SELF-DAMAGING BEHAVIORS IN BORDERLINE PERSONALITY DISORDER:

A FUNCTIONAL ASSESSMENT OF SELF-HARM, SUBSTANCE USE,

AND DISORDERED EATING BEHAVIORS

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ABSTRACT

Self-Damaging Behaviors in Borderline Personality Disorder: A Functional Assessment of Self-Harm, Substance Use, and Disordered Eating Behaviors

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Borderline Personality Disorder (BPD) is an enduring personality disorder marked by severe self-damaging behaviors such as self-harm, substance use, and disordered eating behaviors. This study examined the emotional antecedents and consequences of self-damaging behavior (self-harm, binge drinking, substance use, and disordered eating behavior) among individualls who report features of BPD to assess the function of these behaviors. Additionally, this study examined whether self-reported difficulties in emotion regulation mediated the relationship between features of BPD and the presence of self-damaging behavior. Results from this study found support for the use of self-harm, drugs use, and disordered eating behavior to regulate emotional experiences and all forms of self-damaging behavior were found to significantly increase the presence of pleasant emotional experiences. The function of self-damaging behavior remains stable, regardless of whether the behavior occurs in isolation or co-occurs with other self-damaging behaviors. In addition, higher rates of polysubstance use were found for individuals with features of BPD compared to those without. Higher rates of difficulties in emotion regulation were found to be associated with features of BPD and the presence of self-damaging behavior was found to partially mediate the relationship between the two constructs. Findings from this study have substantial implications for the conceptualization and treatment of self-damaging behavior in individuals with BPD.

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CHAPTER 1

INTRODUCTION

Borderline personality disorder (BPD) is defined as an enduring personality disorder characterized by marked instability in interpersonal relationships, identity, and affect. Individuals with BPD exhibit dramatic shifts in their views of themselves and others, often vacillating between idealizing and devaluing significant others. Individuals with BPD also commonly display extreme and rapid changes in mood. BPD occurs in approximately 2% of the general population, 10% of outpatient treatment populations, and 20% of inpatient treatment populations (DSM-IV-TR; American Psychiatric Association).

Perhaps the most dangerous aspect of BPD is that individuals with BPD commonly engage in severe and potentially life-threatening behaviors. Individuals with BPD often display self-damaging behaviors such as self-harm, substance use, and disordered eating behaviors. It is estimated that 50-78.6% of individuals with BPD intentionally harm themselves (Brodsky, Cloitre, & Dulit, 1995; Dubo, Zanarini, Lewis, & Williams, 1997; Dulit, Fyer, Leon, Brodsky, & Frances, 1994) and a review of published comorbidity rates from 1987 to 1997 reported that 57.4% of individuals with BPD met criteria for a substance use disorder; 48.8% were diagnosed with an alcohol use disorder and 38.0% were diagnosed with a drug use disorder (Trull, Sher, Minks-Brown, Durbin, & Burr, 2000). In addition, between 53% and 62% of individuals with BPD meet criteria for an eating disorder (Marino & Zanarini, 2001; Zanarini et al., 1998). Specifically, BPD appears to be more associated with binge-eating and/or purging

behaviors compared to restricted eating behaviors (Johnson, Tobin, & Enright, 1989; Marino & Zanarini, 2001; Sansone & Levitt, 2005; Zanarini et al., 1998).

Rather than viewing self-harm, substance use, and disordered eating behaviors as stemming from distinct, comorbid disorders, Linehan's (1993) biosocial theory of BPD relates these behaviors to common difficulties in emotion regulation. According to Linehan's theory, BPD is conceptualized as a dysfunction of the emotion regulation system. This theory proposes that BPD develops through a transaction between a biological vulnerability to emotional experiences and an emotionally invalidating environment. Individuals with BPD are thought to be more emotionally vulnerable in that they are more sensitive to their emotional experiences, experience their emotions more intensely, and are slower to return to baseline following emotional experiences. These traits are thought to transact with an emotionally invalidating environment, in which individuals are taught that their emotional experiences are incorrect and unjustified. As adults, individuals raised in this environment are unable to tolerate their own emotional experiences and thus develop intense feelings of shame in response to their emotions. According to the biosocial theory, the self-damaging behaviors seen in BPD are attempts to regulate these experiences of overwhelming unpleasant emotions. However, the specific mechanisms by which these behaviors regulate unpleasant affect are not specified.

Supporting this theory, research has shown that for individuals with BPD, these behaviors—specifically self-harm—may function to reduce or eliminate unpleasant affect. There is a long history of anecdotal evidence suggesting that individuals engage in self-harm to relieve feelings of tension (Graff & Mallin, 1967; Grunebaum & Klerman,

1967; Rosenthal, Rinzler, Wallsh, & Klausner, 1972). Indeed, when retrospectively questioned about the reasons for engaging in self-harm, many individuals report the alleviation of unpleasant affect as their primary motivation (Briere & Gil, 1998; Brown, Comtois, & Linehan, 2002; Favazza & Conterio, 1989; Herpertz, 1995; Huband & Tantam, 2004; Nock and Prinstein, 2004). Furthermore, studies that retrospectively examine emotional experiences have found that individuals who engage in self-harm, specifically those with BPD, report experiencing unpleasant affect prior to self-harm and also report experiencing decreases in unpleasant affect and increases in pleasant affect following acts of self-harm (Bennum & Phil, 1983; Briere & Gil, 1998; Chapman and Dixon-Gordon, 2007; Herpertz, 1995; Kemperman, Russ, & Shearin, 1997). In addition, psychophysiological studies have shown that individuals who engage in self-harm experience decreases in physiological and self-report measures of arousal in response to imaginal exposure to self-harm (Brain, Haines, & Williams, 1998; Brain, Haines, & Williams, 2002; Haines, Williams, Brain, & Wilson, 1995). Given this body of work, it seems likely that at least some individuals who engage in self-harm experience reductions in unpleasant affect and/or increases in pleasant affect in response to self-harm, suggesting that self-harm may help them manage unpleasant emotional experiences.

Substance use may also function to regulate unpleasant affect for individuals with BPD. The pattern of substance use typically seen in BPD populations suggests that drugs and alcohol are used to regulate mood states. Individuals with BPD display more episodic drinking patterns compared to individuals with personality disorders other than BPD and those without personality disorders (Nace, Davis, & Gaspari, 1991; Skinstad, Laberg, & Ellertsen, 1998). Although not directly assessed in these studies, this pattern of

drinking behavior is consistent with the theory that individuals with BPD utilize alcohol to moderate unpleasant mood states. If the use of substances functions primarily to alleviate unpleasant mood states, then it follows that increases in substance use would be seen during periods of unpleasant affect, reflecting an episodic pattern of drinking. Indeed, there is some evidence to suggest that individuals with BPD are more likely to report drinking during periods of unpleasant affect compared to those without BPD (Kruedelbach, McCormick, & Schulz, 1993). Furthermore, individuals with BPD who abuse substances have been shown to demonstrate greater polysubstance use than those without BPD who abuse substances (Jonsdottir-Baldursson & Horvath, 1987; Kruedelbach et al., 1993; Skinstand et al., 1998). According to the self-medication hypothesis, individuals select particular drugs based on the drug's interaction with the individual's mood state (Khantzian, 1985). Given the affective variability seen in BPD, drug selection based on mood state would yield a wider variety of substances used by the individual. Thus, the increased number of substances used by individuals with BPD may mirror their rapid fluctuations in mood, suggesting that different mood states may occasion the use of different substances. Although the pattern of use and substance preferences seen in individuals with BPD is consistent with the theory that substances are used to regulate mood states, there have been no studies assessing emotional states prior to and following use. To determine that substance use functions to regulate unpleasant mood states, it must be established that substance use is preceded by an unpleasant mood state that is subsequently reduced following use.

In addition to self-harm and substance use, individuals with BPD may also engage in disordered eating behaviors to reduce or eliminate unpleasant affect. BPD appears to

be more strongly associated with binge-eating and/or purging behaviors rather than restricted eating behaviors (Sansone & Levitt, 2005; Marino & Zanarini, 2001; Zanarini et al., 1998). One such purging behavior shown to be associated with BPD is laxative abuse (Johnson et al., 1989; Pryor, Wiederman, & McGilley, 1996; Tozzi et al., 2006). Laxative abuse is commonly observed in individuals with eating disorders and is thought to be a form of purging intended to control weight gain. However, this has not been shown to be an effective means of controlling weight gain, calling into question the function of laxative abuse among individuals with eating disorders. For individuals with BPD, laxative abuse shows a strong association with the self-harm criterion of BPD (Tozzi et al., 2006). Given the poor ability of laxative use to control weight gain and its strong association with the self-harm criterion of BPD, laxative abuse may share functions similar to forms of self-harm for individuals with BPD.

Many researchers have suggested that individuals with eating disorders use binge-eating and/or purging behaviors to regulate emotional experiences (Herman & Polivy, 1988; McCarthy, 1990; Rosen & Leitenberg, 1982, 1985; Sim & Zeman, 2005). It is likely that such behaviors function to reduce or eliminate unpleasant affect for individuals with BPD as well; however, much of the research exploring the function of these behaviors has been conducted with eating disorder populations. Most of the existing research on the co-occurrence of BPD and disordered eating focuses on prevalence rates, clinical correlates, and the outcome of treatment focused on developing emotion regulation strategies. Future research is needed to further examine the function of disordered eating behaviors in BPD. Specifically, to establish that these behaviors

function to regulate unpleasant affect, the emotional antecedents and consequences of disordered eating behaviors must be examined.

Much of the research exploring the function of self-harm, substance use, and disordered eating behaviors has evaluated these behaviors independently. However, for individuals with BPD, such behaviors often do not exist in isolation. Frequently multiple self-damaging behaviors co-occur among individuals with BPD (Dulit et al., 1994; Johnson et al., 1989; Sansone, Fine, & Nunn, 1994). Given the frequent co-occurrence of self-harm, substance use, and disordered eating behavior and their putative shared functions, it is possible that these behaviors comprise a response class. A response class is defined as a set of topographically different behaviors that serve the same function. Thus, individuals with BPD may utilize one or more of these behaviors to modulate their own unpleasant emotional experiences.

This has substantial implications for how clinicians conceptualize and treat BPD. Rather than assigning individuals with BPD independent diagnoses of comorbid eating and substance use disorders, it should be considered that these behaviors may all be functioning to regulate unpleasant affect and are behavioral manifestation of difficulties in emotion regulation. Thus, these behaviors should be viewed as learned responses to unpleasant emotions. This theoretical model would then suggest that treatments for BPD should focus on the entire response class of behaviors and emotion regulation problems more generally, rather than incorporating treatments for several distinct disorders. Whereas in some cases it is necessary to address problematic behaviors that are life-threatening or interfere with the treatment process, treatments that only target specific behaviors may yield increases in other behaviors that are part of the same response class

(Sprague & Horner, 1992). If multiple self-damaging behaviors serve the same function, then as one behavior decreases, the individual may display increases in another behavior that serves the same function. Thus, until the function of the class of behaviors is addressed more directly, the individual may continue to engage in topographically different behaviors that serve the same "escape" function as the behavior being specifically targeted for reduction or elimination.

To demonstrate that self-harm, substance use, and disordered eating behaviors are members of a response class, it must be established that these behaviors all function to regulate unpleasant affect. That is, it must be demonstrated that individuals experience a pleasant emotional shift associated with self-damaging behavior. Furthermore, to establish how these behaviors are maintained, it must be determined whether it is the removal of unpleasant affect or the addition of pleasant affect that reinforces the behavior. Given that these behaviors are commonly reported to occur in the presence of unpleasant emotional experiences and thought to regulate the experience of such emotions, they are likely maintained through a negative reinforcement model.

Hypotheses

1. It was hypothesized that individuals with features of BPD who engaged in self-damaging behavior would be more likely to report experiencing pleasant emotional shifts associated with self damaging behavior rather than unpleasant emotional shifts or no changes in valence. It was predicted that observed changes in emotional experiences would reflect a negative reinforcement pattern (the reduction of unpleasant emotional experiences) than either a positive reinforcement pattern (an increase in pleasant emotional experiences) or a

combined pattern (both a decrease in unpleasant emotional experiences and an increase in pleasant emotional experiences).

2. It was hypothesized that individuals with features of BPD who engaged in all forms of self-damaging behavior would report experiencing pleasant emotional shifts across topographically different self-damaging behaviors rather than distinct emotional patterns associated with each behavior. It was predicted that changes in emotional experiences would reflect a negative reinforcement pattern rather than a positive or combined reinforcement pattern.
3. It was hypothesized that individuals with features of BPD would report more polysubstance use than individuals who did not report features of BPD.
4. It was hypothesized that the presence of features of BPD and the presence of self-damaging behavior would be associated with greater difficulties in emotion regulation. It was also hypothesized that there would be an interaction between the two variables.
5. It was hypothesized that reported difficulties in emotion regulation would mediate the relationship between features of BPD and self-damaging behavior.

CHAPTER 2

METHODS

This study utilized a retrospective, self-report methodology. The primary reason for this decision was the nature of the behaviors of interest. Specifically, self-harm, substance use, and disordered eating are by definition self-damaging. Accordingly, ethical concerns precluded the use of mood induction strategies that would likely precipitate behaviors known to be harmful to vulnerable individuals. Furthermore, we were interested in the emotional antecedents and consequences of three topographically distinct behaviors. These behaviors are likely to occur in a variety of contexts, following a complex combination of establishing conditions which would have been nearly impossible to recreate in a laboratory setting. In addition, high intensity behaviors such as self-harm, substance use, and disordered eating behaviors are likely to occur at a low rate. Given the time course for this study, conducting real time analyses with adequate power would likely not have been feasible. A retrospective, self-report approach provided a uniform methodology to assess all of these behaviors within a period of time that was more appropriate for this project.

Thus, this study utilized a self-report methodology to assess individual perceptions of changes in emotional experiences prior to and following self-damaging behaviors. Participants were asked to complete measures intended to identify the presence of self-damaging behaviors: self-harm, binge-drinking, drug use, and disordered eating behavior. For each identified behavior, participants were asked to report on their emotional experiences prior to and following engaging in the specified behavior. Additionally, participants were screened for features of BPD, polysubstance use, and

difficulties in emotion regulation. The presence of self-damaging behavior was measured as a discrete variable, as is it not theorized that increases in frequency or severity of these behaviors impact the function of the behavior. Polysubstance use and emotion regulation were measured continuously, as the presence of features of BPD is thought to be related to increases in polysubstance use and increases in difficulties in emotion regulation rather than merely their presence.

Participants

Participants were 939 undergraduate students attending an urban university located in the northeast region of the United States. Participants were students enrolled in undergraduate-level psychology courses and who received course credit for participating in this research project. Participants were provided with a selection of research projects and were permitted to choose those in which they would like to participate. Students were also provided with alternative options instead of participating in research projects that yielded equivalent course credit.

Measures

The *Personality Assessment Inventory-Borderline Features* (PAI-Bor; Morey, 1991) is a 24-item measure intended to assess features of BPD among non-clinical samples (See Appendix A for a list measures to be included in the proposed study). Items are rated on a 4-point Likert-type scale ranging from *false, not at all true* to *very true.* A factor analytic investigation found that the PAI-Bor is comprised of six factors: (a) Impulsivity/Dyscontrol (e.g., “I am a reckless person”); (b) Mood Instability (e.g., “My mood can shift quite suddenly”); (c) Chronic Emptiness (e.g., “Sometimes I feel terribly

empty inside"); (d) Separation concerns (e.g., "I worry a lot about other people leaving me"); (e) Negative relations (e.g., "My relationships have been stormy"); (f) Reckless Spending (e.g., "I spend money too easily;" Jackson & Trull, 2001). The PAI-Bor has shown good validity and reliability. Among a college sample, individuals identified by the PAI-Bor as having features of BPD displayed a significantly greater number of BPD symptoms as assessed by the Structured Interview for DSM-III-R Personality (SIDP-R; Pfohl, Blum, Zimmerman, & Stangl, 1989) than those not identified as having features of BPD. Additionally, the PAI-Bor has demonstrated good internal consistency (α = .84) and 2-12 week test-retest reliability across two college samples (r = .73, .77). PAI-Bor total scores were used to assess the presence of BPD features. Consistent with original investigations of this measure, in the present study a raw total score $\geq$ 38 (T-score $\geq$70) was used to indicate the presence of features of BPD (Morey, 1991; Trull, 1995).

The *Deliberate Self-Harm Inventory* (DSHI; Gratz, 2001) is a 17-item measure of deliberate self-harm. The author defines self-harm as "the deliberate, direct destruction or alteration of body tissue without conscious suicidal intent, but resulting in injury severe enough for tissue damage (e.g., scarring) to occur" (Gratz, 2001, p. 255). The DSHI is comprised of dichotomous items assessing the presence of topographically different types of self-harm behavior (e.g., "Have you ever intentionally (i.e., on purpose) cut your wrist, arms, or other area(s) of your body (without intending to kill yourself)?") and open-ended questions intended to measure the frequency (e.g., "How many times have you done this?") duration, (e.g., "How many years have you been doing this?") and severity (e.g., "Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment?") of the behavior. Item 17 allows for the participant to indicate any

behavior not otherwise assessed on the measure that was intended to hurt oneself (e.g., "Have you ever intentionally (i.e., on purpose) done anything else to hurt yourself that was not asked about in this questionnaire? If yes, What did you do to hurt yourself?").

