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The current project proposed a model to predict repeated episodes of self-injurious behavior (RSIB) integrating the personality variable of neuroticism, and the cognitive factors of a ruminative thinking style and SIB-specific cognitive content. Study 1 evaluated items proposed for inclusion in a measure of SIB-specific cognitions. Internal reliability of the questionnaire was good ($\alpha = .87$), and values for the four scales ranged from $\alpha = .71$ to $.84$. Following revisions, the Self-Injurious Cognitive Content Measure (SCCM) consisted of four scales with six to eight items each. Study 2 evaluated the ability of the proposed model to predict RSIB. First, competing confirmatory factor analyses of the SCCM produced in Study 1 were completed. Results favored a 3-factor model, and item loadings were good to excellent ($.78$ to $.99$). Next, a series of regressions supported the hypothesis that ruminative thinking partially mediates the relation of neuroticism to RSIB. Path analyses examining moderating effects of each cognitive content variable on ruminative style revealed only direct effects for the first two cognitions (self-injury is acceptable/necessary, the body and self are disgusting and deserving of punishment). In the final model including ruminative thinking and Cognitive Content 1 and 2, only the belief that self-injury is acceptable significantly and uniquely predicted RSIB over and above neuroticism, a ruminative style, and the belief that the self deserves punishment. This study was the first to propose a measure of SIB-specific cognitions and the first to integrate specific thought content into explanatory models of

SIB. Results highlight the importance of further investigation into cognitions unique to SIB and their place within future models.

NEUROTICISM AND COGNITIVE CONSTRUCTS AS
RISK FACTORS FOR REPEATED EPISODES
OF SELF-INJURIOUS BEHAVIOR

by

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CHAPTER I

INTRODUCTION

Due to an increasing concern over self-injurious behavior (SIB), a plethora of studies examining risk factors related to its onset and continuation is available. As the research field of SIB matures, researchers have become increasingly interested in investigating explanatory models to understand how these identified risk factors may interact to contribute to the continuation of SIB. Existent models designed to explain maintenance of SIB have primarily focused on problematic coping, emotional instability, and consequences of SIB that may increase the likelihood of future episodes. For example, the anti-suicide model, a psychodynamic conceptualization of self-injury, posits SIB is a coping strategy to manage suicidal urges and balance the life and death drives (Suyemoto, 1998). By self-injuring rather than committing suicide, the person is able to preserve life while still finding an outlet for destructive impulses. The affect-regulation model, conversely, views acts of SIB as attempts to lessen or manage intense negative experiences or decrease affective arousal, perhaps because the individual lacks more effective emotion regulation skills (Klonsky, 2007). The Experiential Avoidance Model, a behavioral model, also suggests that individuals with poor emotion regulation and distress tolerance skills self-injure to avoid or escape intense negative affect (Chapman, Gratz, & Brown, 2006). This model additionally hypothesizes that because SIB

successfully decreases affective arousal, SIB is negatively reinforcing. A more comprehensive model, the Functional Model (Nock, 2009), proposes distal risk factors (e.g., childhood abuse, genetic factors) leave one prone to develop intra- or interpersonal vulnerabilities (e.g., poor distress tolerance or social skills). In turn, these individuals are unable to respond effectively to stressors. In the presence of additional SIB-specific vulnerabilities (e.g., knowing others who self-injure), the person is more likely to engage in SIB to cope.

Many models attempting to explain SIB integrate problematic emotion regulation or negative affect. Coping ability and affective state/instability may be conceptualized as behavioral and affective manifestations of more stable underlying personality traits such as neuroticism suggesting that a higher order explanatory model may benefit from the inclusion of neuroticism. In addition, cognitive factors have rarely been represented in existent models with the exception of the Cognitive Vulnerability-Stress Model. This model posits that a negative attributional style interacts with stressful events, in particular interpersonal stressors, to produce SIB (Guerry & Prinstein, 2010). Unfortunately, this model does not include personality traits. Considering their relevance to behavior and emotional state as well as to manifestations of pathology, it seems important to investigate how cognitive factors may combine with personality traits to increase risk for engaging in repeated episodes of SIB. In an effort to address the shortcomings of existent models, the current project proposes and tests a new model designed to predict repeated episodes of SIB integrating the personality variable of neuroticism, a ruminative cognitive style, and SIB specific cognitive content.

Overview of Self-Injurious Behavior

Self-injurious behavior (SIB) is defined as “any socially unaccepted behavior involving deliberate and direct injury to one’s own body surface without suicidal intent” (Claes & Vandereycken, 2007, p. 138). Noting the social aspect of the definition, Favazza (1996) delineates between culturally sanctioned tissue damage such as rituals associated with coming of age and deviant pathological forms of injury. Pathological self-injury may involve significant tissue damage, rhythmic or repetitious self-injury associated with developmental delays and intellectual deficits, compulsive or ritualistic SIB such as hair-pulling in trichotillomania, moderate and repetitious SIB marked by a preoccupation with the behavior, or moderate and occasional SIB in the absence of preoccupation (Favazza, 1996). Swallowing objects or poisons, imbibing alcohol to excess, and substance abuse are excluded from the definition as these methods do not cause injury to the exterior of the body (Favazza, 1996). Finally, the action must not involve intent to die. Therefore, suicidal gestures or attempts, regardless of ambivalence level, are excluded. Although individuals who engage in SIB may be at increased risk for suicide, research has consistently demonstrated important differences between SIB and suicide attempts and suggests the two behaviors are distinct (e.g., Duffy, 2006; Muehlenkamp & Gutierrez, 2004).

The current project restricts SIB to moderate forms of self-injury (occasional and repetitive SIB) as practiced by individuals without intellectual or developmental disabilities. Although there are theoretical differences between occasional and repetitive self-injurers (see Favazza, 1996), research does not currently distinguish between them;

hence, there are no guidelines for doing so. As such, the current paper refers to both occasional and repetitive SIB as conceptualized by Favazza (1996) as repeated SIB (RSIB). Individuals engaging in SIB only once are not categorized as self-injurers as the current project focuses on repeated episodes. Furthermore, swallowing objects, poisons, or substances such as drugs or alcohol are excluded as are suicide attempts or gestures. As intent to injure often becomes difficult to establish for particular types of injury such as hair pulling or self-tattooing, the method of injury is further restricted to cutting, burning, hitting, insertion of objects under the skin, picking at wounds to cause injury, biting, scraping skin, using pencil erasers to burn skin, and picking at skin and drawing blood with intent to cause damage.

Prevalence, Age of Onset, and Methods of SIB

Prevalence rates have been found to vary depending on the operational definition of SIB, the time frame assessed, and the population sampled. Research indicates a six-month prevalence rate of 4% within the general adult population (Briere & Gil, 1998). Undergraduate rates in studies range from a lifetime prevalence of 17% (Whitlock, Eckenrode, & Silverman, 2006) to 38% (Gratz, Conrad, & Roemer, 2002). Prevalence rates within nonclinical high school samples have been found to vary from lifetime prevalence rates of 14% (Ross & Heath, 2002) to one-year prevalence rates of 47% (Lloyd-Richardson, Perrine, Dierker, & Kelley, 2007). Within adolescent clinical samples, the estimates are even higher, ranging from six-month prevalence rates of 38% (Nixon, Cloutier, & Aggarwal, 2002), to one-year prevalence rates of 63% (Weismoore & Esposito-Smythers, 2010). Similarly, lifetime prevalence rates within adult clinical

samples range from 21% using a mixed gender sample (Briere & Gil, 1998) to 77% using an adult female inpatient sample (Zlotnick et al., 1996).

Research suggests rates of SIB in men and women are equivalent (Briere & Gil, 1998; Croyle & Waltz, 2007; Gratz et al., 2002). Historically, researchers suggested women displayed higher rates; however, these findings may have reflected higher numbers of women within clinical samples or differences between the sexes in methods of self-injury employed (Heath, Toste, Nedecheva, & Charlebois, 2008). Research suggests that women, on the one hand, are more likely to overdose or abuse medications (Heath et al., 2008), are 2.4 times more likely to cut, and are 2.3 times more likely to severely scratch or pinch themselves (Whitlock et al., 2006). Men, on the other hand, are 2.8 times more likely to punch an object with intent to cause bodily injury (Whitlock et al., 2006). Studies restricting the operational definition of SIB to direct tissue damage of external body surfaces (excluding swallowing poisons, objects, and substances) have discovered no difference in overall rates of SIB between the sexes (Heath et al., 2008). The historical appearance of sex differences in the overall prevalence rate of SIB may be an artifact of measurement rather than a reflection of true differences.

Age of onset for SIB appears to cluster around adolescence between the ages of 13 and 18 (Croyle & Waltz, 2007; Heath et al., 2008; Muehlenkamp & Gutierrez, 2004; Ross & Heath, 2002). Once individuals begin to self-injure, most will engage in repeated episodes of SIB. Studies utilizing undergraduate samples indicate around 71% to 75% of those engaging in SIB have done so more than once (Borrill et al., 2009; Heath et al., 2008; Whitlock et al., 2006). Between 49% (Borrill et al., 2009) and 70% (Whitlock et

al., 2006) of individuals engaging in repeated episodes of SIB also practice more than one method of self-injury. However, the use of multiple methods may be related to age, as a study including 49 seventh through eleventh graders who self-injure found 84% used only one method (Ross & Heath, 2002). Cutting frequently emerges as the most often used method (e.g., Briere & Gil, 1998; Hoff & Muehlenkamp, 2009; Ross & Heath, 2002); however, other studies show high levels of scratching and punching. In one study, severe scratching or pinching resulting in bleeding or marks was endorsed by 52% of the 490 undergraduates who self-injure, banging or punching objects causing bruising or bleeding was reported by 38%, and cutting was endorsed by 34% (Whitlock et al., 2006).

Neuroticism and Self-Injury

Neuroticism is the tendency to experience negative emotional states such as depression or anxiety (McCrae & Costa, 1987). Several studies have found higher levels of neuroticism associated with SIB. In a study of 200 consecutive admissions to an inpatient hospital, high levels of neuroticism were significantly associated with a history of self-injury defined as cutting in both men and women (Williams & Hassanyeh, 1983). This trend does not appear to be restricted to clinical samples. A study undertaken by Kamphuis and colleagues (2007) of 106 Dutch women recruited from a self-injury support group revealed significantly higher levels of neuroticism compared with the Dutch normative sample for the NEO-FFI (Costa & McCrae, 1992). The resulting effect size was strong ($d = 1.90$); however, 56% of the self-selected sample were diagnosed with Borderline Personality Disorder which may have elevated the observed effect size. Goldstein and colleagues (2009) reported a significant positive correlation between self-

injury and neuroticism in a sample of 319 undergraduates; however, the researchers included intent to cause harm in their definition of SIB. As such, the sample included risky substance use and placement of oneself in dangerous situations. Finally, a study of 238 undergraduates found individuals who had engaged in at least one incident of SIB over the lifetime reported significantly higher levels of neuroticism than those reporting no SIB (Brown, 2009).

Conversely, one study found only limited support for a relation between neuroticism and SIB. Using a sample of 393 Australian adolescents between the age of 13 and 18, ($M = 14.80$, $SD = .92$), Hasking and colleagues (2010) examined personality traits of students who self-injure, defined as cutting, burning, severe scratching, and wound picking. A hierarchical multiple regression was run entering age and psychological distress as measured by the Brief Symptom Inventory (BSI; Derogatis, 1993) in the first step; personality as measured by the International Personality Item Pool (IPIP; Goldberg, 1999) in the second step; coping and emotion regulation in the third step; and interactions between each of the Big Five personality factors and each coping (problem-solving, reference to others, non-productive coping) and emotion regulation (cognitive reappraisal, expressive suppression) factor in the last step. A simple slopes analysis revealed neuroticism was related to SIB only for those who also reported suppressing emotions. In addition, the correlation between SIB and neuroticism was not significant. A number of limitations in this study may have contributed to the lack of significant findings. First, the power to detect significance in simple slopes analyses was reduced as the estimate of the standard error in predicted scores was inflated. Second, the

model consisted of a large number of variables, again decreasing the power to detect differences within the sample size (Hasking et al., 2010). Thus, the results should be interpreted with caution. Overall, the available research supports the relation between high levels of neuroticism and SIB in both clinical and nonclinical samples.

Cognitive Factors and Self-Injury

In addition to behavioral manifestations such as self-injury, neuroticism is also associated with cognitive manifestations. Higher levels of neuroticism may predispose an individual to a ruminative cognitive style. For example, a study of 200 Belgian and British undergraduate students required participants to recall the most intensely negative emotional event during recent months and rate their frequency of rumination and the amount of intrusive thoughts (Luminet, Zech, Rimé, & Wagner, 2000). Neuroticism emerged as a significant predictor of amount of intrusive thought (operationalized as degree of controllability and amount of disruption caused by the thought), accounting for 11% of the variance in rumination in the Belgian sample and 7% in the British sample. The relation between frequency of rumination and neuroticism was not significant, perhaps due to the way that frequency was assessed, using one 7-point Likert scale item ranging from 0 (never thought about the event) to 6 (thought about it more than six times). Research using validated measures of rumination consistently demonstrates a positive association between neuroticism and rumination (e.g., Bjärehed & Lundh, 2008; Muris, Roelofs, Rassin, Franken, & Meyer, 2005; Roberts, Gilboa, & Gotlib, 1998). Using the Ruminative Response Scale (RRS; Nolen-Hoeksema & Morrow, 1991), Muris and colleagues (2005) discovered a significant correlation between rumination and

neuroticism ($r = 0.39, p < 0.01$) in a sample of 73 undergraduate students. Using a sample of 198 clinically depressed outpatients, Roelofs, Huibers, Peeters, Arntz, and van Os (2008) found very similar results when employing the same measure of rumination for the full rumination scale ($r = 0.43, p < 0.001$), and reported positive correlations between neuroticism and the subscales of Reflective Rumination ($r = 0.33, p < 0.001$) and Brooding ($r = 0.41, p < 0.001$) as well. Thus, neuroticism appears to be related to both rumination and SIB.

