

TESTING ALTERNATIVE MOTIVATIONAL MODELS  
FOR SELF-INJURIOUS BEHAVIOR

BY

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DISSERTATION

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## ABSTRACT

Emotion-related motivations for self-injurious behavior were examined in a sample of 115 women, 26 of whom reported a history of self-injury. Specifically, two popular motivational models were tested, 1) the Affect Regulation Model, which asserts that self-injurious behavior is used to down-regulate unpleasant emotions, and 2) the Self-Punishment Model, which asserts that individuals who self-injure view themselves as bad persons who deserve to be punished. The present study also tested an alternative, novel motivational model for self-injury, the Shame Regulation Model, which asserts that self-injurious behaviors are used particularly to down-regulate shame among individuals who are prone and averse to that emotion.

A variety of self-report measures were used to assess history of and motivations for self-injury, proneness and aversion to emotions, and punishment deservingness. Further, a finger pressure algometer task was employed to determine whether changes in state emotions following the experience of physical pain would be consistent with the expectations of the above models.

Overall, results indicated that women who are averse to unpleasant emotions in general are more likely to have engaged in self-injurious behavior. Moreover, among women with a history of self-injury, being prone to frequent shame was associated with the use of a greater variety of self-injurious behaviors and with more frequent self-injurious acts. Women with a history of self-injury were more tolerant of pressure pain on the algometer task, and they experienced a decrease in both general negative affect and shame. Implications for future research on self-injury, as well as the treatment of this serious psychological problem, are discussed.

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## CHAPTER 1: GENERAL INTRODUCTION TO SELF-INJURIOUS BEHAVIOR AND ITS PROPOSED MOTIVATIONS

Acts of self-injury are not uncommon, employed by an estimated 4% of the general adult population and with the highest rates (10-17%) in the general population seen among adolescents and young adults (e.g., Evans, Hawton, Rodham, & Deeks, 2005; Laukkanen et al., 2009; Whitlock, Eckenrode, & Silverman, 2006). Self-injurious behaviors are also present in approximately 21% of adults with psychological disorders (e.g., Briere & Gil, 1998). Moreover, self-injury appears to be on the rise (Heilbron & Prinstein, 2008; Klonsky, 2007). Not only is it common, but self-injury has potentially serious consequences. Suicide is a leading cause of death among 25-34 year olds, second only to accidents (Wenzel & Beck, 2008). Although some research has focused specifically on non-suicidal self-injury (NSSI; e.g., Favazza, 1998), it is not necessarily the case that NSSI is conceptually distinct from suicide attempts. For example, NSSI predicts future suicidal acts (e.g., Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006). Individuals who engage in self-injury, with or without the intent to die, are also 30 times more likely to die by suicide than are individuals who do not engage in any acts of self-injury (Cooper, Kapur, Webb, Lawlor, Guthrie, Mackway-Jones et al., 2005). In the present research, we define self-injurious behavior as any act of physical harm inflicted on oneself that has the potential to cause damage to bodily tissue and is done with that intention, though it may be with or without the intent to die.

Several models of motivations for self-injury have been described. Some of these models focus on the interpersonal effects of self-injury. The interpersonal boundaries model suggests that self-injury is used to help individuals distinguish between themselves and others (Carroll, Schaffer, Spensley, & Abramowitz, 1980; Suyemoto, 1998), and the interpersonal-influence model hypothesizes that acts of self-injury are used to acquire help or care from others (Allen,

1995; Chowanec, Josephson, Coleman, & Davis, 1991; Podovall, 1969). Other models of motivations for self-injury focus on intrapersonal effects. The anti-dissociation model suggests that self-injury stops ongoing, distressing dissociative experiences, bringing individuals back in touch with reality and themselves (Gunderson, 1984). The anti-suicide model suggests that people engage in self-injury as a means of reducing the likelihood that they will instead attempt suicide (Suyemoto, 1998), and the sensation-seeking model hypothesizes that self-injurious behaviors are used to create thrill and excitement (Nixon, Cloutier, & Aggarwal, 2002; Osuch, Noll, & Putnam, 1999; Shearer, 1994). Although theoretically appealing to some researchers, these models have generated little empirical support (see Klonsky, 2007).

#### *Affect Regulation Model*

Currently, the best-supported model of self-injury motivations is the Affect Regulation Model. The Affect Regulation Model suggests that individuals engage in self-injury as a means of down-regulating ongoing unpleasant emotional experiences (e.g., Favazza, 1992; Gratz, 2003). According to this model, individuals who self-injure choose to endure physical pain in order to forgo the continuation of emotional pain or negative affect (NA).

The Affect Regulation Model has been examined in more studies than has any other model for self-injury motivations (see Klonsky, 2007). Studies using self-report questionnaires consistently indicate that the alleviation of unpleasant emotions is a primary reason for engaging in self-injurious acts. For example, in research with women with borderline personality disorder (BPD), participants endorsed reasons such as “to stop bad feelings” at rates as high as 96% (Brown, Comtois, & Linehan, 2002). Among broader clinical samples of psychiatric patients from in- and out-patient settings, items such as “reduction of tension,” “to decrease feelings of rage,” and “manage stress” are all endorsed by the majority of such samples (e.g., Briere & Gil,

1998; Herpertz, 1995; Osuch et al., 1999). Even among a non-clinical sample, reasons broadly consistent with the Affect Regulation Model (e.g., “to feel relaxed,” “to control their mind when it is racing”) were highly endorsed in previous research (Favazza & Conterio, 1989).

Other studies ask individuals who self-injure about the thoughts, feelings, and/or events that occur before, during, and after acts of self-injury. These phenomenological studies have also provided evidence for the Affect Regulation Model. For example, upwards of 90% of women with BPD in phenomenological studies indicated that they experienced high levels of NA prior to self-injury and reductions in NA after self-injury (e.g., Coid, 1993; Kemperman, Russ, & Shearin, 1997). Participants had further indicated that they experience an increase in pleasant emotions such as relief and peacefulness following self-injury. Research on non-clinical samples provides similar results (Briere & Gil, 1998; Laye-Gindhu & Schonert-Reichl, 2005).

#### *Self-Punishment Model*

The Self-Punishment Model (e.g., Linehan, 1993) similarly implicates unpleasant emotion as a motivator for self-injurious acts. This model assumes that individuals who self-injure tend to view themselves as deserving punishment, a belief that is commonly thought to be associated with guilt (e.g., Roseman, Wiest, & Swartz, 1994), and they also feel anger toward themselves for being bad people, commonly associated with shame (Lewis, 1971; Tangney & Dearing, 2002). Therefore, according to the Self-Punishment Model, when people have a trait-like belief that they deserve to be harmed that is coupled with high levels of unpleasant self-conscious emotions, they injure themselves as a means of reparation for the bad things they have done and/or the bad person that they are (Linehan, 1993).

Although the Self-Punishment Model has generated less empirical interest than has the Affect Regulation Model, results from existing self-report studies provide modest to strong

support for self-punishing functions (see Klonsky, 2007). For example, in an adult clinical sample, 83% of individuals noted that self-punishment was a reason for their self-injurious behavior (Briere & Gil, 1998). In other studies, anywhere from 10% to 70% of samples endorse motivations such as “I felt like a failure” and “I was angry at myself” (e.g., Shearer, 1994; Brown et al., 2002; Briere & Gil, 1998), which are consistent with the shame-related content of the Self-Punishment Model.

### *Goals of the Present Research*

The present paper postulates the Shame Regulation Model (further described in Chapter 3) as an alternative motivational model for self-injurious behavior, and the overarching goal of the research presented herein was to examine the predictions of this model alongside those of the Affect Regulation and Self-Punishment Models. Chapter 2 describes the participants who participated in this research, as well as the research procedures used. In Chapter 3, the Shame Regulation Model is described, and we examine the relevance of personality dimensions implicated by the Affect Regulation, Self-Punishment, and Shame Regulation Models to self-injurious behavior. These models are then further tested in Chapter 4 by investigating changes in state emotions as a consequence of pressure pain and by examining the relationships between model-implicated dimensions and pressure pain perception. In Chapter 5, we examine the specificity and comprehensiveness of the Shame Regulation Model, considering the relationships of the model-implicated personality dimensions to other self-destructive behaviors, as well as investigating the roles of impulsivity and general emotion regulation difficulties in self-injury. Finally, in Chapter 6, we discuss the strengths/limitations of the present research and describe some important clinical implications and future research directions.

## CHAPTER 2: PARTICIPANT CHARACTERISTICS AND RESEARCH PROCEDURES

One hundred fifteen females were recruited for the present study, 26 of whom reported a history of self-injurious behavior. We recruited 53.0% of our sample from undergraduate psychology courses, and these women received course credit for their participation. These women had a mean age of 18.9 years ( $SD = 0.8$ ). The majority of these women were White American (54.1%), followed by 23.0% Asian American, 8.2% Latina/Hispanic American, 4.9% Biracial American, and 3.3% African American. Four women described themselves as being of an “Other” ethnicity. Self-Injury versus No Self-Injury group membership for these women was determined based on responses to items on the Inventory of Statements about Self-Injury (ISAS; Klonsky & Olino, 2008), which is further described below. Women from this portion of the sample were included in the Self-Injury group if they reported engaging in some form self-injurious behavior on two or more occasions in their lifetime (e.g., engaging in a single behavior multiple times, engaging in multiple behaviors). Twelve undergraduate women reported a history of self-injury and were included in the Self-Injury group.

The remainder of the sample consisted of women currently living in the Champaign-Urbana community who represent a subsample of women ( $N = 54$ ) who were originally recruited to participate in a larger research project examining personality and emotion. These women had a mean age of 24.8 years ( $SD = 6.6$ ). The majority of these women were White American (64.8%), followed by 13.0% Asian American, 9.3% African American, 7.4% Latina/Hispanic American, and 5.5% Biracial American. Participants in that project responded to questions about suicidality/self-injury both on a paper-and-pencil questionnaire and during an in-person interview; more specifically, these women completed the Suicide Proneness subscale from the Schedule for Nonadaptive and Adaptive Personality-2 (SNAP-2; Clark, Simms, Wu, & Casillas,

in press) and were interviewed with the BPD portion of the Personality Disorders Interview-IV (PDI-IV; Widiger, Mangine, Corbitt, Ellis, & Thomas, 1995). Women from the community were invited to complete the present study if their reports regarding history of suicidality/self-injury were consistent across both of these measures, which are further described below.

However, because of their potential influence on pain perception, we also excluded women from the community member portion of the sample if they 1) had a history of chronic pain, 2) were experiencing current pain at the time of the study, 3) had taken pain medications on the day of the study, and/or 4) had more than one milligram of caffeine per one kilogram of body weight in their system at the time of the study (for a review of the relationship between caffeine and pain perception, see Sawynok & Yaksh, 1993).<sup>1</sup> Women were also excluded from the present study if they had a history of psychosis and/or mania. All women recruited from the community received monetary compensation for their participation.

#### *Measurement of Self-Injurious Behavior*

As one measure of self-injurious behaviors, we administered an expanded version of the ISAS (Klonsky & Olino, 2008) to all participants in the present research. The original ISAS has been found to be a reliable and valid measure in research on a large young adult sample (Klonsky & Olino, 2008; Klonsky & Glenn, 2009). The ISAS measures the frequency of self-injury, forms of self-injury, and motivations for self-injury. The first portion of the ISAS asks participants to report which, if any, self-injurious behaviors they engage in (e.g., burning, biting, interfering with wound healing, swallowing chemicals), as well as some descriptive features of

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<sup>1</sup> Although participants recruited through the undergraduate psychology courses also reported on these histories and had their weight determined, in keeping with the departmental guidelines we did not exclude any individuals from participating in the study. However, by assessing each of these histories, we were able to take them into consideration when analyzing the data.

their self-injury. For example, the ISAS asks participants whether they experience pain during self-injury, whether they injure when alone, and how much time passes between the urge to injure and the act itself.

All participants additionally completed the Suicide-Proneness items from the Self-Harm trait scale of the SNAP-2 (Clark et al., in press). This measure uses 9 true-false items to assess trait tendencies to think about and/or engage in self-injurious behaviors (e.g., “Sometimes I get so upset I feel like hurting myself”). Finally, all participants were asked about their history of self-injury by the researcher during an in-person interview. All participants were interviewed by the researcher using the BPD portions of the PDI-IV (Widiger et al., 1995), which includes the assessment of suicidality and recurrent self-injurious behavior as a part of the fifth criterion for BPD (see APA, 2000).

#### *Relevant Characteristics of the Sample*

As would be expected, the community member portion of our sample was significantly older ( $F(1, 114) = 48.08, p < .01$ ). Women from the community were also more likely to have taken medications for mental health concerns during their lifetime ( $F(1, 114) = 8.92, p < .01$ ) and to have sought individual counseling ( $F(1, 114) = 10.65, p < .01$ ); however, there were no subsample-related differences in psychiatric hospitalizations ( $F(1, 114) = 1.26, p = \text{n.s.}$ ) or group counseling ( $F(1, 114) = 1.59, p = \text{n.s.}$ ). With respect to suicide/self-injury-related variables, women recruited from the undergraduate psychology population did not differ from those recruited from the community with regard to the number of suicide attempts. Further, among women within these subsamples, there were no differences across subsamples in the age when self-injury began or preference for self-injuring when alone. However, undergraduate women with a history of self-injury reported that greater time elapsed between their initial urge to self-

injure and the actual act than did women with a history of self-injury recruited from the community ( $F(1, 22) = 5.26, p < .05$ ).

### *Procedures*

The present research can be thought of as consisting of three parts. Part 1 involved a long packet of questionnaires assessing a range of personality and emotion constructs. In Part 2 participants were interviewed by the researcher using the BPD portion of the PDI-IV and were additionally asked to report on their mental health history, history of tattooing, and physical pain history. They also reported their caffeine consumption for that day, and their weight was assessed using a standard bathroom scale. Finally, Part 3 involved three short packets of questionnaires, two administrations of a pressure pain task, and assessment of state emotions before and after each task administration. In other words, the procedure for Part 3 can be thought of as two sets, each set composed of 1) a short packet of questionnaires, 2) a pre-pain task state emotion assessment, 3) administration of the pressure pain task, and 4) a post-pain task state emotion assessment. These two sets was followed by one additional short packet of questionnaires. Because of their temporal proximity to the pain task administrations, the measures given as part of the short packets were presented in a random order. Given practical considerations (e.g., community members having already completed the questionnaires in Part 1 as part of the larger research project for which they had originally been recruited), the undergraduate and community member portions of our total sample completed the parts of this study in different orders. Specifically, the community members completed Part 1, followed by Part 2, followed by Part 3; by contrast, the undergraduates completed Part 2, followed by Part 3, followed by Part 1.

### CHAPTER 3: SELF-INJURY AS A MEANS OF REGULATING SHAME

Although the Affect Regulation and Self-Punishment Models are not thought to be mutually exclusive, they have only been investigated as distinct reasons for self-injury. However, the Affect Regulation and Self-Punishment Models may be more useful for understanding motivations for self-injury when taken together. Drawing on both models and further incorporating information from the literature on self-conscious emotions, in the present research we propose an alternative model of motivations for self-injury – the Shame Regulation Model. Via the Shame Regulation Model, we suggest that self-injurious behaviors are a form of maladaptive down-regulation of shame specifically, enacted by individuals who experience shame with some frequency and find the experience of shame to be especially unpleasant in comparison to the experience of other forms of NA.

