual behavior ($\beta = .28$, $p < .001$, $\Delta R^2 = .06$), drug use ($\beta = .17$, $p < .05$, $\Delta R^2 = .03$), other risk-taking behavior ($\beta = .40$, $p < .001$, $\Delta R^2 = .14$), and the total risk-taking behavior composite scale ($\beta = .37$, $p < .001$, $\Delta R^2 = .11$), as well as greater risk-taking on the BART ($\beta = .33$, $p < .001$, $\Delta R^2 = .09$).

Hypothesis 4

Hypothesis four was that participants higher in BPD traits in the rejection condition would engage in greater self-reported and behavioral risk-taking relative to lower BPD trait participants. Consistent with expectations, results revealed an interaction between BPD traits and the manipulation condition that predicted alcohol use ($\beta = .28$, $p < .05$, $\Delta R^2 = .03$) (see Figure 1), risky sexual behavior ($\beta = .27$, $p < .01$, $\Delta R^2 = .04$) (see Figure 2) and total risk-taking behavior ($\beta = .19$, $p < .01$, $\Delta R^2 = .04$) (see Figure 3).

29

Contrary to expectation, however, the same interaction did not predict greater risk-taking on the BART or the IGT. Follow-up analyses conducted for each group separately revealed that BPD traits had a significant effect on alcohol use, but only following a rejection experience. For participants in the academic failure condition, the regression line slope was not significantly different from zero, and the same pattern was identified for risky sexual behavior. In contrast, for total reported risk-taking behavior, both groups' slopes were significantly different from zero.

Hypothesis 5

Hypothesis four was that participants higher in BPD traits in the rejection condition would rate the relived rejection experience as more important to them, and would report a stronger emotional reaction when the event took place, relative to participants lower in BPD traits. The hypothesis that there would be an interaction between BPD traits and rejection in predicting both participants' rating of the importance of the relived event and participants' emotional reaction to the relived event was partially supported. While there was no significant interaction for the prediction of participants' emotional reaction, there was a significant interaction between BPD traits and rejection predicting participants' importance rating of the relived event ($\beta = .22$, $p < .05$, $\Delta R^2 = .09$) (see Figure 4). Further, separate follow-up analyses for the rejection and academic failure conditions revealed that slopes for importance ratings were statistically significant from zero for both conditions.

Hypothesis 6

Hypothesis six was that significant associations would hold after partialling out variance explained by rejection sensitivity, and that rejection sensitivity would not significantly contribute to explained variance in risk-taking outcomes. This hypothesis was partially supported, as main effects of BPD traits and interactions between BPD traits and the reliving task condition were significant with rejection sensitivity entered in the first step of each regression model. However, rejection sensitivity did uniquely contribute to the prediction of scores on the other risk-taking behavior scale.

CHAPTER IV

DISCUSSION

The goal of the present study was to explore the associations among borderline

personality traits, social rejection, and several types of risk-taking behavior. The literature

thus far has largely shown that individuals with BPD or who are high in BPD traits

generally are highly sensitive to rejection (APA, 2013; Staebler et al., 2011), are likely to

experience intense negative affect following rejection (e.g., Skinner, 2014), and are more

likely than the typical person to engage in risk-taking behaviors such as non-suicidal self-

injury (Stroehmer, Edel, Pott, Juckel, & Haussleiter, 2015) and risky sexual behavior

(Mangassarian, Sumner, & O'Callaghan, 2015; Tull, Gratz, & Weiss, 2011) as a means

of coping with intense negative affect (Linehan, 1993). No previous studies to date,

however, have examined specifically the effects of social rejection on both self-reported

and behavioral risk-taking, nor have any studies examined whether the trait of rejection

sensitivity uniquely contributes to these outcomes over and above BPD traits and

rejection.

Specifically, this thesis examined three research questions: (1) Does the degree of

BPD traits, assessed dimensionally, predict level of risk-taking on both computerized

analogue risk-taking tasks and self-reported risk-taking?; (2) Does the interaction

between degree of BPD traits and the experimental manipulation condition (i.e., social

rejection or academic failure) predict greater self-reported and behavioral risk-taking?;

and (3) Do these associations hold when controlling for rejection sensitivity? In total, six hypotheses were tested in order to investigate these questions.

BPD Traits, Rejection, and Mood

First, it was hypothesized that participants higher in BPD traits in the rejection condition would show the greatest mood disturbance on the POMS Total Mood Disturbance scale relative to lower BPD trait participants. No main effect of rejection or interaction with BPD traits was found when predicting POMS Total Mood Disturbance. Because no significant difference in POMS Total Mood Disturbance scores between groups was found, it is likely that the mood manipulation was not differentially effective for rejection versus academic failure in this study. Although research suggests that idiographic emotion inductions are most effective for individuals with BPD or who are high in BPD traits, this finding is likely the result of the minimal effect of the reliving task on mood that occurred in the current study. This may be due to a greater concern about academic failure in the current sample than would be seen in a more representative community sample. Moreover, the lack of differential mood change between conditions may explain why no significant interactions were found for behavioral risk-taking indices.