Ruminative Response Style

Rumination can be conceptualized as a form of repetitive negative thinking (Goring & Papageorgiou, 2008; McEvoy, Mahoney, & Moulds, 2010; McLaughlin & Nolen-Hoeksema, 2011) and has been conceptualized as “a cognitive and behavioral manifestation of neuroticism” (Roberts et al., 1998, p. 401). Because it is frequently researched in conjunction with depression, rumination as a cognitive style often becomes definitionally imbued with depressogenic symptomatology. For example, Nolen-Hoeksema (1991) defined rumination as “behaviors and thoughts that focus one’s attention on one’s depressive symptoms” (pg. 569). Measures of rumination based on this definition such as the Response Styles Questionnaire (Nolen-Hoeksema, & Morrow, 1991) include items that appear to measure depressive symptoms rather than rumination (Treyner, Gonzalez, & Nolen-Hoeksema, 2003). More recently, this form of rumination has been referred to as “depressive rumination,” and researchers have attempted to remove syndrome specific language from the definition of rumination (e.g., McEvoy et al., 2010). A ruminative response style has been defined as a tendency to respond to

distress by “passively and perseveratively think[ing] about...upsetting symptoms and the causes and consequences of those symptoms, while failing to initiate the active problems solving that might alter the cause of that distress” (McLaughlin, & Nolen-Hoeksema, 2011, p. 186). As a form of repetitive negative thinking, a ruminative style is marked by a pattern of repetitive, intrusive, unproductive, and cognitively engaging thinking about problems or negative experiences (Ehring et al., 2011).

Previous research on rumination has supported an association between the construct and neuroticism. Although this research relied on measures of depressive rumination, these studies may still be informative to the current endeavor. Using 317 undergraduate students, Roberts and colleagues (1998) proposed and found support for a path model wherein neuroticism predicted rumination and both variables independently contributed to dysphoria. Rumination has also consistently been shown to partially mediate the relation between neuroticism and depression in undergraduate samples (Muris, et al., 2005; Roelofs, Huibers, Peeters & Arntz, 2008), adolescents (Bjärehed & Lundh, 2008; Kuyken, Watkins, Holden, & Cook, 2006; Muris, Fokke, & Kwik, 2009), and clinical adult samples (Roelofs, Huibers, Peeters, Arntz, & van Os, 2008).

Rumination and negative affect appear to be reciprocally related. Research consistently reveals rumination increases negative affect such as depressed mood states and anger (e.g., Donaldson & Lam, 2004; Nolen-Hoeksema & Morrow, 1993; Rusting & Nolen-Hoeksema, 1998) and may lead to increased pessimism, inaccurate and negative interpretations, and less effective problem-solving in those reporting elevated levels of dysphoria (Lyubomirsky & Nolen-Hoeksema, 1995). Longitudinal research indicates that

negative affect such as depression, in turn, results in increases in self-focused rumination (Nolen-Hoeksema, Stice, Wade, & Bohon, 2007). Furthermore, a ruminative cognitive style may increase risk for the development of maladaptive coping strategies (Nolen-Hoeksema et al., 2007).

This relation between rumination and depression or negative mood states is particularly relevant to the study of SIB. SIB is frequently conceptualized as a way in which individuals attempt to neutralize negative emotions, or a maladaptive coping strategy. Given the findings that negative affect, rumination, and maladaptive coping strategies are related, higher levels of rumination would be expected to be associated with SIB. Research has indeed demonstrated this relation: individuals who engage in SIB also report higher levels of rumination. Borrill and colleagues (2009) conducted a study examining SIB, rumination, coping, and alexithymia using 617 undergraduate students from an array of majors (27% reported SIB). Individuals reporting SIB endorsed significantly higher levels of rumination. In addition, a logistic regression testing the ability of rumination, coping styles, and emotion inhibition to predict SIB status revealed only rumination significantly predicted group membership. A second logistic regression designating alexithymia and rumination as predictors revealed that rumination and one facet of alexithymia (difficulty identifying feelings) significantly predicted SIB (Borrill et al., 2009). However, the operational definition of SIB included swallowing objects/poisons and overdosing indicating the results should be interpreted cautiously as suicidal gestures or ambivalence may be reflected within the results.

Hoff and Muehlenkamp (2009) drew upon escape theory to explain the link between rumination and SIB. Escape theory suggests an individual reacts to a disappointing event with internal attributions of failure and blame and heightened self-evaluation (Baumeister, 1990). S/he views the self as inadequate or guilty, giving rise to negative affect and unsuccessful attempts to escape this undesirable affect and thought pattern. The individual seeks a more effective solution and, due to decreased inhibition arising from the current mental state, is at higher risk of contemplating suicide. Hoff and Muehlenkamp (2009) explored the application of this model to SIB rather than suicide. They proposed the ruminative style evoked by disappointing events results in distressing affective states. SIB becomes the method chosen to alleviate this distress. This is consistent with reports that individuals who engage in SIB do so to escape or decrease unwanted negative affect (Briere & Gil, 1998; Polk & Liss, 2009; Walsh & Rosen, 1988) and is consistent with research indicating those who ruminate may adopt maladaptive coping techniques to escape rumination (Nolen-Hoeksema et al., 2007). As perfectionistic traits may lead an individual to adopt unrealistic high standards and therefore experience more disappointment and self-blame, Hoff and Muehlenkamp (2009) proposed perfectionism as well as ruminative styles would be higher in those who practice SIB. In their study of 165 undergraduates, those who endorsed SIB ($n = 56$) reported higher levels of rumination and perfectionism related to concern over mistakes and parental criticism than those with no history of SIB. Although only preliminary, the results offer some evidence for the escape model. Results also revealed the importance of rumination in the model; the reflection facet of rumination (the tendency to reflect

inward) and perfectionism related to organization emerged as significant predictors of SIB group status after controlling for anxiety, depression, and gender (Hoff & Muehlenkamp, 2009). Thus, a ruminative cognitive style may increase an individual's tendency to focus on negative emotions, thereby intensifying affect, and leading to self-injurious episodes in an attempt to cope with the overwhelming negative emotional state.

Cognitive Content

Neuroticism and rumination alone are unlikely to result in SIB. Perhaps the presence of cognitions related to SIB that occur with or without awareness lead the individual to view self-injury as a viable behavioral option. Walsh and Rosen (1988) proposed four categories of cognitions that may lead to self-injury: self-injury is acceptable, "one's body and self are disgusting and deserving of punishment," "action is needed to reduce unpleasant feelings," and "overt action is necessary to communicate feelings to others" (pp. 156-158). The first two beliefs create a cognitive environment wherein self-injury is perceived as a legitimate option. The third and fourth cognitions reflect the belief that intense emotions require action. Despite the proposal of these four categories over twenty years ago, no studies directly examine their validity. However, an article reviewing 11 studies of self-reported reasons for SIB revealed support for categories consistent with the suggested cognitions (Klonsky, 2007). Six of the 11 studies reviewed by Klonsky (2007) yielded strong evidence supporting reasons for SIB related to self-punishment in Borderline Personality Disorder, psychiatric, and adolescent samples while the remaining 5 studies offered modest support. Akin to the third cognition, all 11 studies revealed reasons related to affect regulation in adolescent,

inpatient, outpatient, forensic, and nonclinical samples. Finally, an interpersonal influence function including reasons consistent with help-seeking and communication of distress received modest to strong support in six studies including Borderline Personality, psychiatric, and adolescent samples (Klonsky, 2007).

More specific support for the cognitions can be found in the individual studies mentioned by Klonsky (2007). Briere and Gil (1998), using a sample recruited through popular magazines as well as publications and conferences catering to child abuse survivors, conducted a study examining reasons that individuals engaged in self-injury. Participants were provided with a list of reasons commonly cited in the literature for self-injury and asked to indicate whether they ever harmed for the given reason. Although the authors did not directly probe for thought content, many of the endorsed reasons were consistent with the proposed cognitions, offering some support. In addition, the researchers conducted a factor analysis on reasons for SIB endorsed by at least 20 participants which yielded nine factors. Many of the factors appear consistent with content from the proposed cognitions. Specific examples from this study are presented below with the related cognitive content area.

Rather than offering only forced choice responses, Polk and Liss (2009) conducted a study with an online sample of self-injuring individuals using an open-ended question allowing participants to use their own words to explain motivations for self-injury. The primary researchers then categorized responses using an iterative coding process based on themes of responses resulting in six categories which again consisted of content similar to that found in the proposed cognitive content areas. The results of these

two studies are discussed in the following section alongside the relevant cognitive content area. The four cognitive content areas listed below are those proposed by Walsh and Rosen (1988).

Cognition 1: SIB is acceptable/necessary. The first proposed cognition suggests that to engage in self-injury, individuals must view the behavior as acceptable, necessary, or useful (Walsh & Rosen, 1988). The authors propose that this cognition becomes integrated as a value within the individual which may be held with or without awareness. As values affect behavior, an individual who holds this belief is at higher risk for engaging in repeated episodes of self-injury. While no studies directly investigate the veracity of the relation between this belief and SIB, previous studies have supported the existence of contagion effects of SIB and awareness of SIB within peer groups. Such studies provide evidence for the creation of subcultures wherein SIB may be “acceptable.” In a year-long study of SIB episodes performed by adolescents in an inpatient hospital, Taiminen and colleagues (1998) noted 37 incidences of contagion involving 10 patients, 2 of whom had no prior incidences of SIB before hospitalization. The authors further reported group dynamics were associated with the incidences for all except one patient, mostly in an attempt to create feelings of togetherness and shared emotional experiences. It is noteworthy that one patient who did not report relief following SIB was “openly treated with contempt” by the others in the group and “was labeled by them as a fake or pretender” (Taiminen, Kallio-Soukainen, Nokso-Koivisto, Kaljonen, & Helenius, 1998, p. 215), suggesting SIB may have become a group norm and therefore acceptable within the confines of the group.

Social contagion is not limited to inpatient samples. In a study of 150 Dutch high school students, 74% of the participants who engaged in SIB knew others who practiced SIB, significantly more than the 43% of students who did not report self-injury (Claes, Houben, Vandereycken, Bijttebier, & Muehlenkamp, 2010). Furthermore, those who self-injured were more likely to know more than one person who engaged in self-injury. Similarly, a study of 1,965 undergraduates (SIB = 21%) indicated individuals with previous exposure to SIB but not suicide were significantly more likely to have engaged in SIB themselves (Muehlenkamp, Hoff, Licht, Azure, & Hasenzahl, 2008). These results suggest individuals who engage in SIB tend to know others who also engage in SIB. By creating a small subculture of individuals who practice the behavior, SIB may be viewed as acceptable within that group, leading individuals to view SIB as less of a taboo in general.

Heath and colleagues (2009) similarly suggested social factors are related to SIB. In their study of SIB within undergraduates, the researchers discovered, of the 23 participants endorsing SIB, approximately 33% talked to their friends about it between 1 to 2 times, 24% between 3 and 10 times, and 10% more than 10 times. In addition, 86% reported that others knew of their behavior. When asked how they first got the idea to injure, 22% got the idea from someone they knew who self-injured and 22% had previous media exposure. Seventy-four percent had at least one friend who practiced SIB, and 52% of participants used at least some of the same methods of SIB as their friends used (Heath, Ross, Toste, Charlebois, & Nedecheva, 2009). Increased awareness of SIB or

association with those who practice SIB may create an atmosphere of normalcy around the behavior, nurturing cognitions regarding acceptability of the act.

Cognition 2: My body and I are disgusting and deserve punishment. The second cognition reflects low self-image and a belief that self-injury is deserved (Walsh & Rosen, 1988). This category of cognitions includes self-critical thoughts, particularly about the body. Walsh and Rosen (1988) argue that these thoughts allow the person to view the body as repulsive, setting the body up as a target for self-sacrifice, abuse, or injury. Also included within this category are thoughts rife with self-hate, self-criticism, and low self-esteem. In support of the second cognition, 83% of the participants in Briere and Gil's (1998) aforementioned study endorsed self-punishment as a reason for SIB while 37% reported injuring to make the body unattractive. In addition, their factor analysis identified a "disfigurement as self-punishment" factor. Similarly, Polk and Liss (2009) noted 10% of their sample endorsed reasons for self-injury consistent with self-punishment.

Cognition 3: I must act to get rid of these feelings. The third proposed cognition is twofold. When in distress, those who engage in self-injury believe they must engage in a physical action to decrease their unbearable tension or stress (Walsh & Rosen, 1988). Additional cognitions insinuate they will feel better once the act is complete. Self-injury begins to represent a means to relieving unwanted distress (Walsh & Rosen, 1988). Consistent with this cognition, 71% of the individuals in Briere and Gil's (1998) study engaged in SIB to get rid of anger, 80% to distract from painful emotions, 77% to manage stress, 75% to reduce tension, 77% to release pent-up feelings, and 38% injured

to stop feelings of guilt. The researchers also identified several factors during their analysis that reflected attempts to avoid undesirable emotions: decrease dissociative symptoms, decrease stress, avoid upsetting memories or flashbacks, communicate and release distress, and decrease anger. When given the opportunity to respond to an open-ended question probing reasons for self-injury, 61% of Polk and Liss's (2009) sample reported engaging in SIB to release or express emotion, or to physically display emotional suffering, 21% injured to reduce dissociation/ numbness or feel alive, and 6% injured to distract from or avoid unwanted feelings, thoughts, or memories. Thus, available research supports engagement in SIB as an action to alleviate unwanted distress.

Cognition 4: The only way for others to know how much I hurt is to show them.

The final cognition suggests the individual must engage in explicit action to express powerful emotions (Walsh & Rosen, 1988). Others will not be able to completely realize the extent of the emotion unless direct action is taken. This includes not only attention-seeking behaviors, but attempts to communicate severity of suffering nonverbally. This cognition may become so strong that individuals who self-injure may underestimate the emotions of others who do not manifest their feelings through behaviors (Walsh & Rosen, 1988). In one study, participants reported reasons consistent with attempts to communicate suffering: 60% engaged in SIB to leave a visible mark of the internal pain, and 40% injured to obtain attention or help (Briere & Gil, 1998). The factor analysis completed during the study unveiled one factor, "help-seeking", that was also consistent with this cognition. In further support of this proposed cognition, 61% of Polk and Liss's

(2009) participants reported using SIB to express emotion or to physically display emotional suffering.

Despite the absence of studies directly examining the proposed relation between these four SIB-related cognitive content areas and self-injury, existing research indirectly reflects the probable presence of such cognitions. Reasons for SIB endorsed by those who self-injure are consistent with the cognitions, suggesting further inquiry is warranted.

Proposed Model: Neuroticism and Cognitive Risks for Repeated SIB

The current project seeks to explain risk factors not for the initial episode of self-injury, but rather for the choice to engage in additional episodes of self-injury. The proposed model for repeated SIB theorizes higher levels of neuroticism, a ruminative thinking style, and SIB-specific cognitive content will predict engagement in repeated incidences of SIB (see Figure 1). The relation between neuroticism and repeated SIB is hypothesized to be partially mediated by a ruminative style while the relation between a ruminative style and repeated SIB is hypothesized to be moderated by SIB-specific cognitive content. To better understand the relations, a review of the proposed factors is warranted.