Even though it has yet to be examined directly, there is some indirect evidence for the Shame Regulation Model. In fact, some of the research supporting the Self-Punishment Model likewise provides support for the Shame Regulation Model. For example, findings indicating that individuals with a history of self-injury engage in such acts because they feel ashamed/like a failure/etc. (e.g., Shearer, 1994; Brown et al., 2002; Briere & Gil, 1998) suggest that having a propensity for viewing one's self as inadequate, inferior, or bad is a motivator for self-injury. Moreover, shame is frequently described as being angry at the self, and existing research suggests that self-injury is associated with anger turned in toward the self (e.g., Herpertz, Sass, & Favazza, 1997; Nock, Prinstein, & Sterba, 2009; Soloff, Lis, Kelly, Cornelius, & Ulrich, 1994). In their study, Briere and Gil (1994) found that 35% of individuals who self-injure endorsed feeling “anger at self” before acts of self-injury, but only 5% felt this way after self-injury. Thus, there appears to be some support not only for a relationship between shame and self-injury but

also for the hypothesis that self-injury serves to alleviate shame. Ultimately, this is consistent with the Shame Regulation Model's position that shame is a central motivational factor for self-injurious behavior and should be down-regulated by such behavior.

#### *Distinctions among Alternative Motivational Models*

The Affect Regulation, Self-Punishment, and Shame Regulation Models are distinguishable in that they make different predictions regarding the emotions thought to engender self-injurious acts. As already mentioned above, the Affect Regulation Model suggests that self-injury is related to the experience of general NA, whereas the Self-Punishment Model suggests that self-injury is related to the experience of shame and, indirectly, guilt. By contrast, shame alone is expected to be particularly important to self-injurious behavior in the Shame Regulation Model.

Although often used interchangeably, guilt and shame are separable emotions (e.g., Lewis, 1971; Tangney, Wagner, Hill-Barlow, Marschall, & Gramzow, 1996). Following a negative event, guilt will be experienced if individuals attribute the event to something bad or inappropriate that they did; in other words, the particular action they took in that situation is at fault. By contrast, shame will be experienced if individuals attribute the negative event to flaws in who they are; in other words, the *self* is at fault, rather than the particular action (Lewis, 1971). Guilt and shame are also associated with different response tendencies. Individuals experiencing guilt typically desire to apologize, make amends, and openly accept blame, but those experiencing shame typically desire to escape or avoid the situation (Tangney et al., 1996).

Extant research also suggests that anger, hostility, and aggression may be responses associated with shame (Tangney et al., 1996; Jakupcak, Tull, & Roemer, 2005). Described as “humiliated fury” or “shame-rage,” overwhelming shame may be redirected into expressions of

anger (Lewis, 1971; Tangney & Dearing, 2002). In some cases, individuals experiencing shame may engage in other-directed aggression (i.e. inflicting harm on others or their property), especially if they have a tendency to externalize blame (e.g., Stuewig, Tangney, Heigel, Harty, & McCloskey, 2010). Alternatively, we believe that some individuals experiencing shame may cope with this emotion via acts of self-directed aggression. Supporting this possibility, shame prospectively predicts self-injury among individuals with BPD (Brown, Linehan, Comtois, Murray, & Chapman, 2009). On the other hand, guilt is generally found to be an adaptive emotion, related to positive psychological functioning rather than distress (e.g., Baumeister, Stillwell, & Heatherton, 1994; De Hooge, Zeelenberg, & Breugelmans, 2007), but this is only the case when there is no simultaneous experience of shame (i.e. shame-free guilt). When guilt is fused with shame, shame appears to override guilt and lead to negative psychological outcomes and other shame-related responses (e.g., Tangney, Wagner, Fletcher, & Gramzow, 1992).

We began testing the predictions of the various motivational models by investigating the roles of various personality dimensions implicated by them in self-injurious behavior and its motivation. Taking all of the above information into consideration, via the Shame Regulation Model, we predicted that self-injury will be associated specifically with shame-related constructs, over and above any relationship self-injury might have to guilt-related constructs specifically (expected by the Self-Punishment Model) or general NA-related constructs (expected by the Affect Regulation Model).

Personality dimensions are not explicitly discussed as part of the Affect Regulation Model; the model does not begin to provide any explanation for why some individuals experiencing NA choose to harm themselves when others do not. However, a reasonable extension of the Affect Regulation Model would be to expect that individuals with high trait NA,

who have a characteristic tendency to experience a variety of unpleasant emotions, will be more likely to engage in self-injurious behavior. Although high levels of unpleasant emotion are, by definition, not enjoyable, individuals likely differ in the extent to which they are able to tolerate unpleasant emotions when they are elicited. As such, a second reasonable extension of the Affect Regulation Model is that self-injury would be more likely among individuals with a strong aversion to NA. Therefore, in the present study, we examined the separate roles of NA-proneness and NA aversion in self-injury as extensions of the Affect Regulation Model.

Both the Self-Punishment and Shame Regulation Models directly hypothesize about the personality dimensions that should help distinguish between individuals who do and do not engage in self-injurious acts. According to explicit hypotheses of the Self-Punishment Model, individuals who engage in self-injury should have elevated levels of two personality dimensions. First, they should be high on punishment-deservingness, or the belief that one deserves to suffer. Indirectly, because punishment is typically a response expected by someone experiencing guilt, the Self-Punishment Model could be extended to also hypothesize that self-injury should be seen among individuals who are high on guilt-proneness. Guilt-proneness is the propensity for experiencing guilt across many situations (Lewis, 1971). Second, the Self-Punishment Model directly suggests that individuals who engage in self-injury should be high on shame-proneness, or the propensity for experiencing shame across many situations (Lewis, 1971). Although not an explicit hypothesis of the Self-Punishment Model, it seems reasonable to further conjecture that individuals who self-injure will find experiences of guilt and shame to be particularly unwelcome and aversive. If guilt and shame are not perceived of as intolerable emotions, then individuals would not be expected to engage in acts designed to reduce these emotions.

The Shame Regulation Model predicts that two personality dimensions will be important in understanding why some individuals engage in self-injury when others do not. Although it does not assume that punishment-deservingness or guilt-related dimensions are particularly important in self-injury, the Shame Regulation Model is similar to the Self-Punishment Model in predicting that individuals with a history of self-injury will have elevated levels of shame-proneness. Moreover, the Shame Regulation Model explicitly suggests that these individuals will exhibit elevations on shame aversion, or the tendency to perceive of shame as an especially painful and undesirable emotion (Schoenleber & Berenbaum, 2010). It should be noted that we do not believe that elevations in shame-proneness and shame aversion are sufficient for predicting the presence of self-injurious behavior. Other personality and environmental features (e.g., hopelessness, peer-modeling), the measurement of which is beyond the scope of the present investigation, are likely important to the development of this particular means of shame regulation. However, we expect that levels of shame-proneness and aversion will be good predictors of self-injury.

Importantly, although we expect that both shame-proneness and shame aversion are useful constructs for understanding who is likely to become motivated to engage in self-injury, we believe that shame-proneness will play a relatively larger role in self-injury. As we have described more fully elsewhere (Schoenleber & Berenbaum, in press a), the use of self-directed aggressive behaviors as a means of reducing shame occurs only *after* shame has been elicited; thus, for self-injury to be a frequently employed shame regulation strategy, shame-proneness would necessarily be high. On the other hand, shame aversion may not be as strongly associated with the extent of self-injury (i.e. in this study, the number of different self-injurious behaviors used and/or the total frequency of self-injurious acts), as individuals who are highly averse to

shame are probably especially motivated to avoid shame before it begins. In other words, as the tendency to view shame as intolerable increases, the likelihood that one will attempt to engage in preemptive shame regulation strategies – those designed to reduce the likelihood of anticipated shame well in advance of its onset – should increase as well. To the extent that any of the preemptive strategies used are effective in preventing shame, individuals would need to use self-injury to reduce shame less often. Thus, although we predict that shame aversion should be elevated among women with a history of self-injury compared to women with no self-injury, the relationship between shame aversion and self-injury is likely to be weaker than the relationship between shame-proneness and self-injury.

In summary, we tested three models of self-injury motivation by considering not only self-reported motivations but also by examining the relationships between self-injury and personality dimensions implicated by each of the respective models. The Affect Regulation Model predicted that self-injury would be positively associated with proneness and aversion to general NA. The Self-Punishment Model predicted that self-injury would be positively associated with punishment deservingness, guilt-proneness and aversion, and shame-proneness and aversion. Finally, via the Shame Regulation Model, we predicted that self-injury would be positively associated with proneness and aversion to shame, specifically.

## Methods

### *Participants*

Information regarding the sample of women who participated in this study can be found in Chapter 2.

## *Measures*

*Self-Injury and its Motivations.* Extent of self-injury was assessed using an expanded version of the ISAS (Klonsky & Olino, 2008). All participants indicated how many times they have engaged in each of 13 different self-injurious behaviors, including an open-ended “Other” option. With this information, we calculated two scores as relevant indicators of the extent of self-injury: 1) the total number of types of self-injurious behaviors used, and 2) the total frequency of self-injurious acts across all behaviors.

The second portion of the original ISAS uses thirteen 3-item subscales to assess various self-injury motivations. Participants were asked how relevant a series of statements are to their self-injurious behaviors (e.g., “When I self-harm, I am calming myself down,” “When I self-harm, I am punishing myself”) on a scale from 0 (not relevant) to 2 (very relevant). For this investigation, we were particularly interested in the existing affect regulation and self-punishment subscales on the ISAS. Moreover, to examine the Shame Regulation Model using self-report, additional items were necessary. Thus, we expanded this portion of the ISAS.

Although the items for the Affect Regulation Model on the ISAS are relatively distinct from those for the Self-Punishment Model and do not conceptually overlap with the Shame Regulation Model, two of the items on the ISAS for the Self-Punishment Model could equally reflect the Shame Regulation Model (e.g., “When I self-harm, I am expressing anger toward myself for being worthless or stupid”). Given that the Self-Punishment and Shame Regulation Models are primarily distinguishable in that the Self-Punishment Model also emphasizes the importance of guilt-related constructs and punishment-deservingness, we created 2 additional items that reflect guilt (e.g., “When I self-harm, I am reacting to feeling like I have done something wrong,”) and 2 additional items that reflect punishment-deservingness (e.g., “When I

self-harm, I am making myself suffer for bad things I have done”), for a total of 5 items unique to the Self-Punishment Model. To enhance our ability to test Shame Regulation Model, we also added 3 items to the ISAS that reflect shame-related motivations for self-injury (e.g., “When I self-harm, I am reducing feelings of self-hate”); therefore, a total of 5 items reflected shame, 3 of which were separate from the already-existing Self-Punishment scale on the ISAS.

As mentioned in Chapter 2, the original version of the ISAS has demonstrated good validity and reliability (Klonsky & Olino, 2008; Klonsky & Glenn, 2009). Additionally, all of the subscales utilized in the present research demonstrated acceptable internal consistency. Cronbach’s alpha was .85 for the affect regulation subscale and .88 for the original, 3-item version of the self-punishment subscale. Our expanded, 7-item self-punishment subscale was also highly internally consistent ( $\alpha = .94$ ). Finally, Cronbach’s alpha for the shame regulation subscale was .86 when including all five shame regulation-related items (including two that overlap with the self-punishment subscale) and was .70 when including only the three newly created items.

*Proneness to Emotions.* We measured NA-proneness using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), which presents participants with 10 emotional terms reflecting negative affect (e.g., “distressed,” “afraid”). Each of these items was rated on a 5-point Likert scale indicating the degree to which the participant feels that way “in general.” This scale therefore reflects trait NA, which can be thought of as a proneness to experiencing NA frequently. To ensure that the scale is not simultaneously reflecting guilt-proneness or shame-proneness, we removed the “guilty” and “ashamed” items prior to calculating the NA scale. The full NA scale has good internal consistency when using the “general” timeframe ( $\alpha = .87$ ) and test-retest reliability after an 8-week interval ( $r = .71$ ; see

Watson et al., 1988). The NA scale also shows expected relationships to distress and psychological functioning (Watson et al., 1988). The 8-item trait NA scale had good internal consistency ( $\alpha = .87$ ) in this study.

Guilt- and shame-proneness were measured using the Test of Self-Conscious Affect-3 (TOSCA-3; Tangney, Dearing, Wagner, & Gramzow, 2000). The TOSCA-3 includes 16 brief scenarios. For each scenario (e.g., “You make plans to meet a friend for lunch. At 5 o’clock you realize you stood your friend up.”), there is one reaction that reflects a guilt response (e.g., “You’d think you should make it up to your friend as soon as possible”) and one reaction that reflects a shame response (e.g., “You would think: ‘I’m inconsiderate’”). Participants indicated the extent to which they would experience each of the guilt and shame responses on a scale from 1 to 5. Test-retest reliabilities are .74 and .85 for the guilt and shame scales, respectively, across a 3-5 week test-retest interval (Tangney et al., 1992). Previous research has found reasonable internal consistency ( $\alpha = .61$  and  $.74$ , for guilt and shame, respectively; see Tangney, 1996) for scenario-based measures. Internal consistency was comparable to past research for both the guilt-proneness ( $\alpha = .66$ ) and shame-proneness ( $\alpha = .80$ ) subscales in the present sample.

*Aversion to Emotions.* In order to assess broad distress intolerance, or aversion to general NA, we used the Affective Control Scale (ACS; Williams, Chambless, & Ahrens, 1997). Specifically, we used the 29 items on the ACS that measure participants’ fears of negative emotional experiences (i.e. anger, depression, and anxiety) to calculate a total NA aversion score. Items on the ACS are rated on a 7-point Likert scale for which the participants indicated the extent of their agreement with statements such as “When I am nervous, I am afraid that I will act foolish” and “I am afraid that I could go into a depression that could wipe me out.” In previous research, the ACS has shown expected relationships to other measures of psychological

functioning, and with a two-week test-retest interval, the total scale has also exhibited good reliability ( $r = .78$ ; Williams et al., 1997). Commensurate with previous work (e.g., Williams et al., 1997; Berg, Shapiro, Chambless, & Ahrens, 1998), the NA-related score calculated in this study had good internal consistency ( $\alpha = .93$ ).

The Shame-Aversive Reactions Questionnaire (ShARQ; Schoenleber & Berenbaum, 2010) was used to assess shame aversion. The ShARQ includes 14 items reflecting the painfulness and undesirability of shame (e.g., “Feeling inadequate troubles me more than anything else” and “I am comfortable acknowledging my own imperfections”), which participants rated on a 7-point Likert scale indicating their degree of agreement with the statement. Half of the items on the ShARQ are reverse-scored. The ShARQ has shown good convergent and discriminant validity, as well as internal consistency (see Schoenleber & Berenbaum, 2010). Cronbach’s alpha was .88 in the present sample.

Finally, aversion to guilt was assessed using the Guilt Aversion Assessment (GuAvA; Schoenleber & Berenbaum, in press b). The GuAvA includes 16 items (e.g., “I cannot stand feeling guilty after I have done something I shouldn’t have,” “I am not usually distressed when I am accountable for bad outcomes”), 7 reverse-scored, which participants rated on a 7-point Likert scale. The measure exhibits good convergent validity and internal consistency (see Schoenleber & Berenbaum, in press b). Internal consistency was also adequate in the present sample ( $\alpha = .79$ ).