Rejection and Risk-Taking

It was hypothesized that, given the aversive quality of rejection for most, if not all, individuals (Baumeister & Leary, 1995), there would be a main effect of rejection for total reported risk-taking; however, this effect was not significant. Although this was an *a*

33

priori hypothesis, further consideration of this hypothesis suggests that it was misguided. Specifically, it seems more likely that, overall, people would be more likely to respond to social rejection in more typical ways such as withdrawal, sadness, or avoidance rather than in increased risk-taking behavior.

BPD and Risk-Taking

It was expected that BPD traits would predict greater overall risk-taking. As expected, BPD traits did uniquely predict all self-reported risk-taking scales, as well as BART performance. However, BPD traits did not predict IGT performance. Given the dearth of research on the association between BPD or high BPD traits and the BART, these results provide preliminary evidence that female college students higher in BPD traits are more likely to engage in maladaptive coping-related behavior (e.g., alcohol use, drug use, etc.), as well as general risk-taking (i.e., as indexed by the BART) than are their lower BPD trait peers. This is in contrast to the only other known study that examined the association between BPD and BART performance; however, Coffey and colleagues' (2011) study, which found no differences in BART performance, compared individuals who met full criteria for BPD, BPD patients with comorbid substance use, and healthy controls, and their divergent finding may be due to small sample sizes that did not allow for the detection of small differences between the groups.

The null results found for the IGT are likely due to the number of trials that the task was limited to due to study time constraints, as well as issues with the task itself. Specifically, some research suggests that participants are unable to effectively learn and

use an advantageous strategy on the IGT until at least 40 to 50 trials have been completed (e.g., Chiu, Lin, Huang, Lin, Lee, & Hsieh, 2008). Moreover, it has been argued that the task itself is flawed because there exists a confound between the long-term outcome (i.e., expected value) and gain-loss frequency values of the IGT (Chiu et al., 2008; Lin, Chiu, Lee, & Hsieh, 2007). In the current study, it is likely that the 50 trials administered did not allow for adequate learning and performance in this respect and, considering the criticisms of the IGT put forth by other researchers, it is possible that the task is not well-suited to accurately measure behavioral risk-taking.

It was also hypothesized that individuals higher in BPD traits in the rejection condition would engage in the greatest amount of self-reported and behavioral risk-taking relative to all other participants. In fact, the interaction between BPD traits and the rejection condition did uniquely predict alcohol use, risky sexual behavior, and the total risk-taking behavior composite score. Thus, participants higher in BPD traits who experienced a poignant rejection experience were more likely to drink alcohol, and engage in risky sexual behavior and other risk-taking behaviors that contributed to the total risk-taking score following the experience, which is consistent with their purported tendency to cope with negative affect by engaging in risky, yet self-soothing behavior (APA, 2013; Tull, Gratz, & Weiss, 2011). It should be noted, however, that those with lower BPD traits reported engaging in greater risky sexual behavior, alcohol use, and total risk-taking behavior following an academic failure than after a rejection experience compared to those higher in BPD traits. Post-hoc analyses conducted for each group separately further revealed that BPD traits had a significant effect on alcohol use, but

only following a rejection experience. For participants in the academic failure condition, there was no significant effect. In contrast, both academic failure and rejection experiences were found to have a significant effect on total reported risk-taking behavior.

That higher BPD trait participants in the rejection condition would exhibit the greatest amount of behavioral risk-taking (i.e., on the BART and IGT) was not supported, as no significant interaction was found. This finding may be due to the fact that performance on the BART and IGT is far removed from typical responses to social rejection. Results suggest that high BPD trait individuals turn to maladaptive coping-related behaviors following a rejection experience, and these types of behaviors do not appear to converge with behavioral analogue risk-taking tasks. Thus, people who are higher in BPD traits and relive a social rejection experience do not experience significant detriment to their performance on these analogue tasks. Yet another possible explanation for this finding is that the rejection manipulation was not effective enough or the mood effect did not last long enough to lead to poorer performance on the behavioral tasks.

Although the current study used an idiographic emotion induction technique (i.e., the reliving task) as suggested by the work of Kuo and colleagues (2013), and that has been successful at manipulating mood in high BPD trait participants in the past (Skinner, 2014), there are multiple factors that may further account for this finding. For example, given that this study used a sample of undergraduate students, it is possible that this particular sample represents a more conscientious or sensitive-to-failure group of young adults than Skinner's (2014) previous study. Another importance difference between Skinner's (2014) work and the current study is that Skinner used an acceptance condition

36

as her control, rather than academic failure. The latter may also produce negative mood and lead to risk-taking behavior in college students, whereas acceptance would not. If this is the case, the reaction to academic failure may be as equally upsetting or more upsetting than a rejection experience. In addition, although participants were asked to write about a time when they felt intensely rejected, many wrote about experiences that did not seem to the casual reader to be intense rejection experiences.