The DSHI demonstrated good reliability with high internal consistency (α = .82) and adequate test-retest reliability over a period of 2 to 4 weeks (φ = .68, p < .001) among a college sample. The construct validity for the DSHI was demonstrated through correlations with items assessing self-harm from other inventories (Mental Health History Form; Boudewyn & Liem, 1995b; Diagnostic Interview for Borderlines, Revised; DIB-R; Zanarini, Gunderson, Frankenburg, & Chauncey, 1989; & Suicide Behaviors Questionnaire; SBQ; Linehan, as cited in Sabo, Gunderson, Najavits, Chauncey, & Kisiel, 1995; r = .35–.49). This study utilized the DSHI dichotomous self-harm variable to assess for the presence of self-harm behavior. For this study, a "yes" response to any of the 17 items (when item 17 is judged to be a legitimate self-harm event) indicated the presence of self-harm[1].

The *Alcohol Use Disorders Identification Test* (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) is a 10-item brief screening scale intended to identify individuals at risk for developing alcohol abuse or dependence. Items are rated on a 5-point Likert scale ranging from *never* to *daily or almost daily*. The AUDIT is intended to be comprised of three subscales: alcohol intake (e.g., "How often do you have a drink containing alcohol?"), alcohol dependence (e.g., "How often during the last year have you failed to do what was normally expected from you because you were drinking?"), and adverse consequences of alcohol use (e.g., "How often during the last year have you

[1] All behaviors identified by item 17 were judged to be legitimate self-harm events. The majority of events reported under item 17 fit descriptions of events listed in previous items.

been unable to remember what happened the night before because you had been drinking?"). Factor analysis of the AUDIT suggests that when used with the general population, the AUDIT reflects a two-factor model capturing the dimensions of alcohol use and problems associated with drinking behavior (Reinert & Allen, 2002). The AUDIT has been shown to have good reliability among college student populations (α = .77–.80; Clements, 1998; Fleming, Barry, & MacDonald, 1991) and has demonstrated good test-retest reliability (r = .86; Sinclair, McRee, & Babor, 1992). In addition, the AUDIT has been shown to be superior to other measures at identifying individuals who have problems with alcohol (Reinert & Allen, 2002). For the purposes of this study, a response of *less than monthly, monthly, weekly,* or *daily or almost daily* for item 3 ("How often do you have 6 or more drinks on one occasion?"), was used to identify the presence of binge-drinking.

The *Drug-Use Disorders Identification Test* (DUDIT; Berman, Bergman, Palmstierna, & Schlyter, 2005) is an 11-item scale intended to assess problematic drug-use. The DUDIT was adapted from the AUDIT and was designed for use in combination with the AUDIT. Items were altered to assess for drug use rather than alcohol use (e.g., "How often do you use drugs other than alcohol?"); thus items are rated on a 5-point Likert scale ranging from *never* to *daily or almost daily.* Factor analysis of the DUDIT suggests that, similar to the AUDIT, when used with the general population the DUDIT reflects a two-factor model assessing the dimensions of drug dependence and drug-related problems. The DUDIT has been shown to be reliable with a sample of individuals from the general population (α = .93). DUDIT total scores range from 0–44. For this study, a response of *once a month or less, 2–4 times a month, 2–3 times a week,* or *4 or*

more times a week for item 1 (“How often do you use drugs other than alcohol?”) was used to identify the presence of drug use.

Polysubstance Use was assessed using an adapted version of Commonly Abused Drugs List (CADL; National Institute on Drug Abuse [NIDA], n.d.). Participants were asked to provide a yes/no response to indicate whether during the past 12 months they have used a drug from a specified classification of drugs. The Commonly Abused Drugs list yields seven classifications of drugs, including an “Other Compounds” category comprised of three subcategories. For the purpose of this study, we created a continuous variable of polysubstance use with total scores ranging from 0–9.

The *Questionnaire for Eating Disorder Diagnosis* (Q-EDD; Mintz, O’Halloran, Mulholland, & Schneider, 1997) is a 50-item self-report measure intended to operationalize DSM-IV criteria for eating disorders. The Q-EDD is advantageous in that it assesses subsyndromal disordered eating behaviors as well as diagnosable eating disorder patterns. The Q-EDD yields eight categorical labels: six eating disorder categories and two non-eating disorder categories. The eating disorder categories consist of anorexia nervosa, bulimia nervosa, and four types of EDNOS: subthreshold bulimia nervosa, menstruating anorexia nervosa, non-binge-eating bulimia nervosa, and Binge Eating Disorder (BED). The non-eating disorder categories consist of an asymptomatic category reflecting those that report no eating disorder symptoms, and a symptomatic category indicating that the individual is identifying some eating disorder symptoms, yet does not fit into an eating disorder category. Participants are to identify whether they have engaged in a specified behavior, then asked to rate the frequency and duration of the behavior (e.g., “Do you take laxatives to prevent weight gain? How often do you do this?

How long have you been doing this?"). Frequency ratings are made on a 4-point scale ranging from *daily* to *once/month*. Duration ratings are made on a 6-point scale ranging from *1 month* to *more than a year*. The Q-EDD has shown good validity and reliability. Among a college sample, when compared to diagnostic clinical interviews, the accuracy rate for the eating-disordered versus non-eating-disordered diagnostic differentiation is 98% and the accuracy rate for the eating-disordered, symptomatic, asymptomatic differentiation is 90%. The Q-EDD demonstrates good test-retest reliability. Among a sample of college students, 1 to 3 months test-retest reliability was adequate for the diagnostic differentiation of eating-disordered versus non-eating-disordered (κ = .64) and the differentiation of eating-disordered, symptomatic, and asymptomatic (κ = .54). In a subsequent study of college students, 2-week test-retest reliability was much higher (κ = .94; κ = .85, respectively). The authors recommend the use of the measure for assessing frequency data concerning disordered eating behaviors. For this study, the Q-EDD was used to assess for the presence and topography of disordered eating behavior.

The *emotional antecedents and consequences* of self-damaging behavior were assessed using a list of discrete emotions proposed by Ekman (1999). Based on examination of behavioral and physiological changes associated with emotional experiences, Ekman (1999) argues that these emotions represent a comprehensive list of discrete emotions. Ekman (1999) bases this argument on the evaluation of 11 criteria (a) distinctive universal signals, (b) distinctive physiology, (c) automatic appraisal, (d) distinctive universal antecedent events, (e) distinctive appearance developmentally, (f) presence in other primates, (g) quick onset, (h) brief duration, (i) unbidden occurrence, (j) distinctive thoughts, memories, images, and (h) distinctive subjective experience.

By identifying these states as basic emotions, Ekman (1999) distinguishes them from other affective phenomena such as moods or personality traits.

In the proposed study, participants who reported self-damaging behavior were asked to rate their emotional experience both prior to and following their most recent incident of self-damaging behavior. Participants were presented with the 15 emotion terms (e.g., “Anger,” “Relief,” “Shame”) proposed by Ekman (1999) and asked to rate the extent to which they experienced the specified emotion on a 5-point Likert-type scale. Responses ranged from *very slightly or not at all* to *extremely*.

The *Difficulties in Emotion Regulation Scale* (DERS; Gratz & Roemer, 2004) is a 36-item self-report measure intended to assess emotion dysregulation. Factor analysis of the measure indicates that the DERS is comprised of six subscales: (a) Nonacceptance of emotional responses (e.g., “When I’m upset, I feel guilty for feeling that way.”); (b) Difficulties in engaging in goal-directed behavior (e.g., “When I’m upset I have difficulty focusing on other things.”); (c) Impulse control difficulties (e.g., “When I’m upset, I lose control over my behavior.”); (d) Lack of emotional awareness (e.g., “I pay attention to how I’m feeling.” [reverse scored item]); (e) Limited access to emotion regulation (e.g., “When I’m upset, I believe that I will remain that way for a long time.”); and (f) Lack of emotional clarity (e.g., “I have difficulty making sense out of my feelings.”).

Responses are made on a 5-point scale ranging from *almost never* to *almost always*. With a college sample, the DERS has shown good internal consistency for the scale as a whole ($\alpha = .93$) as well as the separate subscales ($\alpha > .80$). Additionally, the DERS has shown good test-retest reliability over 4-8 weeks ($\rho_1 = .88$, $p < .01$). Construct validity for the DERS was established through a positive correlation with a measure of

experiential avoidance (Acceptance and Action Questionnaire; AAQ; Hayes et al., 2004; $r = .60$, $p < .01$) and negative correlations with measures of emotion regulation (Generalized Expectancy for Negative Mood Regulation Scale; NMR; Catanzaro & Mearns, 1990; $r = -.69$, $p < .01$) and emotional expression (Emotional Expressivity Scale; EES; Kring, Smith, & Neale, 1994; $r = -.23$, $p < .01$). For the purposes of this study, DERS scores were recoded such that high scores indicate greater emotion dysregulation. DERS total scores were used as a continuous measure of difficulties in emotion regulation.

Procedures

This study was administered online using the University's online data collection software. Participants who chose to participate in this project were informed in writing about the purpose of the study, the voluntary nature of their participation, the potentially distressing subject matter, and the confidentiality procedures regarding data collection. Participants provided an electronic signature consenting to participate in the study. All questionnaires were completed online. All participants were asked to complete the PAI-Bor, DSHI, AUDIT, DUDIT, CADL, Q-EDD, and DERS. Participants who reported self-harm, high risk alcohol use, high risk substance use, and/or disordered eating behavior rated their emotional experiences immediately following each measure that positively identified a self-damaging behavior. Participants rated their emotional experiences twice for each identified behavior, once with the temporal instructions, "immediately prior to engaging in the most recent instance of self harm/alcohol use/drug use/eating behavior" and once with the temporal instructions, "immediately following engaging in the most recent instance of self harm/alcohol use/drug use/eating behavior." After the participants

completed the questionnaires, they were provided debriefing information in writing. Participants were given further details about the purpose of the study and contact information for the primary researchers involved in this study. Additionally, all participants received a referral to the Temple University Psychological Services Center. Participants received course research credits in exchange for their participation in this study.

Data Analytic Plan

Hypothesis 1: Individuals with Features of BPD Will Report Pleasant Emotional Shifts Associated with Self-Damaging Behavior, Reflecting a Negative Reinforcement Pattern

This hypothesis aimed to examine each self-damaging behavior independently as it occurred in individuals with features of BPD. To investigate this hypothesis, changes in emotional experiences were evaluated using a combination of within-subject t-tests and repeated measures, planned contrasts. To examine overall changes in emotional experiences associated with each self-damaging behavior, an emotional experience total score was created for both pre- and post- time points, reflecting scores of emotional experiences prior to engaging in the specified behavior and following the behavior. To create a uniform scale, scores for unpleasant emotional experiences were reverse-scored so that high scores represented a smaller presence of the discrete, unpleasant emotion and lower scores indicated a larger presence. Within subject t-tests were then used to compare pre- and post- total scores for each self-damaging behavior.

Repeated measures, planned contrasts were used to evaluate changes in pleasant emotional experiences, unpleasant emotional experiences, and discrete emotions for each self-damaging behavior. Given that self-damaging behaviors were being evaluated

independently, family-wise Bonferroni corrections were applied (Jaccard and Guilamo-Ramos, 2002).

The within-subject *t*-test is based on several assumptions. It assumes that the distribution of difference scores is normal and, more specifically, symmetrical. In addition, repeated measures planned contrasts also require normality (symmetry) of the distribution of difference scores. Symmetry was evaluated using the coefficients of skewness as well as a visual inspection of the distributions.

Hypothesis 2: Individuals with Features of BPD and All Forms of Self-Damaging Behavior Will Report Pleasant Emotional Shifts, Reflecting Negative Reinforcement Patterns, Across Behaviors

The aim of this hypothesis was to examine self-damaging behaviors as they co-occurred in individuals with features of BPD. Thus, the data analyzed for the investigation of this hypothesis were drawn from individuals who reported engaging in all four types of self-damaging behavior. To examine emotional changes associated with self-damaging behavior, as previously outlined above, within-subject *t*-tests and repeated measures planned contracts were conducted to investigate changes in overall emotional experiences and changes in pleasant and unpleasant emotional experiences associated with self-damaging behavior. Family-wise Bonferroni corrections were applied.

To assess the degree to which each form of self-damaging behavior similarly impacted emotional experiences, intraclass correlations were conducted. More commonly used to assess inter-rater reliability, this technique measures agreement between two or more sets of ratings. This method is advantageous over pooling Pearson's *r* correlation coefficients for all possible pairwise comparisons in that it assesses absolute agreement,

as opposed to relative agreement; that is, it assesses for agreement between mean differences as well as increases and decreases in rating scores (Cohen, 2001). For each self-damaging behavior, a profile of mean differences scores, from pre- to post- time points, for each discrete emotion was created. These profiles were then compared using intraclass correlations, specifically two-way fixed-effects models (absolute agreement definition). In addition, intraclass correlations, specifically one-way fixed-effect models (absolute agreement definition), were conducted to compare difference scores for each self-damaging behavior, within each discrete emotion.

Hypothesis 3: Features of BPD Will Be Associated with Increased Polysubstance Use

To explore whether individuals with features of BPD were more likely to engage in greater polysubstance use than those without features of BPD, we conducted an independent samples *t*-test. Similar to the within subjects *t*-test, the independent samples *t*-test is based on the assumptions that the observations are normally distributed (specifically, symmetrically distributed), there is homogeneity of variances, and the samples of observations are independent. Symmetry was evaluated using the coefficients of skewness, as well as a visual inspection of the distributions. In the event that the assumption of symmetry was violated, the analyses were conducted as planned, as the *t*-test is robust to violations of normality with large sample sizes (Moore, 1995). Homogeneity of variances was evaluated by examination of the Levines' Test for Equality of Variance and evaluation of the coefficients of variance. In the event that unequal variances were observed, a *t*-test for unequal variances was utilized.

Hypothesis 4: Features of BPD and Self-Damaging Behavior Will Be Associated with Increased Difficulties in Emotion Regulation

To determine whether the presence of features of BPD and the presence of self-damaging behavior were related to difficulties in emotion regulation, we used a 2 x 2 ANOVA, with presence/absence of BPD and presence/absence of self-damaging behavior as the independent variables and difficulties in emotion regulation serving as the dependent variable.

The assumptions for this analysis were that all samples were normally distributed, have homogeneity of variance and were drawn independently from each other. The assumptions were evaluated using the aforementioned methods.

Hypothesis 5: Difficulties in Emotion Regulation will Mediate the Relationship Between Features of BPD and Self-Damaging Behavior

To examine whether difficulties in emotion regulation mediated the relationship between features of BPD and self-damaging behavior, we conducted a mediational analysis in accordance with the algorithm described by Baron and Kenny (1986). Accordingly, logistic regression was used to establish the impact of features of BPD on the presence of self-damaging behavior, a regression analysis was used to examine the effect of features of BPD on difficulties in emotion regulation, and logistic regression (forced entry approach) was used to analyze the effect of difficulties in emotion regulation on the presence of self-damaging behaviors and, subsequently, the impact of features of BPD on the presence of self-damaging behavior, when controlling for difficulties in emotion regulation. If the effect of features of BPD on the presence of self-damaging behaviors was reduced to zero when controlling for difficulties in emotion

regulation, this would have indicated that difficulties in emotion regulation perfectly mediated the relationship between features of BPD and the presence of self-damaging behavior. If the effect of features of BPD on the presence of self-damaging behaviors was significantly reduced but still present, this would have indicated that difficulties in emotion regulation partially mediated the relationship between features of BPD and self-damaging behavior. A Sobel test was then used to evaluate the significance of the indirect effect. To account for the multiple analyses throughout this procedure the alpha level was set to .01 to maintain an experiment-wise alpha level of .05.

CHAPTER 3

RESULTS

The demographic information for the total sample is summarized in Table 1. Of the total sample, 165 (17.6%) participants were classified as exhibiting features of BPD, of whom 127 were female (76.5%). A summary of the self-damaging behaviors observed in individuals who reported features of BPD is listed in Table 2.

Table 1. Total Sample Demographic Information

	Total Sample (n = 939)
Gender (% Female)	69.6
Age in years (*M* and *SD*)	20.35 (3.66)
Ethnicity (%)	
Caucasian	64.6
African-American	14.7
Asian	9.9
Latino/Hispanic	5.1
Other/decline to respond	5.4

Table 2. Frequency of Self-Damaging Behavior in Individuals with Features of BPD

Form of Self-Damaging Behavior	Frequency
No Self-Damaging Behavior	17
Self-Harm	91
Cutting body	60 (65.9%)
Scratching self	42 (46.2%)
Carving words into skin	29 (31.9%)
Preventing wounds from healing	27 (29.7%)
Sticking sharp objects (i.e., needles, pins, staples) into skin	26 (28.6%)
Punching self	23 (25.3%)
Banging head against something	22 (24.2%)
Burning self with cigarette	22 (24.2%)
Carving pictures/designs/other marks into skin	17 (18.7%)
Biting self	16 (17.6%)
Burning self with lighter/matches	13 (14.3%)
Rubbing glass into skin	3 (3.3%)
Rubbing sandpaper on body	2 (2.2%)
Dripping acid onto skin	1 (1.1%)
Using bleach/comet/oven cleaner to scrub skin	1 (1.1%)
Breaking bones	0 (0%)
Other behaviors (pinching/hitting self, hitting walls, etc.)	22 (24.3%)

Alcohol Use	119
Drug Use	87
Disordered Eating Behavior	62
Binge eating	45 (72.6%)
Vomiting	15 (24.2%)
Laxative use	9 (14.5%)
Diuretic use	8 (12.9%)
Excessive Exercise	8 (12.9%)
Use of an enema	1 (1.6%)

Hypothesis 1: Individuals with Features of BPD Will Report Pleasant Emotional Shifts Associated with Self-Damaging Behavior, Reflecting a Negative Reinforcement Pattern

Self-Harm

Overall, emotional experiences surrounding self-harm behavior reflected a significant pleasant emotional shift from pre- to post- time points. Changes in overall emotional experiences associated with all forms of self-damaging behavior are reported in Table 3. Alpha level for all analyses was set at $p < .003$.