Neuroticism is hypothesized to have both direct and indirect effects on repeated SIB (RSIB) through a ruminative style. As previous research on neuroticism, rumination, and depression revealed rumination only partially mediated the relation of neuroticism to depression (e.g., Muris et al., 2005), the test model suggests a similar partially mediating effect of increased ruminative style on the relation between high neuroticism and RSIB. Within the model, neuroticism reflects emotional instability and a tendency to experience

negative affect while a ruminative style helps to explain how negative affect is amplified and builds to a level where the individual feels s/he must escape. The model does not predict the content of the rumination; rather it suggests higher levels of ruminative behavior are predictive of RSIB.

The four cognitive content areas proposed by Walsh and Rosen (1988) are represented by the “Cognitive Content” variables. Cognitions are hypothesized to moderate the relation between a ruminative style and RSIB. More specifically, individuals who engage in more ruminative behavior and experience higher levels of SIB-related cognitions are predicted to report RSIB. The model does not suggest that individuals are ruminating on the SIB-related content; rather a tendency to engage in perseverative thinking coupled with the presence of particular thoughts and beliefs related to SIB is suggested to set the stage for self-injurious behaviors.

Support for the importance of cognitive content within the model is offered by the cognitive content-specificity hypothesis. This hypothesis proposes that specific pathology is uniquely associated with particular cognitive content (Beck, 1976). For example, in a study of 236 outpatient adults, Clark, Beck, and Brown (1989) found that depression was uniquely predicted by thoughts of loss, failure, and hopelessness while anxiety was predicted by thoughts of harm and danger. The authors replicated the results with the exception of hopelessness on a second sample of 150 outpatient adults (Clark et al., 1989). A more recent study using a community sample of 135 adults meeting criteria for a depressive or anxiety disorder found depressive cognitions predicted depressive but not anxiety symptoms (accounting for 40% of the unique variance in depression scores)

while a measure of anxious cognitions uniquely predicted anxiety but not depression (accounting for 56% of the unique variance in anxiety scores; Lambertson & Oei, 2008). Thus, content of cognitions may uniquely predict the form of pathology that emerges.

Just as particular categories of cognitions may predict depression or anxiety, particular cognitive content may predict RSIB. As SIB is, by definition, a socially unacceptable act, an individual who engages in such actions on multiple occasions likely views the behavior as necessary or acceptable on a conscious or unconscious level (Cognitive Content 1). Additional cognitions around low self-worth, rejection or self-hatred of one's own body, and self-disgust allow the individual to direct emotional distress back onto the self as the self and body are deemed as unworthy and deserving of punishment (Cognitive Content 2; Walsh & Rosen, 1988). Together, these cognitions set the stage for RSIB. The remaining cognitions involve the belief that overt action is necessary to achieve an ends, whether it be to decrease negative affect (Cognitive Content 3) or to communicate a sense of need or pain (Cognitive Content 4) and as the self has been identified as a potential target, risk for SIB increases.

CHAPTER II

STUDY 1

Although Walsh and Rosen (1988) suggested cognitive content areas relevant to SIB, no research on cognitions and SIB has since been undertaken, nor have any measures of SIB-related cognitive content been devised. As a result, the purpose of Study 1 was to examine proposed items for a questionnaire of SIB-related cognitive content. The goal was to test and refine items designed to reflect the four cognitive content areas proposed by Walsh and Rosen (1988) and to replace problematic items, producing a better measure. As such, no specific hypotheses were posited.

Methods

Participants

A total of 37 undergraduates enrolled in summer psychology classes participated in the study in exchange for class extra credit. Students were provided with other non-participatory options to earn extra credit as well. One participant was excluded from analyses due to excessive missing data (did not respond to 8 of 28 questions) resulting in a total sample size of 36. Demographic information was not collected for the sample.

Measures

SIB Cognitive Content Measure- Trial (SCCM-T)

The SCCM-T is a self-report measure constructed for the current study (see Appendix B). It consists of questions designed to measure the four cognitive content

areas proposed by Walsh and Rosen (1988): self-injury is necessary/acceptable (Cognition Content 1); the body and self are disgusting and deserve punishment (Cognitive Content 2); overt action is necessary to reduce unwanted affect (Cognitive Content 3); and overt action is necessary to communicate wants/needs (Cognitive Content 4). Items proposed for inclusion were generated, reviewed, and edited by a team of psychology graduate students and a Ph.D. level clinical psychologist. Each scale (Cognitive Content 1, Cognitive Content 2, Cognitive Content 3, and Cognitive Content 4) contains 7 items, including both positively and negatively worded items, resulting in 28 total items. The measure used a 5-point Likert scale from “strongly disagree” to “strongly agree.” Within the appendix, each item is labeled with the corresponding cognitive content area (C1 through C4). An additional open-ended item was added, prompting participants to report any confusing or difficult questions. Higher scale scores indicate a higher level of agreement with the cognition.

Procedure

Participants completed the measure as part of a larger study piloting a new electronic delivery system to collect research data. Undergraduate participants gathered in small groups in classrooms located in the psychology building on campus to complete online questionnaires. The experimenter provided verbal instructions and responded to participant questions. Informed consent forms were presented electronically prior to the questionnaire. Participants were prompted to accept or refuse terms of the consent using a forced choice question before proceeding with the study. Names and other identifying information were not collected.

Results

An examination of responses revealed only one missing value for one participant. The data point was treated as a missing value and the participant's data was retained for analysis. Item 15 was inadvertently deleted from the online measure and was therefore not included in analyses. As a result, Cognitive Content 3 contained six items while all other subscales included seven items. Due to the small sample size, analyses primarily consisted of correlations among items proposed for each subscale. Items that demonstrated numerous non-significant or extremely variable correlations ranging from negative or weak to significant were considered for removal. Items demonstrating correlations that were on the cusp of significant or weak were restructured. Corrected-item total correlations for each item were also examined to determine the relation between the item and the proposed parent scale. Items with values below the general trend of other items on the scale were considered for deletion. Means, standard deviations, and frequency distributions are presented in Table 1. Internal reliability of the subscales (calculated prior to removal or revision of items) ranged from acceptable to good (Cognitive Content 3 $\alpha = .71$, Cognitive Content 2 $\alpha = .76$, Cognitive Content 4 $\alpha = .80$, and Cognitive Content 1 $\alpha = .84$). Internal reliability for the entire scale was good ($\alpha = .87$).

Prior to the calculation of Pearson correlations, all positively worded items were reverse scored to better compare results. An inspection of the inter-item correlations on Cognitive Content 1 (C1) revealed non-significant correlations between Item 21 and most of the other items ($r = .24$ to $.57$; see Table 2). As a result, this item was removed. After

exclusion of this item, correlations among the remaining items was generally acceptable to good for Item 1 ($r = .29$ to $.68$), Item 5 ($r = .34$ to $.95$), Item 9 ($r = .36$ to $.95$), Item 13 ($r = .35$ to $.79$), Item 17 ($r = .29$ to $.37$), and Item 25 ($r = .36$ to $.61$). Corrected-item total correlations were good, ranging from $.52$ to $.73$. Item 17 was reworded for clarity and ease of reading: “It is not all right to harm my body on purpose” was rewritten as “It’s wrong for people to hurt themselves on purpose.”

On Cognitive Content 2 (C2), Items 6 and 22 were deleted due to several non-significant correlations and lower corrected-item total correlations ($.34$ and $.39$, respectively; see Table 3). Item 2 also exhibited a lower corrected-item total correlation ($.38$) and variable correlations with remaining items ($r = .17$ to $.45$) and was reworded to better reflect both the disgust and punishment aspects of Cognition 2. The remaining inter-item correlations ranged from acceptable to strong for Item 10 ($r = .32$ to $.71$), Item 14 ($r = .25$ to $.71$), Item 18 ($r = .25$ to $.49$), and Item 26 ($r = .49$ to $.64$). Two new items were added to replace deleted items: “I respect myself and my body and I should be treated well” and “I never feel disgusted with myself or my body.”

Cognitive Content 3 (C3) demonstrated numerous problematic items (see Table 4). Item 3 was deleted due to a weak corrected-item total correlation ($.27$) and non-significant correlations ranging from $r = -.04$ to $.21$ with the exception of a significant correlation with Item 23 ($r = .54$). It was replaced with a new item tapping a need to take action: “I must take action to decrease unpleasant feelings or solve the current crisis.” Item 7 displayed inconsistent correlations (ranging from $r = .11$ to $.50$) and was restructured for simplicity and to more clearly address the connection between action and

purpose (remove unwanted feelings). Item 11 demonstrated weaker correlations with remaining items ($r = .28$ to $.35$) and a weaker corrected-item correlation ($.36$). It was reworded for clarity, replacing “tolerated” with “deal with”: “I can deal with unpleasant feelings without having to take action to try to make them go away.” Item 23 demonstrated good correlations with retained items ($r = .35$ to $.50$) and was edited for simplicity, replacing “to reduce” with “I can get rid of”: “The only way I can get rid of overpowering negative feelings is to take some kind of action.” Item 27 was problematic, demonstrating weak correlations ($r = .11$ to $.39$) and corrected-item total correlation ($.34$), resulting in larger restructuring to tap the cognition focusing on a need to take action to reduce unwanted affect. The new item stated, “When things go so wrong that I feel overwhelmed by upsetting emotions, I need to try to do something to make me feel better.”

On Cognitive Content 4 (C4), Item 16 demonstrated non-significant, weak correlations with numerous items ($r = -.29$ to $.31$) and a negligible corrected item-total correlation ($.01$). It was therefore deleted. After deletion, the remaining items largely demonstrated good inter-item and corrected item-total correlations and were retained without further editing (see Table 5). Weaker correlations did not appear patterned. A new item was introduced for subsequent testing: “I feel like others do not really understand how upset I am unless I show them”.

Discussion

The purpose of Study 1 was to create the SIB Cognitive Content Measure (SCCM) by evaluating and refining items proposed for inclusion in this measure. It was

the first known attempt to create a measure assessing cognitive content uniquely related to SIB. The SCCM-Trial attempted to assess four thought groups proposed by Walsh and Rosen (1988) posited to be related to SIB: SIB is acceptable, my body and I are disgusting and deserve punishment, I must act to get rid of these feelings, and the only way for others to know how much I hurt is to show them. The SCCM-Trial consisted of four subscales comprised of seven items with the goal of identifying at least four retainable items per subscale.

Prior to revision of items, results indicated that the overall scale demonstrated good internal reliability ($\alpha = .87$); however, prior to item deletion and restructuring, alpha values for the subscales were lower (ranging from $\alpha = .71$ to $.84$). Based on inter-item correlations and corrected-item correlations within subscales, one item was deleted and one was reworded on C1. On C2, two items were deleted and one was rewritten to better reflect both the disgust and punishment aspects of the associated cognition. Three new items were added. C3 was problematic as several items demonstrated poor or variable correlations. One item was deleted, three were reworded for clarity or simplicity, and one additional item underwent larger restructuring. A new item was also added to the subscale. On C4, one item was deleted and replaced with a new item. Of note, several of the items that performed poorly were negatively worded items.

Overall, five items were deleted, five were reworded, one item underwent significant restructuring, and five new items were introduced. The resulting scale, the SCCM (see Appendix F for items), retained the structure of four subscales with six to eight items on each subscale. Unfortunately, analyses were limited to correlations and

evaluation of descriptive statistics due to the small sample size. As a result, further analysis of items included on the scales is warranted.

CHAPTER III

STUDY 2

The primary purpose of the second study was to evaluate the ability of the proposed model integrating neuroticism, a ruminative style, and cognitive content to predict repeated episodes of SIB. To effectively evaluate the contribution of SIB-specific cognitive content to the model, it was first necessary to confirm items contained in the novel SIB-specific Cognitive Content Measure (SCCM) created for the study performed as expected and to ascertain whether a single cognitive content variable or multiple variables should be entered into the full model. Study 2 posited several hypotheses:

1. A measure of SIB-specific thoughts will reflect four underlying cognitive content areas: C1 (self-injury is acceptable/necessary), C2 (the body and self are disgusting and deserving of punishment), C3 (action is necessary to reduce negative affect), and C4 (action is necessary to communicate severity of suffering).
2. Higher levels of neuroticism will positively predict engagement in repeated SIB (RSIB).
3. Higher levels of ruminative style will partially mediate the relation of neuroticism to RSIB.

4. SIB-related cognitive content will moderate the relation of a ruminative style to repeated SIB. Higher levels of each content area will interact with a more ruminative style to predict repeated self-injury.
5. The proposed moderated partial mediation model including neuroticism, a ruminative style, and SIB-related cognition will positively predict RSIB.

Methods

Participants

A total of 466 male and female undergraduate students enrolled in introductory psychology classes at the University of North Carolina at Greensboro participated in exchange for required course credit. In an effort to ensure an adequate sample size of individuals who have engaged in RSIB, undergraduates who reported engaging in more than one episode of SIB during mass screening received an email invitation to participate in the study. The study also allowed for open enrollment. The only exclusionary criterion was age; participants were required to be 18 years of age or older to participate.

The Infrequency Scale (IFS; Chapman & Chapman, 1986) was embedded within questionnaires to detect potential random or careless responding styles. Based on Chapman and Chapman's (1986) recommended cut-off score of three or greater, 38 participants (approximately 8%) were excluded from further analyses. An additional 16 participants (approximately 3%) had excessive missing data defined as failing to respond to 15 or more items on one questionnaire. All of these excluded participants were missing a large number of responses on multiple questionnaires, causing their responses in

general to be suspect. One participant reported 10,000 lifetime episodes of self-injury and was excluded as an outlier.

The remaining sample of 411 participants had a mean age of 19.06 years ($SD = 2.86$). Consistent with the University's demographic, participants were primarily Caucasian/Non-Hispanic (62%), female (69%), and single or never married (97%). Table 6 provides demographic information for the entire sample for Study 2. Of the 411 participants, 133 (32%) endorsed more than one episode of self-injury during the lifetime. Number of lifetime episodes ranged from 0 to 2555 ($M = 19.98$, $SD = 141.74$).

Measures

Demographic Questionnaire

A brief questionnaire gathering information on age, gender, race/ethnicity, and marital status was administered. (See Appendix C).