Rejection Sensitivity and BPD

With the exception of other risk-taking behavior and the importance and emotional reaction ratings, rejection sensitivity did not significantly account for any variance in the regression models. For other-risk-taking behavior, the effect was small. People with BPD or high BPD traits have an intense fear of abandonment and intolerance of being alone (APA, 2013; Gunderson, 1996); however, the results of this study, which show that associations between the predictors and risk-taking behavior remain significant when controlling for rejection sensitivity, as well as previous research (e.g., Berenson, Gregory, Glaser, Romirowsky, Rafaeli, Yang, & Downey; 2016; Skinner, 2014; Staebler et al., 2011), suggest that BPD and rejection sensitivity are two related, yet distinct constructs. Indeed, individuals high in BPD traits often possess other related features (e.g., emotion dysregulation; Linehan, 1993) that contribute to their volatile reactions to perceived slights or rejection. Moreover, BPD traits such as impulsivity, affective instability, and inappropriate, intense anger may also contribute to more extreme responses to social rejection that individuals who are simply high in rejection sensitivity.

Importance and Emotional Reaction Ratings

Given the saliency of social rejection to individuals with BPD or high in BPD traits (APA, 2013), it was expected that participants higher in BPD traits who were in the rejection condition would rate the relived rejection experience as more important to them and would report a stronger emotional reaction to the event when it took place, relative to lower BPD trait participants. Interestingly, a significant interaction was found, but only for the importance of the event. Further analysis showed that the slopes of importance ratings were significant for both the academic failure condition and the rejection condition. Participants higher in BPD traits who recalled a rejection experience considered the event to be of greater importance than did lower BPD trait participants, but did not report a greater emotional reaction to the event than participants who recalled an academic failure. Furthermore, participants lower in BPD traits rated an academic failure as more important than a rejection experience. This is somewhat surprising, considering the number of studies that have shown people with BPD or who are high on BPD traits react with more intense emotion than a typical person (e.g., Lawrence et al., 2011; Renneberg et al., 2011; Tragesser et al., 2008). One possible explanation for this finding is that, although such individuals generally experience more intense negative affect, their retrospective ratings of their emotional reaction at the time may not accurately convey that intensity. Another explanation may be the sample used. As noted above, for college students in general, academic failure may simply be more upsetting than a rejection experience due to the potential financial and temporal consequences associated with it.

Strengths

The current study possesses several strengths. First, this was the first study to use both self-reported and behavioral risk-taking measures to assess the moderating effect of social rejection on the association between BPD traits and risk-taking behavior. Such a design allowed the investigation of differential responses to rejection regarding self-reported coping type behaviors (e.g., alcohol use, risky sexual behavior, etc.) versus general risk-taking propensity (i.e., BART and IGT performance). The results of this study provide preliminary evidence that, although participants higher in BPD traits were more likely to be risk-takers on the BART, they were not significantly more likely to do so after reliving a rejection experience than an academic failure. This finding suggests that females higher in BPD traits are more likely to engage in risky behavior on an analogue risk-taking task, but as a response to rejection are only more likely to engage in coping related risk-taking behavior. Furthermore, these findings elucidate differential responses to rejection (e.g., drug use versus risky sexual behavior) for those higher in BPD traits, and suggest that being high in BPD traits, as well as being high in BPD traits and experiencing rejection, confer both specific and general risks.

Second, the current study examined associations among BPD traits, rejection, and risk-taking behavior in a college sample that contained a dimensional representation of BPD traits. Oversampling for these traits during mass screening allowed for higher BPD trait participants to be invited to the study—a number of whom participated. Moreover, this dimensional approach is in line with more recent conceptualizations of both normative and psychopathological personality characteristics as existing on a continuum

39

(e.g., see Widiger, 2011). This type of approach facilitated the inclusion of many participants who may have otherwise been excluded in other research designs for failure to meet criteria of a BPD diagnosis, yet still possess BPD traits that cause significant interpersonal difficulties and impairment in their lives.

Third, the current study used an idiographic rejection manipulation, which has been shown to be particularly effective in eliciting negative affect for individuals high in BPD traits (Kuo et al., 2014). This manipulation required the recall of an actual abandonment or rejection experience, rather imagining a hypothetical situation. Moreover, the study utilized a rejection versus negative control design, which allowed for the examination of risk-taking reactions to rejection as well as a more general negative experience. Lastly, a measure of rejection sensitivity was included in each hierarchical regression model to determine whether rejection sensitivity made any unique contributions to the explanation of variance in various forms of risk-taking behavior, both self-reported and behavioral, and whether associations among the other predictor variables held after partialling out the contribution of rejection sensitivity.