Both significant increases in pleasant emotions and decreases in unpleasant emotions were observed to be associated with self-harm. Significant increases were observed in the pleasant emotions of contentment, pride, relief, and satisfaction. Significant decreases were observed for the unpleasant emotions of anger, disgust, and sad. No changes were observed for amusement, excitement, pleasure, contempt,

Table 3. Changes in Emotional Experiences Associated with Self-Damaging Behaviors for Individuals with Features of BPD

Self-Damaging Behavior	Mean Score Pre-	Mean Score Post-	*t*	*df*	*p*	*d*
Self-Harm (*n* = 84)	35.96 (9.55)	42.15 (11.68)	-5.78	83	.001	.63
Alcohol Use (*n* = 99)	53.84 (6.98)	54.96 (8.94)	-1.27	98	.206	.13
Drug Use (*n* = 83)	52.58 (7.35)	58.05 (8.75)	-6.76	82	.001	.74
Disordered Eating Behavior (*n* = 52)	40.77 (11.26)	44.31 (15.64)	-1.69	51	.097	.23

embarrassment, fear, guilt, and shame. Mean scores from pre- and post- time points and changes in emotional experiences are listed in Figure 1 and Table 4.

Figure 1. Mean Scores of Emotion Ratings Prior to and Following Self-Harm Behavior for Individuals with Features of BPD

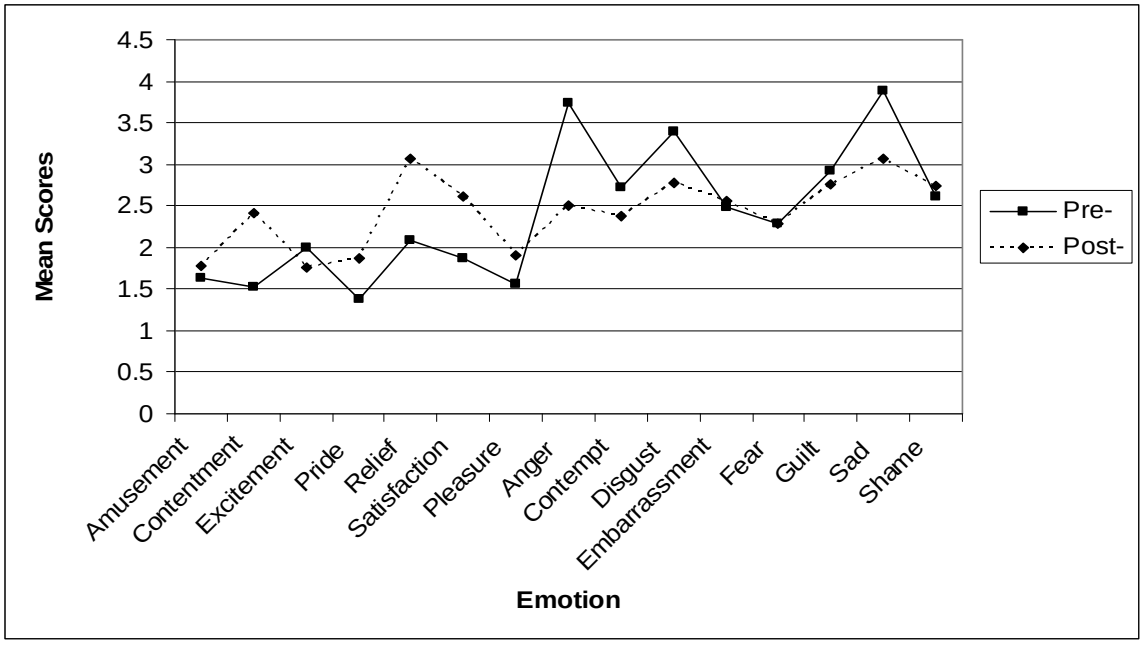


Table 4. Changes in Emotional Experiences Associated with Self-Harm Behavior for Individuals with Features of BPD

	Prior to Self-Harm	Following Self-Harm	Mean Score Difference	Within Subject Contrasts			
	M (SD)	*M (SD*)	*M (SD*)	*F*	*df*	*p*	*d*
Pleasant Emotions	12.01 (4.94)	15.35 (7.12)	-3.33 (5.30)	32.50	1,80	.001	.63
Unpleasant Emotions	23.97 (7.81)	20.97 (8.19)	3.00 (5.77)	25.65	1,80	.001	.52
Anger	3.73 (1.34)	2.51 (1.32)	1.23 (1.21)	79.54	1,80	.001	1.01
Relief	2.08 (1.32)	3.07 (1.45)	-.99 (1.56)	38.00	1,80	.001	.63
Contentment	1.52 (.93)	2.41 (1.33)	-.89 (1.32)	38.56	1,80	.001	.67
Sad	3.89 (1.43)	3.07 (1.44)	.82 (1.22)	42.00	1,80	.001	.67
Satisfaction	1.87 (1.26)	2.61 (1.36)	-.74 (1.37)	21.79	1,80	.001	.54
Disgust	3.40 (1.40)	2.77 (1.33)	.63 (1.47)	14.43	1,80	.001	.43
Pride	1.37 (.80)	1.86 (1.34)	.49 (1.01)	18.27	1,80	.001	.49
Contempt	2.73 (1.37)	2.37 (1.25)	.37 (1.20)	8.24	1,80	.005	.31
Pleasure	1.56 (1.02)	1.90 (1.35)	-.35 (1.05)	7.24	1,80	.009	.33
Excitement	2.00 (1.19)	1.76 (1.21)	.24 (.96)	5.26	1,80	.024	.25
Guilt	2.92 (1.53)	2.76 (1.51)	.15 (1.60)	2.42	1,80	.933	.10
Amusement	1.64 (.99)	1.78 (1.18)	-.14 (.96)	1.87	1,80	.176	.16
Shame	2.62 (1.39)	2.74 (1.48)	-.12 (1.14)	.96	1,80	.330	.11
Embarrassment	2.48 (1.47)	2.56 (1.44)	-.08 (1.40)	.27	1,80	.607	.06
Fear	2.29 (1.42)	2.29 (1.43)	0.00 (1.19)	.00	1,80	1.000	.00

Binge-Drinking

Overall, a significant emotional shift was not observed surrounding binge-drinking from pre- to post- time points. However, there was a significant increase in the presence of pleasant emotions, but no significant change in the presence of unpleasant emotions. Significant increases were demonstrated for the pleasant emotions of amusement, contentment, satisfaction, and pleasure as well as the unpleasant emotion of embarrassment. No changes were found for excitement, pride, relief, anger, contempt, disgust, fear, guilt, sad, and shame. Changes in emotional experiences are reported in Figure 2 and Table 5.

Figure 2. Mean Scores Prior to and Following Binge-Drinking for Individuals with Features of BPD

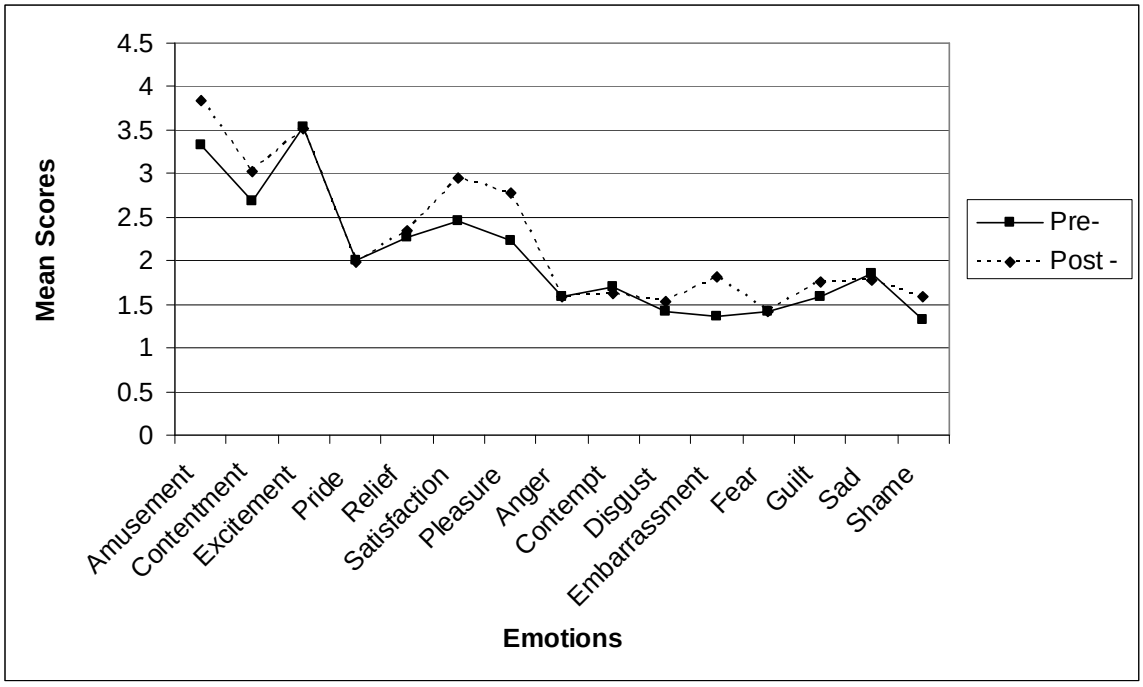


Table 5. Changes in Emotional Experiences Associated with Binge-Drinking Behavior for Individuals with Features of BPD

	Prior to Binge-Drinking	Following Binge-Drinking	Mean Score Difference	Within Subject Contrasts			
	M (SD)	*M (SD*)	*M (SD*)	*F*	*df*	*p*	*d*
Pleasant Emotions	18.35 (5.59)	20.31 (6.27)	-1.96 (5.26)	17.08	1,91	.001	.35
Unpleasant Emotions	12.21 (4.71)	13.05 (5.67)	-.84 (5.49)	1.36	1,91	.247	.15
Pleasure	2.24 (1.24)	2.77 (1.46)	-.53 (1.31)	20.42	1,91	.001	.40
Amusement	3.32 (1.18)	3.83 (1.16)	-.51 (1.30)	15.77	1,91	.001	.39
Satisfaction	2.45 (1.23)	2.95 (1.27)	-.49 (1.24)	21.16	1,91	.001	.40
Embarrassment	1.37 (.71)	1.81 (1.06)	-.44 (.96)	15.21	1,91	.001	.49
Contentment	2.68 (1.18)	3.03 (1.39)	-.35 (1.20)	10.81	1,91	.002	.29
Shame	1.33 (.74)	1.59 (.95)	-.25 (.98)	4.84	1,91	.030	.26
Disgust	1.41 (.80)	1.54 (.95)	.24 (.96)	1.19	1,91	.278	.13
Guilt	1.59 (.87)	1.76 (1.01)	-.17 (1.11)	2.65	1,91	.107	.15
Relief	2.26 (1.28)	2.35 (1.27)	-.09 (1.25)	1.37	1,91	.245	.07
Sad	1.85 (1.85)	1.77 (1.10)	.08 (1.07)	.59	1,91	.444	.07
Contempt	1.70 (.90)	1.63 (.85)	.07 (.99)	.71	1,91	.402	.07
Excitement	3.53 (1.05)	3.51 (1.22)	.02 (1.15)	.07	1,91	.792	.02
Anger	1.59 (.81)	1.58 (.80)	.01 (1.07)	.25	1,91	.621	.01
Pride	2.00 (1.20)	1.99 (1.27)	.01 (1.16)	.03	1,91	.856	.01
Fear	1.42 (.76)	1.41 (.81)	.01 (.86)	.14	1,91	.712	.01

Drug Use

Emotional experiences surrounding drug use reflected a significant pleasant emotional shift from pre- to post- time points. For drug use, pleasant emotions significantly increased from pre- to post- time points, contrary to unpleasant emotions, which did not demonstrate a significant change. Significant increases were observed in the pleasant emotions of amusement, contentment, relief, satisfaction, and pleasure. Significant decreases were observed for the unpleasant emotions of sad. No changes were observed for excitement, pride, anger, contempt, disgust, embarrassment, fear, guilt, and shame. Mean scores from pre- and post- time points and changes in emotional experiences are reported in Figure 3 and Table 6.

Figure 3. Mean Scores of Emotion Ratings Prior to and Following Drug Use for Individuals with Features of BPD

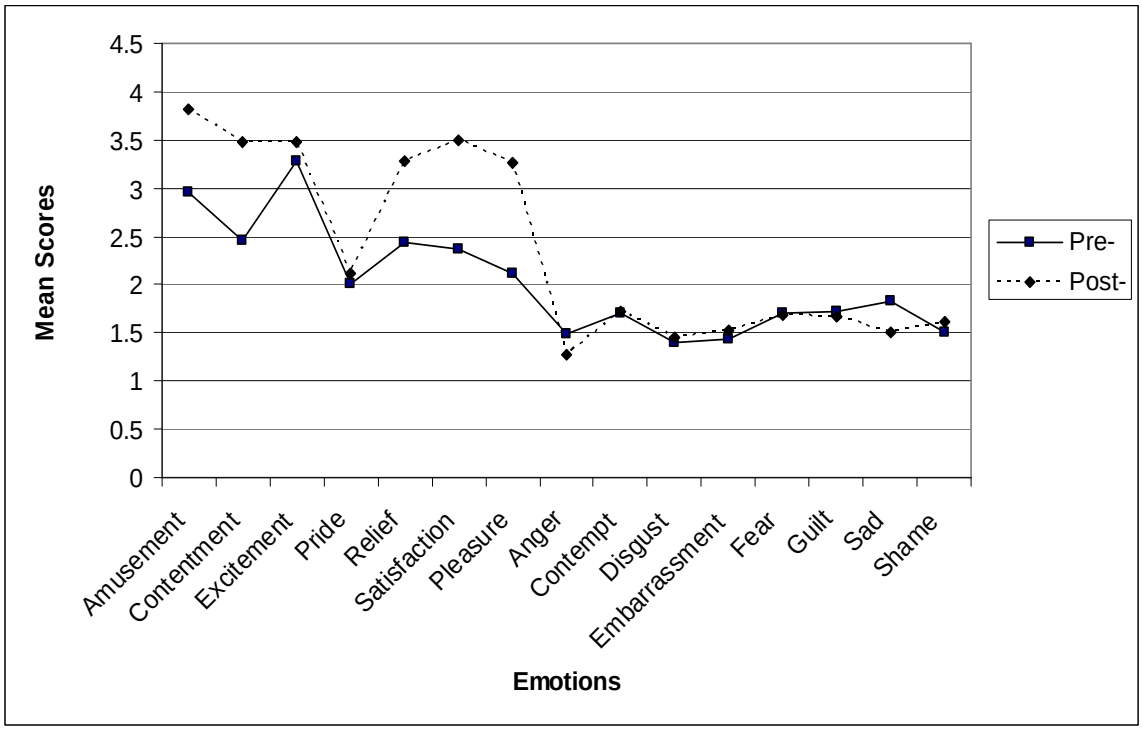


Table 6. Changes in Emotional Experiences Associated with Drug Use Behavior for Individuals with Features of BPD

	Prior to Drug Use	Following Drug Use	Mean Score Difference	Within Subject Contrasts			
	M (SD)	*M (SD*)	*M (SD*)	*F*	*df*	*p*	*d*
Pleasant Emotions	17.54 (6.34)	22.75 (6.67)	-5.20 (5.35)	75.54	1,77	.001	.97
Unpleasant Emotions	12.67 (4.86)	12.34 (5.14)	.34 (3.85)	.51	1,77	.477	.09
Pleasure	2.11 (1.23)	3.26 (1.40)	-1.15 (1.33)	61.82	1,77	.001	.86
Satisfaction	2.36 (1.27)	3.49 (1.25)	-1.13 (1.24)	66.55	1,77	.001	.91
Contentment	2.46 (1.25)	3.47 (1.33)	-1.01 (1.36)	49.76	1,77	.001	.74
Amusement	2.95 (1.30)	3.81 (1.24)	-.86 (1.19)	39.04	1,77	.001	.72
Relief	2.43 (1.28)	3.28 (1.29)	-.84 (1.35)	30.47	1,77	.001	.62
Sad	1.82 (.97)	1.50 (.76)	.32 (.80)	13.00	1,77	.001	.40
Anger	1.49 (.83)	1.28 (.63)	.22 (.83)	5.73	1,77	.019	.27
Excitement	3.28 (1.19)	3.48 (1.26)	-.20 (1.06)	2.79	1,77	.099	.19
Shame	1.50 (.74)	1.62 (.92)	-.12 (.85)	2.53	1,77	.116	.14
Pride	2.01 (1.26)	2.11 (1.36)	-.10 (.96)	.15	1,77	.699	.10
Disgust	1.39 (.71)	1.46 (.75)	-.08 (.71)	.86	1,77	.358	.10
Embarrassment	1.43 (.74)	1.52 (.89)	-.08 (.84)	.83	1,77	.365	.10
Guilt	1.73 (.96)	1.66 (.90)	.07 (.79)	.51	1,77	.479	.09
Contempt	1.70 (.94)	1.72 (1.07)	-.03 (.83)	.07	1,77	.787	.04
Fear	1.71 (1.01)	1.69 (1.00)	.02 (.88)	.14	1,77	.708	.02

Disordered Eating Behavior

The overall emotional shift surrounding disordered eating behavior was not significant. However, pleasant emotions did significantly increase from pre- to post- time points, although unpleasant emotions did not change significantly. Significant increases were observed in the pleasant emotions of pride, relief, and satisfaction. Significant decreases were not observed for any of the unpleasant emotions. No changes were observed for amusement, contentment, excitement, pleasure, anger, contempt, disgust, embarrassment, fear, guilt, sad, and shame. Mean scores from pre- and post- time points and changes in emotional experiences are reported in Figure 4 and Table 7.