*Self-Punishment & Punishment Deservingness.* The Self-Rating Scale (SRS) had been developed by Hooley and colleagues (Hooley, Ho, Slater, & Lockshin, 2010) in order run post-hoc analyses in relation to the Self-Punishment Model in their study. Three items originally from the NEO Five Factor Inventory (Costa & McCrae, 1992) and 5 items originally from the

Personality Beliefs Questionnaire (Beck & Beck, 1991) were combined to create the SRS, which is meant to assess what Hooley and colleagues describe as “self-critical beliefs.” They suggest that the items reflect the Self-Punishment Model’s focus on the belief that one is a bad person who deserves to suffer (e.g., “If others criticize me they must be right,” “I often feel inferior to others;” Hooley et al., 2010). All items are rated on a scale from 0 to 7, reflecting the extent of agreement with each statement. The SRS has shown good internal consistency (Hooley et al., 2010; Glassman, Weierich, Hooley, Deliberto, & Nock, 2007) in previous studies. For the present sample, Cronbach’s alpha was .82.

Unfortunately, because the SRS was developed post-hoc from a limited pool of available items, it potentially confounds the two components of the Self-Punishment Model – a propensity for guilt/shame and a tendency to view oneself as deserving punishment. Therefore, in order to better assess the trait-like belief that one deserves to suffer (separate from guilt- and shame-proneness), we developed the Punishment Deservingness Scale (PDS). For the present investigation, we embedded 16 true-false items with high face validity (e.g., “When bad things happen to me, I think I have it coming,” “I do not believe that I ought to be punished”) that we created into a broader measure of maladaptive personality (SNAP-2). One item was removed because it reduced the internal consistency of the measure, resulting in a 15-item measure (7 items reverse-scored) with a Cronbach’s alpha of .86. In further support of the validity of the PDS, we found an expectedly strong correlation between the PDS and the SRS ( $r = .56$ ). Consistent with our goal of assessing punishment deservingness more specifically than is done by the SRS, the PDS was still positively associated with shame-proneness ( $r = .29$ ), but less so than was the SRS ( $r = .48$ ).

## Results

### *Exploring Self-Reported Motivations for Self-Injury*

In order to investigate the relative utility of the Affect Regulation, Self-Punishment, and Shame Regulation Models for understanding self-injury motivation, we first examined the relationships between self-injury history and the motivation-related subscales from the ISAS. Among the women with a history of self-injury, skewness and kurtosis were within acceptable limits for both of the indicators of self-injury we examined; we therefore computed zero-order correlations when examining both the number of types of behaviors used and the total frequency of self-injury. As shown in Table 1, the number of types of self-injurious behaviors was positively associated with the expanded 7-item self-punishment subscale, which includes items that reflect shame, guilt, and punishment deservingness. Importantly, both the newly created 3-item shame regulation subscale and the 5-item scale, which additionally includes the items from the original self-punishment subscale that conceptually overlap with the Shame Regulation Model, were also positively related to the total number of types of self-injurious behavior used as well as the total frequency of self-injurious acts. By contrast, the affect regulation subscale of the ISAS was not associated with either of these self-injury variables.

### *Model-Implicated Personality Dimensions in Self-Injury*

We next considered between-group differences in the various model-implicated personality dimensions examined in this study, as well as the relationships between self-injury and these constructs. As depicted in the right portion of Table 2, individuals in the Self-Injury group had significantly higher means for all constructs except guilt-proneness. Self-injury's relationships with the various model-implicated dimensions are presented in the left portion of Table 2. Among women with a history of self-injury, the NA-, punishment-, and shame-related

constructs were all associated with the use of a great variety of self-injurious behaviors, whereas the guilt-related constructs were not. With regard to the frequency of self-injury, elevations in shame-proneness were associated with engaging in self-injury more often; no other model-implicated personality dimensions were significantly associated with self-injury frequency. Thus, the results in Table 2 provide at least partial support for all three models and indicate that a propensity for shame may be especially relevant to the extent of self-injurious behavior.

#### *The Specificity of Model-Implicated Emotion-Related Personality Dimensions in the Self-Injury*

Given that both the Self-Punishment and Shame Regulation Models assert that particular emotions – rather than NA in general – motivate self-injurious behaviors, we continued our investigation by running a series of hierarchical regressions to determine whether guilt and/or shame constructs were important in the prediction of self-injury variables over and above their general NA counterparts. For each self-injury outcome, we examined the roles of 1) shame- and guilt-proneness after taking proneness to general NA into account, and 2) shame and guilt aversion after taking aversion to general NA into account. To the degree that shame-related constructs are associated with self-injury over and above general NA- and guilt-related constructs, the Shame Regulation Model would be supported. By contrast, to the degree that shame- and guilt-related constructs are both associated with self-injury over and above general NA-related constructs, the Self-Punishment Model would be supported.

With regard to the presence (versus absence) of self-injury, we ran a pair of hierarchical binary logistic regressions, which are depicted in Table 3. First, we examined the relationship between Self-Injury group membership and the propensity to experience unpleasant emotions. In Block 1, the relationship between self-injury and NA-proneness was significant (odds ratio = 1.84,  $p < .01$ ). We then entered both shame- and guilt-proneness in Block 2. Although the

relationship between self-injury and guilt-proneness was non-significant, the relationship between self-injury and shame-proneness was significant (odds ratio = 2.12,  $p = .01$ ), indicating that for every one unit increase in shame-proneness the likelihood of Self-Injury group membership increased 2.12 times. Thus, these results better support the Shame Regulation Model than the Self-Punishment Model.

Second, as depicted in Table 3, we examined the relationship between Self-Injury group membership and the tendency to view particular unpleasant emotions as intolerable. In Block 1, the relationship between self-injury and NA aversion was significant (odds ratio = 4.37,  $p < .01$ ), with Self-Injury group membership becoming 4.37 times more likely with every one unit increase in NA aversion. When entered in Block 2, neither guilt aversion nor shame aversion was significantly associated with self-injury, but the overall model was significant ( $\chi^2 = 31.39$ ,  $p < .01$ ). Taken together, the results of the hierarchical binary logistic regressions provide partial support for both the Self-Punishment and Shame Regulation Models, as both of these models hypothesize that shame-proneness is relevant to self-injury over and above proneness to general NA.

Four hierarchical multiple regression analyses were conducted in order to further test the predictions of the Self-Punishment and Shame Regulation Models by focusing on the number and frequency of self-injurious behaviors within the Self-Injury group. As shown in Table 4, two of these analyses focused on the propensity for experiencing unpleasant emotions. When entered in the first step of analyses, increases in NA-proneness were significantly related to the use of a greater number of self-injurious behaviors ( $\beta = .40$ ,  $p < .05$ ) but not to having a greater frequency of self-injury. We then entered both shame-proneness and guilt-proneness in the second step to test the Self-Punishment and Shame Regulation Models. Guilt-proneness was not

associated with either self-injury. However, shame-proneness was positively associated with the number of behaviors used ( $\beta_s = .52, p < .01$ ) and with the total frequency of self-injury ( $\beta_s = .56, p < .01$ ).

The other two hierarchical multiple regression analyses investigated the role of aversion to emotions. Like NA-proneness, NA aversion was positively related to the number of self-injurious behaviors used ( $\beta = .40, p < .05$ ) in Step 1. Shame aversion and guilt aversion were entered in Step 2 to test the Self-Punishment and Shame Regulation Models. Neither motivational model was supported. Neither shame aversion nor guilt aversion were significantly associated with either indicator of the extent of self-injurious behavior after taking NA aversion into account.

## Discussion

In many ways, our predictions regarding the role of shame and its regulation in the motivation for self-injury were supported in the present study. Among women with a history of self-injury, the strength of shame regulation as a motivation for self-injury increased as the number different of self-injurious behaviors increased and as self-injurious acts became more frequent. Moreover, elevated levels of both shame-proneness and shame aversion – personality dimensions about which the Shame Regulation Model makes explicit predictions – were found in the subsample of women who self-injure. Both personality dimensions were positively related to the use of more types of self-injurious behavior, and increases in the propensity for shame were additionally related to engaging in self-injury more often. However, whereas shame-proneness continued to be associated with our indicators of self-injury over and above proneness to unpleasant emotions in general, shame aversion was not associated with our self-injury indicators after taking aversion to unpleasant emotions in general into account. These results are

broadly consistent with our expectation that shame-proneness would play a greater role in the motivation for self-injury than would shame aversion, though we had expected that latter construct to remain associated with self-injury over and above NA aversion. Thus, this initial examination of the Shame Regulation Model helps us to understand that women with a greater readiness for shame may be more motivated to engage in self-injury and that increases in the reported motivation to reduce shame is related to the use of self-injury to a greater extent.

The two other motivational models tested herein were also generally supported. Even though the affect regulation subscale on the ISAS was not associated with the indicators of the extent of self-injury, it was still a commonly reported motivation among the women in our sample. In fact, 73.1% of the women with a history of self-injury endorsed all three affect regulation items as “relevant” or “very relevant.” By comparison, 50.0% endorsed all three items on the original self-punishment subscale, and 38.5% endorsed all seven items on the expanded self-punishment subscale. Finally, 26.9% of women with a history of self-injury endorsed all three of the newly created items for the shame regulation subscale, and 23.1% endorsed all five items on the version of this subscale that included those items from the self-punishment subscale that conceptually overlap with the Shame Regulation Model. Ultimately, whereas the goal of regulating unpleasant emotions in general was the most commonly reported motivation among women who self-injure, the results of the correlation analyses indicate that motivations associated with the regulation of shame in particular were especially relevant to the extent of self-injurious behavior.

Also consistent with the Affect Regulation Model, both proneness and aversion to general NA were significant predictors of the presence of self-injury. Intolerance for unpleasant emotions was an especially strong correlate of the presence of self-injury, and the likelihood of

having a history of self-injury became more than 4 times greater with every unit increase in NA aversion. A greater propensity for unpleasant emotions was likewise associated with an increased likelihood of having a history of self-injury. However, no role for NA-proneness or NA aversion is made explicit by the Affect Regulation Model. That model simply asserts that self-injury is used to down-regulate unpleasant emotions; there are no assertions made about *for whom* this motivation may be relevant. We tested reasonable extensions of the model – that proneness and aversion to unpleasant emotions should be greater among individuals who self-injure than among those who do not – and found that these extensions were supported. Therefore, the present results suggest that the Affect Regulation Model be usefully extended, specifically by asserting that self-injury serves to reduce unpleasant emotions among those who experience distress frequently and are additionally unable to tolerate the experience.

The results herein also provide partial support for the Self-Punishment Model, which may help us to understand the motivations for self-injury and to whom those motivations generally apply. Linehan's (1993) direct assertion that self-injurers have a tendency to view themselves as “bad” people was supported, as we found that shame-proneness was associated with the presence and extent of self-injury above and beyond trait NA. Moreover, believing more strongly that one deserves to suffer punishment was also associated with the presence of self-injury and the number of different behaviors used.

Ultimately, the present findings regarding punishment deservingness raise questions about the meaning of “punishment” in the context of self-injury. Punishment, according to the principles of operant conditioning, is a means of reducing unwanted or “bad” behaviors. Although the goal of punishment is to change what a person *does*, punishment is not generally discussed as a means of changing who a person *is*. Punishment should thus be an action

expected in response to situations that elicit guilt – situations in which one’s behavior is judged to be inappropriate. However, guilt appears to be less important in understanding who is likely to engage in self-injury than are other emotions, with guilt-proneness showing no relationship to self-injury. Instead, at least among women with a history of self-injury, there appears to be a mistaken belief that punishing oneself can make amends for characterological flaws they perceive in who they are; punishment seems to have become a response to shame, perhaps because they do not have alternative shame-reducing strategies at their disposal.

That guilt-proneness is unassociated with the presence or extent of self-injury does not, however, necessarily imply that self-injury is ineffective in reducing state guilt, as might be expected by the Self-Punishment Model. Similarly, that NA-proneness and shame-proneness are associated with self-injury does not imply that physical injury or pain does effectively reduce general NA or shame, respectively. To better examine whether self-injury results in changes in state emotions that would be predicted by the Affect Regulation, Self-Punishment, and Shame Regulation Models, studies would need to employ laboratory task designs that involve proxies for self-injurious behavior. Such a study is the focus of Chapter 4.

## CHAPTER 4: SELF-INJURY MOTIVATIONS AND PRESSURE PAIN PERCEPTION

Laboratory tasks enable researchers to better investigate the functions of self-injury, which is useful in understanding what motivates individuals to willingly harm themselves. A number of past studies have used laboratory tasks. For instance, studies using imagery tasks have found that individuals with a history of self-injury report more unpleasant emotion before imagery and more pleasant emotion following imagery, but only when the imagery is related to self-injury (e.g., Haines, Williams, & Brain, 1995).

Other laboratory task studies use devices that actually induce physical pain. These studies also assess emotional experiences that precede, accompany, and follow tasks that serve as a proxy for self-injury. Such studies have the advantage of assessing these experiences as they are occurring, rather than retrospectively. Russ et al. (1992), for example, found that individuals with BPD who had a history of self-injury reported reductions in NA following a cold pressor test. Studies that use physical pain-inducing laboratory tasks are also able to assess important pain-related variables. For instance, by having participants engage in a pain-inducing task, it is possible to measure their ability to withstand the experience, an ability that is likely to differ across individuals.

The results of the study by Russ and colleagues (e.g., Russ et al., 1992) are consistent with the Affect Regulation Model, as they found that NA in general decreased from pre- to post-task. Furthermore, a recent study by Hooley et al. (2010) indicates that personality dimensions implicated by the Self-Punishment Model are associated with performance differences on tasks that induce pressure pain. Specifically, individuals who reported greater self-critical beliefs on the SRS, which reflect a combination of shame-proneness and punishment deservingness, had substantially greater abilities to endure pressure pain during a finger pressure task.

In the present investigation, we used a finger pressure algometer (Forgione & Barber, 1971) to induce pressure pain. This device creates a dull, aching pain in the right index finger that increases the longer the task continues. Because the task can be stopped by the participants at any time, we were able to assess individual and group differences in pain-related variables (further described below). Before and after the pressure pain task, we asked all participants to report their state emotional experiences to determine whether any changes in emotion consistent with the Affect Regulation, Self-Punishment, and Shame Regulation Models were taking place as a result of the task.

All three motivational models of self-injury motivation predict that individuals who self-injure will perform differently from those who do not self-injure on pressure pain tasks such as the finger pressure algometer. In particular, all three models predict that individuals who self-injure should be able to withstand pressure pain for a longer amount of time, given that pressure pain seems to serve some ulterior purpose for these individuals. However, each model predicts that the group differences in pain variables should be related to different emotions and personality dimensions.

A reasonable extension of the Affect Regulation Model is that greater ability to withstand pain will be associated with NA-proneness and aversion. For the Self-Punishment Model, longer duration on the pressure pain task should be associated with punishment-deservingness, guilt- and shame-proneness, and guilt and shame aversion. Via the Shame Regulation Model, we predict that shame-proneness and aversion will uniquely contribute to elevations on pressure pain-related variables, over and above any relationships to NA- or guilt-related constructs.

With regards to the measurement of state emotions, the Affect Regulation Model predicts that individuals with a history of self-injury should experience a decrease in NA from pre- to

post-task. The Self-Punishment Model predicts that there should be specific decreases following the pressure pain task in state guilt and shame. Finally, via the Shame Regulation Model, we expected there would be changes specifically in state shame.

## Methods

### *Participants*

Information regarding the sample of women who participated in this study can be found in Chapter 2.

### *Measures*

Information on measures of self-injury, proneness to emotion, aversion to emotion, and self-punishment/punishment deservingness can be found in the Methods section of Chapter 3.