Limitations

Importantly, there are also several limitations to the study. Despite the fact that participants were oversampled for high BPD traits, the sample was nonetheless comprised of college students—a group of young adults that are in many ways high functioning. Thus, it is possible that even participants with the highest levels of BPD traits in this study also possess coping skills that allow them to function at a higher level in their daily lives and cope with the impairment caused by their maladaptive personality

traits than would be seen in a more representative, community sample. Furthermore, despite oversampling for BPD traits, only 10.3% of participants met criteria for clinically significant BPD traits (Trull, 1995)—another factor which contributed to the detection of associations based on high BPD traits being difficult to establish.

Although the decision to include only females was based on the rates of BPD diagnoses reported by the American Psychiatric Association (2013) and the composition of undergraduate psychology students at the university, it is possible that not including male participants in the study may have excluded potential high BPD trait participants who could have contributed to the study. Moreover, the inclusion of these participants could have increased the total percentage of study participants that met or exceeded the recommended cutoff for clinically significant BPD traits on the PAI-BOR.

Additionally, although participants were asked to think about and write about a past rejection experience, it is unclear to what extent participants actually *relived* the event. In other words, no measure of mental immersion in the event was administered, so it is unclear how much cognitive and emotional processing was occurring during the reliving task. Thus, some participants may have experienced a stronger or weaker emotional reaction to the reliving manipulation simply due to greater or lesser immersion during recall.

Future Directions

 The constructs examined in the current study represent important pieces within a larger nomological network, and further study of these constructs will contribute to both our theoretical and clinical understanding of how BPD traits, rejection, and risk-taking behavior are related, as well as how this information can be used to inform intervention or preventative care. Indeed, additional research is needed to further our understanding of the relations among these constructs.

 Future studies should consider, for example, comparing different types of social rejection manipulations within a similar study design as the current study. As mentioned previously, the type of social rejection manipulation is likely to influence both the poignancy and effectiveness of mood manipulation in individuals high in BPD traits, and there have been mixed findings within the literature as to the efficacy of various rejection manipulations (e.g., Kuo et al., 2014; Lawrence et al., 2011; Renneberg et al., 2011). It is therefore critical to conduct additional studies in which various forms of social rejection manipulations are compared in order to determine whether there are differential reactions to the manipulations within subclinical BPD trait populations. One such promising study would be the comparison of Cyberball versus a reliving task; yet another would be the use of a "future alone" rejection manipulation.

 Furthermore, our understanding of BPD as a dimensional personality construct would benefit from the examination of additional behavioral responses following social rejection—such as aggression, for example. Given that individuals with BPD are likely to engage in aggressive behavior following rejection (Mancke, Herpertz, & Bertsch, 2015),

it will be informative to see whether, and to what extent, that association exists across a continuum of BPD traits. Doing so will likely provide greater insight into the underlying mechanisms of such behavior.

Lastly, transdiagnostic research focused on emotional dysregulation more broadly is likely to be a fruitful avenue of investigation. Grant-funded research would allow substantially more investigation of mental health disorders in which emotional dysregulation is thought to play a primary role. Moreover, the use of psychophysiological measures can be used to verify hyperarousal following a rejection manipulation, rather than self-reported measures of mood.

Conclusion

In summary, the current study contributed to the literature by being the first to use a large, subclinical, undergraduate sample to examine the associations among BPD traits, rejection, and risk-taking behaviors. Evidence for a general risk-taking was found using an analogue computerized risk-taking task but there was no interaction with the rejection condition, suggesting that female students who are higher in BPD traits do engage in greater generalized risk-taking, but this propensity does not necessarily increase following a rejection reliving task. Again, though, this finding may be due to a small effect on negative mood following the rejection manipulation. Findings do suggest, however, that female college students who are higher in BPD traits and experience a rejection situation are more likely to engage in particular coping related behaviors such as self-reported risky sexual behavior or alcohol use. Moreover, these individuals are more

likely to perceive these rejection experiences as more important to them than their lower

BPD trait peers.

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APPENDIX A

TABLES

Table 1

Descriptive Statistics for Study Variables

Variable	*M*	*SD*	Range	Cronbach's α
PAI-Bor	28.36	10.78	8 - 60	.85
Alcohol Use	1.11	1.54	0 - 6	.78
Drug Use	.32	.80	0 - 3	.70
Risky Sex	.75	1.39	0 - 5	.84
Other RTB	2.79	2.50	0 - 8	.73
BART	26.44	12.91	6 - 63	—
RSQ	9.28	3.40	1.17 - 23.22	.91
Importance	3.25	1.06	1 - 4	—
Reaction	7.42	2.47	0 -10	—
POMS TMD	2.82	11.01	-33 - 58	—
Iowa Gambling Task	1990.11	571.72	300 – 3000	—
Total RTB	14.67	4.31	3 - 20	.80

Note. N = 195. Actual values for the current study.
PAI-Bor = Personality Assessment Inventory – Borderline Features scale; Other RT = Other risk-taking behavior; BART = Balloon Analogue Risk Task; RSQ = Rejection Sensitivity Questionnaire; Importance = importance of rejection or academic failure event; Reaction = emotional reaction to event; POMS TMD = Profile of Mood Scale Total Mood Disturbance difference score; Total RTB = Total risk-taking behavior.