Figure 4. Mean Scores of Emotion Ratings Prior to and Following Disordered Eating Behavior for Individuals with Features of BPD

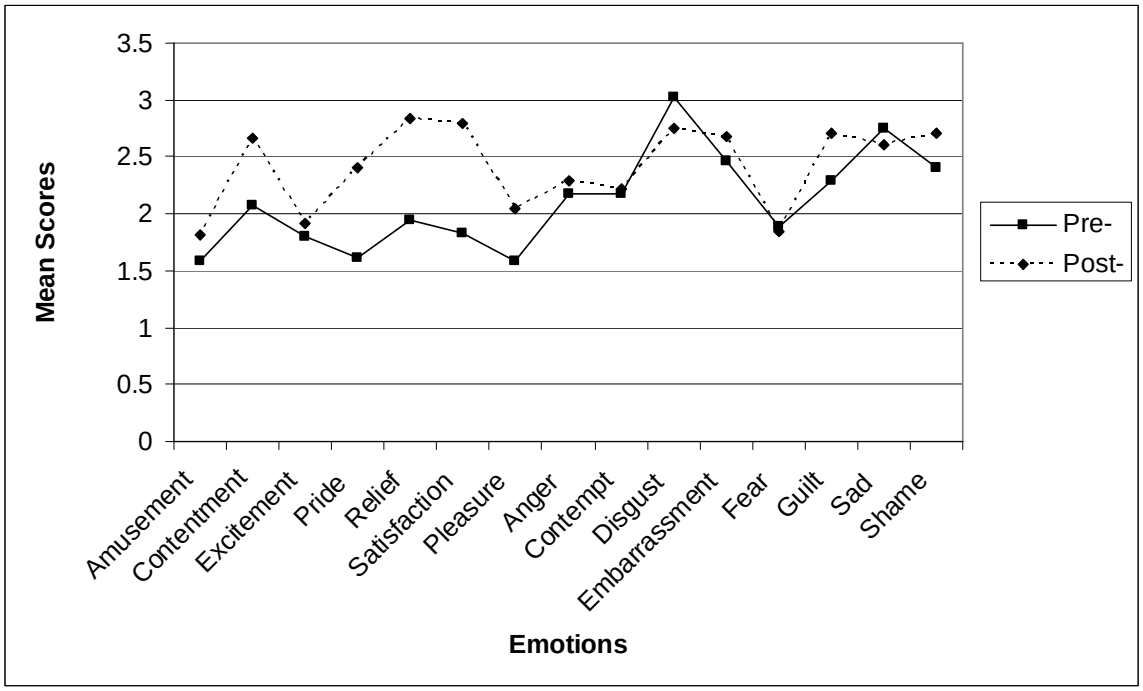


Table 7. Changes in Emotional Experiences Associated with Disordered Eating Behavior for Individuals with Features of BPD

	Prior to Eating Behavior	Following Eating Behavior	Mean Score Difference	Within Subject Contrasts			
	M (SD)	*M (SD*)	*M (SD*)	*F*	*df*	*p*	*d*
Pleasant Emotions	12.25 (5.24)	16.23 (8.26)	-3.98 (7.63)	11.21	1,46	.002	.52
Unpleasant Emotions	18.79 (8.74)	18.79 (8.74)	-.67 (8.17)	.45	1,46	.506	.08
Satisfaction	1.83 (1.12)	2.79 (1.60)	-.96 (1.47)	19.57	1,46	.001	.65
Relief	1.94 (1.22)	2.84 (1.51)	-.90 (1.77)	10.29	1,46	.002	.51
Pride	1.61 (.98)	2.41 (1.56)	-.80 (1.52)	10.94	1,46	.002	.53
Contentment	2.08 (1.21)	2.66 (1.57)	-.58 (1.64)	5.82	1,46	.020	.35
Pleasure	1.58 (1.05)	2.04 (1.40)	-.46 (1.57)	4.32	1,46	.043	.29
Guilt	2.29 (1.45)	2.71 (1.64)	-.41 (1.68)	4.28	1,46	.044	.24
Shame	2.40 (1.49)	2.71 (1.59)	-.31 (1.41)	2.49	1,46	.121	.22
Disgust	3.02 (1.54)	2.75 (1.56)	.27 (1.59)	1.00	1,46	.323	.17
Amusement	1.58 (1.02)	1.81 (1.36)	-.23 (1.18)	.66	1,46	.420	.19
Embarrassment	2.46 (1.54)	2.68 (1.61)	-.22 (1.58)	1.17	1,46	.286	.14
Sad	2.75 (1.52)	2.61 (1.46)	.14 (1.39)	.27	1,46	.609	.10
Excitement	1.80 (1.15)	1.92 (1.32)	-.12 (1.23)	.33	1,46	.569	.10
Anger	2.18 (1.37)	2.29 (1.47)	-.12 (1.44)	.47	1,46	.496	.08
Contempt	2.18 (1.19)	2.22 (1.37)	-.04 (1.29)	.06	1,46	.809	.03
Fear	1.88 (1.08)	1.84 (1.28)	.04 (1.14)	.06	1,46	.806	.04

Hypothesis 2: Individuals with Features of BPD and All Forms of Self-Damaging Behavior Will Report Pleasant Emotional Shifts, Reflecting Negative Reinforcement Patterns, Across Behaviors

Twenty participants reported engaging in all forms of self-damaging behavior. Two individuals did not complete measures assessing emotional antecedents and consequences of binge-drinking behavior. Significant overall pleasant emotional shifts were observed for the self-damaging behaviors of self-harm and drug use. No significant changes in overall emotional experiences were observed for either binge-drinking or disordered eating behaviors. Changes in overall emotional experiences associated with all forms of self-damaging behavior are reported in Table 8. Alpha level for all analyses was set at $p < .017$.

Table 8. Changes in Overall Emotional Experiences Associated with Self-Damaging Behaviors for Individuals with Features of BPD who Report All Forms of Self-Damaging Behavior

Self-Damaging Behavior	Mean Score Pre-	Mean Score Post-	*t*	*df*	*p*	*d*
Self-Harm (*n* = 20)	35.05 (11.11)	43.70 (12.60)	-2.92	19	.009	.65
Binge Drinking (*n* = 18)	52.83 (6.49)	56.89 (9.70)	-1.95	17	.068	.46
Drug Use (*n* = 20)	49.40 (6.29)	58.55 (8.77)	-5.03	19	.001	1.13
Disordered Eating Behavior (*n* = 20)	37.40 (11.14)	43.15 (13.89)	-1.37	19	.188	.31

Self-Harm

Emotional experiences associated with self-harm behavior reflected significant increases in the presence of pleasant emotions and significant decreases were observed for unpleasant emotions. Changes in pleasant and unpleasant emotional experiences are listed in Table 9. Changes in all discrete emotions associated with self-damaging behavior are listed in Figure 5 and Table 10.

Figure 5. Mean Scores of Emotion Ratings Prior to and Following Self-Harm Behavior for Individuals with Features of BPD who Report All Forms of Self-Damaging Behavior

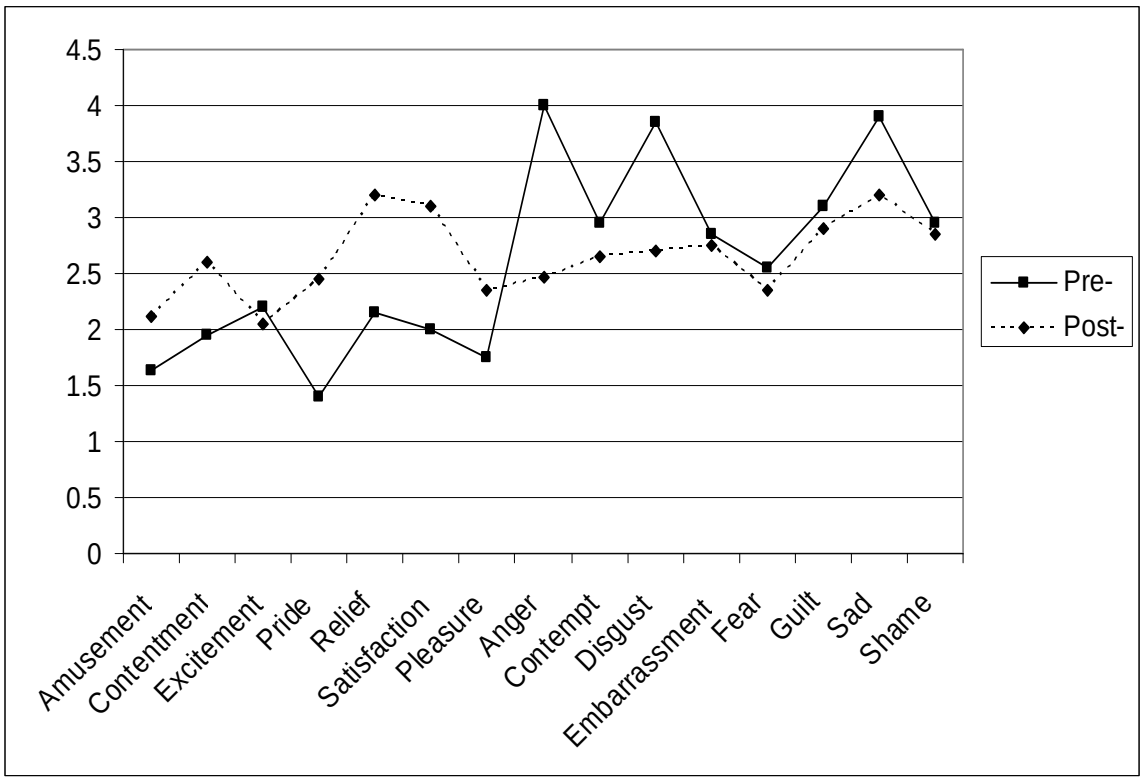


Table 9. Changes in Pleasant and Unpleasant Emotional Experiences Associated with Self-Damaging Behaviors for Individuals with Features of BPD who Report All Forms of Self-Damaging Behavior

Self-Damaging Behavior	Difference of Mean Scores	Within Subject Contrasts			
	M (SD)	*F*	*df*	*p*	*d*
Self Harm					
Pleasant Emotions	-4.70 (7.03)	9.46	1,18	.007	.67
Unpleasant Emotions	4.25 (6.95)	10.22	1,18	.005	.61
Binge Drinking					
Pleasant Emotions	-3.61 (5.49)	7.79	1,17	.013	.66
Unpleasant Emotions	.44 (5.24)	.13	1,17	.723	.08
Drug Use					
Pleasant Emotions	-8.20 (5.57)	45.31	1,18	.001	1.47
Unpleasant Emotions	1.25 (3.84)	2.33	1,18	.144	.33
Disordered Eating Behavior					
Pleasant Emotions	-6.45 (8.51)	9.43	1,17	.007	.76
Unpleasant Emotions	.20 (11.30)	.01	1,17	.938	.02

Table 10. Mean Scores of Emotional Experiences Associated with Self-Harm for Individuals with Features of BPD who Report All Forms of Self-Damaging Behavior

Prior to Self-Harm		Following Self-Harm		Difference Between Pre- and Post-Self Harm		
Emotion	*M (SD)*	Emotion	*M (SD)*	Emotion	*M (SD)*	*d*
Anger	4.00 (1.29)	Sad	3.20 (1.24)	Anger	1.52 (1.58)	.97
Sad	3.90 (1.45)	Relief	3.20 (1.44)	Disgust	1.15 (1.50)	.77
Disgust	3.85 (1.42)	Satisfaction	3.10 (1.33)	Satisfaction	-1.10 (1.41)	.78
Guilt	3.10 (1.80)	Guilt	2.90 (1.52)	Pride	-1.05 (1.28)	.82
Shame	2.95 (1.50)	Shame	2.85 (1.57)	Relief	-1.05 (1.73)	.61
Contempt	2.95 (1.36)	Embarrassment	2.75 (1.41)	Sad	.70 (1.13)	.62
Embarrassment	2.85 (1.50)	Disgust	2.70 (1.42)	Contentment	-.65 (1.42)	.46
Fear	2.55 (1.50)	Contempt	2.65 (1.31)	Pleasure	-.60 (1.35)	.44
Excitement	2.20 (1.40)	Contentment	2.60 (1.50)	Amusement	-.47 (1.39)	.34
Relief	2.15 (1.35)	Anger	2.47 (1.26)	Contempt	.30 (1.75)	.17
Satisfaction	2.00 (1.26)	Pride	2.45 (1.64)	Guilt	.20 (1.74)	.11
Contentment	1.95 (1.15)	Fear	2.35 (1.57)	Fear	.20 (1.32)	.15
Pleasure	1.75 (1.64)	Pleasure	2.35 (1.57)	Excitement	.15 (.99)	.15
Amusement	1.63 (1.07)	Amusement	2.11 (1.45)	Embarrassment	.10 (1.45)	.07
Pride	1.40 (.88)	Excitement	2.05 (1.39)	Shame	.10 (1.37)	.07

Binge-Drinking

Despite the lack of significant change in overall emotional experiences associated with binge-drinking, there was a significant increase in the experience of pleasant emotions; however no significant change was observed for the presence of unpleasant emotions. Changes in pleasant and unpleasant emotional experiences are reported in Table 9. Changes in all discrete emotions associated with binge drinking behavior are listed in Figure 6 and Table 11.

Figure 6. Mean Scores of Emotion Ratings Prior to and Following Binge-Drinking for Individuals with Features of BPD who Report All Forms of Self-Damaging Behavior

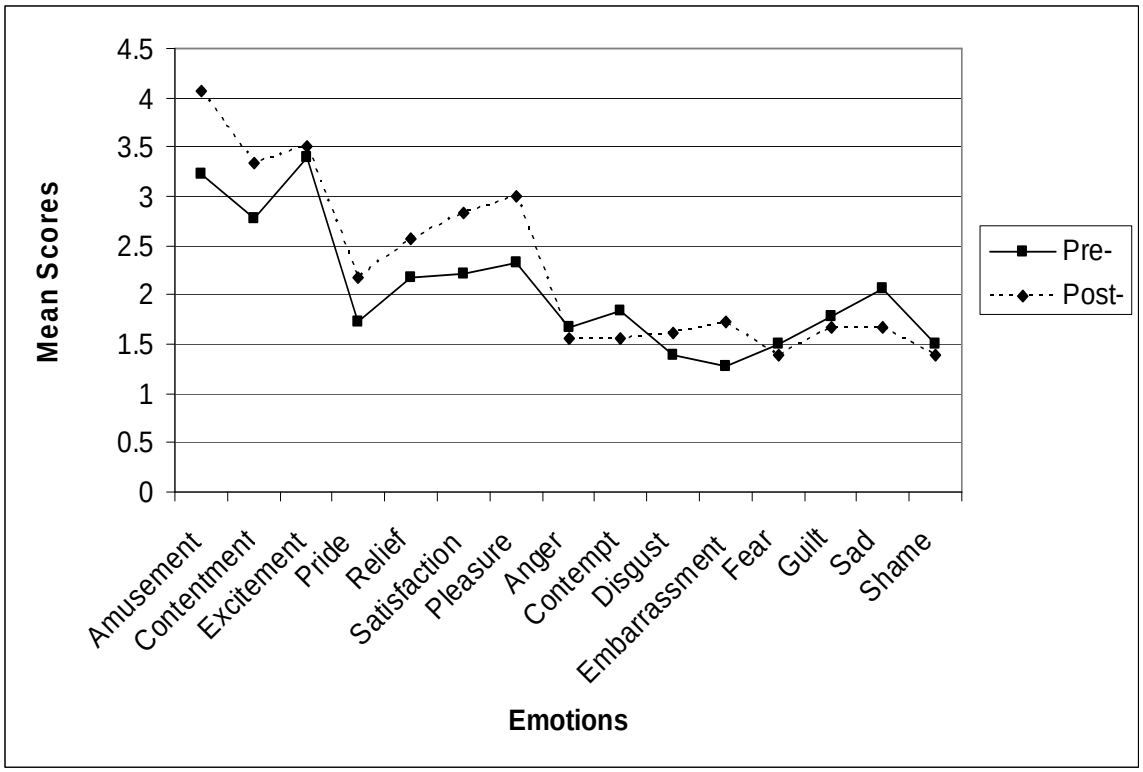


Table 11. Mean Scores of Emotional Experiences Associated with Binge-Drinking for Individuals with Features of BPD who Report All Forms of Self-Damaging Behavior

Prior to Binge Drinking		Following Binge Drinking		Difference Between Pre- and Post-Binge Drinking		
Emotion	*M (SD)*	Emotion	*M (SD)*	Emotion	*M (SD)*	*d*
Excitement	3.39 (1.20)	Amusement	4.06 (.94)	Amusement	-.83 (1.72)	.48
Amusement	3.22 (1.35)	Excitement	3.50 (1.47)	Pleasure	-.67 (1.37)	.49
Contentment	2.78 (1.31)	Contentment	3.33 (1.37)	Satisfaction	-.61 (.78)	.78
Pleasure	2.33 (1.41)	Pleasure	3.00 (1.71)	Contentment	-.56 (1.29)	.43
Satisfaction	2.22 (1.40)	Satisfaction	2.83 (1.25)	Pride	-.44 (1.42)	.31
Relief	2.17 (1.47)	Relief	2.56 (1.50)	Embarrassment	-.44 (.78)	.56
Sad	2.06 (.94)	Pride	2.17 (1.50)	Sad	.39 (1.24)	.31
Contempt	1.83 (1.56)	Embarrassment	1.72 (1.13)	Relief	-.39 (.98)	.40
Guilt	1.78 (1.17)	Guilt	1.67 (1.03)	Contempt	.28 (1.27)	.22
Pride	1.72 (.96)	Sad	1.67 (1.14)	Disgust	-.22 (1.11)	.20
Anger	1.67 (.91)	Disgust	1.61 (1.04)	Excitement	-.11 (1.32)	.08
Fear	1.50 (.86)	Anger	1.56 (.70)	Anger	.11 (1.28)	.09
Shame	1.50 (.86)	Contempt	1.56 (.78)	Fear	.11 (.96)	.11
Disgust	1.39 (.70)	Fear	1.39 (.85)	Guilt	.11 (1.28)	.09
Embarrassment	1.28 (.57)	Shame	1.39 (.70)	Shame	.11 (.76)	.14

Drug Use

For drug use, pleasant emotions significantly increased from pre- to post- time points. There was no significant change observed for unpleasant emotions. Changes in pleasant and unpleasant emotional experiences are listed in Table 9. Changes in all discrete emotions associated with drug use are displayed in Figure 7 and listed in Table 12.