*Current Caffeine Levels.* Because of its potential impact on the pain variables (see Sawynok & Yaksh, 1993), we assessed each participant's use of caffeine on the day of the study. All participants reported on their consumption of coffee, tea, soda, and energy drinks on the day that they participated. The amounts reported were converted to an approximate number of milligrams, based on nutrition information made available by manufacturers of major brands and then divided by the woman's weight in kilograms. Women additionally reported on how long prior to coming in for the study they had consumed the caffeinated beverage, as caffeine has a half-life of five hours in the human body. Thus, the final score we calculated reflects the amount of caffeine per kilogram unit body weight in the woman's system given how long ago she consumed caffeine. For example, if a 140 lb. woman reported consuming a can of Coca-Cola (34 mg) five hours prior to beginning the study, her current caffeine level would be .27. As discussed in Chapter 2, women from the community were excluded from the present research if their current caffeine levels were above 1.0. We were unable to exclude women recruited from

the undergraduate population based on their caffeine levels; their current levels ranged from 0.0 to 1.15 and were significantly higher than those for the women recruited from the community ( $F(1, 113) = 7.194, p < .01$ ).

*Tattooing History.* History of tattooing was thoroughly assessed in this study because pilot testing suggested that individuals with tattoos were more tolerant of pressure pain than were those without tattoos. We asked: (1) how many tattoos the participants have; (2) how many different times they have had tattoo work done; (3) the amount of time spent getting tattooing done; (4) the percentage of their tattoos that were filled (versus just lines); and (5) approximately how many square inches of their body are covered in tattoos. Participants were provided with a visual image of a square inch to help them approximate how much of their body has been tattooed. As all of our indicators of the extent of tattooing were very highly correlated (all  $rhos < .92$ ), we created a tattooing composite score for use in subsequent analyses.

*Pressure Pain Perception.* We used a finger pressure algometer (Beecher, 1959) based on the design by Forgione and Barber (1971) to create pressure pain. This device has a 30 cm long hinge that is connected to a 40 cm long x 8 cm wide base. Near the end of the hinge that is connected to the base, a 1 cm long by 2 mm wide Lucite edge is attached. At the other end of the hinge, a weight is placed. The algometer is calibrated so that the weight at the far end of the hinge creates a constant 2 kg of pressure at the Lucite edge.

To use the algometer, participants were asked to place their right index finger into the device so that when the Lucite edge is lowered it contacts the skin between the first and second joints, an area of the body where there are minimal neurohistological variations across individuals. The device creates a dull, aching pain using focal pressure, which is useful because it is less influenced by physiological factors such as blood pressure or heart rate than are other

pain-inducing procedures (e.g., cold pressor tests; Forgione & Barber, 1971). The algometer is also useful in that it is safe for the participants, as it does not cause any tissue damage. In order to further ensure the safety of our participants, we did not allow any participant to use the device for longer than 10 minutes during any administration of the task. As participants were allowed to terminate the task at any time, they did not necessarily reach the 10 minute maximum for any of the task administrations.

Use of an algometer for assessing pressure pain variables has been successful in previous research (e.g., Hooley & Delgado, 2001; Hooley et al., 2010). Specifically, we used the algometer to measure pressure pain threshold and tolerance.<sup>2</sup> Pressure pain threshold was defined as the amount of time in seconds that it takes for the participants to indicate that they have begun to feel pressure pain. Pressure pain tolerance was the amount of time it takes in seconds for the participants to reach the greatest amount of pain they are willing to experience; in other words, it is the time at which the participants choose to stop the task. In order to obtain a more reliable measure of these variables, the pressure pain task was administered twice during the session. The algometer has been used in this way successfully in previous research on self-injury among individuals with schizophrenia (e.g., Hooley & Delgado, 2001) as well as with an undergraduate sample with a history of NSSI (Hooley et al., 2010).

We also asked participants to periodically provide verbal painfulness and unpleasantness ratings throughout the pain task administrations. Whereas painfulness was defined for the

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<sup>2</sup> Hooley and colleagues additionally calculated a pain endurance score by subtracting each participant's pain threshold from his/her pain tolerance. Although we did the same for our sample, results for the endurance scores were essentially identical to those for tolerance, potentially because there was such limited variability in pain threshold scores.

participant as the intensity with which the stimulus hurts, unpleasantness was defined as the extent to which the stimulus is bothersome. Given that some stimuli, such as overly loud music, can be bothersome and unpleasant without actually being painful, we wanted to ensure these dimensions were assessed separately. Using two visual analogue scales, participants rated the intensity of the pain they are experiencing from 0 (“no pain”) to 10 (“highest possible pain”), as well as the unpleasantness of the experience from 0 (“no unpleasantness”) to 10 (“as unpleasant as possible”). Ratings were made every 15 seconds during each administration of the pressure pain task. For each administration we computed a mean painfulness rating and a mean unpleasantness rating, each of these scores taking into consideration that the women differed in the number of ratings made (given that they could terminate the tasks at different times).

*State Emotions.* Because we were interested in changes in state emotions across administrations of the pressure pain task, participants were asked to make ratings regarding their current emotional state before and after each task administration on a state emotion measure (SEM). Three items each were created to reflect general negative affect (Mean  $\alpha = .83$ ; e.g., “I feel overwhelmed in the current situation”), guilt (Mean  $\alpha = .91$ ; e.g., “I feel like my behavior should be criticized”), and shame (Mean  $\alpha = .94$ ; e.g., “I feel like I am a terrible person”). Additionally, three items each were created to reflect general positive affect (PA; Mean  $\alpha = .91$ ; e.g., “I feel pleased right now”), high arousal PA (Mean  $\alpha = .88$ ; e.g., “I am cheerful about what is going on”), and low arousal PA (Mean  $\alpha = .85$ ; e.g., “I feel calm about what is happening”). Each of the items was rated on a scale from 1 to 5, indicating the degree to which the participants agreed with each given statement.

## Results

### *Self-Injurious Behaviors and the Perception of Pressure Pain*

The Affect Regulation, Self-Punishment, and Shame Regulation Models all assume that physical pain is functional for individuals who self-injure, serving as a (maladaptive) means of achieving short-term goals (e.g., down-regulating unpleasant emotions, punishing oneself). As such, all three motivational models indirectly suggest that having a history of self-injury should increase one's willingness and ability to tolerate pressure pain. Because both pain perception variables were non-normally distributed, rank-order correlations were used in all analyses involving pain threshold and/or tolerance. As shown in Table 5, whereas pain threshold was not related to self-injury in the present sample, pain tolerance levels were positively related to both the presence of self-injury and the total frequency of self-injurious acts. Therefore, although they begin to feel pain as quickly as individuals who do not self-injure, women who do self-injure are willing and/or able to withstand pressure pain for longer periods of time.

### *Factors Potentially Influencing Pain Perception and Its Relationship to Self-Injury*

Rank-order correlations indicated that current caffeine levels were not associated with either pain threshold or pain tolerance ( $\rho$ s = -.04 and -.12,  $p$ s = n.s., respectively). The relationship between tattooing and pain threshold was also not significant ( $\rho$  = .04,  $p$  = n.s.). However, the relationship between tattooing and pain tolerance was almost statistically significant ( $\rho$  = .18,  $p$  = .058), indicating that individuals with more extensive tattooing histories are somewhat more willing and/or able to withstand pressure pain. Moreover, tattooing was associated with having a history of self-injury ( $\rho$  = .23,  $p$  = .01), with women in the Self-Injury group reporting more substantial tattooing than those in the No Self-Injury group ( $F(1, 114) = 12.97, p < .01$ ). Although the results of a hierarchical binary logistic regression indicated

that tattooing history was associated with an increased likelihood of membership in the Self-Injury group (odds ratio = 2.04,  $p < .01$ ), pain tolerance remained significantly associated with the presence of self-injury over and above tattooing history.

#### *Pain and Unpleasantness Ratings during Pain Task Administrations*

We next considered whether the pressure pain task was more or less painful and/or unpleasant depending on group membership. Although mean painfulness ratings did not differ between the Self-Injury and No Self-Injury groups during the second administration of the pain task ( $F(1, 104) = 1.17, p = \text{n.s.}$ ), they were marginally different between groups during the first administration ( $F(1, 107) = 3.10, p = .081$ ). Similarly, although mean unpleasantness ratings did not differ between groups during the second administration ( $F(1, 104) = 1.71, p = \text{n.s.}$ ), they were marginally different during the first administration ( $F(1, 107) = 3.77, p = .055$ ). Thus, women with a history of self-injury reported a slightly less painful and less unpleasant experience than women without such a history during the first pain task administration.

#### *Changes in State Emotions as a Consequence of Pressure Pain*

As shown in Table 6, women in the Self-Injury group had significantly higher initial levels of general NA and shame, as well as significantly lower general PA and low arousal PA, than did women in the No Self-Injury group. Moreover, although the between-group differences for general NA, general PA, and low arousal PA became non-significant following the first pain task administration, the differences between the groups in state shame remained significant until after the second pain task administration.

To determine whether there were any important *changes* in the various state emotions as a consequence of the pain task administrations, we next ran a series of repeated measures ANOVAs, treating the four assessments of each emotion, respectively, as the within-subjects

factor and group membership as a between-subjects factor. For four of the emotions – general NA, shame, general PA, and low arousal PA – the State Emotion Assessment Number x Group interaction was statistically significant, indicating that women in the Self-Injury group had overall rates of change for these emotions that differed from those of women in the No Self-Injury Group. Huynh-Feldt  $F$  statistics for each of the emotions are presented below the graphs in Figure 1.

We then re-ran the same set of repeated measures ANOVAs after splitting the data file by group membership in order to conduct within-group pairwise comparisons to examine whether any of the changes in state emotion were statistically significant for women with and/or without self-injury history. The results of these comparisons are depicted both in Figure 1 and in Table 7. Statistically significant ( $p < .05$ ) pairwise comparisons are indicated on each of the graphs in Figure 1, with at least one comparison achieving significance for each of the emotions assessed. For general NA and shame, only changes from before to after the administration of the first pain task were significant. Importantly, this was true among women both with and without a history of self-injury, indicating that women experienced a reduction in general NA and shame during the first pain task regardless of their group membership. Changes in guilt, general PA, high arousal PA, and low arousal PA were only significant within the No Self-Injury group. Women without any self-injury history experienced decreases in guilt from before to after the first pain task administration but subsequent increases in guilt leading up to the second pain task administration. These women also endorsed decreases in PA from before to after the first pain task administration, as well as decreases specifically in low arousal PA from before to after the second pain task administration.

### *Model-Implicated Personality Dimensions and the Perception of Pressure Pain*

Having found that our sample displayed between-group differences in pain perception and that our groups additionally differed in their mean levels for most of the model-implicated personality dimensions, we continued by examining the relationships between performance on the pressure pain task and the constructs predicted to be important in self-injury motivations according to the Affect Regulation, Self-Punishment, and Shame Regulation Models. Table 8 shows the results of rank-order correlation analyses, which indicate that higher pain threshold levels were associated only with elevations in self-critical beliefs on the SRS. By contrast, having higher pain tolerance was associated with increase in aversion to both guilt and shame, as well as shame-proneness.

### Discussion

The Shame Regulation Model, which asserts that the physical pain created by self-injurious behaviors serves as a means of reducing shame, predicts that laboratory tasks like the one used in the present study should also result in shame reduction. Consistent with this prediction, women in the present sample with a history of self-injury experienced a decrease in shame following the experience of pressure pain induced by the finger pressure algometer. The Shame Regulation Model additionally predicts that individuals' abilities to withstand pain should be greater among those with elevations in shame-proneness and shame aversion, as these personality dimensions are hypothesized to be useful in understanding which individuals are motivated to engage in self-injury as a means of regulating shame. The results reported above also generally support this prediction, as elevations in both the propensity for shame and the perception of shame as especially painful and unwanted were associated with increases in tolerance for pressure pain. Further, consistent with the Shame Regulation Model's assumption

that self-injury is relatively more strongly associated with shame-proneness than with shame aversion, only elevations in proneness to shame remained significant after taking general NA into account.

We also found changes in state general NA among the women in this study with a history of self-injurious behavior, which seems to support the predictions of the Affect Regulation Model. This model has already received considerable support from laboratory task studies (see Klonsky, 2007), and our results therefore potentially add to the growing evidence that self-injury broadly serve a broad emotion regulation function. However, that there were no significant reductions in state guilt among women with a history of self-injury is actually in contrast to the expectations of not only the Self-Punishment Model but also the Affect Regulation Model, as the latter model predicts reductions in any and all unpleasant emotions as a consequence of physical pain. It stands to reason that although self-injury may reduce a variety of unpleasant emotions, behaviors designed to cause physical harm appear not to reduce unpleasant emotions completely indiscriminately.

Closer consideration of our findings regarding changes in state NA additionally suggests that greater caution may be warranted when interpreting the results of this or any laboratory task study that tests the Affect Regulation Model. Specifically, it is important to consider the extent to which the state NA measure assesses distress associated with state anxiety. For example, our SEM includes three items for general NA, at least two of which may assess current anxiety-related distress. To the degree that measures used in other laboratory task studies similarly involve items that could be interpreted as asking about anxiety, there may be two important limitations placed on the interpretation of the results of such studies. First, if it is not the case that the measures used actually assess *general* NA, then this should be clarified when describing

the changes in state emotions that are found. For example, in the present study it may be more appropriate to report that we found reductions in state anxiety after the administration of the first pressure pain task.

Second, and perhaps more importantly when the state emotion measure used reflects largely anxiety, it may not really be appropriate to attribute any reductions found in state NA to the pressure pain created by the self-injury proxy. Anxiety is especially likely to arise in unpredictable situations in which there is the potential for an unpleasant outcome to occur (Dugas, Buhr, & Ladouceur, 2004; Mineka & Zinbarg, 1996). Pain tasks like the finger pressure algometer are surely novel for the participants, and the task's stated potential to generate an unpredictable amount of pain is likely to induce anxiety in many participants. Because the task and its outcomes are no longer unpredictable after the task is complete, individuals are likely to report a decrease in anxiety. However, this reduction in anxiety is not a consequence of the pressure pain, as the Affect Regulation Model would suggest. Ultimately, to adequately test the Affect Regulation Model future studies should assess a range of unpleasant emotions, separately, in order to better determine which emotions actually decrease as a result of the physical pain. Additionally, because anticipation of the task itself is likely to elicit anxiety prior to the first administration of the task, it may be more appropriate to look for changes in anxiety that result from the second administration.

It is also interesting that women with a history of self-injury did not experience the same decreases in PA that the women with no history of self-injury did. In fact, whereas women who have never self-injured reported decreases in low arousal PA (e.g., feeling calm, relaxed) and general PA (e.g., feeling positive, good), those who have self-injured reported increases. Thus, the experience of pressure pain in this study made women who have hurt themselves on purpose

feel more relaxed and positive, which is commensurate with some previous laboratory task studies (e.g., Coid, 1993; Kemperman et al., 1997).

Research on tattooing and self-injury is sparse (e.g., Hicinbothem, Gonsalves, & Lester, 2006; Stirn & Hinz, 2008), and to our knowledge ours is the first study to consider the impact of tattooing on pain perception in relation to self-injury. Although the present findings require replication in another, hopefully larger sample of individuals with a history of self-injury, they suggest that women who self-injure may also be motivated to engage in frequent or extensive tattooing. Getting tattoos may result in the same desired changes in state emotions, with the added benefit of tattooing being that it is a more socially acceptable behavior than other acts (e.g., cutting, burning). In fact, at least one previous study has considered tattooing to be a form of self-injury, at least when the tattooing was done by the individuals themselves (Franklin et al., 2010). Future work should also assess changes in state emotions that result as a consequence of tattooing. On the other hand, post-hoc analyses revealed that tattooing history among women in our Self-Injury group was unrelated to the personality dimensions implicated by the three motivational models, with the exception of NA-proneness ( $r = .39, p = .05$ ). Therefore, although it is still possible that the same motivations drive tattooing and self-injurious behaviors (e.g., wanting to reduce unwanted emotions), different personality factors may help to explain who is likely to engage in tattooing versus who is likely to engage in other self-destructive behaviors. Overall, a broader question we are interested in is: to what extent do the personality dimensions implicated by the Shame Regulation Model help us understand who is likely to engage in self-destructive behaviors of any kind? This question is considered in Chapter 5.