Table 2

T-test for Equality of Means

Variable	Academic Failure		Rejection		t-test	p	Cohen's d
	M	SD	M	SD			
PAI-Bor	28.87	10.75	27.83	10.86	.67	.50	.10
Alcohol Use	2.80	1.28	2.70	1.22	.55	.57	.08
Drug Use	1.61	1.37	1.41	1.14	1.11	.27	.16
Risky Sex	2.69	1.57	2.57	1.40	.56	.57	.08
Other RTB	3.91	2.16	3.66	2.18	.80	.42	.12
BART	26.01	13.47	26.87	12.24	-.47	.64	.07
RSQ	9.67	3.63	8.87	4.25	1.39	.16	.20
Importance	3.06	1.16	3.43	.93	-2.47*	.02	.35
Reaction	7.45	2.37	7.38	2.58	.22	.84	.03
POMS TMD	1.89	9.61	3.77	12.26	-1.18	.23	.17
Iowa Gambling Task	1959.82	521.23	2020.40	622.21	.46	.46	.11
Total RTB	15.14	4.29	14.19	4.30	1.54	.12	.22

Note. $N = 96$ (rejection); $N = 99$ (academic failure).
PAI-Bor = Personality Assessment Inventory – Borderline Features scale; Other RT =
Other risk-taking behavior; BART = Balloon Analogue Risk Task; RSQ = Rejection
Sensitivity Questionnaire; Importance = importance of rejection or academic failure;
Reaction = emotional reaction to event; POMS TMD = Profile of Mood Scale Total
Mood Disturbance difference score; Total RTB = Total risk-taking behavior.
*p < .05.

Table 3

Bivariate Correlations Among Key Study Variables for Rejection (Above Diagonal) and Academic Failure (Below Diagonal) Conditions

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. PAI-Bor	—	.27**	.30**	.47**	.55**	.22*	.44**	.27**	.40**	.11	.08	.57**
2. Alcohol Use	-.05	—	.49**	.56**	.33**	.19	.15	-.03	.09	.04	.11	.79**
3. Drug Use	-.03	.61**	—	.40**	.27**	.22**	.11	.04	.18	-.00	.04	.62**
4. Risky Sex	.03	.63**	.55**	—	.41**	.13	.29**	-.01	.16	.08	.13	.75**
5. Other RTB	.32**	.38**	.41**	.35**	—	.11	.32**	.26**	.42**	.09	.09	.72**
6. BART	.36**	.04	-.05	.07	.10	—	.02	.18	.08	.05	.09	.16
7. RSQ	.35**	-.33**	-.21*	-.25*	.10	.09	—	.28**	.25*	.14	.03	.30**
8. Importance	-.047	.09	.09	.14	.06	-.03	.07	—	.25*	.14	.11	.12
9. Reaction	.16	.01	-.06	-.04	.09	.13	.08	.29**	—	.18	-.05	.33
10. POMS TMD	-.10	.00	.03	-.20*	.08	-.14	.14	-.01	.06	—	.12	.21
11. IGT	-.03	.05	.08	.12	.13	.02	.09	.11	.05	.07	—	.06
12. Total RTB	.14	.80**	.77**	.77**	.71**	.06	-.19	.13	.06	-.03	.16	—

Note. $N = 96$ (rejection); $N = 99$ (academic failure).
PAI-B = Personality Assessment Inventory – Borderline Features scale; Other RT = Other risk-taking behavior; BART = Balloon Analogue Risk Task; RSQ = Rejection Sensitivity Questionnaire; Importance = importance of rejection or academic failure; Reaction = emotional reaction to event; POMS TMD = Profile of Mood Scale Total Mood Disturbance difference score; IGT = Iowa Gambling Task; Total RTB = Total risk-taking behavior.
*p < .05; **p < .01.

Table 4

Predicting Self-Reported Risk-Taking Behavior from Borderline Personality Traits and Condition

Predictor	Alcohol Use			Risky Sex			Drug Use			Other RTB			Total RTB		
	$B(SE)$	β	t	$B(SE)$	β	t	$B(SE)$	β	t	$B(SE)$	β	t	$B(SE)$	β	t
Step 1															
R^2	.01			.02			.00			.04			.00		
RSQ	-.02(.02)	-.08	-1.05	.00(.01)	.02	.24	-.01(.01)	-.03	-.46	.06(.02)	.20	2.80**	.04(.01)	.05	.76
Step 2															
ΔR^2	.02			.06			.03			.14			.11		
PAI-Bor	.05(.02)	.17	2.13*	.07(.02)	.28	3.59***	.03(.01)	.17	2.18*	.13(.02)	.40	5.57***	.28(.06)	.37	4.90***
Step 3															
ΔR^2	.01			.01			.03			.00			.02		
Condition	-.04(.04)	-.08	-1.07	-.05(.04)	-.11	-1.54	-.06(.02)	-.18	-2.54*	-.03(.04)	-.04	-.60	-.20(.11)	-.13	-1.83
Step 4															
ΔR^2	.03			.04			.01			.00			.04		
PAI-Bor X Condition	.10(.04)	.28	2.50*	.10(.04)	.27	2.80**	.03(.02)	.14	1.41	.04(.04)	.09	1.01	.30(.06)	.19	2.80**