Functional Assessment of Self-Mutilation (FASM)

The FASM (Lloyd, Kelley, & Hope, 1997) is a self-report measure of self-injurious behavior. Participants were presented with a checklist of 11 methods of SIB and prompted to provide frequency of each method during the past 12 months. The additional item that allows participants to write in methods of SIB was not included in analyses. Internal consistency for the methods has been shown to be fair ($\alpha = 0.65$ to 0.66 ; Guertin, Lloyd-Richardson, Spirito, Donaldson, & Boergers, 2001). For the current project, several modifications were made to the FASM (see Appendix D). Instructions were expanded to clarify the behaviors of interest are undertaken with intent to cause injury, not death. The frequency question was expanded to request number of incidences during

the lifetime as well as during the previous year. Items tapping method of injury were clarified to remind participants to count only incidences wherein the intended outcome was damage to oneself. A dichotomous score was created. Participants endorsing more than one episode of SIB over the lifetime were placed in the repeated self-injury (RSIB) group and those reporting one or no lifetime incidences were placed in a comparison group. Lifetime prevalence of SIB was used in analyses as the current study was interested in exploring factors associated with risk for engagement in multiple episodes of SIB in general rather than factors predicting behaviors only within the past year.

For the purposes of the study, hair pulling was excluded to avoid inclusion of trichotillomania. Seventeen participants reported hair pulling with number of episodes ranging from 1 to 100 (mean = 21.82, SD = 31.76). Of these participants, one (two lifetime episodes of hair pulling) did not endorse any other type of SIB and one (one lifetime episode of hair pulling) endorsed one episode of interfering with wound healing. Both were placed in the comparison group. The remaining 15 engaged in at least one other type of self-injury with lifetime frequency ranging from 2 to 153 episodes (mean = 38.53, SD = 43.63) and were placed in the RSIB group. Self-tattooing was also excluded as tattoos are believed to be a form of self-enhancement rather than self-harm (e.g., Claes, Vandereycken, & Vertommen, 2005). Four participants endorsed self-tattooing ranging from one to three episodes. However, all endorsed other methods of self-injury with lifetime frequency ranging from 9 to 270 episodes (mean = 131, SD = 109.86) and were thus placed in the RSIB group.

Revised NEO Personality Inventory (NEO-PI-R)

The NEO-PI-R (Costa & McCrae, 1992) is a 240-item self-report measure of normal personality traits as represented by neuroticism, extraversion, conscientiousness, openness, and agreeableness. Respondents reported the extent to which they agree with each item using a 5-point Likert scale from “strongly disagree” to “strongly agree.” For the current project, only the 48-item Neuroticism scale was used. Internal consistency of the Neuroticism scale is strong ($\alpha = 0.92$) and the six-year test-retest reliability is good ($r = 0.83$; Costa & McCrae, 1992). A continuous total scale score was used for this project.

Perseverative Thinking Questionnaire (PTQ)

The PTQ (Ehring et al., 2011) assesses repetitive negative thinking (RNT) defined as a style of thinking about problems or negative experiences characterized by three qualities: repetitious, intrusive, and difficult to stop (see Appendix E). Furthermore, RNT is seen as unproductive and consumes cognitive faculties (Ehring et al., 2011). The cognitive processes outlined in the definition (repetitive, intrusive, difficult to disengage) are assessed by three questions each, as are the dysfunctional effects (unproductive, requires cognitive capacity). All 15 self-report items use a 4-point Likert scale from 0 (never) to 3 (almost always). Two confirmatory factor analyses support one higher-order factor, Repetitive Negative Thinking, and three lower-order factors collectively referred to as Core Characteristics: Cognitive Processes (Factor 1, nine items), Unproductiveness (Factor 2, three items), and Cognitive Capacity (Factor 3, three items). Research has demonstrated excellent internal consistency of the total scale ($\alpha = 0.95$), and the consistencies of the Core Characteristics, Unproductiveness, and Cognitive Capacity

subscales have ranged from good to excellent ($\alpha = 0.94$, $\alpha = 0.83$, and $\alpha = 0.86$, respectively; Ehring et al., 2011). Convergent validity for the PTQ full scale was demonstrated with the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) and Response Style Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991) total scale, Brooding subscale, and Reflection subscale ($r = 0.48$, $r = 0.59$, $r = 0.54$, and $r = 0.43$, respectively). Higher correlations would not be expected or desirable as the PTQ seeks to measure the process of repetitive thinking independent of depressive or anxious symptomatology. For the current project, the continuous total scale score was used.

SIB Cognitive Content Measure (SCCM)

The SCCM is a self-report measure constructed for the current study (see Appendix F). It consists of questions designed to measure the four cognitive content areas proposed by Walsh and Rosen (1988): self-injury is necessary/acceptable (Cognitive Content 1); the body and self are disgusting and deserve punishment (Cognitive Content 2); overt action is necessary to reduce unwanted affect (Cognitive Content 3); and overt action is necessary to communicate wants/needs (Cognitive Content 4). Participants responded to 28 items using a 5-point Likert scale ranging from “strongly disagree” to “strongly agree.” The Cognitive Content 1 subscale consisted of six items, Cognitive Content 2 subscale contained eight items, and Cognitive Content 3 and 4 subscales contained seven items. Within the appendix, each item is labeled with the corresponding cognitive content area (C1 through C4).

Personality Assessment Inventory- Borderline Features Scale (PAI-BOR)

The Personality Assessment Inventory (Morey, 2007) is a self-report questionnaire consisting of 22 scales assessing personality and psychopathology. The PAI-BOR is a 24-item scale that measures traits and symptoms associated with Borderline Personality disorder including affective instability, identity problems, relationship problems, and self-injury or impulsive behaviors. Items utilize a 4-point Likert scale ranging from 0 (false) to 3 (very true). Internal consistency of the Borderline scale using college samples has been shown to be strong ($\alpha = .86$; Morey, 2007).

Infrequency Scale (IFS)

The IFS (Chapman & Chapman, 1986) is a 13-item scale constructed to detect random or careless responding styles (see Appendix G). Items were embedded within other questionnaires. Scores of three or more suggest random or careless responding; thus participants endorsing at or beyond this threshold were removed from further analyses.

Procedure

Undergraduate participants completed online questionnaires in small groups in exchange for research credits necessary for completion of introductory psychology classes. The study was open to all students 18 years of age or older. In addition, undergraduates reporting a history of self-injury during mass screening were invited to participate to ensure an adequate sample of participants with a history of SIB. The experimenter provided verbal instructions, responded to participant questions, and provided a debriefing handout following completion of the study. Informed consent forms were presented electronically before the questionnaires. Participants were

prompted to accept or refuse terms of the consent using a forced choice question before proceeding with the study. Questionnaires were identified by numbers only and names were not attached to participant numbers.

Results

Descriptive Statistics

Participants were divided into two groups based on responses to the FASM. Participants reporting more than one lifetime incident of SIB were placed in the RSIB group ($n = 133$) and the remaining participants were placed in a comparison group ($n = 276$). Within the RSIB group, the mean number of lifetime episodes was 61.55 ($SD = 244.60$) with 50% reporting engaging in between two and nine episodes and 50% reporting more than nine lifetime episodes. Approximately 70% ($n = 93$) reported engaging in SIB within the last year with a mean of 8.66 episodes ($SD = 27.36$, range 0 to 205 over the previous year). Average age of the RSIB group was 18.98 ($SD = 1.64$). The group was primarily Caucasian/non-Hispanic (69%), single (96%), and female (59%). Approximately 13% of the group reported African American descent, 6% Asian American heritage, and 5% Hispanic ethnicity. The mean age of the comparison group was 19.10 ($SD = 3.29$). The comparison group was also primarily Caucasian (59%), single (97%), and female (73%). Approximately 27% were African American, 5% were Hispanic, and 3% were Asian American.

T-tests were utilized to assess for differences between groups in age and Borderline symptomatology. Chi-square analyses were conducted on marital status and race/ethnicity. As several cells contained less than five participants, groups were

collapsed to permit analyses. Marital status was dichotomized as “married” or “not married” and race was collapsed into “Caucasian”, “African American”, “Hispanic”, “Asian”, and “Other.” There were no significant differences between groups on age ($t(409) = .37, p = .71$) or marital status ($\chi^2(1, N = 411) = .23, p = .633$). The chi-square statistic for gender was not significant using Fisher’s exact test ($p = .76$). The overall chi-square statistic for race/ethnicity was significant ($\chi^2(4, N = 410) = 11.65, p = .02$). An analysis revealed proportionately more African American students in the comparison group. As expected, the RSIB group reported significantly higher levels of symptoms associated with Borderline Personality ($M = 7.45, SD = .75$) than the comparison group ($M = .87, SD = .74; t(407) = -7.33, p = .00$).

All measures demonstrated acceptable to good internal consistencies ranging from $\alpha = .78$ to $.94$. Means, standard deviations, and Cronbach’s alpha values may be found in Table 7. Neuroticism exhibited mild skew, and Cognitive Content 1 and 2 were skewed and kurtotic. Log transformations successfully decreased skew and kurtosis for later use in the path analyses. Zero-order correlations were calculated for neuroticism, ruminative style, the dichotomous RSIB variable, Cognitive Content 1, Cognitive Content 2, and Cognitive Content 4 (see Table 8). Pearson correlations were computed for the continuous variables following transformations while Spearman rho correlations were computed for the dichotomous variable. All variables were significantly correlated with one another with values ranging from $.17$ to $.65$. Cognitive Content 1, 2, and 4 were significantly correlated with repeated SIB with Cognitive Content 1 and 2 demonstrating

the largest values. Values are not reported for Cognitive Content 3 due to the inability to obtain a subscale score as detailed in the “data screening” section below.

Confirmatory Factor Analysis

The project hypothesized that a measure of SIB-specific Cognitive Content (SCCM) would reflect four underlying cognitive content areas: Cognitive Content 1 (self-injury is acceptable/necessary), Cognitive Content 2 (the body and self are disgusting and deserving of punishment), Cognitive Content 3 (action is necessary to reduce negative affect), and Cognitive Content 4 (action is necessary to communicate severity of suffering). To examine this hypothesis, several competing confirmatory factor analyses were completed. The intent was to use the results to inform later model building and path analyses, which included additional variables such as neuroticism and ruminative response style. Prior to this step, it was necessary to evaluate individual items from the SCCM using data screening procedures.

Data screening

Using the SCCM developed following Study 1 (see Appendix F), items were evaluated using SPSS Version 20 software (IBM, 2011). First, items were reverse scored as needed and descriptive statistics were examined with particular attention paid to the mean and standard deviation. Means and standard deviations were calculated for all items following reverse scoring. Second, frequency statistics were inspected to evaluate the distribution and endorsement rates. To allow for easier comparison of endorsement rates to item content (see Appendix F), response rates in Table 9 reflect responses prior to reverse scoring. On this table, items specifically designed to target SIB related thoughts

and behaviors would be expected to have low endorsement rates while reverse items would be expected to have higher endorsement rates. Third, inter-item correlation matrices for each subscale were examined with respect to the range of values for each item and the strength of the correlations. Larger ranges suggested the item's relation to similar items was variable rather than consistent and correlations below .30 suggested less than medium/moderate strength (Cohen, 1998). The values for each item were also compared to the overall trend or range of correlations for the entire subscale. Items yielding correlations consistently lower than the general trend may indicate the item did not function as intended. Fourth, corrected-item total correlations of items to the parent subscale were evaluated for trends. Items with correlations lower than the overall trend for each subscale demonstrate a weaker relation to the subscale. Fifth, the correlation between each item and the remaining three subscales were examined. Items with equal or greater correlations with other subscales did not cleanly measure the construct within their own subscale. Items displaying two or more problems were considered for deletion.

For the Cognitive Content 1 subscale, no items demonstrated a questionable mean. An examination of frequency histograms revealed Item 17 appeared bimodal. In addition, Item 17 demonstrated inter-item correlations well below those achieved by other items on Subscale 1 ($r = .29$ to $.31$) and a weaker corrected-item total correlation (CIT = $.31$; see Table 10). Other items achieved inter-item correlations ranging from $.38$ to $.81$ and corrected-item total correlations of $.51$ to $.74$. As a result, Item 17 was deleted from the subscale. The correlation between Item 24 and the Cognitive Content 2 subscale ($.48$) approached the strength of the corrected-item total correlation ($.51$). Because Item

24 may be equally related to Subscale 2 but did not evidence other problems, the item was flagged as requiring further evaluation during the CFA.

An examination of the descriptive statistics for Cognitive Content 2 items yielded one concerning item. Item 21's mean of 3.05 ($SD = 1.2$) suggested it discriminated poorly and may not have tapped the desired characteristic. Results of the frequency analysis supported this interpretation as 40% of the respondents disagreed or strongly disagreed with the item (i.e., they reported disgust with their bodies), suggesting the item was not uniquely related to SIB. Inter-item correlations for Item 21 ranged from .21 to .39 with the lowest corrected item-total correlation of the subscale ($CIT = .41$; see Table 11). Thus, the item was removed from further consideration. Item 18 demonstrated variable correlations with remaining items, ranging from .20 to .62. Item 2's corrected item-total correlation ($CIT = .63$) was discovered to have an equally strong correlation with Subscale 1 (.67); however, it yielded moderate correlations with remaining Subscale 2 items ($r = .32$ to .57). Both Items 18 and 2 were flagged for further evaluation during the CFA.

Subscale 3 demonstrated numerous problems. Items 3, 7, 15, and 26 were discovered to have means between 3.02 and 3.35 with large standard deviations ranging from 1.07 to 1.27. Item 3 also displayed a bimodal distribution. Inter-item correlations (see Table 12) varied dramatically suggesting items proposed for the Cognitive Content 3 subscale may have tapped more than one construct. Items 3, 11, and 19 demonstrated poor and variable correlations with other items as well as lower corrected-item total correlations (ranging from .28 to .32). However, three of the four other items (7, 15, and

26) showed questionable discriminative abilities as their means hovered between 3.15 and 3.35 with wide standard deviations ($SD = 1.07$ to 1.10). Item 19 demonstrated a stronger correlation with Subscale 2. Although Items 3, 11, and 19 appear to qualify for deletion, the remaining items do not confidently measure the construct of interest. As a result, it was not possible to retain enough items from scale 3 to include it in a CFA.

No items on the Cognitive Content 4 subscale demonstrated concerning means. Two items yielded inconsistent inter-item correlations (see Table 13). Because Item 4's inter-item correlation values ranged from $.04$ to $.57$ and the corrected item-total correlation ($CIT = .30$) was weak, it was removed. Item 20's inter-item correlations also ranged from $.08$ to $.57$ with a weaker corrected item-total correlation ($CIT = .39$) resulting in removal. Remaining items demonstrated inter-item correlations ranging from $.48$ to $.70$ and corrected-item total correlations ranging from $.51$ to $.70$.