## CHAPTER 5: THE SPECIFICITY AND COMPREHENSIVENESS OF THE SHAME REGULATION MODEL OF SELF-INJURY

Self-injurious behavior is not the only potentially self-destructive behavior associated with psychopathology. Thus, although in proposing the Shame Regulation Model we have suggested that self-injury is used to down-regulate shame among individuals with elevations in shame-proneness and shame aversion, we did not assume that these personality dimensions or the goal of reducing shame were specific to self-injury as an outcome. In fact, we have elsewhere asserted that the regulation of shame is central in a broad range of psychopathological outcomes and motivates a wide variety of maladaptive behaviors (see Schoenleber & Berenbaum, in press a). As a logical next step in this research, we therefore examined the utility of the Shame Regulation Model for understanding the motivation to engage in self-destructive behaviors other than self-injury. Importantly, we use the term “self-destructive behavior” somewhat broadly to include any act that can result in damage to the individual, where that damage may be physical, social, or occupational in nature.

Furthermore, even though the central premise of the Shame Regulation Model is that elevations in shame-related constructs are important in the motivation for self-injurious behavior, these constructs are unlikely to fully predict who will engage in self-injury. Why proneness and/or aversion to shame motivate self-injury among some people but not others remains an open question. Undoubtedly, other personality and environmental factors play a role in self-injury motivation. In this study, we therefore examined the relevance of impulsivity and general difficulties regulating emotions in self-injurious behavior as an initial test of the comprehensiveness of the Shame Regulation Model.

*Specificity of the Shame Regulation Model: Binge Eating, Substance Use, and Other-Directed Aggression*

The literature on binge eating, substance use, and aggressive acts suggests that they are a means of coping with or responding to unpleasant emotions. For example, existing studies indicate that episodes of binge eating are often preceded by NA (Greeno, Wing, & Shiffman, 2000), and it has been hypothesized that binge eating is used as a means of reducing unpleasant emotions (e.g., Heatherton & Baumeister, 1991; Stice, Bohon, Marti, & Fischer, 2008). Similarly, problematic drinking behavior and drug use are thought to be perpetuated, at least in part, by the need to cope with high levels of NA (e.g., Cooper, Frone, Russell, & Mudar, 1995; Stewart, Karp, Pihl, & Peterson, 1997), and reactive forms of other-directed aggression are a response to perceived threat and motivated by unpleasant emotion (usually anger; e.g., Dodge, 1991). However, if the Shame Regulation Model is non-specific to self-injury as a self-destructive behavior, then binge eating, substance use, and aggression may all be alternative outcomes potentially motivated by the desire to reduce shame in particular among individuals with elevated levels of shame-proneness and aversion.

Some evidence of relationships between these self-destructive behaviors and shame has already begun to accumulate. Binge eating is associated with shame-proneness even after taking general NA into account (e.g., Gupta, Rosenthal, Mancini, Cheavens, & Lynch, 2008). Past research has also found a positive relationship between shame-proneness and alcohol dependence in both college and criminal populations (e.g., Dearing, Stuewig, & Tangney, 2005). Additionally, greater propensity for shame is associated with more frequent use of cocaine, as well as greater dependence on cocaine and marijuana, in an offender sample (Dearing et al., 2005). Shame's association with anger and aggression has long been referred to by others as

“shame-rage”, wherein hostility and violence toward others is the consequence of self-hate that becomes so overwhelming it must be directed away from the self (e.g., Lewis, 1971). Although the relationship between shame and anger/aggression requires further clarification, evidence suggests that elevations in shame-proneness are related to increased other-directed aggression when individuals also have a tendency to externalize blame (Stuewig et al., 2010). Thus, it is possible that shame may play a role in these self-destructive behaviors above and beyond general NA, as would be expected if the Shame Regulation Model was applicable to self-destructive behaviors broadly.

*Comprehensiveness of the Shame Regulation Model: Impulsivity and Emotion Regulation Difficulties*

Several researchers have suggested that problems with impulse control are closely tied to the tendency to self-injure (e.g., Evans & Lacey, 1992; Pattison & Kahan, 1993). Some theories assert that impulsivity is a proximal antecedent to suicidal and self-injurious behaviors, preventing individuals from thinking through the consequences of reacting to the urge to hurt themselves (e.g., Baumeister, 1990). Other theories focus on impulsivity as a distal etiological factor, putting individuals at greater risk of habituating to the fear of pain and death (e.g., Joiner, 2005). There is some evidence of a positive relationship between impulsivity and self-injurious behaviors (Lynam, Miller, Miller, Bornolova, & Lejuez, 2011) and suicide attempts (Anestis & Joiner, 2011); however, this relationship warrants further empirical investigation.

People can have difficulty regulating their emotions for various reasons. Gratz and Roemer (2004), for example, suggest broad emotion regulation difficulty involves tendencies to be purposefully inexpressive, difficulty inhibiting behaviors when experiencing unpleasant emotions, having a limited repertoire of strategies, and being unable to benefit from the

informational value of emotions. Past research has found positive relationships between self-injury and some of these features of emotion regulation difficulty. For example, increases in self-injury coincide with elevations in the tendency to not display one's emotions and to be less clear about emotions (Evren & Evren, 2005; Gratz, 2006; Polk & Liss, 2007). Self-injury is also positively associated with emotion dysregulation more broadly (Gratz & Chapman, 2007). Additionally, all of the evidence reviewed in the previous chapters that supports the Affect Regulation Model is essentially consistent with a positive relationship between emotion dysregulation and self-injurious behavior.

In the present investigation, we were interested in examining the importance of personality dimensions implicated by the Shame Regulation Model in the context of impulsivity and features of broad emotion regulation difficulty, both of which are already known correlates of self-injury. However, whereas we expect that shame-proneness and aversion are useful for understanding which individuals will experience motivation to engage in self-injurious acts, impulsivity and difficulty regulating emotions may place individuals at risk of actually using these behaviors. In other words, experiencing shame often and finding that experience intolerable may produce an urge to harm oneself, but the inability to inhibit behavior and/or finding the regulation of emotions to be challenging in general may increase the likelihood of actually using self-injury as a means of reducing shame. If this is the case, then impulsivity and difficulty regulating emotions should moderate any relationships between shame constructs and self-injury.

#### *Shame Regulation Model-Implicated Personality Dimensions and BPD*

In terms of psychopathology, self-injurious behavior is perhaps most commonly thought of in association with BPD, as repetitive self-mutilation is symptomatic of the disorder (APA,

2000). Although the Shame Regulation Model focuses on motivations for self-injurious behavior in particular, it is possible that shame-proneness and/or aversion are associated with BPD symptoms in general. In fact, our previous work indicates that elevations in shame-proneness and aversion are associated with increases in self-reported BPD symptoms on a paper-and-pencil questionnaire within a general undergraduate sample, though only shame aversion remained significantly related to BPD symptoms after taking trait NA and experiential avoidance (see Hayes et al., 2004) into account (Schoenleber & Berenbaum, in press b). In the present investigation, we sought to replicate our previous findings in a more diverse sample and when additionally using an interview measure of BPD. Thus, we considered the roles of shame-proneness and aversion in BPD symptoms over and above NA-proneness on the PANAS and NA aversion on the ACS in the present sample.

In summary, extending the Shame Regulation Model to other self-destructive behaviors, we predicted that shame-proneness and shame aversion would be positively associated with binge eating and bulimia-related attitudes/behaviors, problematic alcohol and illicit drug use, and reactive aggressive acts. Further, we expected that impulsivity and emotion regulation difficulty would moderate the relationships between shame constructs and self-injury. Finally, we hypothesized that shame-proneness and shame aversion would be positively associated with symptoms of BPD over and above proneness and aversion to NA in general.

## Methods

### *Participants*

Information regarding the sample of women who participated in this study can be found in Chapter 2.

## *Measures*

Information on measures of self-injury, proneness to emotion, and aversion to emotion can be found in the Methods section of Chapter 3.

*Binge Eating.* Diagnostically, binge eating occurs when an individual consumes considerably more food than would be expected given the circumstances, within a discrete period of time, and during which time the individual feels as though s/he does not have control over the quantity of food being consumed (APA, 2000). Taken from the Eating Disorders Diagnostic Scale (EDDS; Stice, Telch, & Rizvi, 2000), all participants were asked: “how many days per week on average over the past 6 months have you eaten an unusually large amount of food *and experienced a loss of control?*” Responses ranged from 0 to 7 with a mean of .84 days per week ( $SD = 1.6$ ). Additionally, we used the Bulimia subscale from the Eating Disorders Inventory (EDI; Garner, Olmstead, & Polivy, 1983) to assess the degree to which the women in the present sample tended to engage in uncontrollable overeating. This measure has 7 items rated from “never” to “always.” Past research indicates that the EDI subscales are valid and reliable measures of attitudinal/behavioral features of eating disorders (see Garner et al., 1983). Commensurate with previous research, Cronbach’s alpha was .94 in the present sample.

*Substance Use Problems.* The Alcohol Use Disorders Identification Test (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) was used to measure the extent of alcohol misuse in the present sample. The AUDIT includes 10 questions designed to assess current symptoms of alcohol dependence (e.g., “How often during the last year have you failed to do what was normally expected of you because of drinking?”). The AUDIT shows good internal consistency and good convergent validity with other self-report measures of alcohol-related

problems, as well as biochemical measures (see Allen, Litten, Fertig, & Babor, 2006).

Cronbach's alpha for the AUDIT in the present sample was .83.

To measure the misuse of illicit drugs, we used the Drug Use Disorders Identification Test (DUDIT; Berman, Bergman, Palmstierna, & Schlyter, 2005a). This measure includes 10 items ("Over the past year, have you felt that your longing for drugs was so strong that you could not resist it?") that assess substance use problems within the last year and one additional item that assesses the frequency of usage of various illicit drugs. Because of the relatively small number of individuals in the present sample who reported having a history of illicit drug use ( $N = 34$ ), we were unable to focus on problematic use of any particular drug in our analyses. Existing research indicates that it is a reliable and valid measure of drug dependence (Berman et al., 2005b). Commensurate with past studies, internal consistency for the DUDIT was good ( $\alpha = .87$ ) in the present sample.

*Aggression.* We used the Forms of Aggression questionnaire (FOA; Verona, Sadeh, Case, Reed, & Bhattacharjee, 2008) to assess various forms of reactive aggression. Forty items on a 5-point scale are used to assess physical aggression (8 items;  $\alpha = .91$ ; "I start fights"), aggression directed toward property (6 items;  $\alpha = .97$ ; "I start a fire that causes damage"), verbal aggression (8 items;  $\alpha = .89$ ; "I curse them out"), relational aggression (9 items;  $\alpha = .87$ ; "I ruin their friendships with other people), and passive-rational aggression (9 items;  $\alpha = .86$ ; "I take my time doing things they want me to do, just to show them"). The FOA has demonstrated good convergent validity with other aggression measures (e.g., Buss & Warren, 2000).

*Impulsivity.* In the present study, impulsivity was assessed using two subscales from the Constraint primary trait scale of the Multidimensional Personality Questionnaire – Brief Form (MPQ-BF; Patrick, Curtin, & Tellegen, 2002), with lower scores on these subscales indicating

greater tendencies for impulsive action. Individuals who score low on the Control subscale tend to be less cautious and fail to plan ahead ( $\alpha = .78$ ; “I like to stop and think things over before I do them”). Those who score low on the Harm Avoidance subscale tend to put themselves in physically dangerous situations in the pursuit of thrills ( $\alpha = .56$ ; “I would dislike more being out on a sailboat during a great storm at sea, versus having to stay at home every night for two weeks with a sick relative”). The MPQ subscales generally display adequate validity and reliability (Patrick et al., 2002), though the internal consistency of the Harm Avoidance subscale was somewhat lower in the present sample than is typically found.

*Emotion Regulation Difficulty.* To assess a variety of problems regulating emotions, we used the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). This 52-item measure is used to calculate six subscales: 1) Non-Acceptance of Emotion Responses ( $\alpha = .90$ ; “When I’m upset, I become angry with myself for feeling that way”), 2) Difficulties Engaging in Goal-Directed Behavior ( $\alpha = .87$ ; “When I’m upset, I have difficulty getting work done”), 3) Impulse Control Difficulties ( $\alpha = .85$ ; “I experience my emotions as overwhelming and out of control”), 4) Lack of Emotional Awareness ( $\alpha = .76$ ; “I pay attention to how I feel”), 5) Limited Access to Emotion Regulation Strategies ( $\alpha = .88$ ; “When I’m upset, I believe I will remain that way for a long time”), and 6) Lack of Emotional Clarity ( $\alpha = .67$ ; “I am confused about how I feel”). All of the scales, as well as DERS total scores, display adequate validity and test-retest reliability (see Gratz & Roemer, 2004).

*BPD.* BPD was assessed using both a questionnaire and an interview in the present research. Participants responded to the items on the SNAP-2 (Clark et al., in press) that comprise the BPD diagnostic scale (e.g., “I have a lot of love-hate relationships”). The SNAP-2 BPD diagnostic scale has good criterion and construct validity in clinical and normative samples,

as well as test-retest reliability (Clark, et al., in press). Because dimensional scores for the SNAP-2 scales tend to have better reliability than criterion scores (see Clark et al., in press), we used a dimensional SNAP-2 BPD score in our analyses. Internal consistency in the present sample was good ( $\alpha = .88$ ).

Additionally, all participants were interviewed by the researcher using the BPD portions of the PDI-IV (Widiger, et al., 1995). Each of the nine BPD criteria was rated on a scale from 0 to 3 with 0 indicating the absence of a given symptom, 1 indicating sub-clinical presence of the symptom, 2 indicating clinically significant levels of the symptom, and 3 indicating severe levels of the symptom.<sup>3</sup> In the analyses presented below, we used a weighted symptom count score for PDI-IV BPD. The SNAP-2 BPD diagnostic scale and the PDI-IV BPD scores were highly correlated ( $r = .70, p < .01$ ).

## Results

### *Specificity of the Shame Regulation Model to Self-Injury as a Self-Destructive Behavior*

As an initial test of the specificity of the Shame Regulation Model, we examined the correlations between self-destructive behaviors and shame-related constructs. Because they were non-normally distributed, we used Spearman rank order correlations for the aggression, drug use, and binge eating variables. The results shown in Table 9 indicate that, consistent with the Shame Regulation Model, both shame-proneness and shame aversion were positively related to verbal aggression, passive-rational aggression, attitudinal/behavioral features of bulimia, and the

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<sup>3</sup> The PDI-IV is typically used with a scale from 0 to 2; however, for this study, a “sub-clinical” rating was added. This change in the PDI-IV rating scale has been used previously (Berenbaum, Thompson, Milanak, Boden, & Bredemeier, 2008) and was developed in consultation with Thomas Widiger.

frequency of binge eating over the last 6 months. Additionally, higher shame aversion was associated with increases in drug use problems and physical and relational aggression, though shame-proneness was not. Thus, the personality dimensions implicated by the Shame Regulation Model are associated with various self-destructive behaviors, rather than self-injury alone.