Note. $N = 195$.
PAI-BOR = Personality Assessment Inventory – Borderline Features scale; Other RTB = Other risk-taking behavior; Total RTB = Total risk-taking behavior; RSQ = Rejection Sensitivity Questionnaire.
*p < .05; **p < .01; ***p < .001.

Table 5

Predicting Behavioral Risk-Taking and Emotional Response from Borderline Personality Traits and Rejection

Predictor	BART B(SE)	β	t	Importance B(SE)	β	t	Reaction B(SE)	β	t	POMS TMD B(SE)	β	t	IGT B(SE)	β	t
Step 1															
R^2		.00			.04			.03			.02			.02	
RSQ	.64(.93)	.10	.70	.22(.08)	.21	2.90**	.43(.17)	.17	2.43*	1.50(.79)	.13	1.86	.33(.08)	.13	2.37
Step 2															
ΔR^2		.09			.00			.06			.00			.00	
PAI-Bor	4.30(.98)	.33	4.40***	.05(.08)	.05	.62	.64(.18)	.26	3.41***	-.47(.87)	-.04	-.54	.24(.26)	.11	.92
Step 3															
ΔR^2		.00			.02			.00			.01			.01	
Condition	1.01(1.78)	.04	.56	-.32(.15)	-.15	-2.11*	.02(.35)	.00	.04	2.20(1.60)	.10	1.38	.05(.04)	.04	1.15
Step 4															
ΔR^2		.00			.02			.02			.01			.00	
PAI-Bor X Condition	-1.70(1.8)	-.10	-.94	.33(.15)	.22	2.24*	.70(.35)	.19	1.90	2.21(1.61)	.14	1.37	.02(.01)	.02	2.01

Note. N = 195.
BART = Balloon Analogue Risk Task; Importance = importance of rejection or academic failure;
Reaction = emotional reaction to event; POMS TMD = Profile of Mood States Total Mood
Disturbance difference score; IGT = Iowa Gambling Task; RSQ = Rejection Sensitivity Questionnaire.
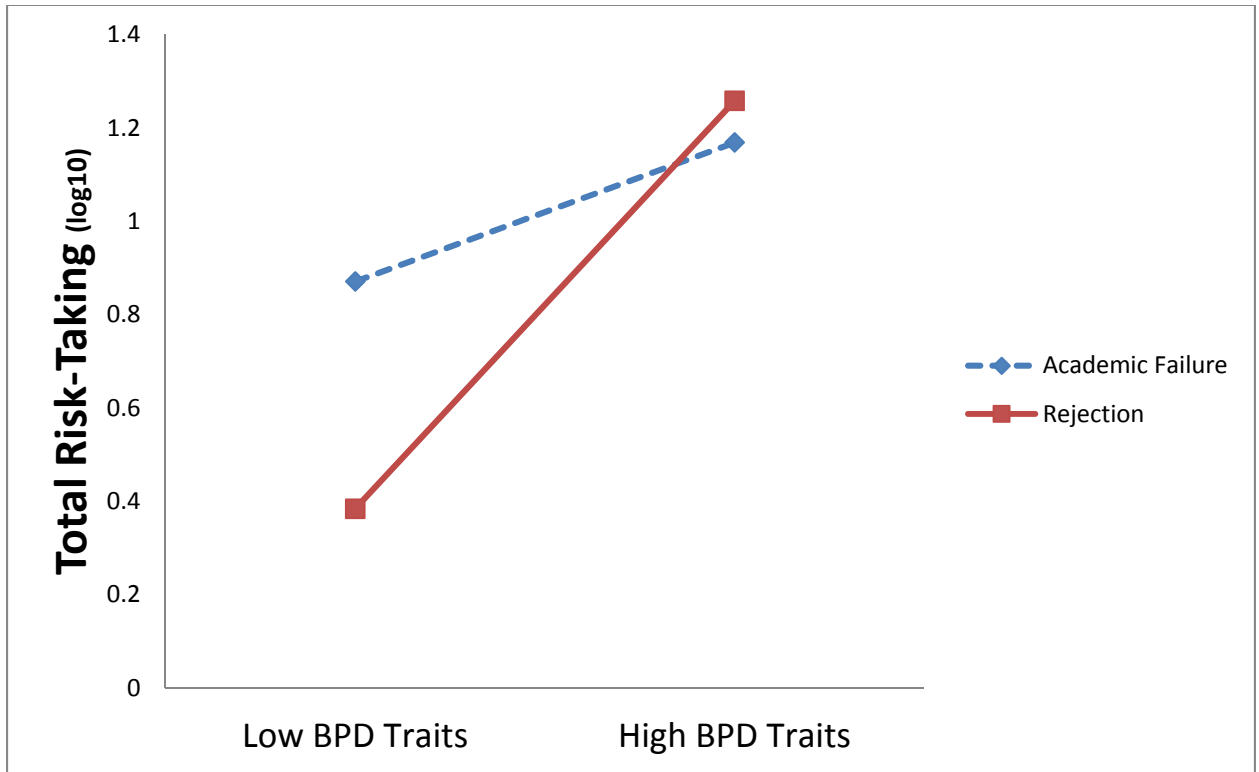*p < .05; **p < .01; ***p < .001.