In total, four items from Cognitive Content 1, 2, and 4 subscales were removed from further analyses and Cognitive Content 3 subscale was removed in its entirety due to difficulty retaining an adequate number of items that confidently assessed the proposed underlying cognition area. (See Table 14 for a summary of deleted items).

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Remaining items were entered into a confirmatory factor analysis using LISREL 8.8 software (Jöreskog & Sörbom, 2006). In accordance with recommendations provided by Kline (2011), multiple fit indices were examined including the chi-square statistic, the Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Standardized Root Mean Square Residual (SRMR), and

Akaike Information Criterion (AIC). While it is desirable for chi-square statistic p -values to be greater than .05, the statistic is extremely sensitive to sample size and is frequently significant within larger samples (Kline, 2011). In samples of a larger size, a significant p -value does not necessarily indicate poor fit. Such cases require careful consideration of additional indices. Good model fit is suggested by RMSEA values lower than .08, SRMR values lower than .10, and CFI, and GFI values greater than .90 (Kline, 2011). AIC values from each model were examined to compare models; lower values are indicative of better model fit. Standardized factor loadings of items on the proposed parent subscale were examined for consistency and evidence of convergent validity.

All variables were defined as ordinal due to the categorical nature of the responses to the items. Because the distribution of items violated bivariate normality, as expected, an asymptotic covariance matrix was calculated and the weighted least squares approach was employed. The original intent was to complete a confirmatory factor analysis using a proposed four-factor model. Despite problems noted within Subscale 3, an attempt was made to conduct a CFA using four factors. However, the resulting asymptotic covariance matrix was not positive definite and thus could not be calculated. As a result, the Cognitive Content 3 subscale was removed and a three-factor model consisting of 17 items was considered (see Figure 2). An attempt to compute an asymptotic covariance matrix was unsuccessful due to violations to bivariate normality occurring between Items 13 and 24 on Cognitive Content 1 subscale. Deletion of Item 13 resulted in a successful attempt to create a covariance matrix whereas deletion of Item 24 did not. As a result, Item 24 was retained.

The four retained items from Cognitive Content 1 subscale were then loaded onto Factor 1, the seven retained items from Cognitive Content 2 subscale were loaded onto Factor 2, and the five retained items from Cognitive Content 4 subscale were loaded onto Factor 3 (see Table 15 for content of retained items). The path between each factor and the first item was constrained to a value of 1.0. Factors were permitted to correlate with one another. Although fit statistics for the 3-factor model were varied (see Table 16 for a summary of fit), the model overall demonstrated adequate to good fit on most indices. Unsurprisingly, the chi-square statistic was significant ($\chi^2 (101) = 283.09, p = .00$), likely due to the large sample size. The RMSEA (RMSEA (101) = 0.066, $p = .00$) as well as all values within the 90% confidence interval (upper bound = .076) fell within recommended limits, suggesting good fit. In addition, the CFI (.98) and GFI (.98) indicated good fit. The SRMR (.17), however, suggested poor fit. Overall, the majority of fit indices suggested good fit.

Standardized item loadings for all factors were strong to excellent, ranging from .78 to .99 (see Table 17). As a result, no items were deleted. The correlation between Factor 1 and Factor 2 was high (.92) while the correlations between Factor 3 and 1 and between 3 and 2 were moderate (.40 and .51, respectively). Due to the high correlation between Factors 1 and 2, a competing 2-factor model was compared (see Figure 3). To create the 2-factor model, Cognitive Content 1 and 2 subscales were collapsed into a single factor while Cognitive Content 4 subscale remained independent. The path between the first item on each factor and the factor was constrained to a value of 1.0 and the factors were permitted to correlate (see Table 18 for parameter estimates). The chi-

square statistic was again significant ($\chi^2(103) = 320.37, p = .00$; see Table 16). The RMSEA suggested adequate fit ($\text{RMSEA}(103) = 0.072, p = .00$) but values within the 90% confidence interval fell beyond recommended limits (upper bound = .081). The CFI (.98) and GFI (.98) suggested good fit but the SRMR revealed poor fit (.20). The AIC value for the 2-factor model ($\text{AIC} = 386.37$) was higher than for the 3-factor model ($\text{AIC} = 353.09$) suggesting superiority of the 3-factor model. Overall, compared with the 3-factor model, the 2-factor model revealed worse fit as evidenced by increased RMSEA, SRMR, and AIC values.

An attempt was made to derive a hierarchical model with three lower-order factors and one higher-order factor; however, the resulting psi matrix was not positive definite due to a negative error variance existing on Factor 2. This suggested that a second-order factor did not fit the data. Instead, a competing 1-factor model was calculated (see Figure 4). All fit statistics worsened indicating the superiority of the 3-factor model (see Table 16). The chi-square statistic remained significant ($\chi^2(104) = 520.55, p = .00$) and RMSEA increased ($\text{RMSEA}(104) = 0.099, p = .00$) with the 90% confidence interval falling beyond recommended limits (upper bound = .11). The CFI (.96) and GFI (.97) decreased, and the SRMR (.37) and AIC increased ($\text{AIC} = 584.55$; see Table 19 for parameter estimates). The 3-factor model remained superior to the 1-factor model. Hypothesis 1 was partially supported; items proposed for each subscale evidenced strong factor loadings and the 3-factor model displayed the best fit. These results indicated three independent cognitive content variables were more appropriate to use during model testing of moderations than two or one overarching cognitive variable.

Model Testing

The primary purpose of Study 2 was to evaluate the ability of a model integrating neuroticism, ruminative style, and SIB-specific cognitive content areas to predict repeated episodes of SIB. Specifically, we hypothesized that higher levels of neuroticism would predict repeated SIB, that ruminative style would partially mediate the relation of neuroticism to RSIB, and that SIB-specific cognitive content areas would moderate the relation of ruminative style to RSIB. To evaluate these hypotheses, a series of models were tested using LISREL 8.8 (Jöreskog & Sörbom, 2006). Three cognitive content variables were created by summing items retained on each scale following the CFA. Because an asymptotic covariance matrix could not successfully be computed, non-normally distributed variables were transformed using log transformations as previously noted and all models utilized a maximum likelihood estimate method. Model fit was assessed using the chi-square statistic, RMSEA, SRMR, GFI, and CFI.

First, three simple models were run to examine the hypotheses that higher levels of neuroticism would positively predict RSIB, and that ruminative style would partially mediate the relation between neuroticism and RSIB. For these analyses, model statistics are not reported as the models were fully saturated. To demonstrate a partial mediation, first it is necessary to show the predictor significantly predicts both the outcome and the proposed mediator variables. Then, a model proposing the partial mediation is evaluated. Using a path analysis, if all pathways remain significant, a partial mediation is suggested, particularly if the direct effect of the predictor variable on the outcome variable decreases in value but remains significant. Additional evidence supporting a partial mediation is

provided by examining the direct and indirect effect values. If both the calculated direct and indirect effects of the predictor variable are significant, a partial mediation is supported (Kline, 2011).

To test for a significant relation between the predictor and outcome variables, Model 1 regressed RSIB onto neuroticism (see Figure 5). Neuroticism significantly predicted repeated episodes of SIB ($\beta = .27, t(409) = 5.63, p < .001; R^2_{\text{smc}} = .07$), demonstrating that higher levels of neuroticism predicted repeated self-injury (see Table 20). Model 2 tested for a significant relation between the predictor and proposed mediating variables by regressing ruminative style onto neuroticism. Results were significant and revealed a positive predictive relation ($\beta = .62, t(409) = 15.79, p < .001; R^2_{\text{smc}} = .38$); higher levels of neuroticism predicted higher levels of ruminative thinking (see Table 20). Because both linear regressions were significant, Model 3 was next constructed to examine the hypothesis that ruminative style partially mediates the relation of neuroticism and RSIB (see Figure 7). Results supported a partial mediation: neuroticism significantly predicted both a ruminative style ($\beta = .62, t(408) = 15.80, p < .001$) and RSIB ($\beta = .19, t(408) = 3.24, p < .01$), and ruminative style significantly predicted RSIB ($\beta = .12, t(408) = 1.99, p < .05$; see Table 20). Notably, the direct effect of neuroticism on RSIB in Model 3 ($\beta = .19$) not only remained significant, but also decreased in value compared to Model 1 ($\beta = .27$), suggesting a partial mediation. In addition, indirect and direct effects of neuroticism on RSIB were examined for significance. Results revealed both the indirect ($\beta = .07, t(408) = 1.97, p < .05$) and direct ($\beta = .12, t(408) = 3.24, p < .05$) paths predicting RSIB from neuroticism were significant

(see Table 21). The hypothesis that a ruminative style would partially mediate the relation between neuroticism and RSIB was supported. That is, not only did higher levels of neuroticism predict repeated self-injurious episodes, but they also predicted higher levels of ruminative or perseverative thinking, which in turn also predicted repeated SIB.

Next, a series of path analyses were produced to assess the hypothesis that higher levels of SIB-related cognitions moderate the relation between higher levels of ruminative style and repeated SIB. In SEM, all terms in a moderation are entered simultaneously (Kline, 2011). If the interaction term significantly predicts the outcome variable in the presence of the predictor and hypothesized moderator, the results support a moderation. If the interaction term does not significantly predict the outcome variable, main effects of the remaining variables may be analyzed. Again, model statistics are not reported as the models were fully saturated. Prior to creating interaction variables, ruminative style and the three cognitive content variables were centered. Because CFA analyses offered the strongest support for conceptualizing the SCCM as measuring three different cognitions, a separate model for each cognitive content variable was calculated, producing a total of three independent models. The confirmatory factor analyses also revealed a strong correlation between Cognitive Content 1 and 2. As a result a fourth model treated them as a single variable and evaluated for a moderating effect of the cognition variable and ruminative style. The two cognitive content scales were collapsed by summing all items for Cognitive Content 1 and 2 and transformed using log base 10 due to skew and kurtosis.

To assess for moderating effects of Cognitive Content 1 (SIB is necessary/acceptable), Model 4 included the centered Cognitive Content 1 and ruminative style variables, and the interaction term as predictors of RIB (see Figure 8). The interaction term did not significantly predict RSIB ($\beta = .02, t(407) = .43, p > .05$) indicating there was no moderation. As a result, main effects were evaluated. Cognitive Content 1 ($\beta = .29, t(407) = 5.75, p < .001$) and ruminative style ($\beta = .15, t(407) = 3.15, p < .001$) both significantly predicted RSIB (see Table 22 for model estimates). This suggested that the belief that self-injury is necessary did not moderate the relation between ruminative thinking styles and repeated episodes of self-injury. However, individuals who reported engaging in repeated episodes of SIB also reported higher levels of agreement with this belief and a more ruminative thinking style.

Model 5 assessed for the presence of a moderating effect of Cognitive Content 2 (the self and body are disgusting and deserve punishment) on ruminative style (see Figure 9). The centered ruminative style and Cognitive Content 2 variables as well as the interaction term were entered as predictors of repeated SIB. Again, the interaction term did not significantly predict RSIB ($\beta = .06, t(407) = 1.28, p > .05$) indicating no moderating effects. Main effects were present for both ruminative style ($\beta = .14, t(407) = 2.80, p < .001$) and Cognitive Content 2 ($\beta = .25, t(407) = 4.93, p > .05$; see Table 22). Results suggested that while the belief that the self and body are disgusting and deserving of punishment did not moderate the relation between ruminative style and RSIB, higher levels of agreement with this cognition as well as a more ruminative thinking style predicted a tendency to repeatedly self-injure.

Model 6 investigated the hypothesis that Cognitive Content 4 (others can only know how much I hurt if I show them) moderated the relation of ruminative style to RSIB (see Figure 10). An interaction term was again created and entered simultaneously with the centered ruminative style and Cognitive Content 4 variables. There was no moderating effect of the interaction term ($\beta = .00, t(407) = .02, p > .05$) or main effect for Cognitive Content 4 ($\beta = .10, t(407) = 1.92, p > .05$). There was a main effect for ruminative style on RSIB ($\beta = .20, t(407) = 3.87, p > .05$; see Table 22 for model estimates). This indicated that cognitions related to a belief that action is needed to communicate pain to others does not affect the relation between ruminative style and RSIB, nor do higher levels of the belief predict engagement in repeated SIB.

In the final moderation model, Model 7, an interaction term was entered simultaneously with the centered ruminative style and collapsed Cognitive Content 1 and 2 variable (see Figure 11). No moderating effect of the interaction term was present ($\beta = .04, t(407) = .89, p > .05$). Main effects were noted for ruminative style ($\beta = .12, t(407) = 2.51, p > .05$) and the collapsed Cognitive Content 1 and 2 variable ($\beta = .30, t(407) = 5.85, p > .05$; see Table 22 for model estimates). Overall, there were no moderating effects for any of the cognitive content variables; however, there were main effects for Cognitive Content 1 (self-injury is necessary), Cognitive Content 2 (the body and self are disgusting and deserve punishment), the collapsed Cognitive Content 1 and 2, and ruminative style on RSIB.

Finally, the last hypothesis proposed that a ruminative style partially mediates the relation of neuroticism to RSIB and that specific cognitions moderate the relation of a

ruminative style and RSIB. Earlier analyses revealed no interaction effects between ruminative style and cognitive content variables; therefore the hypothesized moderations could not be completed. Because analyses revealed no main effect for Cognitive Content 4, only Cognitive Content 1 and Cognitive Content 2 were added to the partial mediation model including neuroticism and ruminative style as predictor variables (see Figure 12). Overall, the resulting fit statistics were variable, but suggested good model fit (see Table 23). SRMR (0.028), GFI (.99), and CFI (.99) indicated good fit while the chi-square statistic ($\chi^2(2) = 6.12, p = .047$) suggested poor fit. RMSEA (RMSEA (2) = 0.071, $p = .22$) indicated good fit and the close-fit test favored the proposed model, but the upper bounds fell beyond recommended values (upper bound = .14). Together, the variables accounted for 15% of the variance in repeated SIB ($R^2_{\text{smc}} = .15$). Surprisingly, only Cognitive Content 1 emerged as a significant predictor of RSIB ($\beta = .22, t(406) = 3.55, p < .001$; see Table 24 for model estimates). These results suggest a high level of multicollinearity among predictor variables and are unsurprising considering the strong correlation between Cognitive Content 1 and Cognitive Content 2. Once the shared variance was accounted for, only the belief that self-injury is acceptable/necessary predicted repeated SIB above and beyond neuroticism, a ruminative style, and thoughts that the body and self deserve to be punished.