Figure 7. Mean Scores of Emotion Ratings Prior to and Following Drug Use for Individuals with Features of BPD who Report All Forms of Self-Damaging Behavior

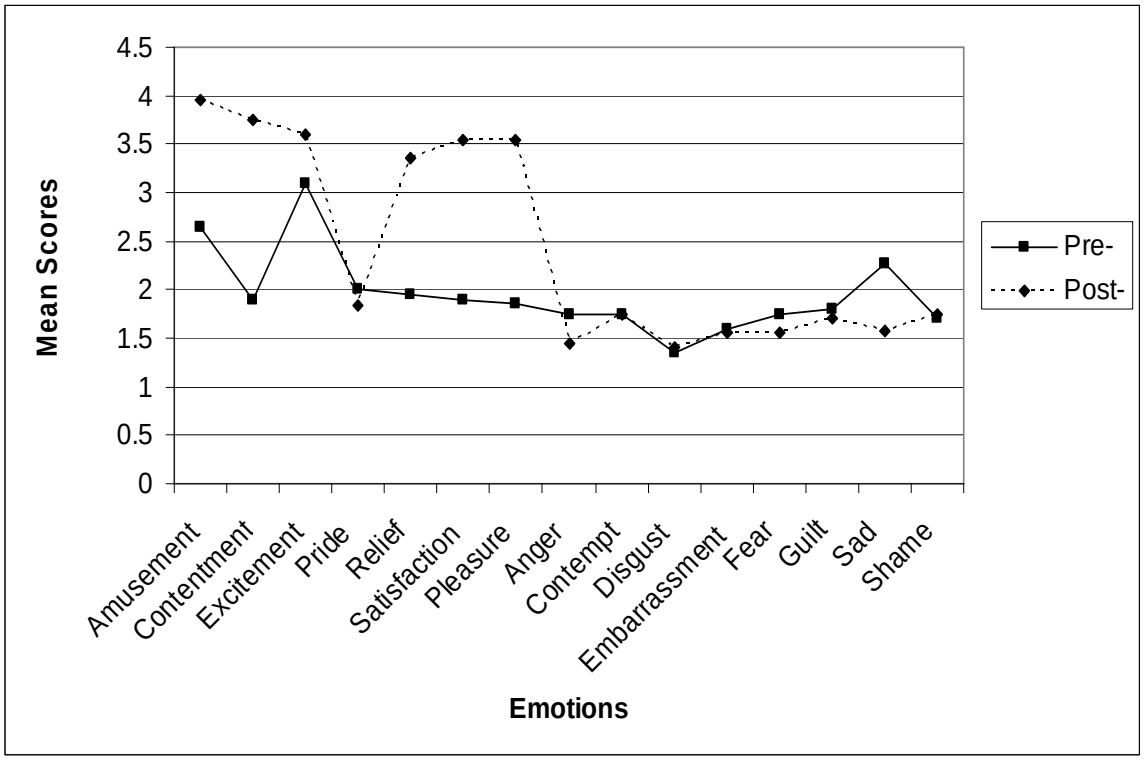


Table 12. Mean Scores of Emotional Experiences Associated with Drug Use for Individuals with Features of BPD who Report All Forms of Self-Damaging Behavior

Prior to Drug Use		Following Drug Use		Difference Between Pre- and Post-Drug Use		
Emotion	*M(SD)*	Emotion	*M(SD)*	Emotion	*M (SD)*	*d*
Excitement	3.10 (.97)	Amusement	3.95 (1.23)	Contentment	-1.85 (1.14)	1.62
Amusement	2.65 (1.09)	Contentment	3.75 (1.07)	Pleasure	-1.70 (1.38)	1.23
Sad	2.26 (1.15)	Excitement	3.60 (1.27)	Satisfaction	-1.65 (1.23)	1.34
Pride	2.00 (1.05)	Satisfaction	3.55 (1.10)	Relief	-1.40 (1.31)	1.07
Relief	1.95 (1.10)	Pleasure	3.55 (1.23)	Amusement	-1.30 (1.22)	1.07
Contentment	1.90 (.91)	Relief	3.35 (1.18)	Sad	.68 (1.00)	.68
Satisfaction	1.90 (1.02)	Pride	1.84 (1.21)	Excitement	-.50 (1.40)	.36
Pleasure	1.85 (1.04)	Contempt	1.75 (1.12)	Anger	.30 (.98)	.31
Guilt	1.80 (.89)	Shame	1.75 (1.02)	Fear	.20 (.95)	.21
Anger	1.75 (1.02)	Guilt	1.70 (.86)	Pride	.16 (.83)	.19
Contempt	1.75 (1.02)	Sad	1.58 (.84)	Guilt	.10 (.85)	.12
Fear	1.75 (1.02)	Embarrassment	1.55 (.83)	Embarrassment	.05 (.89)	.06
Shame	1.70 (.92)	Fear	1.55 (.69)	Disgust	-.05 (.83)	.06
Embarrassment	1.60 (.75)	Anger	1.45 (.76)	Shame	-.05 (.89)	.06
Disgust	1.35 (.81)	Disgust	1.40 (.68)	Contempt	0.00 (1.34)	.00

Disordered Eating Behavior

Although the overall emotional shift surrounding disordered eating behavior was not significant, a significant increase in pleasant emotions was observed, but there were no significant changes in the presence of unpleasant emotions. Changes in pleasant and unpleasant emotional experiences are listed in Table 9. Changes in all discrete emotions associated with disordered eating behaviors are displayed in Figure 8 and listed in Table 13.

Figure 8. Mean Scores of Emotion Ratings Prior to and Following Disordered Eating Behavior for Individuals with Features of BPD who Report All Forms of Self-Damaging Behavior

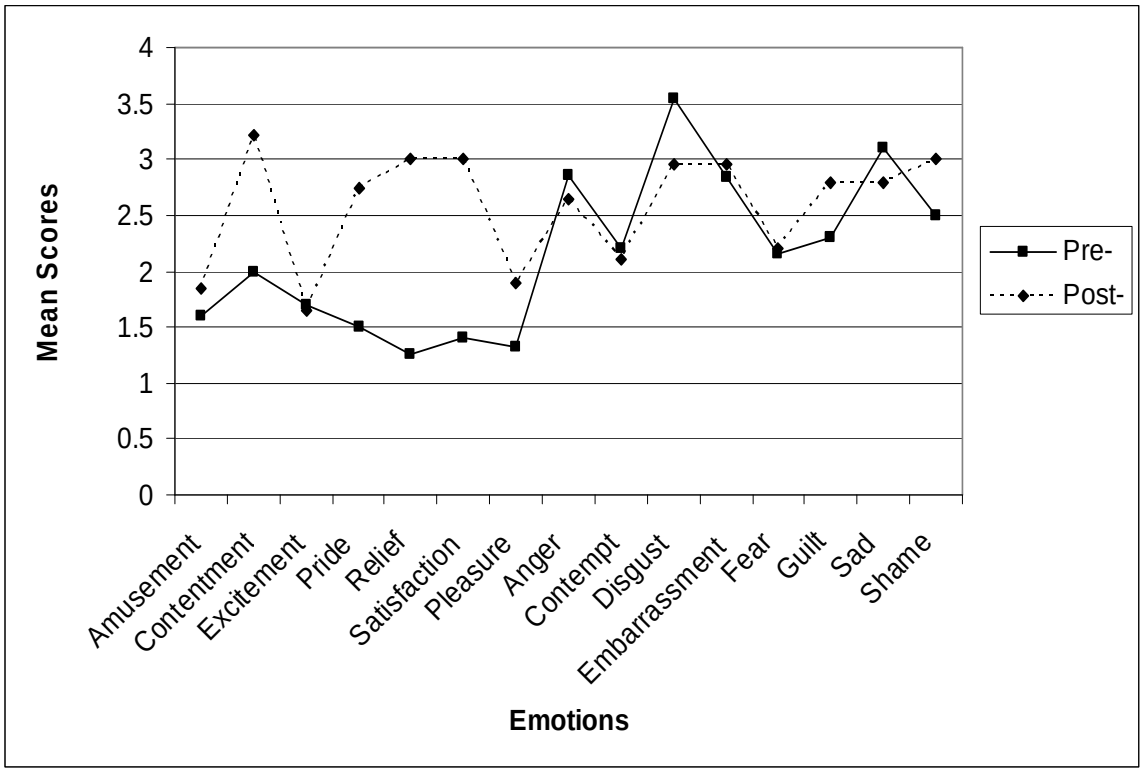


Table 13. Mean Scores of Emotional Experiences Associated with Disordered Eating Behavior for Individuals with Features of BPD who Report All Forms of Self-Damaging Behavior

Prior to Eating Behavior		Following Eating Behavior		Difference Between Pre- and Post-Eating Behavior		
Emotion	*M (SD)*	Emotion	*M (SD)*	Emotion	*M (SD)*	*d*
Disgust	3.55 (1.57)	Contentment	3.21 (1.55)	Relief	-1.75 (1.62)	1.08
Sad	3.11 (1.45)	Relief	3.00 (1.52)	Satisfaction	-1.60 (1.67)	.96
Anger	2.85 (1.60)	Satisfaction	3.00 (1.62)	Pride	-1.25 (1.86)	.67
Embarrassment	2.84 (1.57)	Shame	3.00 (1.41)	Contentment	-1.21 (1.90)	.64
Shame	2.50 (1.40)	Disgust	2.95 (1.39)	Disgust	.60 (1.98)	.30
Guilt	2.30 (1.38)	Embarrassment	2.95 (1.54)	Pleasure	-.58 (1.50)	.39
Contempt	2.20 (1.28)	Guilt	2.80 (1.44)	Shame	-.50 (1.91)	.26
Fear	2.16 (1.21)	Sad	2.79 (1.23)	Guilt	-.50 (2.21)	.23
Contentment	2.00 (1.33)	Pride	2.75 (1.52)	Sad	.32 (1.80)	.18
Excitement	1.70 (.92)	Anger	2.65 (1.42)	Amusement	-.25 (1.16)	.22
Amusement	1.60 (.99)	Fear	2.21 (1.44)	Anger	.20 (1.91)	.10
Pride	1.50 (.95)	Contempt	2.10 (1.29)	Embarrassment	-.11 (1.88)	.06
Satisfaction	1.40 (.68)	Pleasure	1.89 (1.24)	Contempt	.10 (1.71)	.06
Pleasure	1.32 (.82)	Amusement	1.85 (1.27)	Excitement	.05 (1.36)	.04
Relief	1.25 (.79)	Excitement	1.65 (1.04)	Fear	-.05 (1.54)	.03

Intraclass Correlations

The mean difference scores of discrete emotional experiences from pre- to post-time points for each self-damaging behavior were significantly correlated between types of self-damaging behaviors (ICC: .660; F (14,42) = 9.87; $p < .001$). Pairwise interclass correlations of mean difference scores of emotional ratings between forms of self-damaging behavior are listed in Table 14. Difference scores of changes in emotional

Table 14. Interclass Correlation Coefficients of Mean Difference Scores of Emotional Experiences from Pre- to Post- Time Points Between Forms of Self-Damaging Behavior

Self-Damaging Behavior	Self-Harm	Binge Drinking	Drug Use	Disordered Eating Behavior
Self-Harm	1.00	.63**	.57**	.79***
Binge Drinking		1.00	.57**	.54*
Drug Use			1.00	.79***
Disordered Eating Behavior				1.00

Note. *$p < .05$. **$p < .01$. ***$p < .001$.

experiences from pre- to post- time points for each form of self-damaging behavior were significantly correlated within the discrete emotions of contempt, excitement, amusement, relief, and satisfaction. There were no significant correlations found for the emotions of contentment, pride, pleasure, anger, disgust, embarrassment, fear, guilt, sad, and shame. Intraclass correlations are displayed in Table 15.

Table 15. Intraclass Correlations of Difference Scores of Emotion Ratings between Forms of Self-Damaging Behavior, Within Discrete Emotions

Emotion	ICC
Contempt	.34**
Excitement	.33**
Amusement	.27**
Relief	.26*
Satisfaction	.25*
Contentment	.09
Pride	-.04
Pleasure	.08
Anger	-.07
Disgust	.01
Embarrassment	.06
Fear	.16
Guilt	-.06
Sad	.09
Shame	.06

Note. *$p < .05$. **$p < .01$.

Hypothesis 3: Features of BPD Will Be Associated with Increased Polysubstance Use

The Levines' Test for Equality of Variance revealed unequal variances in the distribution of ratings of polysubstance use between those with features of BPD and those without features of BPD, thus a *t*-test for unequal variances was used. An evaluation of polysubstance use revealed that individuals with features of BPD exhibited significantly more polysubstance use (M = 1.77, SD = 2.11) than those without features of BPD (M = .85, SD = 1.37; t (187.93) = -5.31, $p < .001$, d = .60). Frequencies are reported in Table 16.

Table 16. Frequency of Number of Drug Classes Used Over the Past Year for Individuals with and without Features of BPD

Number of Types of Drugs Used	With features of BPD	Without features of BPD
0	59 (35.8%)	419 (54.1%)
1	41 (24.8%)	214 (27.6%)
2	14 (8.5%)	55 (7.1%)
3	16 (9.7%)	27 (3.5%)
4	8 (4.8%)	20 (2.6%)
5	7 (4.2%)	14 (1.8%)
6	9 (5.5%)	5 (0.6%)
7	4 (2.4%)	6 (0.8%)
8+	2 (1.2%)	2 (0.2%)

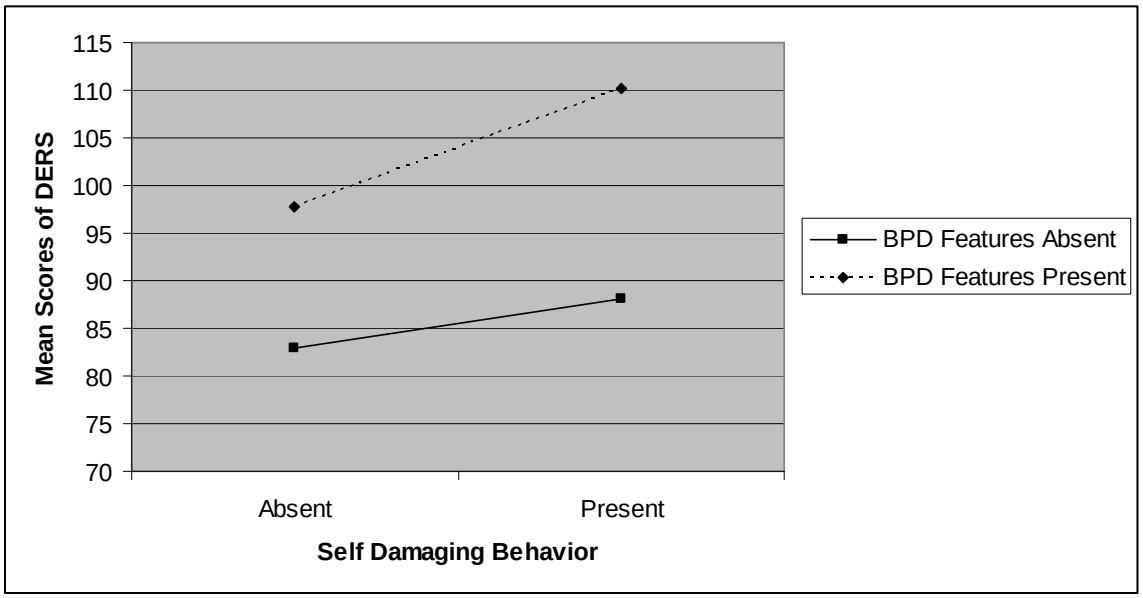
Hypothesis 4: Features of BPD and Self-Damaging Behavior Will Be Associated with Increased Difficulties in Emotion Regulation

Of the total sample, 218 participants reported neither features of BPD nor self-damaging behavior; 556 reported self-damaging behavior, with no features of BPD; 17 reported features of BPD with no self-damaging behavior; and 148 reported features of BPD and self-damaging behavior. The 2x2 ANOVA yielded a main effect for the presence of features of BPD (F (1,935) = 87.56, $p < .001$), such that individuals with features of BPD reported higher levels of difficulties in emotion regulation (M = 104.02, SD = 1.88) compared to those without features of BPD (M = 85.55, SD = .59). The main effect of self-damaging behavior was also significant (F (1,935) = 19.97, $p < .001$) indicating that individuals who reported self-damaging behavior also reported higher levels of difficulties in emotion regulation (M = 99.20, SD = .68) compared to those who did not report self-damaging behavior (M = 90.38, SD = 1.85). The interaction effect was not significant (F (1,935) = 3.29, p = .070). The alpha level was set to $p < .017$. Estimated marginal means are shown in Figure 9.