FIGURES

Figure 1. Simple Slopes Analysis Conducted to Determine the Effect of Rejection, the Moderator, on the Nature of the Relation Between BPD Traits and Total Self-Reported Risk-Taking.
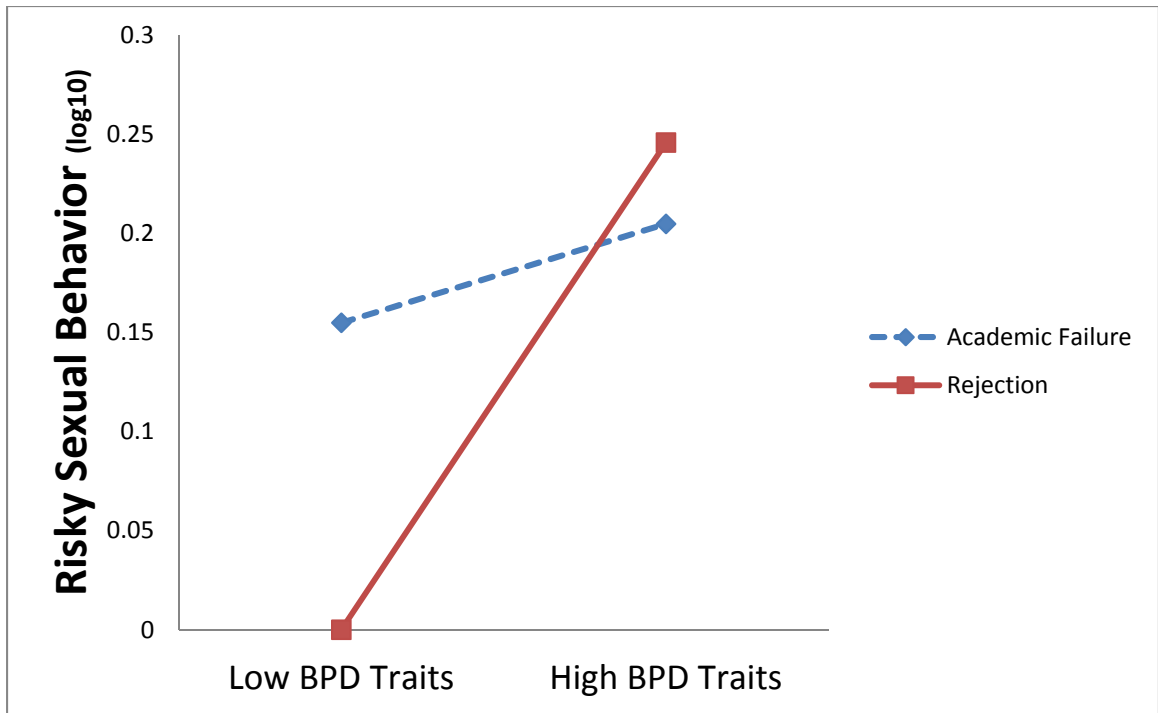
Figure 2. Simple Slopes Analysis Conducted to Determine the Effect of Rejection, the