An alternative model using the collapsed Cognitive 1 and 2 variable was similarly run and compared with the full model due to the high correlation between these variables (see Figure 13). The resulting fit statistics suggested worse fit compared to the full model (see Table 23). SRMR (0.027), GFI (.99), and CFI (.99) indicated good fit while the chi-

square statistic ($\chi^2(1) = 5.77, p = .016$) and RMSEA and the upper bounds (RMSEA (1) = 0.110, $p = .082$, upper bounds = .200) indicated poor fit. Together, the variables accounted for 14% of the variance in repeated SIB ($R^2_{\text{smc}} = .14$). Only the cognitive content variable significantly predicted RSIB ($\beta = .29, t(407) = 5.55, p < .001$; see Table 25 for model estimates). Consistent with the results of the factor analyses, the full model which retained Cognitive Content 1 and Cognitive Content 2 as separate variables better fit the data.

Discussion

The primary purpose of Study 2 was to test the ability of a model integrating facets of personality and cognitive style to predict repeated episodes of SIB. To do so, it was necessary to evaluate a novel measure of SIB-related cognitive content (SCCM) developed during Study 1. The SCCM was the first known attempt to develop a questionnaire to assess cognitions specific to SIB. Items proposed for inclusion were based on four groups of cognitions presented by Walsh and Rosen (1988): 1) self-injury is acceptable/necessary, 2) the body and self are disgusting and deserving of punishment, 3) action is necessary to decrease negative affect, and 4) action is necessary to communicate severity of suffering. Given the interest in applying cognitive and behavioral strategies to the treatment of SIB (see Muehlenkamp, 2006 for a summary), more specific knowledge on cognitions or beliefs particularly relevant to SIB may prove beneficial to providers. An assessment tool that allows practitioners to identify cognitions that may contribute to the perpetuation of self-injury in individual clients as well as track changes in cognitions during treatment would be advantageous.

Unfortunately, in this study, numerous problems with items measuring Cognitive Content 3 (action is necessary to reduce negative affect) precluded inclusion of the scale in further analyses. This was particularly disappointing as available research consistently demonstrates SIB serves to decrease distress or unwanted emotional states. Scale items attempted to measure ability to manage or tolerate emotions, need to take action to reduce emotions, and the tendency to feel relief following action. Items did not distinguish between healthy action to reduce negative affect (e.g., exercising, talking to a friend) and unhealthy action (e.g., drinking, self-injuring). As a result, items assessing any type of action were frequently endorsed and did not discriminate between the RSIB and comparison groups. In addition, items measuring emotional tolerance displayed inconsistent correlations with other scale items.

The final SCCM used in analyses consisted of three subscales measuring Cognitive Content 1 (SIB is necessary/acceptable, containing four items), 2 (the body and self are disgusting and deserving of punishment, seven items), and 4 (overt action is necessary to communicate suffering, five items; see Table 15 for item content). Results revealed that items on the SCCM appeared to best be conceptualized as reflecting three different areas of thought. Each cognitive content area was significantly and positively correlated with repeated episodes of SIB. Repeated SIB was associated with a stronger belief that SIB is necessary, that the body and self are disgusting and deserve punishment, and that action is needed to communicate suffering. The belief that SIB is necessary demonstrated the strongest association with repeated SIB. Internal consistency of each scale was adequate to good. Overall, preliminary evidence suggests the SCCM may be a

useful tool to measure SIB-specific thoughts, although further research should be conducted to assess Cognitive Content 3 (action is necessary to reduce negative affect).

The study also investigated variables associated with repeated episodes of self-injury, specifically the personality variable of neuroticism, the cognitive style of rumination, and the three previously identified cognitive contents related to SIB (SIB is necessary, the body and self are disgusting and deserve punishment, and action needs to be taken to communicate suffering). The main purpose of Study 2 was to test the ability of a model integrating these variables to predict who is at risk for engaging in repeated SIB. The model hypothesized that a ruminative style would partially mediate the relation between neuroticism and RSIB. In addition, the three SIB-specific cognitive content areas were hypothesized to moderate the relation between ruminative style and RSIB. Consistent with previous research, the current study found that a tendency to experience higher levels of negative affect (neuroticism) and a tendency to engage in a perseverative thinking style (ruminative style) predicted repeated SIB. It appears that individuals who tend to experience high levels of negative emotions are at an increased risk of also engaging in repetitive negative thinking. To escape these overwhelming emotions and self-defeating or obsessive thoughts, some individuals may turn to self-injury. This interpretation is consistent with research suggesting that people self-injure to distract from or stop painful emotions or distract from memories or unwanted thoughts (Briere & Gil, 1998; Polk & Liss, 2009). Furthermore, in the current study, neuroticism directly and indirectly (through a ruminative style) positively predicted repeated SIB, supporting the proposed partial mediation. This suggests that the relation among repeated SIB,

neuroticism, and a ruminative style is similar to the relation among depression, neuroticism, and rumination, as hypothesized. Elevated levels of neuroticism and ruminative thinking styles appear to place individuals at an increased risk for psychopathology in general.

The next step was to attempt to explain why some people who experience high neuroticism and ruminative styles turn to self-injury while others do not. To try and explain this, we turned to the cognitive-specificity hypothesis which posits resulting pathology is related to the specific content of thoughts or cognitions (Beck, 1976). For example, individuals who have persistent thoughts related to hopelessness and loss are at an increased risk of developing depression (e.g., Clark et al., 1989). Consistent with this hypothesis, we expected individuals who engage in RSIB would endorse higher levels of SIB-related thoughts. Our model went one step further and predicted higher levels of SIB-specific thoughts would interact with more ruminative thinking styles to uniquely predict RSIB. Although no moderating effect was supported by the results, higher levels of both Cognitive Content 1 and 2 did predict RSIB when accounting for a ruminative style. People who held that self-injury is acceptable or that their body and self was disgusting and deserved to be punished were more likely to repeatedly self-injure, consistent with the cognitive-specificity hypothesis. The results for Cognitive Content 2 are particularly interesting as the items measuring self-punishment were not specific to self-injury; rather they tapped self-abusive behaviors, feelings one should be punished, and low self-worth of both the person and the physical body. Items on the Cognitive Content 1 scale specifically measured intent to injure or approval of injuring oneself and

would be expected to predict self-injury. These results support Walsh and Rosen's (1988) argument that the belief that SIB is acceptable opens the behavior up as an option while disgust with the self and body allow a person to view the body as a target for self-abuse or injury.

Although the first two cognitions were predictive of RSIB, the belief that suffering must be communicated through action (Cognitive Content 4) did not uniquely predict repeated SIB in the presence of a ruminative style. This thought was less important in understanding RSIB within this undergraduate sample. Similar to our findings, participants in Briere and Gil's (1998) study more frequently endorsed reasons associated with self-punishment (83%) than getting attention/help seeking (40%) or creating a visible sign of distress (60%).

In the final model predicting RSIB using neuroticism, ruminative style, and Cognitive Content 1 and 2, only Cognitive Content 1 surfaced as a significant predictor. Only the belief that self-injury is acceptable or necessary predicted repeated self-injury above and beyond high levels of neuroticism, a tendency to engage in a ruminative thinking style, and the belief that one's body is disgusting/deserves punishment. The failure of Cognitive Content 2 to remain significant is likely related to the high correlation between the Cognitions 1 and 2. Although the belief that SIB is acceptable is important in predicting who is at risk for future self-injury, the importance of the thought that oneself deserves punishment in general (not specifically SIB) should not be overlooked.

Interestingly, although a ruminative style predicted RSIB in the presence of neuroticism or each individual thought variable in simpler models, it ceased to remain significant once all variables were entered into the model together. In the presence of SIB-specific cognitions and neuroticism, a ruminative style did not predict RSIB above and beyond the shared qualities of the variables. Results also revealed that both Cognitive Content 1 and 2 were stronger predictors of repeated SIB than a ruminative style and increased the amount of explained variance in repeated SIB. Thus, these thoughts represent important additions to a model that seeks to predict who is at risk for engaging in repeated episodes.

Limitations and Future Directions

Results of the study point to the importance of studying cognitive content related to SIB. The current study was unable to adequately examine Cognitive Content 3, action is necessary to decrease negative affect. Because a large percentage of individuals who self-injure reportedly do so to manage unwanted emotions, this thought may be important to assess. Further refinement of the proposed SCCM through replication of the current measure and testing additional items to more successfully comprise Subscale 3 is warranted. Future studies examining the importance of additional SIB-related thoughts such as “I need to remain in control” (see Polk & Liss, 2009) could identify important targets for treatment. In addition, this study suggested the importance of the belief that self-injury is necessary/acceptable in the maintenance of SIB. Because this study is not longitudinal, it is unclear whether this belief predates onset of SIB and acts as a risk factor, or if engaging in SIB results in cognitive dissonance which motivates individuals

to shift their beliefs to be more consistent with their actions of self-injuring. Future studies attempting to untangle this relation would be particularly beneficial.

The present study examined repeated SIB within a university sample and results may not generalize to other populations. It is possible that different thoughts may be more or less important within different populations. Undergraduates are unlikely to demonstrate severely impairing pathology. Replication with populations such as inpatients or Borderline Personality Disorder is suggested to determine whether the model and identified cognitions predict RSIB in more severe samples. Additionally, results may not apply to other age groups such as adolescents. Because age of onset tends to occur during adolescence, it would be particularly beneficial to understand whether the model successfully predicts repeated SIB within this population. A model identifying likelihood of repetition is imperative to early intervention efforts.

Finally, while the primary purpose of the study was to evaluate a model to predict repeated SIB, it was also necessary to integrate scale development of the SCCM as there are no current measures of cognitions specific to SIB. The intention was to complete scale development during Study 1; however, analyses were limited due to a small sample size and item refinement continued during Study 2. The confirmatory factor analyses of the SCCM in Study 2 were undertaken to inform model building by clarifying whether the cognitive content variables could be represented by one overarching variable or whether multiple variables were more appropriate. However, the CFAs and the path analyses were conducted using the same sample as large samples were necessary for both. Because of this, results of the path analyses should be interpreted with caution until

such time as they can be replicated using an independent sample. Despite this shortcoming, the current study continues to support the utility of considering SIB-specific cognitions in future predictive models and provides promising preliminary results.

CHAPTER IV

OVERALL CONCLUSIONS AND IMPLICATIONS

The present study adds to the existent literature by clarifying the relation among risk factors for repeated SIB. Similar to previous research on depression, a ruminative style appears to partially mediate the relation between neuroticism and RSIB. This highlights the importance of considering cognitive factors in addition to personality traits or emotional dysregulation in the construction of explanatory models of RSIB. The proposed model was the first to attempt to integrate cognitive and personality factors to predict risk for RSIB. In addition, it was the first to examine cognitive content. The belief that SIB is necessary or acceptable demonstrated a stronger predictive ability than did neuroticism or a ruminative style. Additionally, the belief that the body and self are disgusting and deserving of punishment surfaced as an important predictor and reveal that a general sense of self-disgust/loathing and poor self-image (of self and body) place one at heightened risk for SIB. These results increase our understanding of the importance of attending to core beliefs or thought content in addition to affective distress in research on SIB.

The results of the present study also hold important implications for treatment of individuals who engage in repeated episodes of self-injury. Research has consistently demonstrated high levels of neuroticism within self-injuring samples. As a result, practitioners employ strategies to increase coping and improve emotional dysregulation.

Recent studies have also suggested those who self-injure engage in higher levels of rumination (e.g., Borrill et al., 2009). The current study suggests the importance of identifying and addressing cognitions related to self-injury that may be sustaining the behavior. In particular, attending to core beliefs and automatic thoughts related to self-disgust, self-punishment, guilt, and worthlessness through cognitive restructuring or challenging may decrease SIB. Importantly, attempting to shift the belief in the necessity or acceptability of SIB and improve self-image and self-acceptance is paramount.

Interventions may include developing a social support system that does not engage in SIB but remains empathetic and developing a broader sense of self. Favazza (1996) posits that individuals who engage in repeated SIB develop an identity as a “self-injurer”. This may allow individuals to see SIB as acceptable as it is consistent with one’s self-image.

Developing an image of the self as competent, worthy, capable, and defined by one’s abilities and attributes rather than one behavior (e.g., a “cutter”) may result in decreased SIB.

There are also societal implications. Given the research on contagion effects and the possible presence of a “subculture” in which SIB is “normal,” interventions at the community level may be beneficial. Programs providing outreach, education, and skill development within schools, community centers, churches, and youth programs may promote understanding of the behavior as well as development of communication and coping skills. Societal messages regarding beauty, body-image, and definitions of individual worth may also contribute to poor self-image and self-disgust. Efforts to

redefine beauty, broaden definitions of worth, and promote self-acceptance should be encouraged at the community as well as national level.

REFERENCES

- Baumeister, R. F. (1990). Suicide as escape from self. *Psychological Review*, *97*, 90-113.
- Beck, A. T. (1976). *Cognitive therapy and emotional disorders*. New York: International U P.
- Bjärehed, J., & Lundh, L. (2008). Deliberate self-harm in 14-year-old adolescents: How frequent is it, and how is it associated with psychopathology, relationship variables, and styles of emotional regulation. *Cognitive Behaviour Therapy*, *37*, 26-37.
- Borrill, J., Fox, P., Flynn, M., & Roger, D. (2009). Students who self-harm: Coping style, rumination and alexithymia. *Counselling Psychology Quarterly*, *22*, 361-372.
- Briere, J., & Gil, E. (1998). Self-mutilation in clinical and general population samples: Prevalence, correlates, and functions. *American Journal of Orthopsychiatry*, *68*, 609-620.
- Brown, S. A. (2009). Personality and non-suicidal deliberate self-harm: Trait differences among a non-clinical population. *Psychiatry Research*, *169*, 28-32.
- Chapman, L. J., & Chapman, J. P. (1986). *Infrequency scale for personality measures*. Available from T. R. Kwapil, Department of Psychology, University of North Carolina at Greensboro, P.O. Box 26164, Greensboro, NC 27402.