#### *Comprehensiveness of the Shame Regulation Model of Self-Injury*

As depicted in Table 10, impulsivity-related subscales on the MPQ were not significantly related to the presence of self-injury; thus, we did not include these subscales in any subsequent analyses. By contrast, all DERS subscales except Lack of Emotional Awareness were associated with the presence of self-injury. Furthermore, the extent of self-injury, specifically the number of different behaviors used, was positively associated only with having a limited repertoire of emotion regulation strategies and being having low clarity of emotion. Interestingly, the Lack of Emotional Awareness subscale was not correlated with any of the other DERS subscales, though the other subscales were all positively related to each other ( $r$ s from .23 to .68,  $p$ s < .02). Thus, for use in subsequent analyses we calculated a DERS total score that did not include the Lack of Emotional Awareness subscale.<sup>4</sup>

We then ran a hierarchical binary logistic regression predicting the presence of self-injury in order to examine the possible moderating effects of emotion regulation difficulty in the relationship between shame and presence of self-injury. Shame-proneness, shame aversion, and emotion regulation difficulties were entered in the first block. Emotion regulation difficulty significantly predicted group membership (odds ratio = 3.13,  $p$  < .01), and shame aversion

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<sup>4</sup> Using a DERS total score that included the Lack of Emotional Awareness subscale resulted in only minor magnitude differences in the results presented, with all of the significant relationships reported remaining significant when this alternative DERS total score was used.

marginally predicted group membership (odds ratio = 1.83,  $p = .07$ ). Shame-proneness was unassociated with the presence of self-injury in Block 1. In Block 2, neither the shame-proneness x emotion regulation difficulty interaction nor the shame aversion x emotion regulation difficulty interaction was a significant predictor of group membership, indicating that broad difficulty regulating emotions did not moderate the relationship between shame constructs and the presence of self-injury.

Next, the possibility that the relationship between shame and the extent of self-injury would be moderated by broad emotion regulation difficulty was examined via two hierarchical multiple regression analyses, the results of which are depicted in Table 11. A main effect for shame-proneness was found for both the number of self-injurious behaviors used ( $\beta = .42, p < .05$ ) and for the total frequency of self-injurious acts ( $\beta = .62, p < .05$ ), though no main effects were found for either shame aversion or emotion regulation difficulty in the first steps of these analyses. However, in Step 2 the shame aversion x emotion regulation difficulty interaction term was significantly associated with increases in the number of self-injurious behaviors used ( $\beta = .95, p < .01$ ), though the shame-proneness x emotion regulation difficulty interaction term was not. Neither interaction term was significantly associated with the total frequency of self-injurious acts. Following Aiken and West (1991) and as depicted in Figure 2, increased shame aversion was associated with the use of fewer self-injurious behaviors at low levels of emotion regulation difficulty ( $\beta = -.92, p = .01$ ), but was not associated with how many self-injurious behaviors were used at high levels of emotion regulation difficulty ( $\beta = .12, p = \text{n.s.}$ ).

#### *The Role of Shame in BPD*

Based on our interview measure, nine of the women in the present sample met sufficient criteria to warrant a diagnosis of BPD, and an additional 25 women had at least one clinically

significant symptom of that disorder. Thus, 21.7% of the sample evidenced at least one BPD symptom. As shown in Table 12, BPD symptoms on both the PDI-IV interview and SNAP-2 questionnaire were positively associated with both shame-proneness and shame aversion. They were additionally associated with NA-proneness and NA aversion.

To examine the incremental predictive utility of shame-proneness and shame aversion in BPD symptoms, we next ran a pair of hierarchical multiple regression analyses, the results of which are shown in Table 13. NA-proneness and aversion were entered into Step 1, with both constructs being significantly associated with BPD symptoms on the PDI-IV. However, the addition of shame-proneness and shame aversion in the second steps was not significant in either analysis. Thus, shame-related constructs did not play a role in BPD symptoms over and above general NA-related constructs in the present investigation.

## Discussion

The present study considered both the specificity and comprehensiveness of the personality dimensions implicated by the Shame Regulation Model. In general, we found that shame-proneness and shame aversion were relatively non-specific to self-injury as an outcome and non-comprehensive in predicting which individuals would be motivated to engage in self-injury. More specifically, we found that shame-related constructs were associated with binge eating, drug use problems, and some forms of reactive aggression, though neither shame-proneness nor aversion was related to alcohol use problems. Furthermore, whereas shame-proneness was directly related to the extent of self-injurious behavior, emotion regulation difficulties were found to moderate the relationship between shame aversion and the number of self-injurious behaviors used by the women in our sample with a history of such acts. Among

women with a history of self-injury, increasing perceptions of shame as intolerable were related to having tried fewer types of self-injury, if broad difficulty regulating emotions was low.

Some of the findings presented above were inconsistent with our expectations and/or are difficult to interpret. To begin with, although we had expected impulsivity to be associated with self-injurious behavior, as has been found by others (Lynam et al., 2011), our impulsivity-related measures were generally unrelated to self-injury. One possible explanation for why we did not find relationships between impulsivity and self-injury is that growing evidence suggests that impulsivity is actually an umbrella term for a number of lower-order, non-isomorphic personality traits (see Depue & Collins, 1999; Whiteside & Lynam, 2001). For example, the original UPPS model posits four distinct impulsivity-related traits, three of which – Negative Urgency, Lack of Premeditation, and Lack of Perseverance – were positively associated with NSSI and suicidality (Lynam et al., 2011). The fourth trait, Sensation-Seeking, was not associated with these outcomes. However, regression analyses further indicated that only the interaction between Negative Urgency and Lack of Premeditation predicted the number of different self-injurious behaviors used. Conceptually, the Harm Avoidance subscale of the MPQ is most similar to the Sensation-Seeking trait in the UPPS model, and the Control subscale of the MPQ is conceptually most similar to the UPPS Lack of Premeditation trait. Thus, to have the opportunity to replicate the findings of the Lynam et al. (2011) study, we would have needed to include a measure that was at least conceptually similar to the UPPS Negative Urgency trait.

It remains possible that, on the other hand, impulsivity is less central to self-injury than asserted by some theories (e.g., Baumeister, 1990; Herpertz, Steinmeyer, Marx, & Oidtman, 1995). For instance, a recent study by Arney, Crowther, and Miller (2011) that used ecological momentary assessment (EMA) methods to assess state affect before, during, and after real-life

instances of self-injury found that participants began displaying increases in unpleasant emotions several hours before self-injury occurred. Such findings are inconsistent with the hypothesis that individuals react impulsively to increases in unpleasant emotions. On the other hand, these participants retrospectively reported that, on average, they would engage in self-injury within an hour of having the urge to do so. Taken together, these results suggest that individuals who self-injure may perceive their actions to be impulsive because they are relatively unaware of the gradual changes in unpleasant emotions that may ultimately trigger their urge to hurt themselves. Future work on the role of impulsivity in self-injury needs to both clearly define that construct and delineate how it should be operationalized and measured.

More generally, future research on self-injury should consider more comprehensive motivational models. As mentioned in Chapter 1, there are several other motivational models that have generated little research; however, that is not to say that these models do not describe important factors in the motivations for self-injurious behavior. For instance, we expect that the behaviors used by many individuals who engage in self-injury are reinforced by supportive attention and care these individuals consequently receive from others, which would be consistent with the interpersonal-influence model (Allen, 1995; Chohanec et al., 1991; Podovall, 1969). Should future research provide further support for other models, this would not mean that the motivations investigated herein (e.g., that self-injury is a form of emotion regulation) are not also relevant for many individuals. Ultimately, it is unlikely that any one model – all of which are fairly circumscribed – provides a comprehensive understanding of what motivates some individuals to self-injure.

Contrary to expectations, we were unable to entirely replicate our previous findings regarding shame and BPD symptoms (see Schoenleber & Berenbaum, in press b). Although

elevations in both shame-proneness and shame aversion were related to having more clinically significant levels of BPD symptoms on both a paper-and-pencil questionnaire and based on an in-person diagnostic interview, these relationships were no longer significant after taking general NA constructs into account. In fact, post-hoc analyses revealed that our past results also failed to replicate when examining BPD symptoms only as assessed via the SNAP-2 and only among the women in our sample that were recruited from the undergraduate population, which is the most direct replication of our previous study possible with the current data. Important differences between the current sample and the previous sample exist that may partially account for our inability to replicate the past findings. First, when looking across the entire current sample, it is clear that BPD symptoms are much higher among the women recruited from the community than among those recruited from the undergraduate population ( $F_s(1, 112) = 16.47$  for the SNAP-2 and 11.88 for the PDI-IV,  $ps < .001$ ). Second, within the undergraduate subsample, BPD symptoms should be described as minimal at best; of the 61 undergraduate participants, 49 (80.3%) met none of the BPD criteria based on the in person interview. Six undergraduate women met one criterion, with an additional four women meeting two criteria and another two women meeting three criteria. Even on the SNAP-2, undergraduate women in our sample endorsed relatively few BPD symptoms. Ultimately, whether the previously found relationship between shame aversion and BPD symptoms will generalize to community or even clinical populations warrants further investigation, ideally utilizing larger samples selected for the presence of BPD symptoms.

Having found some initial evidence that shame-proneness and/or aversion are relevant to binge eating and aggression, it will be important for future research to consider the role of shame as a motivator for these other self-destructive behaviors. If the Shame Regulation Model is

indeed useful for understanding why some individuals engage in binge eating and/or particular forms of reactive aggression, then we would expect levels of state shame to decrease as a result of these behaviors. For example, the evidence examining reductions in general NA following binge eating episodes is inconsistent across studies (e.g., Agras & Telch, 1998; Hilbert & Tuschen-Caffier, 2007), with a recent meta-analysis of EMA studies indicating that binge eating does not result in general NA decreases (Haedt-Matt & Keel, 2011). As the authors of that meta-analysis also point out, however, it remains an open question whether there are any reductions specific unpleasant emotions. We would be interested in examining reduction specifically in state shame. Because the present research focused on self-injury, we purposefully recruited women from the community with a history of such behavior; however, future studies examining the Shame Regulation Model in the context of binge eating and aggression should involve samples of individuals selected for having histories of those behaviors, respectively.

Similarly, to better delineate the relationships between shame and substance use problems, efforts need to be made to select for samples with more significant alcohol- and drug-related concerns. Participants were included in our analyses regarding the relationships between shame and alcohol use if they did not report “Never” consuming alcohol on the AUDIT, and they were included in our analyses regarding the relationships between shame and illicit drug use if they reported having ever used an illicit drug on the DUDIT, even if it was “Only Once.” As is evident from the descriptive statistics presented in Table 9, the women in the present sample endorsed relatively few problems related to substance use. In fact, referring to these as “problems” may not even be appropriate for the majority of the women in our sample. Ultimately, although we did not find evidence of an association between shame-related constructs and substance use in this study, we expect that future research on more appropriate

samples with greater substance use problems will find positive associations, as has been found in previous research (e.g., Dearing et al., 2005).

## CHAPTER 6: GENERAL DISCUSSION, FUTURE RESEARCH DIRECTIONS, AND CLINICAL IMPLICATIONS OF THE PRESENT RESEARCH

### *Review of Present Results and Their Implications for Understanding Motivations for Self-Injury*

The present research investigated the relevance of three motivational models to self-injurious behavior, with a primary aim of exploring the utility of the Shame Regulation Model. In Chapter 3, we found evidence of a relationship between self-reported shame regulation motivations and the extent of self-injury among women who have a history of engaging in such acts. Furthermore, increases in self-injury were associated with elevations in both shame-proneness and shame aversion, two personality dimensions that are central in the Shame Regulation Model. Of these two dimensions, shame-proneness appears to be especially relevant to self-injury, as shame-proneness continued to be associated with self-injury over and above proneness to unpleasant emotions more generally.

We can put forth some tentative interpretations based on our findings in Chapter 3 that may help us understand who is likely to experience the motivation to self-injure. From our perspective, the results thus far best support roles for NA aversion and shame-proneness in understanding the presence and extent, respectively, of self-injurious behavior. Aversion to unpleasant emotions in general was consistently strongly associated with having a history of self-injury, increasing the odds of Self-Injury group membership significantly. Moreover, aversion to a particular unpleasant emotion did not add to our ability to predict self-injury over and above general NA aversion, though post-hoc analyses indicate that the opposite is not true. Shame-proneness was also consistently associated with having a history of self-injury, over and above proneness to experiencing unpleasant emotions in general and proneness to guilt. However, post-hoc analyses revealed that shame-proneness did not predict Self-Injury group membership after taking NA aversion into account (odds ratio = 1.27,  $p = n.s.$ ). Therefore, finding a broad

range of unpleasant emotions intolerable seems to be especially important in predicting who is likely to have engaged in self-injury.

On the other hand, shame-proneness appears to play a prominent role in maintaining and perpetuating the use of self-injurious behaviors. Having a greater readiness for shame was the only construct significantly associated with the frequency of engaging in self-injurious acts, and it was also related to the use of more types of self-injurious behavior. Further, these relationships remained even after taking NA-proneness and guilt-proneness into account. Post-hoc analyses revealed that the same was true when NA aversion was also included in the model, indicating that shame-proneness may be especially important for understanding who will be motivated to engage in self-injury frequently and attempt to use a variety of self-injurious behaviors.

In Chapter 4, we tested the Shame Regulation Model's hypothesis that state shame would be reduced as a result of experiencing pressure pain. As expected, individuals in our Self-Injury group experienced a substantial decrease in state shame following the first administration of the finger pressure algometer task. Interestingly, women in our No Self-Injury group also showed reductions in shame, though these reductions were smaller in magnitude. Consistent with their elevated shame-proneness, women with a history of self-injury continued to endorse levels of state shame that were higher than those endorsed by women with no self-injury history almost until the end of the study session. We also examined the relationships between the personality dimensions implicated by the Shame Regulation Model and pain perception, finding that elevated shame-proneness and shame aversion were associated with a greater ability to withstand pressure pain. Overall, the findings reported in Chapter support the Shame Regulation Model. Regardless of their self-injury history, pressure pain effectively reduced state shame among the

women in our study; however, as women with a history of self-injury tend to be more prone and averse to experiences of shame, they may have been more motivated to experience physical pain for a longer period of time in order to achieve desired reductions in state shame. Even still, women with a history of self-injury had higher levels of state shame across the course of the study session, indicating that their attempts to down regulate shame via self-injury are not entirely successful.

Chapter 5 focused on better understanding the specificity and comprehensiveness of the Shame Regulation Model. The relationships of the model-implicated personality dimensions to other forms of self-destructive behavior were examined, and we found that shame-proneness and shame aversion are relatively non-specific to self-injury in terms of self-destructive behavioral outcomes. However, shame-related constructs were not indiscriminately associated with self-destructive behaviors, as shame-proneness and aversion were related to binge eating and reactive aggression but not to substance use problems. The personality dimensions implicated by the Shame Regulation Model were also, as expected, non-comprehensive in predicting who will be motivated to engage in self-injurious behaviors. In particular, self-injury is influenced by broad deficits in emotion regulation, such as having limited strategies available for regulating emotions or being unclear about what emotions one is feeling. Finally in Chapter 5, we considered the relationships of the Shame Regulation Model-implicated personality dimensions to BPD, which is a form of psychopathology characterized by self-destructive behaviors – including self-injury – and emotion dysregulation. Although shame-proneness and aversion were both positively associated with BPD symptoms, these relationships were not significant over and above BPD's relationships to unpleasant emotions more generally. Thus, the Shame Regulation Model is likely useful for understanding who may be motivated to engage in a range of self-destructive

behaviors, though it is likely insufficient for predicting who will actually engage in self-injury (or any other self-destructive behavior) specifically.