Moderator, on the Nature of the Relation Between BPD Traits and Risky Sexual
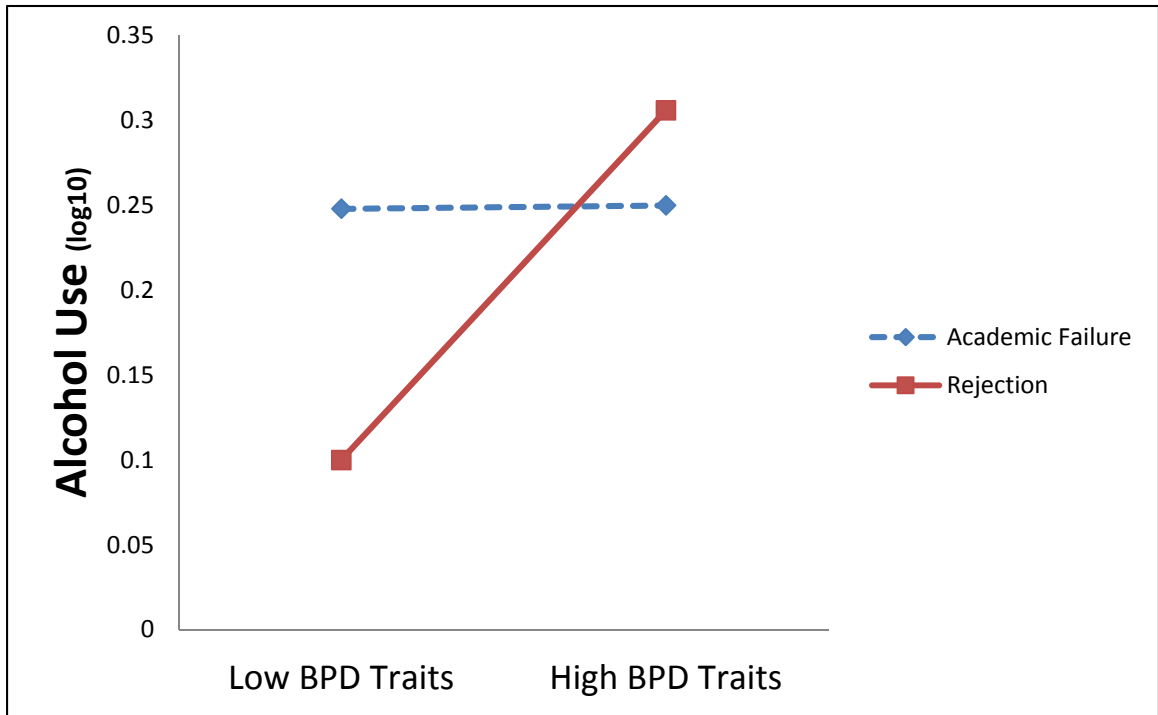
Behavior.

Figure 3. Simple Slopes Analysis Conducted to Determine the Effect of Rejection, the

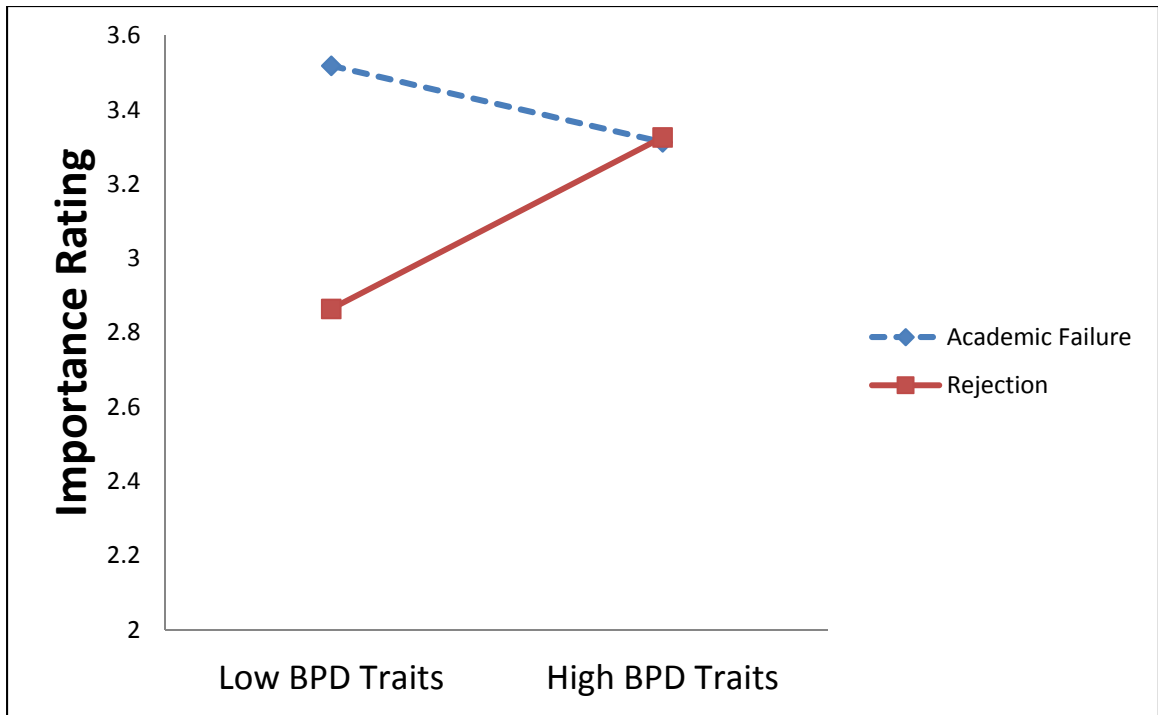Moderator, on the Nature of the Relation Between BPD Traits and Alcohol Use.

Figure 4. Simple Slopes Analysis Conducted to Determine the Effect of Rejection, the

Moderator, on the Nature of the Relation Between BPD Traits and Importance Rating.