Hypothesis 5: Difficulties in Emotion Regulation Will Mediate the Relationship Between Features of BPD and Self-Damaging Behavior

To explore the potential mediational role of difficulties in emotion regulation on the relationship between the presence of features of BPD and the presence of self-damaging behaviors, the approach recommended by Baron and Kenny (1986) was applied. In accordance with step one, we established that there was a relationship between the presence of features of BPD and the presence of self-damaging behavior (X^2 (1, n = 939) = 20.95, $p < .001$). Consistent with step two, we found a significant

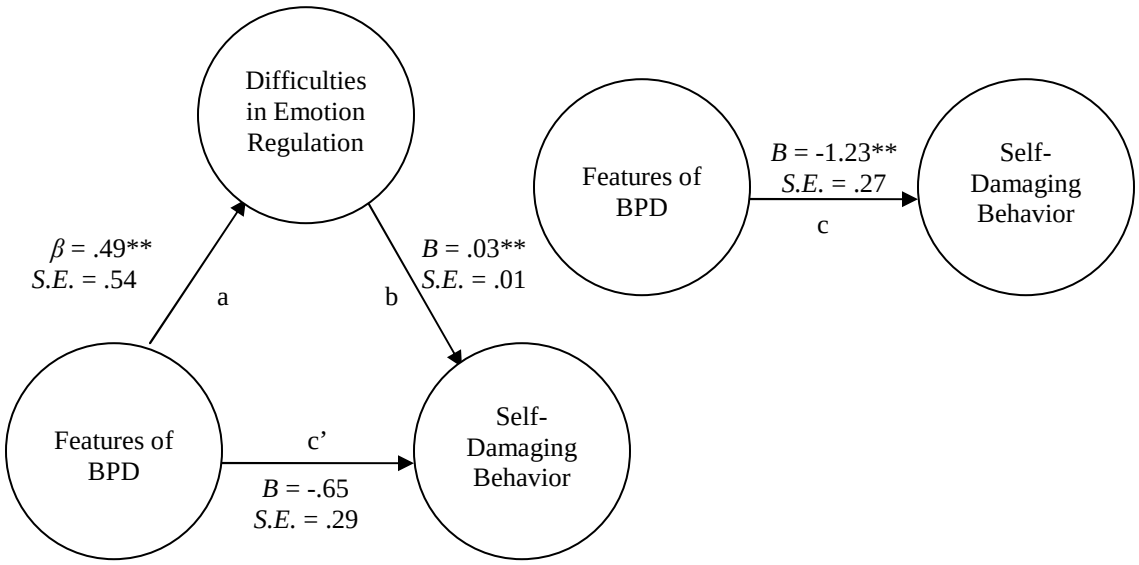
Figure 9. Estimated Marginal Means of Total Scores for the Difficulties in Emotion Regulation Scale



relationship between features of BPD and increases in difficulties in emotion regulation (t (937) = 161.44, $p < .001$) and per step 3, we also found a significant relationship between increases in difficulties in emotion regulation and the presence of self-damaging behavior (X^2 (1, n = 939) = 27.21, $p < .001$). Following the direction of step 4, we assessed the relationship between features of BPD on the presence of self-damaging behavior, when controlling for the effects of difficulties in emotion regulation. When controlling for the presence of difficulties in emotion regulation, the effect of features of BPD on the presence of self-damaging behavior was not significant (X^2 (1, n = 939) = 5.10, p = .024). Furthermore, the Sobel test (Sobel, 1982) indicated that the presence of difficulties in emotion regulation is associated with a significant reduction on the effects of features of BPD on the presence of self-damaging behavior (Aroian Test Statistic = 3.00, p = .003), indicating that difficulties in emotion regulation partially

mediated the relationship between features of BPD and the presence of self-damaging behavior. A path diagram with regression coefficients is shown in Figure 10.

Figure 10. Mediational Model of the Role of Difficulties in Emotion Regulation in the Relationship between Features of BPD and Self-Damaging Behavior



Note. $^{**}p < .001$.

CHAPTER 4

DISCUSSION

This study examines the function of self-damaging behaviors commonly associated with BPD. Linehan's biosocial theory of BPD suggests that these behaviors function to regulate emotional experiences. This study examines this theory and also explores whether co-occurring behaviors may be members of a response class and therefore, functional equivalents. Although previous research has explored the function of self-damaging behaviors as they occur in individuals with features of BPD, these studies have considered these behaviors independently. On the contrary, this study extends previous work to not only assess the function of self-damaging behavior, but also explore the function of multiple behaviors as they co-occur. This study also examines the pattern of substance use, specifically polysubstance use, observed in individuals with features of BPD, and investigates the relationship between features of BPD, self-damaging behavior, and difficulties in emotion regulation.

An evaluation of self-damaging behaviors as they occur in individuals with features of BPD reveals that self-harm, binge-drinking, drug use, and disordered eating behavior significantly impact emotional experiences. Consistent with expectations, when evaluated independently, this study finds self-harm behavior to be associated with an overall pleasant emotional shift. It was hypothesized that overall pleasant emotional shifts would be characterized by decreases in unpleasant emotional experiences, reflecting a negative reinforcement model. However, both increases in pleasant emotions and decreases in negative emotions are observed. Increases are seen in the discrete emotions of contentment, pride, relief, and satisfaction, and decreases are seen in anger, disgust,

and sadness. Thus, it is likely that self-harm is maintained by a combination of both negative and positive reinforcement. Prior to engaging in self-harm the emotions most prevalent are sadness, anger, and disgust and following the behavior, relief and sadness are rated most strongly. Given that unpleasant emotional experiences are most predominant prior to the behavior, and relief is rated most prevalent following the behavior, this provides further support for the emotional regulation function of self harm and emphasizes the role of negative reinforcement in the maintenance of such behaviors.

This study does not find episodes of binge-drinking to be associated with any significant changes in overall emotional experiences. However, the results do reflect a significant increase in pleasant emotional experiences. Specifically, increases are found in the discrete pleasant emotions of pleasure, amusement, and satisfaction, as well as the unpleasant emotion of embarrassment. Interestingly, increases in embarrassment are the only significant increases in a negative emotion found during the course of this study. This change is likely reflective of the occurrence of impulsive behaviors following the consumption of large amounts of alcohol. Given that binge-drinking is associated with pleasant emotional experiences both prior to (excitement and amusement) and following (excitement and amusement) engaging in this behavior, this study provides little support for the emotion regulation function of binge-drinking behavior. This may be attributable to the sample used in this study. This study was conducted among college students, a population known to have higher rates of both binge-drinking and recreational drinking behavior (O'Malley & Johnston, 2002; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). It is possible that among individuals with lower rates of recreational drinking, binge-drinking behavior may reflect emotional regulatory qualities. The

significant increases in pleasant emotions observed provide support that this behavior is capable of impacting emotional experiences. Should binge-drinking be found to be used to regulate emotional experiences in other contexts, possibly those with lower rates of recreational drinking behavior, the significant increases in pleasant emotional experiences found in this study suggest that a positive reinforcement model should be considered.

As expected, drug use is found to be associated with a pleasant emotional shift. It was hypothesized that pleasant emotional shifts would be characterized by decreases in unpleasant emotions; however, increases in pleasant emotions are observed and there are no significant changes in the presence of unpleasant emotions. Significant increases are found for the pleasant emotions of satisfaction, contentment, amusement, and relief. Significant decreases are observed for the unpleasant emotion of sadness. Similar to binge-drinking, drug use appears to occur in a context of pleasant emotional experiences both prior to (excitement and amusement) and following (amusement, satisfaction, excitement, and contentment) the event. This suggests that drug use in a college age sample may not function primarily to regulate emotional experiences. Higher rates of drug use are observed for individuals ages 18-25 (Warner, Kessler, Hughes, Anthony, & Nelson, 1995). This high rate of substance use may make the emotion regulation function of drug use difficult to distinguish, given the likely high rates of recreational use seen in this age range. The significant change in the presence of sadness suggests that there may be an emotion regulation function associated with drug use. Although this phenomenon is not strongly detected in this setting, it may be better observed in environments with lower rates of recreational drug use. Given the strong presence of increases in pleasant emotional experiences, should drug use be determined to be used to regulate emotions, it

should be considered that this behavior may be maintained through a positive reinforcement model.

Contrary to expectations, disordered eating behavior is not observed to significantly impact overall emotional experiences. It is shown to be associated with increases in pleasant emotional experiences but no significant changes in unpleasant emotional experiences are observed. It is likely that disordered eating behaviors are used to regulate emotional experiences. Prior to engaging in such behaviors, disgust and sadness are reported to be the most prevalent emotional experiences and following engaging in disordered eating behaviors relief, satisfaction, disgust, shame, guilt, embarrassment, contentment, and sadness are all strongly reported. Significant changes are found for the discrete emotion of satisfaction, relief, and pride. Taken together, disordered eating behaviors appear to occur in the context of negative emotional experience. Given that changes in emotional experiences are observed only for pleasant emotion and unpleasant emotions are still strongly present following the behavior, these data suggest that disordered eating behaviors may be maintained through a positive reinforcement model and have little impact on the presence of unpleasant emotions. However, future studies should seek to replicate these findings.

In addition to examining the emotional experiences associated with each form of self-damaging behavior independently as it occurs in individuals with features of BPD, the function of self-damaging behaviors as they co-occur is also assessed. Overall, emotional experiences associated with co-occurring self-damaging behaviors closely resemble the emotional experiences associated with self-damaging behaviors, assessed individually. Consistent with previous analyses, self-harm is found to be associated with

an overall pleasant emotional shift and increases in pleasant emotions, as well as decreases in unpleasant emotions. Similarly, sadness, anger, and disgust are among the most prevalent emotions prior to engaging in self-harm; sadness and relief are most prevalent following self-harm. Once again, binge-drinking is not associated with changes in overall emotional experiences and reflected increases in pleasant emotions and no change in unpleasant emotions. The emotions of excitement and amusement are among the most prevalent both prior to and following the behavior.

Consistent with previous analyses, drug use is observed associated with overall pleasant emotional shifts and increases in pleasant emotional experiences. However, in this context, excitement, amusement, and sadness are found to be most prevalent prior to drug use, compared to only excitement and amusement found initially. Following drug use, amusement, contentment, and excitement are reported, and similarly, amusement, satisfaction, excitement, and contentment are reported previously. The increased prevalence of sadness prior to use suggests that drug use may be more likely to function to regulate emotional experiences when it co-occurs with other self-damaging behaviors.

Consistent with individual analyses, disordered eating behaviors are not demonstrated to be associated with overall changes in emotional experiences; pleasant emotions are found to increase and there is no change observed in unpleasant emotions. Again, disgust and sadness are among the most prevalent emotions prior to eating behaviors and contentment, relief, satisfaction, shame, disgust and embarrassment comprise the most prevalent emotions following the behavior.

Taken together, there is little in these data to suggest that for individuals with features of BPD, the function of self-damaging behaviors changes as the behaviors co-

occur. With the exception of increases in the emotion of sadness observed prior to drug use, the emotional experiences associated with self-damaging behaviors appear to be similar regardless of whether the behavior occurs independently or co-occurs with other self-damaging behaviors.

To explore whether these behaviors are members of a functional response class, the degree of similarity between the behaviors' impacts on emotional experiences was assessed. Overall, the impact of self-damaging behavior on associated emotional experiences is highly correlated among types of self-damaging behavior. Furthermore, the behaviors assessed are significantly correlated in the degree to which they impact emotions of contempt, excitement, amusement, and relief. Given that contempt is commonly among the least changed emotions across behaviors, it is likely that these behaviors are highly correlated in that they all have a limited impact on this emotion. This is contrary to excitement, amusement, and relief, which all reflect relatively larger changes from pre- to post- time points, across behaviors. Therefore, although these self-damaging behaviors differ in the ways they impact unpleasant emotional experiences, overall, the emotional changes associated with self-damaging behaviors are highly correlated. This is likely attributable to the increases observed in the presence of pleasant emotions seen across self-damaging behaviors. Thus, this provides support for the presence of a response class in that these self-damaging behaviors may be functional equivalents in their impact on pleasant emotional experiences, but not in their impact on unpleasant emotions. Future studies should seek to extend these findings to other forms of self-damaging behavior commonly seen among individuals we BPD, such as gambling and high-risk sex behavior (DSM-IV-TR; American Psychiatric Association).

The use of drugs to regulate emotional experiences may also be observed in the individual's pattern of use. The self-medication hypothesis proposes that drug selection is reflective of the use of drugs to regulate emotional experiences. It predicts that drug selection is based largely on the individual's emotional state and the desired change on his or her current emotional condition. Thus, it follows that if drug use is used to regulate emotional experiences in individuals with BPD, given the frequent emotional fluctuations commonly observed within this population, their use of drugs would be more varied in terms of the types of drugs used, compared to drug use in those without features of BPD. As expected, in this study individuals with features BPD are observed to use significantly more classes of drugs over the last year than those without features of BPD. Consistent with previous research (Jonsdottir-Baldursson & Horvath, 1987; Kruedelbach et al., 1993; Skinstand et al., 1998), this suggests that polysubstance use is more prevalent among individuals with features of BPD, compared to those without features. The data may provide support for the self-medication hypothesis; however, they may also reflect a pattern of more indiscriminate drug use. Thus, future research should further consider the role of drug selection in the use of drugs to regulate emotional experiences, specifically assessing for differences in emotional experiences prior to and following the use of drugs from different classifications.

The results of this study highlight the ways in which individuals with BPD attempt to regulate their emotional experiences through self-damaging behaviors. Indeed, consistent with expectations, individuals with features of BPD are observed to display significantly greater difficulties in emotion regulation, compared to those without features of BPD, and individuals who display self-damaging behavior are found to also

display significant increases in difficulties in emotion regulation compared to those who did not report self-damaging behavior; however, contrary to expectations, no interaction is observed between the two variables. Further examination of the role of difficulties in emotion regulation reveals that difficulties in emotion regulation partially mediate the relationship between features of BPD and self-damaging behaviors. This finding further supports the theory that self-damaging behaviors can be conceptualized as a strategy that serves to assist the emotion regulation process for individuals with features of BPD.

Clinical Considerations

This study supports the theory that self-damaging behaviors of self-harm, drug use, and disordered eating behavior may function to regulate emotional experiences. Specifically, these results suggest that self-harm serves to both increase pleasant emotions and decrease unpleasant emotions and that binge-drinking, drug use, and disordered eating may serve to increase the experience of pleasant emotions. Given that all behaviors were shown to significantly increase the presence of pleasant emotions, this suggests that it is essential for individuals with features of BPD who engage in such behaviors to develop multiple, safe, alternative behaviors that serve the same function. In a clinical setting, the assumption that self-damaging behaviors are members of a functional response class can be further assessed by teaching the individual a less costly, alternative behavior that shares the same hypothesized function. If indeed these behaviors are members of a response class, decreases in the frequency of the targeted self-damaging behaviors should then be observed. Alternatively, interventions targeted at one identified self-damaging behavior may result in increases in the frequency of other identified self-

damaging behaviors, again, demonstrating support for functional equivalence across behaviors.

This study also finds that difficulties in emotion regulation partially mediate the relationship between features of BPD and self-damaging behavior. Thus, for individuals with features of BPD who display self-damaging behavior, these behaviors should be considered within the context of difficulties in emotion regulation. Therefore, in addition to developing alternative behaviors, such individuals should also develop emotion regulation skills, more generally.

Study Limitations

The findings from this study provide a description of the emotional antecedents and consequences of self-damaging behavior for individuals with features of BPD and examine the ways in which emotional experiences change in conjunction with self-damaging behaviors. These results are not compared to those from a sample of individuals who engage in self-damaging behavior, but do not exhibit features of BPD. Thus, it is unknown whether these findings are specific to individuals with features of BPD or are common among all individuals who engage in self-damaging behaviors, regardless of features of BPD. Furthermore, this study examines the self-damaging behaviors of self-harm, substance use, and disordered eating behavior. The findings from this study may not be limited to these specific forms of self-damaging behavior. It is unknown whether other topographically different forms of self-damaging behavior share similar functions to the ones investigated in this study. Future investigations should evaluate the functions of other such behaviors commonly seen in individuals with BPD, such as high-risk sex behavior and gambling.