### *Strengths, Limitations, and Future Research Directions*

One strength of the present research was its use of a sample that combined women from an undergraduate and community-based population, with some additional efforts made during recruitment to select for individuals with a history of self-injury. As young adults, undergraduates represent a portion of the general population with the highest rates of self-injury (Evans et al., 2005; Favazza & Contei, 1988; Laukkanen et al., 2009; Whitlock et al., 2006) and thus represent an important population to study in relation to self-injury motivation. Additionally recruiting women from the community meant including women in our study who had been engaging in self-injury for a longer period of time and for whom the motivation to *maintain* engagement in self-injury exists. Moreover, we expect that the motivations for self-injury are the same regardless of age, specifically that individuals are motivated to down-regulate shame. Thus, on the whole we believe the inclusion of both undergraduate women and women from the community was appropriate and is a benefit to the present research.

At the same time, our decision to recruit from both the local community and the undergraduate population raises questions about the appropriateness of combining these two samples; to what extent did these subsamples differ with regard to the model-implicated personality dimensions? Post-hoc analyses revealed that there were no differences between the community and undergraduate portions of the sample for any of the personality dimensions, with the exception of shame-proneness ( $F(1, 114) = 6.924, p = .01$ ). We therefore split the sample and ran some additional analyses to determine the extent to which these between-subsamples accounted for our findings. To begin with, all of the correlations involving shame-proneness

were run separately for the community ( $N = 54$ ) and undergraduate ( $N = 61$ ) samples and were then compared. The only statistically significant difference between the correlation coefficients was found for the presence of self-injury ( $z = 2.11, p < .05$ ); the relationship between shame-proneness and the presence of self-injury among undergraduate women was non-significant ( $r = .08, p = \text{n.s.}$ ), whereas this relationship was significantly positive among the women recruited from the community ( $r = .45, p < .01$ ). We next re-ran the binary logistic regression analysis that tested the Shame Regulation Model and involved shame-proneness, now taking recruitment sample into account. Adding sample into the first block did not significantly predict group membership. However, the addition of NA-proneness in the second block continued to improve our ability to predict group membership (odds ratio = 1.85,  $p < .01$ ), as did the addition of shame-proneness in the third block (odds ratio = 2.05,  $p = .014$ ). Therefore, we believe that the benefits of recruiting women from both the undergraduate and community populations ultimately outweighed the potential costs in the case of the present research.

Regardless, many of our findings warrant replication in other samples, including those that do not show any between-subsample differences for any important constructs of interest. As tends to be the case, it would be useful to recruit larger samples of individuals with a history of self-injury. Preferably some of these samples would include men. By including only women in the present research, we cannot know whether the motivational models tested herein are additionally applicable to males with a history of self-injurious behavior. Although past research that included male-only samples indicates that self-injury serves an emotion regulation function (Gratz & Chapman, 2007), the Shame Regulation Model has yet to be tested among men.

Additionally, efforts should be made to include a greater number of individuals who engage in self-injury *currently*. Of the 26 women in our sample that had a history of self-injury,

only 12 had hurt themselves on purpose within the previous year and only 8 within the previous month. This has a couple of important implications. First, although all of the self-injury motivations reported by these women are retrospective in nature (i.e. we did not assess motivations just before the women engaged in a self-injurious act), the motivations reported by women who have not engaged in self-injury recently are likely to be especially susceptible to retrospective report biases. Second, because the model-implicated personality dimensions are not assumed to be static or unchangeable across time, it is possible that these dimensions could be more – or less – relevant to understanding who is likely to engage in self-injury among individuals for whom harming oneself is a more regular current activity.

Another strength of the present research was our attempt to test the predictions of the Shame Regulation Model both via self-reports of motivations and hypothetically relevant personality dimensions and via the use of a laboratory task that served as a proxy for self-injury. Our findings based on each of these methods require replication, and they also suggest some important considerations for future work. As already mentioned in Chapter 4, future research should more carefully consider both the variety of unpleasant emotions that may be down-regulated by self-injurious behavior and the extent to which changes in state emotions assessed during laboratory task studies are, in fact, a consequence of the physical pain being induced. We are concerned that some of the past findings, as well as our own, seem to support the Affect Regulation Model because the termination of physical pain tasks reduces anxiety that the anticipation of the physical pain task had created. Subsequent studies, especially those interested in elucidating the specific role of anxiety in self-injury motivation, should be designed with this possible confound in mind. For instance, the initial administration of any self-injury proxy can be considered an opportunity for the participants to familiarize themselves with the pain

experience that laboratory task creates. The second administration would then be the administration used to test hypotheses regarding changes in state anxiety, as it is less likely that any anxiety reported prior to the second administration is due to the unpredictability of the task experience. However, to ensure that participants are experiencing some anxiety – enough to enable reductions in anxiety to occur – it would be useful to include a manipulation designed to induce anxiety prior to the second administration of the task.

We did not purposefully induce anxiety in the present study. Nor did we have any intention of inducing shame among the women who participated, though we were particularly interested in examining possible changes in that emotion. In some ways, this is a limitation of the present research. If the Shame Regulation Model is useful for understanding self-injury motivations, then inducing shame among women with a history of self-injury would have increased our opportunity to see reductions in state shame as a result of the pressure pain task. However, there are some reasons to believe that we inadvertently induced shame among the women with a self-injury history, as the women in our Self-Injury group generally reported feeling badly about their engagement in self-injurious behavior. Having to share their experiences with the researcher during the in-person interview and then on the ISAS, as well as knowing that the study was about self-injury motivations potentially brought many of their thoughts and feelings regarding their own self-injury to mind. As a result, we may have incidentally elicited shame. If this is the case, it makes physical pain's ability to reduce shame all the more interesting, as it implies that the source of shame (i.e. self-injury) and the behavior that regulates it can be one and the same. Although we have provided an interpretation of our findings that suggests frequent shame leads to a greater likelihood of self-injury engagement, because our research was correlational in nature, it is equally possible that individuals who self-

injure experience considerable shame as a result of their behavior. In fact, we would ultimately hypothesize that the relationship between shame-proneness and the extent of self-injury is bidirectional.

Moreover, the possibility that we may have inadvertently induced shame may also partly explain why the between-group differences in state shame were maintained for a longer portion of the study session than were differences in other state emotions. Even though the pressure pain task was effective in reducing state shame during the first administration, the women in the Self-Injury group reported levels that were elevated in comparison to those reported by the No Self-Injury group both after the first pain task and before the second pain task. This finding is consistent with that of Arney et al.'s (2011) EMA study; they found that state shame-related affect lingered for a longer period of time following real-life instances of self-injury than did general NA. Shame therefore seems to diminish less quickly following self-injury, though Arney and colleagues did find that it decayed eventually. Understanding precisely why shame is less efficiently reduced – but is, in fact, reduced – by self-injurious behaviors and physical pain represents an important next step in research on self-injury and its motivations.

#### *Clinical Implications of the Present Research*

That state shame was reduced following pressure pain should not be taken to imply that self-injury is an adaptive strategy for reducing shame. First of all, if we are correct in assuming that the relationship between shame and self-injury is bidirectional, then self-injury should ultimately lead to increases in shame. To the extent that self-injury is used to regulate unpleasant emotions – indiscriminately or shame, specifically – there must be something reinforcing about the behavior, at least in the short term. Creating physical pain may distract individuals from their emotional pain, providing them with an experience more intense and pressing than their distress.

Alternatively, as the Self-Punishment Model asserts, physical pain may be viewed as an appropriate and necessary punishment for being a bad person, which may provide temporary relief as an irrational means of making reparation. Regardless of why it has short-term emotional benefits, we suspect that it has long-term emotional costs.

Self-injury is, in fact, potentially quite costly. Behaviors like cutting, for instance, left lasting scars on many of the women in our Self-Injury group. These scars reportedly serve as reminders of activities they regret, judge themselves for, and subsequently hide from others. Moreover, individuals with a history of self-injury are more likely incur lasting physical injury (Olfson, Gameroff, Marcus, Greenberg, & Shaffer, 2005) and to die by suicide (e.g., Brown et al., 2002; Joiner, 2005; Nock et al., 2006). Self-injury is costly for society more broadly, as it results in more frequent emergency room visits (Olfson et al., 2005). Therefore, reducing the likelihood of lasting negative consequences of self-injury and successfully addressing self-injury via psychotherapy is imperative.

In general, laboratory task studies that use proxies for self-injury find that inducing physical pain essentially achieves the same goals as actual self-injurious behaviors. As such, one possible avenue for intervention is to use physically safe, but pain-inducing devices as a substitute for behaviors like cutting, burning, biting, etc. Whether or not clients would find the use of these devices equally effective as their usual methods of self-injury is an open question. However, to the extent that self-injurious behaviors could be replaced with alternatives that reduce the risks of physical injury and suicide, the use of devices like those used in self-injury research may be preferable to the alternative (i.e. continuing to engage in other means of causing physical pain). Essentially, this suggestion parallels the treatment of heroin addiction, which frequently includes the use of methadone as a safer alternative to heroin. Although we recognize

that this suggestion is far from ideal, reducing the physical risks associated with self-injury without taking away the clients' current means of down-regulating unpleasant emotions may permit some clients to engage more fully in treatments that address the etiological factors that maintain their motivation to self-injure and ultimately replace their maladaptive coping strategies with more adaptive ones.

Our research and that of others reviewed throughout this paper suggests some other potential avenues for intervention that would better target proximal etiological factors. Given our findings in Chapter 4 and those of Arney et al. (2011), improving emotional awareness has the potential to decrease instances of self-injury. Our results suggest that individuals who self-injure are unclear about their feelings, but perhaps more importantly, they may not be paying attention to their emotions. The EMA methods used by Arney and colleagues suggest that individuals failed to recognize that increases in state NA and shame-related affect were occurring for several hours prior to their decision to engage in self-injury. In our study, the Lack of Emotional Awareness subscale of the DERS was unassociated with self-injury, perhaps because individuals who self-injure do not recognize that they are not paying attention to their emotions until they are extreme.<sup>5</sup> Therefore, treatments targeted at improving emotional awareness could be highly beneficial, as becoming aware of unpleasant emotions before they reach an unmanageable intensity should improve individuals' abilities to cope with those emotions. Some treatments already include a focus on improving emotional awareness; for instance, dialectical behavior therapy (DBT) involves daily self-monitoring of emotions (Linehan, 1993) that may help clients learn to recognize the emotional antecedents of the self-injurious behaviors.

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<sup>5</sup> The DERS Lack of Emotional Awareness subscale assesses lack of attention to emotion (see Gratz & Roemer, 2004).

However, no research has yet examined whether improved emotional awareness serves as a mechanism in DBT for reducing self-injury.

Assuming future research continues to support a role for shame, specifically, in self-injurious behavior, further development of treatments that address shame is also important. Most existing treatments do not include an explicit focus on shame, though we expect the vast majority of clinicians has encountered shame in their clients when providing therapy. A few promising shame-focused treatment approaches have recently emerged (see Tangney & Dearing, in press); however, these treatments have not been thoroughly examined in research. To the degree that future research continues to indicate that shame is relevant to self-injurious behavior (e.g., Brown et al., 2009), clinical researchers should focus more of their efforts on investigating the effectiveness of shame-targeting treatments. Efforts can also be made to refine existing treatments that already address other important proximal causes of self-injury by adding components that more specifically address shame. For instance, DBT addresses NA aversion – referred to as distress intolerance – but may be even more beneficial in the reduction of self-injurious behavior if it more explicitly and thoroughly targeted shame as well. Overall, better addressing shame in treatment will hopefully eventually result in benefits for individuals who struggle with self-injury in their day-to-day lives.

TABLES

Table 1. Relationships between Self-Injury and Self-Reported Motivations for Engaging in Self-Injurious Behavior (N = 26)

	# of SI Behaviors	SI Total Frequency
<i>Motivations for Self-Injury</i>		
Affect Regulation	.25	.14
Self-Punishment (3-item)	.29	.21
Self-Punishment (7-item)	.39*	.29
Shame Regulation (3-item)	.42*	.46**
Shame Regulation (5-item)	.42*	.39*

Note: SI = Self-Injury.

Table 2. Self-Injury's Relationships to and Between-Group Comparisons for Model-Implicated Personality Dimensions

	Presence of SI	# of SI Behaviors	SI Total Frequency	SI (N = 26)	No SI (N = 89)
<i>Model-Implicated Emotion/Personality Constructs</i>					
Negative Affect-Proneness	.26**	.40*	.28	2.3 <sub>a</sub>	1.9 <sub>b</sub>
Negative Affect Aversion	.44**	.40*	.32	3.9 <sub>a</sub>	3.0 <sub>b</sub>
Self-Rating Scale	.39**	.51**	.29	3.5 <sub>a</sub>	2.1 <sub>b</sub>
Punishment Deservingness	.26**	.40*	.30	.35 <sub>a</sub>	.21 <sub>b</sub>
Guilt-Proneness	-.12	.16	.14	4.1 <sub>a</sub>	4.2 <sub>a</sub>
Guilt Aversion	.28**	.20	.17	4.7 <sub>a</sub>	4.2 <sub>b</sub>
Shame-Proneness	.24*	.55**	.58**	3.4 <sub>a</sub>	3.0 <sub>b</sub>
Shame Aversion	.37**	.41*	.16	4.4 <sub>a</sub>	3.6 <sub>b</sub>

Note: SI = Self-Injury.

Note: The # of SI Behaviors and SI Total Frequency columns reflect correlations for the SI subsample (N = 26).

Note: For the right portion of the table, numbers within each row that share a letter subscript are not significantly different from one another.

Table 3. Summary of Hierarchical Binary Logistic Regressions Testing the Self-Punishment and Shame Regulation Models in the Prediction of the Presence of Self-Injury (N = 115)

Block/Predictor(s)	$\beta$	SE $\beta$	Wald's $\chi^2$	df	p	Odds Ratio	Model Statistics
<b>Block 1 <math>\chi^2 = 7.77^{**}</math></b>							
Negative Affect-Proneness	.61	.22	7.44	1	.006	1.84	
<b>Block 2 <math>\chi^2 = 7.96^*</math></b>							
Shame-Proneness	.75	.30	6.46	1	.011	2.12	Model $\chi^2 = 15.73^{**}$ Nagelkerke $R^2 = .22$
Guilt-Proneness	-.38	.27	1.98	1	.169	.69	
<hr/>							
<b>Block 1 <math>\chi^2 = 29.98^{**}</math></b>							
Negative Affect Aversion	1.47	.33	20.41	1	.000	4.37	
<b>Block 2 <math>\chi^2 = 1.48</math></b>							
Shame Aversion	.36	.38	.93	1	.336	1.44	Model $\chi^2 = 31.32^{**}$ Nagelkerke $R^2 = .37$
Guilt Aversion	.40	.34	.01	1	.905	1.04	
<hr/>							

Table 4. Summary of Hierarchical Multiple Regressions Testing the Self-Punishment and Shame Regulation Models in the Prediction of Indicators of the Extent of Self-Injury (N = 26)

	<u>Number of SI Types</u>		<u>Total SI Frequency</u>	
	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$
<b>Step 1</b>		.16*		.08
Negative Affect-Proneness	.40*		.28	
<b>Step 2</b>		.27**		.31**
Shame-Proneness	.52**		.56**	
Guilt-Proneness	-.01		.01	
<b>Step 1</b>		.16*		.10
Negative Affect Aversion	.40*		.32	
<b>Step 2</b>		.08		.00
Shame Aversion	.36		.05	
Guilt Aversion	-.13		.00	

Note: SI = Self-Injury.