- Chapman, A. L., Gratz, K. L., & Brown, M. Z. (2006). Solving the puzzle of deliberate self-harm: The experiential avoidance model. *Behaviour Research and Therapy*, *44*, 371-394.
- Claes, L., Houben, A., Vandereycken, W., Bijttebier, P., & Muehlenkamp, J. (2010). Brief report: The association between non-suicidal self-injury, self-concept and acquaintance with self-injurious peers in a sample of adolescents. *Journal of Adolescence*, *33*, 775-778.
- Claes, L., & Vandereycken, W. (2007). Self-injurious behavior: Differential diagnosis and functional differentiation. *Comprehensive Psychiatry*, *48*, 137-144.
- Claes, L., Vandereycken, W., & Vertommen, H. (2005). Self-care versus self-harm: Piercing, tattooing, and self-injuring in eating disorders. *European Eating Disorders Review*, *13*, 11-18.
- Clark, D. A., Beck, A. T., & Brown, G. (1989). Cognitive mediation in general psychiatric outpatients: A test of the content-specificity hypothesis. *Journal of Personality and Social Psychology*, *56*, 958-964.
- Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual*. Odessa, FL: Psychological Assessment Resources.
- Croyle, K. L., & Waltz, J. (2007). Subclinical self-harm: Range of behaviors, extent, and associated characteristics. *American Journal of Orthopsychiatry*, *77*, 332-342.
- Derogatis, L. R. (1993). *Brief Symptom Inventory: Administration, scoring, and procedures manual*. Minneapolis, MN: Pearson.

- Donaldson, C. C., & Lam, D. D. (2004). Rumination, mood and social problem-solving in major depression. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences*, *34*, 1309-1318.
- Duffy, D. F. (2006). Self-injury. *Psychiatry*, *5*, 263-265.
- Ehring, T., Zetsche, U., Weidacker, K., Wahl, K., Schönfeld, S., & Ehlers, A. (2011). The Perseverative Thinking Questionnaire (PTQ): Validation of a content-independent measure of repetitive negative thinking. *Journal of Behavior Therapy & Experimental Psychiatry*, *42*, 225-232.
- Favazza, A. R. (1996). *Bodies under siege: Self-mutilation and body modification in culture and psychiatry*. Baltimore: Johns Hopkins U P.
- Goldberg, L.R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality Psychology in Europe*, (Vol. 7, pp. 7-28). Tilburg, The Netherlands: Tilburg U P.
- Goldstein, A. L., Flett, G. L., Wekerle, C., & Wall, A. (2009). Personality, child maltreatment, and substance use: Examining correlates of deliberate self-harm among university students. *Canadian Journal of Behavioural Science*, *41*, 241-251.
- Goring, H. J., & Papageorgiou, C. (2008). Rumination and worry: Factor analysis of self-report measures in depressed participants. *Cognitive Therapy and Research*, *32*, 554-566.

- Gratz, K. L., Conrad, S. D., & Roemer, L. (2002). Risk factors for deliberate self-harm among college students. *American Journal of Orthopsychiatry*, *72*, 128-140.
- Guerry, J. D., & Prinstein, M. J. (2010). Longitudinal prediction of adolescent self-injury: Examination of a cognitive vulnerability-stress model. *Clinical Child and Adolescent Psychology*, *39*, 77-89.
- Guertin, T., Lloyd-Richardson, E., Spirito, A., Donaldson, D., & Boergers, J. (2001). Self-mutilative behavior in adolescents who attempt suicide by overdose. *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*, 1062-1069.
- Hasking, P. A., Coric, S. J., Swannell, S., Martin, G., Thompson, H. K., & Frost, A. D. J. (2010). Brief report: Emotion regulation and coping as moderators in the relationship between personality and self-injury. *Journal of Adolescence*, *33*, 767-773.
- Heath, N. L., Toste, J. R., Nedecheva, T., & Charlebois, A. (2008). An examination of nonsuicidal self-injury among college students. *Journal of Mental Health Counseling*, *30*, 137-156.
- Heath, N. L., Ross, S., Toste, J. R., Charlebois, A., & Nedecheva, T. (2009). Retrospective analysis of social factors and nonsuicidal self-injury among young adults. *Canadian Journal of Behavioural Science*, *41*, 180-186.
- Hoff, E. R., & Muehlenkamp, J. J. (2009). Nonsuicidal self-injury in college students: The role of perfectionism and rumination. *Suicide & Life-Threatening Behavior*, *39*, 576-587.

- IBM Corporation. (2012). IBM Statistics for Windows (Version 20) [Computer software]. Armonk, NY: Author.
- Jöreskog, K. G., & Sörbom, D. (2006). LISREL 8.80 for Windows (Version 8.8) [Computer software]. Lincolnwood, IL: Scientific Software International, Inc.
- Kamphuis, J. H., Ruyling, S. B., & Reijntjes, A. H. (2007). Testing the emotion regulation hypothesis among self-injuring females. *The Journal of Nervous and Mental Disease, 195*, 912-918.
- Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York: The Guildford Press.
- Klonsky, E. D. (2007). The functions of deliberate self-injury: A review of the evidence. *Clinical Psychology Review, 27*, 226-239.
- Klonsky, E. D., Oltmanns, T. F., & Turkheimer, E. (2003). Deliberate self-harm in a nonclinical population: Prevalence and psychological correlates. *The American Journal of Psychiatry, 160*, 1501-1508.
- Kuyken, W., Watkins, E., Holden, E., & Cook, W. (2006). Rumination in adolescents at risk for depression. *Journal of Affective Disorders, 96*, 39-47.
- Lamberton, A., & Oei, T. P. S. (2008). A test of the cognitive content specificity hypothesis in depression and anxiety. *Journal of Behavior Therapy and Experimental Psychiatry, 39*, 23-31.
- Lloyd, E. E., Kelley, M. L., & Hope, T. (1997, April). *Self-mutilation in a community sample of adolescents: Descriptive characteristics and provisional prevalence rates*. Poster session presented at the annual meeting of the Society for Behavioral

Medicine, New Orleans, LA.

- Lloyd-Richardson, E. E., Perrine, N., Dierker, L., & Kelley, M. L. (2007). Characteristics and functions of non-suicidal self-injury in a community sample of adolescents. *Psychological Medicine: A Journal of Research in Psychiatry and the Allied Sciences*, *37*, 1183-1192.
- Luminet, O., Zech, E., Rimé, B., & Wagner, H. (2000). Predicting cognitive and social consequences of emotional episodes: The contribution of emotional intensity, the five factor model, and alexithymia. *Journal of Research in Personality*, *34*, 471-497.
- McCrae, R. R., & Costa, P. T., Jr. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, *52*, 81-90.
- McEvoy, P. M., Mahoney, A. J., & Moulds, M. L. (2010). Are worry, rumination, and post-event processing one and the same?: Development of the Repetitive Thinking Questionnaire. *Journal of Anxiety Disorders*, *24*, 509-519.
- McLaughlin, K. A., & Nolen-Hoeksema, S. (2011). Rumination as a transdiagnostic factor in depression and anxiety. *Behaviour Research and Therapy*, *49*, 186-193.
- Meyer, T. J., Miller, M. L., Metzger, R. L., & Borkovec, T. D. (1990). Development and validation of the Penn State Worry Questionnaire. *Behaviour Research and Therapy*, *28*, 487-495.
- Morey, L. C. (2007). *Personality Assessment Inventory (PAI) professional manual* (2nd ed.). Lutz, FL: Psychological Assessment Resources.

- Muehlenkamp, J. J. (2006). Empirically supported treatments and general therapy guidelines for non-suicidal self-injury. *Journal of Mental Health Counseling, 28*, 166-185.
- Muehlenkamp, J. J., & Gutierrez, P. M. (2004). An investigation of differences between self-injurious behavior and suicide attempts in a sample of adolescents. *Suicide and Life-Threatening Behavior, 34*, 12-23.
- Muehlenkamp, J. J., Hoff, E. R., Licht, J., Azure, J., & Hasenzahl, S. J. (2008). Rates of non-suicidal self-injury: A cross-sectional analysis of exposure. *Current Psychology: A Journal for Diverse Perspectives on Diverse Psychological Issues, 27*, 234-241.
- Muris, P., Fokke, M., & Kwik, D. (2009). The rumination response style in adolescents: An examination of its specific link to symptoms of depression. *Cognitive Therapy Research, 33*, 21-32.
- Muris, P., Roelofs, J., Rassin, E., Franken, I., & Mayer, B. (2005). Mediating effects of rumination and worry on the links between neuroticism, anxiety and depression. *Personality and Individual Differences, 39*, 1105-1111.
- Nixon, M. K., Cloutier, P. F., & Aggarwal, S. (2002). Affect regulation and addictive aspects of repetitive self-injury in hospitalized adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry, 41*, 1333-1341.
- Nock, M. K. (2009). Why do people hurt themselves? New insights into the nature and functions of self-injury. *Current Directions in Psychological Science, 18*, 78-83.

- Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*, 569-582.
- Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and posttraumatic stress symptoms after a natural disaster: The 1989 Loma Preita earthquake. *Journal of Personality and Social Psychology, 61*, 115-121.
- Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion, 7*, 561-570.
- Nolen-Hoeksema, S., Stice, E., Wade, E., & Bohon, C. (2007). Reciprocal relations between rumination and bulimic, substance abuse, and depressive symptoms in female adolescents. *Journal of Abnormal Psychology, 116*, 198-207.
- Polk, E., & Liss, M. (2009). Exploring the motivations behind self-injury. *Counselling Psychology Quarterly, 22*, 233-241.
- Roberts, J. E., Gilboa, E., & Gotlib, I. H. (1998). Ruminative response style and vulnerability to episodes of dysphoria: Gender, neuroticism, and episode duration. *Cognitive Therapy and Research, 22*, 401-423.
- Roelofs, J., Huibers, M., Peeters, F., & Arntz, A. (2008). Effects of neuroticism on depression and anxiety: Rumination as a possible mediator. *Personality and Individual Differences, 44*, 576-586.
- Roelofs, J., Huibers, M., Peeters, F., Arntz, A., & van Os, J. (2008). Rumination and worrying as possible mediators in the relation between neuroticism and symptoms of depression and anxiety in clinically depressed individuals. *Behaviour Research and Therapy, 46*, 1283-1289.

- Ross, S., & Heath, N. (2002). A study of the frequency of self-mutilation in a community sample of adolescents. *Journal of Youth and Adolescence, 31*, 67-77.
- Rusting, C. L., & Nolen-Hoeksema, S. (1998). Regulating responses to anger: Effects of rumination and distraction on angry mood. *Journal of Personality and Social Psychology, 74*, 790-803.
- Suyemoto, K. L. (1998). The functions of self-mutilation. *Clinical Psychology Review, 18*, 531-554.
- Taiminen, T. J., Kallio-Soukainen, K., Nokso-Koivisto, H., Kaljonen, A., & Kelenius, H. (1998). Contagion of deliberate self-harm among adolescent inpatients. *Journal of the American Academy of Child & Adolescent Psychiatry, 37*, 211-217.
- Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research, 27*, 247-259.
- Walsh, B. W., & Rosen, P. M. (1988). *Self-mutilation: Theory, research, & treatment*. New York: Guilford P.
- Weismoore, J. T., & Esposito-Smythers, C. (2010). The role of cognitive distortion in the relationship between abuse, assault, and non-suicidal self-injury. *Journal of Youth & Adolescence, 39*, 281-290.
- Whitlock, J., Eckenrode, J., & Silverman, D. (2006). Self-injurious behaviors in a college population. *Pediatrics, 117*, 1939-1948.
- Williams, J. M. G., & Hassanyeh, F. (1983). Deliberate self-harm, clinical history, and extreme scoring on the EPQ. *Personality and Individual Differences, 4*, 347-350.

Zlotnick, C., Shea, M. T., Pearlstein, T., Simpson, E., Costello, E., & Begin, A. (1996).

The relationship between dissociative symptoms, alexithymia, impulsivity, sexual abuse, and self-mutilation. *Comprehensive Psychiatry*, 37, 12-16.

APPENDIX A

TABLES AND FIGURES

Table 1

Item Response Rates, Means, and Standard Deviations for the SIB Cognitive Content Measure- Trial Version in Study 1

Item	SD	D	N	A	SA	Mean	StD
<u>Cognitive Content 1 Subscale</u>							
1	83	8	6	3	0	1.28	.71
5	81	3	11	6	0	1.42	.91
9	81	3	8	6	3	1.47	1.06
13	83	3	8	6	0	1.36	.87
17 ^R	14	3	14	3	67	1.94	1.49
21 ^R	22	6	11	6	56	2.33	1.69
25 ^R	11	6	8	6	69	1.83	1.42
<u>Cognitive Content 2 Subscale</u>							
2	61	14	19	3	3	1.72	1.05
6 ^R	6	3	14	42	36	2.00	1.07
10	72	3	22	3	0	1.56	.94
14 ^R	0	0	19	36	44	1.75	.77
18	50	25	22	3	0	1.78	.90
22 ^R	8	3	22	50	17	2.36	1.07
26	58	19	17	6	0	1.69	.95
<u>Cognitive Content 3 Subscale</u>							
3	14	6	22	53	6	3.31	1.14
7	17	6	19	53	6	3.25	1.20
11 ^R	19	22	19	28	11	3.11	1.33
15	--	--	--	--	--	--	--
19 ^R	6	19	25	42	8	2.72	1.06
23	11	14	19	47	8	3.28	1.61
27	8	19	58	15	0	3.69	1.00
<u>Cognitive Content 4 Subscale</u>							
4* ^R	6	22	11	36	22	2.51	1.25
8	36	28	17	14	6	2.25	1.25
12	39	19	22	14	6	2.28	1.28

Table continued on next page.

Item	SD	D	N	A	SA	Mean	StD
16 ^R	8	25	47	19	0	3.22	.87
20 ^R	3	14	22	47	14	2.44	1.00
24	25	11	36	19	8	2.75	1.27
28	39	14	25	19	3	2.33	1.26

Note. Endorsement rates presented as percentages. Frequency counts in table are prior to reverse scoring for ease of comparison with item content in Appendix A. SD = strongly disagree. D = disagree. N = neutral. A = strongly agree. SA = strongly agree. StD = standard deviation. $N = 36$; * $N = 35$. ^R Means and standard deviations were calculated following reverse scoring, endorsement percentages listed are prior to reverse scoring.

Table 2

Inter-Item Correlations among Items on Cognitive Content 1 Subscale and Corrected-Item Total Correlations for Study 1

	1	5	9	13	17 ^R	21 ^R	25 ^R	CIT
1	--	.58**	.67**	.68**	.29	.26	.36*	.57
5		--	.95**	.79**	.34**	.24	.59**	.71
9			--	.78**	.36*	.26	.61**	.73
13				--	.35*	.27	.54**	.69
17 ^R					--	.57**	.37*	.52
21 ^R						--	.62**	.53
25 ^R							--	.70

Note. CIT = corrected item-total correlation. R = positively worded item, was reverse scored prior to calculation of correlations. 2-tailed. * $p < .05$. ** $p < .01$.