Given that the participants of this study are college students who exhibit features of BPD, it is also unknown whether the results will generalize to clinical populations. The individuals in this study exhibit features of BPD as identified on a self-report measure; BPD is not formally assessed through a clinical interview. Although less severe symptoms of BPD increase the potential for accuracy in the report of emotional experiences, it is possible that emotional experiences for those meeting clinical criteria for BPD may differ from those that exhibit only features of the disorder. It is expected that individuals who meet clinical criteria for BPD will show a similar pattern of emotional experiences, although to a greater degree; however, these hypotheses should be assessed in future studies. Furthermore, the high rates of recreational alcohol and drug use commonly observed in college samples may limit the ability of this study to detect the use of these substances to regulate emotional experiences. Although we do not find support for the use of alcohol in the presence of unpleasant emotional experiences, we find limited support for the use of drugs in such a context. Studies examining different samples with lower levels of recreational drinking may observe more clearly the use of both alcohol and drugs to regulate emotional experiences.

This study is designed to use a retrospective self-report approach in assessing emotional experiences associated with self-damaging behavior. This design is limited in that it requires participants to remember and recall emotional experiences associated with a past event. Although the individual subject's impressions are useful in that they contribute to his or her decision to engage in the behavior again in the future, the accuracy of these reports is questionable. Reports of emotional antecedents and consequences of self-damaging behavior may be biased by participants' beliefs about

themselves and how they believe they would respond in such situations, more generally (Robinson & Clore, 2002). Furthermore, the accuracy of recall may vary across self-damaging behaviors. The measure used to identify disordered eating behaviors inquires about behaviors occurring within the past three months, whereas the scales used to assess binge-drinking and drug use refer to episodes that have occurred within this last year, and the instrument used to assess self-harm captures lifetime self-harm behavior. A design that would allow for real-time analyses would reduce this error.

Lastly, an objective measure of emotional experience, rather than a self-report instrument, would also improve the accuracy of the report. Given that the identification of emotional experiences is a component of emotion regulation and individuals with features of BPD have more difficulties in emotion regulation, their ability to report on their own emotional experiences may be compromised.

REFERENCES

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (text revision). Washington, DC: Author.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173-1182.

Bennum, I., & Phil, M. (1983). Depression and hostility in self-mutilation. *Suicide and Life-Threatening Behavior, 13,* 71-84.

Berman, A. H., Bergman, H., Palmstierna, T., & Schlyter, F. (2005). Evaluation of the Drug Use Disorders Identification Test (DUDIT) in criminal justice and detoxification setting and in a Swedish population sample. *European Addiction Research, 11,* 22-31.

Boudewyn, A. C., & Liem, J. H. (1995b). *Mental health history form.* Unpublished measures, University of Massachusetts, Boston.

Brain, K. L., Haines, J., & Williams, C. L. (1998). The psychophysiology of self-mutilation: Evidence of tension reduction. *Archives of Suicide Research, 4,* 227-242.

Brain, K. L., Haines, J., & Williams, C. L. (2002). The psychophysiology of repetitive self-mutilation. *Archives of Suicide Research, 6,* 199-210.

Briere, J., & Gil, E. (1998). Self-mutilation in clinical and general population samples: Prevalence, correlates, and functions. *American Journal of Orthopsychiatry, 68,* 609-620.

Brodsky, B. S., Cloitre, M., & Dulit, R. A. (1995). Relationship of dissociation to self-mutilation and childhood abuse in borderline personality disorder. *American Journal of Psychiatry, 152,* 1788-1792.

Brown, M. Z., Comtois, K. A., & Linehan, M. M. (2002). Reasons for suicide attempts and nonsuicidal self-injury in women with borderline personality disorder. *Journal of Abnormal Psychiatry, 111,* 198-202.

Catanzaro, S. J. & Mearns, J. (1990). Measuring generalized expectancies for negative mood regulation: Initial scale development and implications. *Journal of Personality Assessment, 54,* 546-563.

Chapman, A. L., & Dixon-Gordon, K. L. (2007). Emotional antecedents and consequences of deliberate self-harm and suicide attempts. *Suicide and Life-Threatening Behavior, 37,* 543-552.

Clements, R. (1998). A critical evaluation of several alcohol screening instruments using the CIDI-SAM as a criterion measure. *Alcoholism: Clinical and Experimental Research, 22,* 985-993.

Cohen, B. H. (2001). *Explaining Psychological Statistics*. NJ: John Wiley & Sons, Inc.

Dubo, E. D., Zanarini, M. C., Lewis, R. E., & Williams, A. A. (1997). Childhood antecedents of self-destructiveness in borderline personality disorder. *Canadian Journal of Psychiatry, 42,* 63-69.

Dulit, R. A., Fyer, M. R., Leon, A. C., Brodsky, B. S., & Frances, A. J. (1994). Clinical correlates of self-mutilation in borderline personality disorder. *American Journal of Psychiatry, 151,* 1305-1311.

Ekman, P. (1999). Basic Emotion. In T. Dalgleish, & M. Power (Eds.), *Handbook of Cognition and Emotion.* Sussex, U.K.: John Wiley & Sons, Ltd.

Favazza, A. R., & Conterio, K. (1989). Female habitual self-mutilators, *Acta Psychiatrica Scandinavia, 79,* 283-289.

Favazza, A. R., DeRosear, L., & Conterio, K. (1989) Self-mutilation and eating disorders. *Suicide and Life-Threatening Behavior, 19,* 352-361.

Fleming, M. F., Barry, K. L., & MacDonald, R. (1991). The alcohol use disorders identification test (AUDIT) in a college sample. *International Journal of Addiction, 26,* 1173-1185.

Graff, H., & Mallin, R. (1967). The syndrome of the wrist cutter. *American Journal of Psychiatry, 124,* 36-42.

Gratz, K. L. (2001). Measurement of deliberate self-harm: Preliminary data on the deliberate self-harm inventory. *Journal of Psychopathology and Behavioral Assessment, 23,* 253-263.

Gratz, K. L. (2006). Risk factors for deliberate self-harm among female college students: The role and interaction of childhood maltreatment, emotional inexpressivity, and affect intensity/reactivity. *American Journal of Orthopsychiatry, 76,* 238-250.

Gratz, K. L. & Roemer, L. (2004). Multidimensional assessment of emotional regulation and dysregulation: Development, factor structure, and initial validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment, 26,* 41-54.

Grunebaum, H. U., & Klerman, G. L. (1967). Wrist Slashing. *American Journal of Psychiatry, 124,* 527-534.

Hayes, S. C., Strosahl, K. D., Wilson, K. G., Bissett, R. T., Pistorello, J., Toarmino, D. et al. (2004). Measuring experiential avoidance: A preliminary test of a working model. *The Psychological Record, 54,* 553-578.

Haines, J., Williams, C. L., Brain, K. L., & Wilson, G. V. (1995). The Psychophysiology of Self-Mutilation. *Journal of Abnormal Psychology, 104,* 471-489.

Herman, C. P., & Polivy, J. (1988). Restraint and excess in dieters and bulimics. In K. M. Pirke, D. Ploog, & W. Vandereycken (Eds.), *The psychobiology of anorexia nervosa* (pp. 33-41). New York: Springer.

Herpertz, S. (1995). Self-injurious behaviour: Psychopathological and nosological characteristics in subtypes of self-injurers. *Acta Psychiatrica Scandinavica, 91,* 57-68.

Huband, N., & Tantam, D. (2004). Repeated self-wounding: Women's recollection of pathways to cutting and of the value of different interventions. *Psychology and Psychotherapy: Theory, Research, and Practice, 77,* 413-428.

Jaccard, J., & Guilamo-Ramos, V. (2002). Analysis of variance frameworks in clinical child and adolescent psychology: advanced issues and recommendations. Journal of Clinical Child & Adolescent Psychology, 31, 278-294.

Jackson, K. M., & Trull, T. J. (2001). The factor structure of the personality assessment inventory-borderline features (PAI-BOR) scale in a nonclinical sample. *Journal of Personality Disorders, 15,* 536-545.

Johnson, C., Tobin, D., & Enright, A. (1989). Prevalence and clinical characteristics of borderline patients in an eating-disordered population. *Journal of Clinical Psychiatry, 50,* 9-15.

Kemperman, I., Russ, M. J., & Shearin, E. (1997). Self-injurious behavior and mood regulation in borderline patients. *Journal of Personality Disorders, 11,* 146-157.

Khantzian, E. J. (1985). The self-medication hypothesis of addictive disorders: Focus on heroin and cocaine. *American Journal of Psychiatry, 142,* 1259-1264.

Kring, A. M., Smith, D. A., & Neale, J. M. (1994) Individual differences in dispositional expressiveness: The development and validation of the Emotional Expressivity Scale. *Journal of Personality and Social Psychology, 66,* 934-949.

Kruedelbach, N., McCormick, R. A., Schulz, S. C., & Grueneich, R. (1993). Impulsivity, coping styles, and triggers for craving in substance abusers with borderline personality disorder. *Journal of Personality Disorders, 7,* 214-222.

Linehan, M. M. (1993). *Cognitive-Behavioral Treatment of Borderline Personality Disorder.* New York: Guilford Press.

Lynch, W. C., Everingham, A., Dubitzky, J., Hartman, M., Kasser, T. (2000). Does binge eating play a role in the self-regulation of moods? *Integrative Physiological and Behavioral Science, 35,* 298-313.

Marino, M. F., & Zanarini, M. C. (2001). Relationship between EDNOS and its subtypes and borderline personality disorder. *International Journal of Eating Disorders, 29,* 349-353.

McCarthy, M. (1990). The thin ideal, depression, and eating disorders in women. *Behaviour Research and Therapy, 28,* 205-215.

Mintz, L. B., O'Halloran, M. S., Mulholland, A. M., & Schneider, P. A. (1997). Questionnaire for eating disorder diagnoses: Reliability and validity of

operationalizing *DSM-IV* criteria into a self-report format. *Journal of Counseling Psychology, 44,* 63-79.

Moore, D. S. (1995). *The basic practice of statistics*. New York: Freeman and Co.

Morey, L. C. (1991). *Personality assessment inventory: Professional Manual.* Odessa: Psychological Assessment Resources.

Nace, E. P., Davis, C. W., & Gaspari, J. P. (1991). Axis II comorbidity in substance abusers. *American Journal of Psychiatry, 148,* 118-120.

National Institute on Drug Abuse (NIDA). (n.d.). Commonly abused drugs. Retrieved August 9, 2007, from http://www.nida.nih.gov/PDF/CADChart.pdf

Nock, M. K., & Prinstein, M. J. (2004). A functional approach to the assessment of self-mutilative behavior. *Journal of Consulting and Clinical Psychology, 72,* 885-890.

O'Malley, P. M., & Johnston, L. D. (2002). Epidemiology of alcohol and other drug use among American college students. Journal of Studies on Alcohol, sup 14, 23-29.

Pfohl, B., Blum, N., Zimmerman, M., & Stangl, D. (1989). *Structured interview for DSM-III-R personality.* Iowa City: Author.

Pryor, T., Wiederman, M. W., & McGilley, B. (1996). Laxative abuse among women with eating disorders: An indication of psychopathology? *International Journal of Eating Disorders, 20,* 13-18.

Reinert, D. F. & Allen, J. P. (2002). The Alcohol Use Disorders Identification Test (AUDIT): A review of recent research. *Alcoholism: Clinical and Experimental Research, 26,* 272-279.

Robinson, M. D. & Clore, G. L. (2002). Belief and feeling: Evidence for an accessibility model of emotional self-report. *Psychological Bulletin, 128,* 934-960.

Rosen, J. C., & Leitenberg, H. (1982). Bulimia nervosa: Treatment with exposure and response prevention. *Behavior Therapy, 13,* 117-124.

Rosen, J. C., & Leitenberg, H. (1985). Exposure plus response prevention treatment of bulimia. In D. M. Garner, & P. E. Garfinkel (Eds.), *A handbook of psychotherapy for anorexia nervosa and bulimia* (pp. 193-209). New York: Guilford Press.

Rosenthal, R. J., Rinzler, C., Wallsh, R., & Klausner, E. (1972). Wrist-cutting syndrome: The meaning of a gesture. *American Journal of Psychiatry, 128,* 1363-1368.

Sabo, A. N., Gunderson, J. G., Najavits, L. M., Chauncey, D., & Kisiel, C. (1995). Changes in self-destructiveness of borderline patients in psychotherapy: A prospective follow-up. *Journal of Nervous and Mental Disease, 183,* 370-376.

Sansone, R. A., Fine, M. A., & Nunn, J. L. (1994). A comparison of borderline personality symtomatology and self-destructive behavior in women with eating, substance abuse, and both eating and substance abuse disorders. *Journal of Personality Disorders, 8,* 219-228.

Sansone, R. A., & Levitt, J. L. (2005). Borderline personality and eating disorders. *Eating Disorders, 13,* 71-83.

Saunders, J. B., Aasland, O. G., Babor T. F., de la Fuente, J. R., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Tests (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption – II. *Addiction, 88,* 791-804.

Sim, L., & Zeman, J. (2005). Emotion regulation factors as mediators between body dissatisfaction and bulimic symptoms in early adolescent girls. *Journal of Early Adolescence, 25,* 478-496.

Sinclair, M., McRee, B., & Babor, T. (1992). Evaluation of the reliability of AUDIT. University of Connecticut School of Medicine, Alcohol Research Center, (Unpublished report).

Sprague, J. R., & Horner, R. H. (1992). Covariation within functional response classes: Implications for treatment of severe problem behavior. *Journal of Applied Behavioral Analysis, 25,* 735-745.

Tozzi, F., Thornton, L. M., Mitchell, J., Fichter, M. M., Klump, K. L. Lilenfeld, L. R., et al. (2006). Features associated with laxative abuse in individuals with eating disorders. *Psychosomatic Medicine, 68,* 470-477.

Trull, T. J. (1995). Borderline personality disorder features in nonclinical young adults: 1. Identification and validation. *Psychological Assessment, 7,* 33-41.

Trull, T. J., Sher, K. J., Minks-Brown, C., Durbin, J., & Burr, R. (2000). Borderline personality disorder and substance use disorders: A review and integration. *Clinical Psychology Review, 20,* 235-253.

Warner, L. A., Kessler, R. C., Hughes, M., Anthony, J. C., & Nelson, C. B. (1995). Prevalence and correlates of drug use and dependence in the United States : results from the national comorbidity survey. *Archives of General Psychiatry, 52,* 219-229.

Wechsler, H., Davenport, A., Dowdall, G., Moeykens, B., & Castillo, S. (1994). Health and behavioral consequences of binge drinking in college: A national survey of students at 140 campuses. *The Journal of the American Medical Association, 272,* 1672-1677.

Zanarini, M. C., Frankeburg, F. R., Dubo, E. D., Sickel, A. E., Trikha, A., Levin, A. et al. (1998). Axis I comorbidity of Borderline Personality Disorder. *American Journal of Psychiatry, 155,* 1733-1739.

Zanarini, M. C., Gunderson, J. G., Frankenburg, F. R., & Chauncey, D. L., (1989). The revised diagnostic interview for borderlines: Discriminating BPD from other axis II disorders. *Journal of Personality Disorders, 3,* 10-18.

Zanarini, M. C., Vujanovic, A. A., Parachini, E. A., Boulanger, J. L., Frankenburg, F. R., & Hennen, J. (2003). A screening measure for BPD: The Mclean Screening Instrument for Borderline Personality Disorder (MSI-BPD). *Journal of Personality Disorders, 17,* 568-573.

Appendix A

PAI-Bor

Read each statement and decide if it is an accurate statement about you. Give your own opinion of yourself. Be sure to answer every statement.

	False, Not at all True	Slightly True	Mainly True	Very True
1. My mood can shift quite suddenly.	○	○	○	○
2. My attitude about myself changes a lot.	○	○	○	○
3. My relationships have been stormy.	○	○	○	○
4. My moods get quite intense.	○	○	○	○
5. Sometimes I feel terribly empty inside.	○	○	○	○
6. I want to let certain people know how much they've hurt me.	○	○	○	○
7. My mood is very steady.	○	○	○	○
8. I worry a lot about other people leaving me.	○	○	○	○
9. People once close to me have let me down.	○	○	○	○
10. I have little control over my anger.	○	○	○	○
11. I often wonder what I should do with my life.	○	○	○	○
12. I rarely feel very lonely.	○	○	○	○
13. I sometimes do things so impulsively that I get into trouble.	○	○	○	○
14. I've always been a pretty happy person.	○	○	○	○
15. I can't handle separation from those close to me very well.	○	○	○	○
16. I've made some real mistakes in the people I've picked as friends.	○	○	○	○
17. When I'm upset, I typically do something to hurt myself.	○	○	○	○
18. I've had times when I was so mad I couldn't do enough to express all my anger.	○	○	○	○

19. I don’t get bored very easily.	○	○	○	○
20. Once someone is my friend, we stay friends.	○	○	○	○
21. I’m too impulsive for my own good.	○	○	○	○
22. I spend money too easily.	○	○	○	○
23. I’m a reckless person.	○	○	○	○
24. I’m careful about how I spend money.	○	○	○	○

DSHI

This questionnaire asks about a number of different things that people sometimes do to hurt themselves. Please be sure to read each question carefully and respond honestly. Often, people who do these kinds of things to themselves keep it a secret, for a variety of reasons. However, honest responses to these questions will provide us with greater understanding and knowledge about these behaviors and the best way to help people. Please answer yes to a question only if you did the behavior intentionally, or on purpose, to hurt yourself. Do not respond yes if you did something accidentally (e.g., you tripped and banged you head on accident). Also, please be assured that your responses are completely confidential.