Table 5. Self-Injury's Relationships to and Between-Group Comparisons for Pressure Pain Perception

	Presence of SI	# of SI Behaviors	SI Total Frequency	SI (N = 26)	No SI (N = 89)
<i>Pain Variables</i>					
Pain Threshold	.07	.00	-.07	13.1 <sub>a</sub>	10.8 <sub>a</sub>
Pain Tolerance	.28**	.26	.31	200.7 <sub>a</sub>	86.1 <sub>b</sub>

Note: SI = Self-Injury.

Note: The # of SI Behaviors and SI Total Frequency columns reflect correlations for the subsample with a history of self-injury (N = 26).

Table 6. Between-Group Comparisons for Changes in State Emotions

<i>Unpleasant Emotions</i>			<i>Pleasant Emotions</i>		
	SI	No SI		SI	No SI
<i>State General Negative Affect</i>			<i>State General Positive Affect</i>		
Pre-Task 1	3.1 <sub>a</sub>	2.5 <sub>b</sub>	Pre-Task 1	2.2 <sub>a</sub>	2.9 <sub>b</sub>
Post-Task 1	2.6 <sub>a</sub>	2.3 <sub>a</sub>	Post-Task 1	2.2 <sub>a</sub>	2.5 <sub>a</sub>
Pre-Task 2	2.6 <sub>a</sub>	2.4 <sub>a</sub>	Pre-Task 2	2.3 <sub>a</sub>	2.6 <sub>a</sub>
Post-Task 2	2.3 <sub>a</sub>	2.3 <sub>a</sub>	Post-Task 2	2.3 <sub>a</sub>	2.5 <sub>a</sub>
<i>State Guilt</i>			<i>State High Arousal Positive Affect</i>		
Pre-Task 1	3.1 <sub>a</sub>	2.6 <sub>a</sub>	Pre-Task 1	2.2 <sub>a</sub>	2.7 <sub>a</sub>
Post-Task 1	2.8 <sub>a</sub>	2.2 <sub>b</sub>	Post-Task 1	2.0 <sub>a</sub>	2.3 <sub>a</sub>
Pre-Task 2	2.8 <sub>a</sub>	2.4 <sub>a</sub>	Pre-Task 2	2.1 <sub>a</sub>	2.4 <sub>a</sub>
Post-Task 2	2.7 <sub>a</sub>	2.3 <sub>a</sub>	Post-Task 2	2.1 <sub>a</sub>	2.4 <sub>a</sub>
<i>State Shame</i>			<i>State Low Arousal Positive Affect</i>		
Pre-Task 1	3.1 <sub>a</sub>	2.3 <sub>b</sub>	Pre-Task 1	2.3 <sub>a</sub>	2.9 <sub>b</sub>
Post-Task 1	2.5 <sub>a</sub>	1.9 <sub>b</sub>	Post-Task 1	2.5 <sub>a</sub>	2.4 <sub>a</sub>
Pre-Task 2	2.6 <sub>a</sub>	2.1 <sub>b</sub>	Pre-Task 2	2.5 <sub>a</sub>	2.6 <sub>a</sub>
Post-Task 2	2.5 <sub>a</sub>	2.1 <sub>a</sub>	Post-Task 2	2.6 <sub>a</sub>	2.4 <sub>a</sub>

Note: SI = Self-Injury.

Note: For the left and right portions of the table, respectively, numbers within each row that share a letter subscript are not significantly different from one another.

Table 7. Within-Group State Emotion Pairwise Comparisons across Pain Task Administrations

Emotion	Comparison	Mean Difference	
		Self-Injury	No Self-Injury
General NA	Pre-Task 1 vs. Post-Task 1	.62**	.27**
	Post-Task 1 vs. Pre-Task 2	-.05	-.12
	Pre-Task 2 vs. Post-Task 2	.27	.05
Guilt	Pre-Task 1 vs. Post-Task 1	.32	.43**
	Post-Task 1 vs. Pre-Task 2	-.08	-.21**
	Pre-Task 2 vs. Post-Task 2	.17	.03
Shame	Pre-Task 1 vs. Post-Task 1	.55**	.39**
	Post-Task 1 vs. Pre-Task 2	-.05	-.15
	Pre-Task 2 vs. Post-Task 2	.10	-.03
General PA	Pre-Task 1 vs. Post-Task 1	-.03	.38**
	Post-Task 1 vs. Pre-Task 2	-.03	-.04
	Pre-Task 2 vs. Post-Task 2	-.08	.10
High Arousal PA	Pre-Task 1 vs. Post-Task 1	.15	.35**
	Post-Task 1 vs. Pre-Task 2	-.08	-.08
	Pre-Task 2 vs. Post-Task 2	.03	.01
Low Arousal PA	Pre-Task 1 vs. Post-Task 1	-.22	.46**
	Post-Task 1 vs. Pre-Task 2	-.05	-.14
	Pre-Task 2 vs. Post-Task 2	-.06	.20**

Note: NA = Negative Affect; PA = Positive Affect.

Note: Positive mean difference scores reflect reductions in the given emotion.

Table 8. Relationships between Pain Perception and Model-Implicated Personality Dimensions (N = 115)

	Threshold	Tolerance
Negative Affect-Proneness	.12	.10
Negative Affect Aversion	.17	.15
Self-Rating Scale	.10	.26**
Punishment Deservingness	.11	.15
Guilt-Proneness	-.01	.10
Guilt Aversion	.14	.25**
Shame-Proneness	.01	.18*
Shame Aversion	.17	.22*

Table 9. Descriptive Statistics for and Relationships between the Shame Regulation Model-Implicated Personality Dimensions and Other Self-Destructive Behaviors

	Bulimia	Binge Eating	Alcohol Problems	Drug Problems	Aggressive Acts				
					Physical	Property	Verbal	Relational	Passive-Rational
Shame-Proneness	.35**	.39**	-.05	.16	.12	.06	.18*	.18	.28**
Shame Aversion	.32**	.27**	.06	.21*	.26**	.08	.23*	.21*	.31**
Mean	10.6	1.8	13.8	11.3	8.7	6.2	14.3	11.9	13.9
SD	8.4	1.9	6.3	3.4	2.3	1.8	5.9	4.5	5.2
Min	0	0	0	0	0	0	0	0	0
Max	37	7	31	37	26	23	32	32	40

Note: Bulimia = Bulimia-related attitudes/behaviors on the EDI Bulimia subscale.

Note: Because they were non-normally distributed, Spearman rank-order correlations were used for Binge Eating, Drug Problems and all Aggressive Acts subscales.

Table 10. Relationships of Impulsivity and Emotion Regulation Difficulties to Self-Injury

	Presence of SI	# of SI Behaviors	SI Total Frequency
<i>Impulsivity</i>			
Control	.10	.15	.17
Harm Avoidance	.00	-.41*	-.25
<i>Emotion Regulation Difficulties</i>			
Non-Acceptance of Emotional Responses	.32**	.20	.20
Difficulties Engaging in Goal-Directed Behavior	.32**	.13	.04
Impulse Control Difficulties	.39**	.12	.12
Lack of Attention to Emotions	.03	.18	-.01
Limited Access to Emotion Regulation Strategies	.38**	.47*	.26
Lack of Emotional Clarity	.27**	.40*	.34

Note: SI = Self-Injury.

Note: The # of SI Behaviors and SI Total Frequency columns reflect correlations for the SI subsample (N = 26).

Table 11. Hierarchical Multiple Regression Examining Emotion Regulation Difficulties as a Moderator for the Relationship Between Shame and Self-Injurious Behaviors (N = 26)

	<u>Number of SI Types</u>		<u>Total SI Frequency</u>	
	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$
<b>Step 1</b>		.37*		.35*
Shame-Proneness (TOSCA)	.42*		.62*	
Shame Aversion (ShARQ)	.15		-.15	
Difficulty Regulating Emotions (DERS)	.22		.08	
<b>Step 2</b>		.25**		.05
TOSCA x DERS	-.02		.10	
ShARQ x DERS	.95**		.37	

Table 12. Relationships of BPD to General Negative Affect- and Shame-Related Constructs

	BPD	
	SNAP-2	PDI-IV
<i>General Negative Affect</i>		
NA-Proneness	.51**	.48**
NA Aversion	.67**	.57**
<i>Shame</i>		
Shame-Proneness	.40**	.26**
Shame Aversion	.48**	.34**

Note: BPD = Borderline Personality Disorder.

Table 13. Summary of Hierarchical Multiple Regressions  
Predicting BPD

	<u>SNAP-2 BPD</u>		<u>PDI-IV BPD</u>	
	$\beta$	$\Delta R^2$	$\beta$	$\Delta R^2$
<b>Step 1</b>		.48**		.39**
NA-Proneness	.19*		.24*	
NA Aversion	.57**		.45**	
<b>Step 2</b>		.01		.00
Shame-Proneness	.07		.05	
Shame Aversion	.08		-.02	

Note: BPD = Borderline Personality Disorder; NA = Negative Affect.

## FIGURES

Figure 1. Between- and Within-Group State Emotion Changes across Pressure Pain Task Administrations

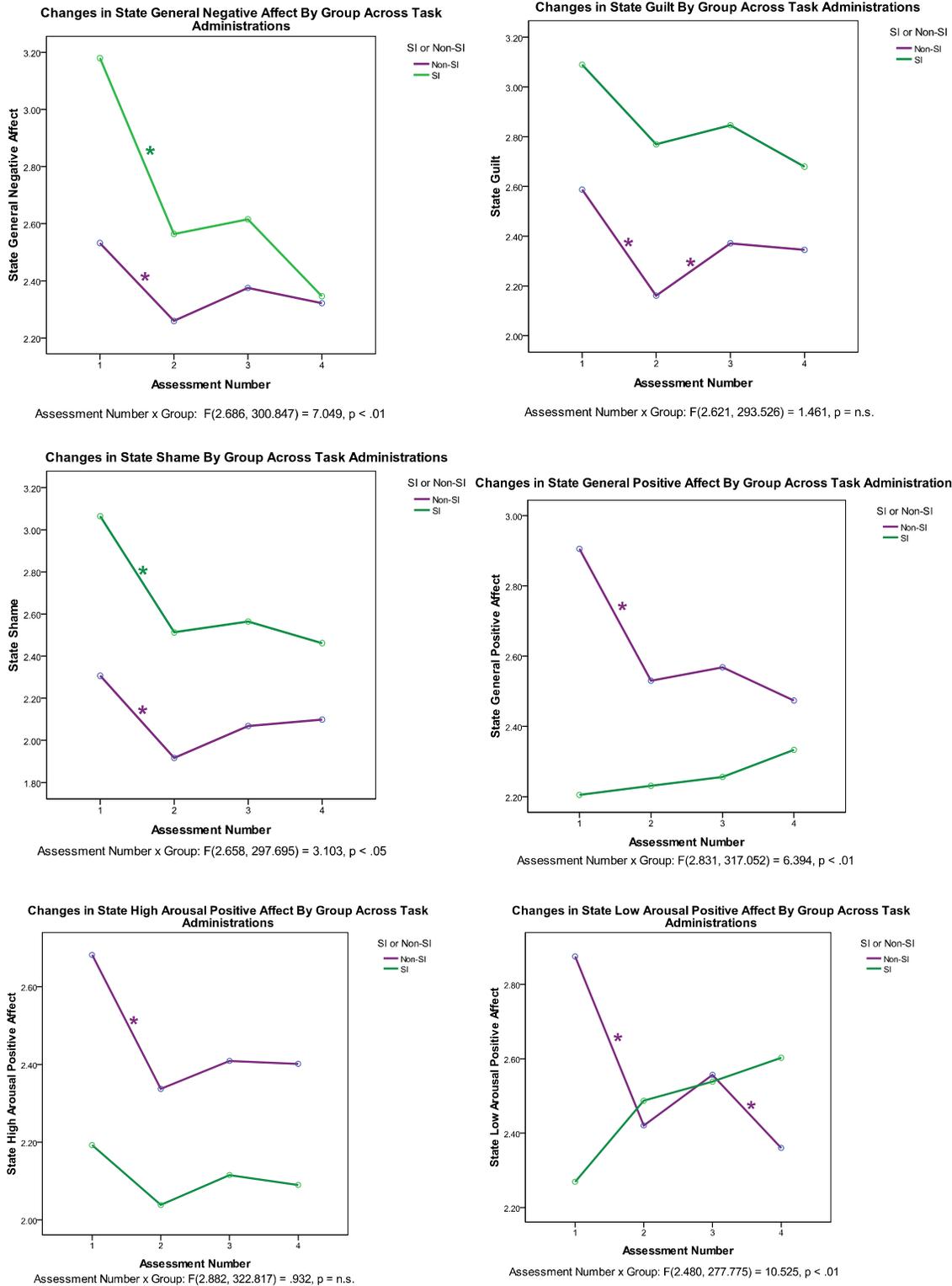
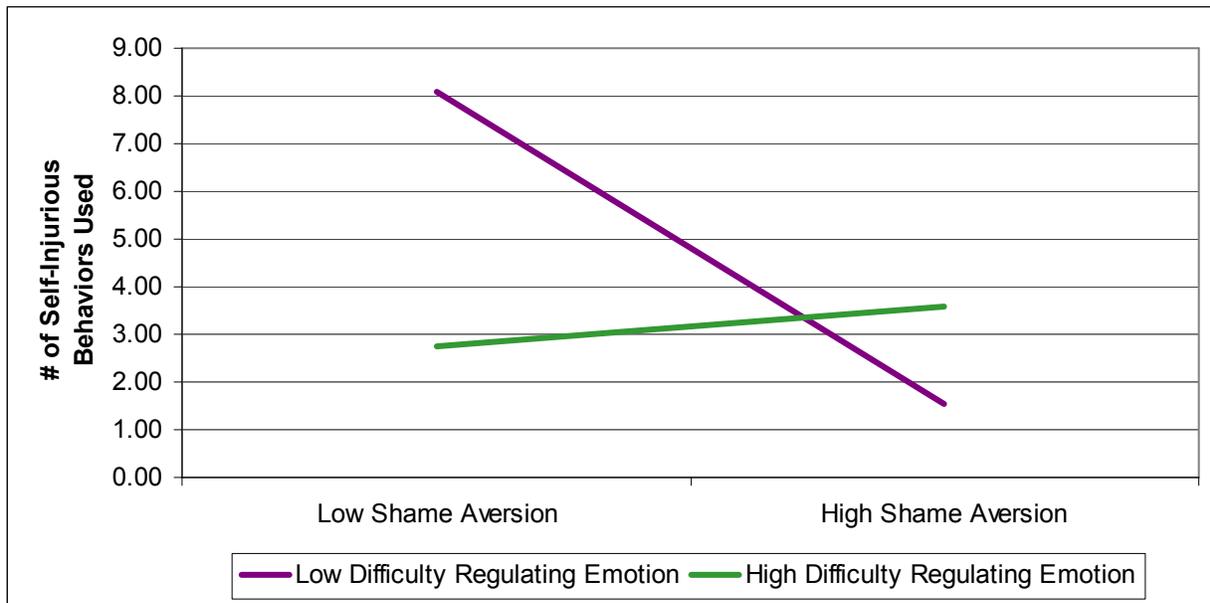


Figure 2. Interaction between Shame Aversion and Difficulty Regulating Emotion Predicting the Number of Self-Injurious Behaviors Used



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