1. Have you ever intentionally (i.e., on purpose) cut your wrist, arms, or other area(s) of your body (without intending to kill yourself)? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few). _____**
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior. _____**
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

2. Have you ever intentionally (i.e., on purpose) burned yourself with a cigarette? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few). _____**
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior. _____**
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

3. Have you ever intentionally (i.e., on purpose) burned yourself with a lighter or a match? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few).** _____
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior.** _____
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

4. Have you ever intentionally (i.e., on purpose) carved words into your skin? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few).** _____
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior.** _____
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

5. Have you ever intentionally (i.e., on purpose) carved pictures, designs, or other marks into your skin? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few).** _____
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior.** _____

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

6. Have you ever intentionally (i.e., on purpose) severely scratched yourself, to the extent that scarring or bleeding occurred? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few).** _____
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior.** _____
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

7. Have you ever intentionally (i.e., on purpose) bit yourself, to the extent that you broke the skin? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few).** _____
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior.** _____
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

8. Have you ever intentionally (i.e., on purpose) rubbed sandpaper on your body? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few).** _____
When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior.** _____
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

9. Have you ever intentionally (i.e., on purpose) dripped acid onto your skin? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few).** _____
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior.** _____
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

10. Have you ever intentionally (i.e., on purpose) used bleach, comet, or oven cleaner to scrub your skin? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few).** _____
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior.** _____
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

11. Have you ever intentionally (i.e., on purpose) stuck sharp objects such as needles, pins, staples, etc. into your skin, **not including** tattoos, ear piercing, needles used for drug use, or body piercing? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____

How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few). _____**
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior. _____**
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

12. Have you ever intentionally (i.e., on purpose) rubbed glass into your skin? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few). _____**
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior. _____**
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

13. Have you ever intentionally (i.e., on purpose) broken your own bones? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few). _____**
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior. _____**
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

14. Have you ever intentionally (i.e., on purpose) banged your head against something, to the extent that you caused a bruise to appear? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few). _____**
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior. _____**
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

15. Have you ever intentionally (i.e., on purpose) punched yourself, to the extent that you caused a bruise to appear? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few). _____**
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior. _____**
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

16. Have you ever intentionally (i.e., on purpose) prevented wounds from healing? (circle one):

1. Yes 2. No

If yes,
How old were you when you first did this? _____
How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few). _____**
When was the last time you did this? _____
How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior. _____**
Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

17. Have you ever intentionally (i.e., on purpose) done anything else to hurt yourself that was not asked about in this questionnaire? (circle one):

1. Yes 2. No

If yes,

What did you do to hurt yourself? _____

How old were you when you first did this? _____

How many times have you done this? **Please write an actual number (e.g., 1, 5, or 15 NOT some, many, or few). _____**

When was the last time you did this? _____

How many years have you been doing this? (If you are no longer doing this, how many years did you do this before you stopped?) **Please write the actual number of years you engaged in this behavior. _____**

Has this behavior ever resulted in hospitalization or injury severe enough to require medical treatment? _____

AUDIT

1) How often do you have a drink containing alcohol?
    0) Never
    1) Monthly or less
    2) 2-4 times a month
    3) 2-3 times a week
    4) 4 or more times a week

2) How many drinks containing alcohol do you have on a typical day when you are drinking?
    0) 1 or 2
    1) 3 or 4
    2) 5 or 6
    3) 7 to 9
    4) 10 or more

3) How often do you have six or more drinks on one occasion?
    0) Never
    1) Less than monthly
    2) Monthly
    3) Weekly
    4) Daily or almost daily

4) How often during the last year have you found that you were not able to stop drinking once you had started?
    0) Never
    1) Less than monthly
    2) Monthly
    3) Weekly
    4) Daily or almost daily

5) How often during the last year have you failed to do what was normally expected of you because of drinking?
    0) Never
    1) Less than monthly
    2) Monthly
    3) Weekly
    4) Daily or almost daily

6) How often during the last year have you needed a first drink in the morning to get yourself going after a heave drinking session?
    0) Never
    1) Less than monthly
    2) Monthly
    3) Weekly
    4) Daily or almost daily

7) How often during the last year have you had a feeling of guilt or remorse after drinking?
    0) Never
    1) Less than monthly
    2) Monthly
    3) Weekly
    4) Daily or almost daily

8) How often during the last year have you been unable to remember what happened the night before because of your drinking?
    0) Never
    1) Less than monthly
    2) Monthly
    3) Weekly
    4) Daily or almost daily

9) Have you or someone else been injured because of your drinking?
    0) No
    2) Yes, but not in the last year
    4) Yes, during the last year

10) Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?
    0) No
    2) Yes, but not in the last year
    4) Yes, during the last year

DUDIT

Here are a few questions about drugs. Please answer as correctly and honestly as possible by indicating which answer is right for you.

Man ___ Women____ Age____

1) How often do you use drugs other than alcohol?
(See list of drugs on back side.)
    0) Never
    1) Once a month or less often
    2) 2-4 times a month
    3) 2-3 times a week
    4) 4 times a week or more

2) Do you use more than one type of drug on the same occasion?
    0) Never
    1) Once a month or less often
    2) 2-4 times a month
    3) 2-3 times a week
    4) 4 times a week or more

3) How many times do you take drugs on a typical day when you use drugs?
    0) 0
    1) 1-2
    2) 3-4
    3) 5-6
    4) 7 or more

4) How often are you influenced heavily by drugs?
    0) Never
    1) Less often than once a month
    2) Every month
    3) Every week
    4) Daily or almost every day

5) Over the past year, have you felt that your longing for drugs was so strong that you could not resist it?
    0) Never
    1) Less often than once a month
    2) Every month
    3) Every week
    4) Daily or almost everyday

6) Has it happened, over the past year, that you have not been able to stop taking drugs once you started?
    0) Never
    1) Less often than once a month
    2) Every month
    3) Every week
    4) Daily or almost everyday

7) How often over the past year have you taken drugs and then neglected to do something you should have done?
    0) Never
    1) Less often than once a month
    2) Every month
    3) Every week
    4) Daily or almost everyday

8) How often over the past year have you needed to take a drug the morning after heavy drug use the day before?
    0) Never
    1) Less often than once a month
    2) Every month
    3) Every week
    4) Daily or almost everyday

9) How often over the past year have you had guilt feeling or a bad conscience because you used drugs?
    0) Never
    1) Less often than once a month
    2) Every month
    3) Every week
    4) Daily or almost everyday

10) Have you or anyone else been hurt (mentally or physically) because you used drugs?
    0) No
    2) Yes, but not over the past year
    4) Yes, over the past year

11) Has a relative or a friend, a doctor, or a nurse, or anyone else, been worried about your drug use or said to you that you should stop using drugs?
    0) No
    2) Yes, but not over the past year
    4) Yes, over the past year

CADL

Please indicate whether you have used the following drugs within the past 12 months.

Please do NOT indicate use of the drug if the drug has been prescribed by a doctor and you take the drug in the prescribed dosage.

	Yes	No
Cannabis *Hashish, Marijuana*	○	○
Depressants *Barbiturates (Amytal, Nembutal, Seconal, Phenobarbital), Benzodiazepines (Ativan, Halcion, Librium, Valium, Xanax), Flunitrazepam (Rohypnol), GHB, Methaqualone (Quaalude, Sopor, Parest)*	○	○
Dissociative Anesthetics *Ketamine, PCP*	○	○
Hallucinogens *LSD, Mescaline (Peyote), Psilocybin (Magic Mushrooms)*	○	○
Opioids and Morphine Derivatives *Codeine (Empirin w/ Codeine, Fiorinal w/ Codeine, Robitussin A-C, Tylenol w/ Codeine), Fentanyl (Actiq, Duragesic, Sublimaze), Heroin, Morphine (Roxanol, Duramorph), Opium (laudanum, paregoric), Oxycodone HCL (Oxycontin), Hydrocodone bitartrate, acetaminophen (Vicodin)*	○	○
Stimulants *Amphetamine (Biphetamine, Dexedrine), Cocaine, MDMA (Ecstasy), Methamphetamine (Desoxyn), Methylphenidate (Ritalin), Nicotine*	○	○
Anabolic Steroids *Anadrol, Oxandrin, Durabolin, Depo-Testosterone, Equipoise*	○	○
Dextromethorphan (DXM) *Some cough and cold medications*	○	○
Inhalants *Solvents (paint thinners, gasoline, glues), gases (butane, propane, aerosol propellants, nitrous oxide), nitrates (isoamyl, isobutyl, cyclohexyl)*	○	○

Q-EDD

Please complete the following questions as honestly as possible. The questions refer to current behaviors and beliefs, meaning those that have occurred in the past 3 months.

Sex:(Please circle) Male Female

Age: _____

School/Occupation Status: (Please circle)
Junior High or younger (specify grade: _____)
High School Freshman
High School Sophomore
High School Junior
High School Senior
College Freshman
College Sophomore
College Junior
College Senior
Not in School/Employed (specify: _____)

Race/Ethnicity: (Please circle)
Caucasian/White
African-American/Black
Hispanic/Latino/Mexican-American
American Indian
Asian American/Pacific Islander
Other (specify: _____)

Present height: _____ feet _____ inches

Present weight _____ pounds

My body-frame is: (Please circle)

small medium large

I would like to weigh _____ pounds

1. Do you experience recurrent episodes of binge eating, meaning eating a discrete period of time (e. g., within any 2-hour period) an amount of food that is definitely larger than most people would eat during a similar time period?

   YES NO

If YES: Continue to answer the following questions.

If NO: Skip to Question #4

2. Do you have a sense of lack of control during the binge eating episodes (i. e., the feeling that you cannot stop eating or control what or how much you are eating)?

   YES NO

3. Circle the answers within the **two** sets of **[bold brackets]** below that best fit for you:

   On average, I have had **[1, 2, 3, 4, 5, 6, or more]** binge eating episodes a WEEK for at least

   [1 month, 2 months, 3 months, 4 months, 5 months, 6-12 months, more than one year]

4. Please circle the appropriate responses below concerning things you may do currently to prevent weight gain. If you circle yes to any question, please indicate how often on the average you do this and how long you have been doing this.

a) **Do you make yourself vomit to prevent weight gain?** YES NO
How often do you do this?
Daily Twice/Week Once/Week Once/Month
How long have you been doing this?
1 month 2 months 3 months 4 months 5-11 months More than a year

b) **Do you take laxatives to prevent weight gain?** YES NO
How often do you do this?
Daily Twice/Week Once/Week Once/Month
How long have you been doing this?
1 month 2 months 3 months 4 months 5-11 months More than a year

c) **Do you take diuretics (water pills) to prevent weight gain?** YES NO
How often do you do this?
Daily Twice/Week Once/Week Once/Month
How long have you been doing this?
1 month 2 months 3 months 4 months 5-11 months More than a year

d) **Do you fast (skip food for 24 hours) to prevent weight gain?** YESNO
How often do you do this?
Daily Twice/Week Once/Week Once/Month
How long have you been doing this?
1 month 2 months 3 months 4 months 5-11 months More than a year

e) **Do you chew food but spit it out to prevent weight gain?** YES NO
How often do you do this?

Daily Twice/Week Once/Week Once/Month
How long have you been doing this?
1 month 2 months 3 months 4 months 5-11 months More than a year

f) **Do you give yourself an enema to prevent weight gain?** YES NO
How often do you do this?
Daily Twice/Week Once/Week Once/Month
How long have you been doing this?
1 month 2 months 3 months 4 months 5-11 months More than a year

g) **Do you take appetite control pills to prevent weight gain?** YES NO
How often do you do this?
Daily Twice/Week Once/Week Once/Month
How long have you been doing this?
1 month 2 months 3 months 4 months 5-11 months More than a year

h) **Do you diet strictly to prevent weight gain?** YES NO
How often do you do this?
Daily Twice/Week Once/Week Once/Month
How long have you been doing this?
1 month 2 months 3 months 4 months 5-11 months More than a year

i) **Do you exercise a lot?** YES NO
How often do you do this?
Daily Twice/Week Once/Week Once/Month
How long have you been doing this?
1 month 2 months 3 months 4 months 5-11 months More than a year

5. If you answered YES to "exercise a lot," please answer questions 5a, 5b, 5c, & 5d. If you answered NO to "exercise a lot," please skip to question #6.

a) Please fill in the blanks below:

I _____ (types of exercise, e. g., jog, swim, etc.) for an average of _____ hours at a time.

b) My exercise sometimes significantly interferes with important activities.

YES NO

c) I exercise despite injury and/or medical complications.

YES NO

d) Is your primary reason for exercising to counteract the effects of binges or to prevent weight gain?

YES NO

6. Does your weight and/or body shape influence how you feel about yourself?

1	2	3	4	5
Not at all	A little	A moderate amount	Very much	Extremely or completely

7. How afraid are you of becoming fat?

1	2	3	4	5
Not at all	A little	A moderate amount	Very much	Extremely or completely

8. How afraid are you of gaining weight?

1	2	3	4	5
Not at all	A little	A moderate amount	Very much	Extremely or completely

9. Do you consider yourself to be:

1	2	3	4	5	6
Grossly Obese	Moderately Obese	Overweight	Normal Weight	Low Weight	Severely Underweight

10. Certain parts of my body (e. g., my abdomen, buttocks, thighs) are too fat.

YES NO

11. I feel fat all over

YES NO

12. I believe that how little I weigh is a serious problem

YES NO

13. I have missed at least 3 consecutive menstrual cycles (not including those miss during a pregnancy).

YES NO

Emotional Experiences

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way immediately prior to/following engaging in _____. Use the following scale to record your answers:

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

_____ amusement
_____ anger
_____ contempt
_____ contentment
_____ disgust
_____ embarrassment
_____ excitement
_____ fear
_____ guilt
_____ pride in achievement
_____ relief
_____ sadness/distress
_____ satisfaction
_____ physical pleasure
_____ shame

DERS

	Almost Never	Sometimes	About Half the Time	Most of the time	Almost Always
1) I am clear about my feelings. (r)	○	○	○	○	○
2) I pay attention to how I feel. (r)	○	○	○	○	○
3) I experience my emotions as overwhelming and out of control.	○	○	○	○	○
4) I have no idea how I am feeling	○	○	○	○	○
5) I have difficulty making sense out of my feelings.	○	○	○	○	○
6) I am attentive to my feelings. (r)	○	○	○	○	○
7) I know exactly how I am feeling. (r)	○	○	○	○	○
8) I care about what I am feeling. (r)	○	○	○	○	○
9) I am confused about how I feel.	○	○	○	○	○
10) When I'm upset, I acknowledge my emotions. (r)	○	○	○	○	○
11) When I'm upset, I become angry with myself for feeling that way.	○	○	○	○	○
12) When I'm upset, I become embarrassed for feeling that way.	○	○	○	○	○
13) When I'm upset, I have difficulty getting work done.	○	○	○	○	○
14) When I'm upset, I become out of control.	○	○	○	○	○
15) When I'm upset, I believe that I will remain that way for a long time.	○	○	○	○	○
16) When I'm upset, I believe that I'll end up feeling very depressed.	○	○	○	○	○
17) When I'm upset, I believe that my feelings are valid and important. (r)	○	○	○	○	○
18) When I'm upset, I have difficulty focusing on other things.	○	○	○	○	○
19) When I'm upset, I feel out of control.	○	○	○	○	○

	Almost Never	Sometimes	About Half the Time	Most of the time	Almost Always
20) When I'm upset, I can still get things done. (r)	○	○	○	○	○
21) When I'm upset, I feel ashamed with myself for feeling that way.	○	○	○	○	○
22) When I'm upset, I know that I can find a way to eventually feel better. (r)	○	○	○	○	○
23) When I'm upset, I feel like I am weak.	○	○	○	○	○
24) When I'm upset, I feel like I can remain in control of my behaviors. (r)	○	○	○	○	○
25) When I'm upset, I feel guilty for feeling that way.	○	○	○	○	○
26) When I'm upset, I have difficulty concentrating.	○	○	○	○	○
27) When I'm upset, I have difficulty controlling my behaviors.	○	○	○	○	○
28) When I'm upset, I believe that there is nothing I can do to make myself feel better.	○	○	○	○	○
29) When I'm upset, I become irritated with myself for feeling that way.	○	○	○	○	○
30) When I'm upset, I start to feel very bad about myself.	○	○	○	○	○
31) When I'm upset, I believe that wallowing in it is all I can do.	○	○	○	○	○
32) When I'm upset, I lose control over my behaviors.	○	○	○	○	○
33) When I'm upset, I have difficulty thinking about anything else.	○	○	○	○	○
34) When I'm upset, I take time to figure out what I'm really feeling. (r)	○	○	○	○	○
35) When I'm upset, it takes me a long time to feel better.	○	○	○	○	○
36) When I'm upset, my emotions feel overwhelming.	○	○	○	○	○