Table 3

Inter-Item Correlations among Items on Cognitive Content 2 Subscale and Corrected-Item Total Correlations for Study 1

	2	6 ^R	10	14 ^R	18	22 ^R	26	CIT
2	--	.00	.28	.40*	.17	.27	.45**	.38
6 ^R		--	.28	.45*	.06	.40*	.23	.34
10			--	.71**	.32	.26	.64**	.63
14 ^R				--	.25	.32	.60**	.72
18					--	.03	.49**	.31
22 ^R						--	.28	.39
26							--	.69

Note. $N = 36$. CIT = corrected item-total correlation. R = positively worded item, was reverse scored prior to calculation of correlations. 2-tailed. * $p < .05$. ** $p < .01$.

Table 4

Inter-Item Correlations among Items on Cognitive Content 3 Subscale and Corrected-Item Total Correlations for Study 1

	3	7	11 ^R	15	19 ^R	23	27	CIT
3	--	.21	-.04	--	.03	.54**	.21	.27
7		--	.30	--	.46**	.50**	.11	.50
11 ^R			--	--	.33	.35*	.28	.36
15				--	--	--	--	--
19 ^R					--	.48**	.13	.45
23						--	.39*	.77
27							--	.34

Note. $N = 36$. CIT = corrected item-total correlation. R = positively worded item, was reverse scored prior to calculation of correlations. 2-tailed. * $p < .05$. ** $p < .01$.

Table 5

Inter-Item Correlations among Items on Cognitive Content 4 Subscale and Corrected-Item Total Correlations for Study 1

	4 ^R	8	12	16 ^R	20 ^R	24	28	CIT
4 ^R	--	.41*	.28	.05	.76**	.14	.62**	.55
8		--	.56**	-.03	.34*	.58**	.67**	.67
12			--	.05	.37*	.57**	.68**	.66
16 ^R				--	.31	-.29	.01	.01
20 ^R					--	.05	.58**	.59
24						--	.46**	.41
28							--	.81

Note. $N = 36$. CIT = corrected item-total correlation. R = positively worded item, was reverse scored prior to calculation of correlations. 2-tailed. * $p < .05$. ** $p < .01$.

Table 6

Summary of the Sample Demographic Information for Study 2

Variable	Classification	Frequency	Percentage
Sex	Male	129	31
	Female	282	69
Ethnicity	Caucasian/Non-Hispanic	255	62
	African-American	91	22
	Asian	17	4
	Hispanic/Latino	20	5
	Biracial/Multiracial	18	4
	Other	9	2
	Missing	1	<1
Marital Status	Single/ Never Married	398	97
	Married	9	2
	Separated/ Divorced	4	1
Variable		Mean	StD
Age		19.06	2.86

Note. $N = 411$. StD = standard deviation.

Table 7

Means, Standard Deviations, and Cronbach's Alphas for Study 2 Measures

Measure	Mean	StD	Alpha
Neuroticism (NEO-PI-R)	140.45	21.92	.92
Perseverative Thinking Questionnaire (PTQ)	41.81	10.62	.94
SIB Cognitive Content Measure (SCCM)*	27.54	8.56	.85
Cognitive Content 1 (4 items)*	5.78	2.68	.78
Cognitive Content 2 (7 items)*	10.03	4.06	.84
Cognitive Content 4 (5 items)*	11.73	4.27	.87
FASM Lifetime Episodes	19.98	141.75	

Note. $N = 411$. Untransformed variables used. FASM = Functional Assessment of Self-Mutilation. StD = standard deviation. *Measures following item removal.

Table 8

Correlations among Study 2 Variables

Variables	1.	2.	3.	4.	5.	6.
1. Neuroticism [†]	--	.62*	.36*	.45*	.41*	.26*
2. Ruminative Style		--	.29*	.36*	.38*	.25*
3. Cognitive Content 1 [†]			--	.65*	.22*	.34*
4. Cognitive Content 2 [†]				--	.38*	.32*
5. Cognitive Content 4 [†]					--	.17*
6. RSIB						--

Note. $N = 411$. RSIB = repeated self-injurious behavior. RSIB is a dichotomous variable and uses Spearman Rho correlations, all other correlations use Pearson. [†]Correlations use transformed variables. 2-tailed test. * $p < .01$.

Table 9

Item Response Rates, Means, and Standard Deviations for the SIB Cognitive Content Measure in Study 2

Item	SD	D	N	A	SA	Mean	StD
<u>Cognitive Content 1 Subscale</u>							
1	78	15	5	2	0	1.31	.65
5	76	14	7	2	1	1.36	.75
9	75	14	5	5	1	1.43	.87
13	79	14	6	2	1	1.31	.69
17 ^R	8	3	10	24	56	1.82	1.19
24 ^R	6	3	9	19	64	1.67	1.11
<u>Cognitive Content 2 Subscale</u>							
2	68	18	6	5	3	1.56	1.00
6 ^R	2	1	10	32	55	1.63	.85
10	75	16	7	2	1	1.37	.74
14 ^R	2	3	10	37	48	1.75	.91
18	47	29	19	5	1	1.84	.93
21 ^R	12	28	24	24	18	3.05	1.22
25	48	28	12	11	1	1.90	1.06
28	66	20	8	5	1	1.55	.90
<u>Cognitive Content 3 Subscale</u>							
3	21	10	23	40	7	3.02	1.27
7	8	12	24	47	9	3.35	1.07
11 ^R	7	14	25	39	15	2.58	1.11
15	11	15	25	44	5	3.15	1.10
19 ^R	6	16	30	37	11	2.69	1.05
22	13	25	34	27	2	2.78	1.03
26	10	13	26	45	6	3.23	1.08
<u>Cognitive Content 4 Subscale</u>							
4 ^R	7	19	24	40	11	2.71	1.10
8	24	38	22	15	2	2.33	1.04
12	30	40	19	10	2	2.14	1.00
16	22	36	23	17	2	2.43	1.08
20 ^R	4	12	23	50	11	2.47	.97
23	18	31	29	22	2	2.58	1.06
27	27	39	19	11	3	2.25	1.08

Note. $N = 411$. Endorsement rates presented as percentages. Frequency counts in table are prior to reverse scoring for ease of comparison with item content in Appendix G. SD = strongly disagree. D = disagree. N = neutral. A = strongly agree. SA = strongly agree. StD = standard deviation. ^R Means and standard deviations were calculated following reverse scoring, endorsement percentages listed are prior to reverse scoring.

Table 10

Inter-Item Correlations among Items on SIB Cognitive Content Measure Cognitive Content 1 Subscale and Corrected-Item Total Correlations in Study 2

	1	5	9	13	17	24	CIT
1	--	.61*	.53*	.65*	.26*	.38*	.62
5		--	.74*	.81*	.23*	.40*	.71
9			--	.76*	.20*	.43*	.68
13				--	.23*	.42*	.75
17					--	.31*	.31
24						--	.51

Note. $N = 411$. CIT = corrected item-total correlation. 2-tailed. * $p < .01$.

Table 11

Inter-Item Correlations among Items on SIB Cognitive Content Measure Cognitive Content 2 Subscale and Corrected-Item Total Correlations in Study 2

	2	6	10	14	18	21	25	28	CIT
2	--	.50*	.47*	.45*	.32*	.39*	.44*	.57*	.63
6		--	.48*	.65*	.20*	.33*	.35*	.45*	.58
10			--	.54*	.52*	.28*	.58*	.58*	.69
14				--	.32*	.30*	.44*	.50*	.63
18					--	.21*	.62*	.45*	.51
21						--	.33*	.28*	.41
25							--	.55*	.67
28								--	.67

Note. $N = 411$. CIT = corrected item-total correlation. 2-tailed. * $p < .01$.

Table 12

Inter-Item Correlations among Items on SIB Cognitive Content Measure Cognitive Content 3 Subscale and Corrected-Item Total Correlations in Study 2

	3	7	11	15	19	22	26	CIT
3	--	.32*	.04	.39*	-.01	.25*	.30*	.31
7		--	.23*	.60*	.19*	.48*	.56*	.62
11			--	.22*	.33*	.28*	.24*	.32
15				--	.23*	.52*	.61*	.67
19					--	.22*	.24*	.28
22						--	.51*	.58
26							--	.64

Note. $N = 411$. CIT = corrected item-total correlation. 2-tailed. * $p < .01$.

Table 13

Inter-Item Correlations among Items on SIB Cognitive Content Measure Cognitive Content 4 Subscale and Corrected-Item Total Correlations in Study 2

	4	8	12	16	20	23	27	CIT
4	--	.17*	.18*	.18*	.57*	.04	.23*	.30
8		--	.56*	.55*	.19*	.57*	.56*	.63
12			--	.70*	.30*	.48*	.63*	.70
16				--	.27*	.50*	.68*	.70
20					--	.08	.30*	.39
23						--	.50*	.51
27							--	.71

Note. $N = 411$. CIT = corrected item-total correlation. 2-tailed. * $p < .01$.

Table 14

Mean, Standard Deviation, and Correlations for Items Deleted from the SIB Cognitive Content Measure in Study 2

Item	Sub-scale	Mean	StD	Inter-item <i>r</i> range, own subscale	Corrected-total <i>r</i>	Other subscales <i>r</i>
17	1	1.82	1.19	.20** - .31**	.31	.07 - .21**
21	2	3.05	1.22	.21** - .39**	.41	.20** - .25**
3	3	3.02	1.27	-.01 - .38**	.31	.15** - .21**
7	3	3.35	1.07	.19** - .60**	.62	.17** - .34**
11	3	2.58	1.11	.04 - .33**	.32	.20** - .27**
15	3	3.15	1.10	.22** - .61**	.67	.17** - .48**
19	3	2.69	1.05	-.01 - .33**	.28	.26** - .43**
22	3	2.78	1.22	.22** - .52**	.58	.18** - .47**
26	3	3.23	1.08	.24** - .61**	.64	.18** - .45**
4	4	2.71	1.10	.04 - .57**	.30	.13* - .35**
20	4	2.47	.97	.08 - .57**	.39	.12* - .33**

Note. *N* = 411. StD = standard deviation. * *p* < .05; ** *p* < .01

Table 15

SCCM Items Retained for Confirmatory Factor Analyses

Cognitive Content 1

1. It is ok to physically hurt myself on purpose.
5. Sometimes, intentionally hurting my body is necessary.
9. Sometimes I have to deliberately hurt myself physically.
24. Deliberately hurting myself physically is unacceptable.

Cognitive Content 2

2. I feel so disgusted with my body at times that I think about abusing or mistreating it.
6. I respect myself and my body and I should be treated well.
10. I should be punished for who I am as a person.
14. I feel good about who I am and I am worthy of having good things happen in my life.
18. I deserve the bad things that happen to me.
25. Sometimes I feel disgusted with myself and feel like I deserve the bad things that happen to me.
28. Sometimes I think that, because I'm a bad person, it's ok to take it out on myself.

Cognitive Content 4

8. Sometimes I feel like I have to do something to show others how upset I am.
 12. The only way others understand how upset I am is if I do something to show them.
 16. I feel like others do not really understand how upset I am unless I show them.
 23. When I am extremely upset, I need to do something to express my feelings to others.
 27. I feel like people don't take me seriously when I'm upset unless I do something to show them how upset I am.
-

Table 16

Summary of the Goodness-of-Fit Statistics for the Confirmatory Factor Analyses

Factor Model	Chi-Square	($p > .05$) p-value	df	(<.08) RMSEA	90% CI	(<.10) SRMR	(>.90) GFI	(>.90) CFI	AIC
3	283.09	.00	101	.066	.057 - .076	.17	.98	.98	353.09
2	320.37	.00	103	.072	.063 - .081	.20	.98	.98	386.37
1	520.55	.00	104	.099	.090 - .110	.37	.97	.96	584.55

Note: $N = 411$. Cut-off scores based on Kline's (2005) recommendations are presented above each fit index in parentheses. RMSEA = Root Mean Square Error of Approximation. 90% CI = 90% confidence interval for RMSEA. SRMR = Standardized Root Mean Square Residual. GFI = Goodness of Fit Index. CFI = Comparative Fit Index. AIC = Akaike Information Criterion.

Table 17

Weighted Least Squares Estimates for a Three-Factor Model of the SIB Cognitive Content Measure

Parameter	Unstandardized	SE	Standardized	R^2_{smc}
<u>Factor Loadings</u>				
<u>Factor 1 (Cognitive Content 1)</u>				
1	1.00	---	.91	.84
5	1.08*	.03	.99	.98
9	1.05*	.03	.96	.92
24	.93*	.04	.85	.73
<u>Factor 2 (Cognitive Content 2)</u>				
2	1.00	---	.89	.80
6	1.05*	.03	.94	.88
10	1.08*	.02	.97	.94
14	1.01*	.03	.91	.82
18	.97*	.03	.87	.76
25	.99*	.03	.88	.78
28	1.05*	.02	.94	.89
<u>Factor 3 (Cognitive Content 4)</u>				
8	1.00	---	.81	.65
12	1.12*	.03	.90	.82
16	1.14*	.04	.92	.85
23	.96*	.04	.78	.61
27	1.12*	.03	.91	.82
<u>Factor Variance and Covariance</u>				
Factor 1	.84*	.04	1.00	
Factor 2	.80*	.03	1.00	
Factor 3	.65*	.04	1.00	
Factors 1 and 2	.75*	.03	.92	
Factors 1 and 3	.30*	.03	.40	
Factors 2 and 3	.37*	.03	.51	

Note. $N = 411$. SE = standard error. R^2_{smc} = standardized multiple correlation. * $p < .05$.

Table 18

Weighted Least Squares Estimates for a Two-Factor Model of the SIB Cognitive Content Measure

Parameter	Unstandardized	SE	Standardized	R^2_{smc}
<u>Factor Loadings</u>				
<u>Factor 1 (Cognitive 1 and Cognitive 2)</u>				
1	1.00	---	.91	.83
5	1.08*	.03	.98	.97
9	1.05*	.03	.96	.92
24	.92*	.03	.84	.70
2	.98*	.03	.90	.80
6	1.02*	.03	.93	.87
10	1.06*	.03	.97	.93
14	1.00*	.03	.91	.82
18	.96*	.04	.87	.76
25	.96*	.04	.87	.76
28	1.05*	.03	.96	.92
<u>Factor 2 (Cognitive 4)</u>				
8	1.00	---	.81	.66
12	1.11*	.03	.90	.81
16	1.18*	.03	.92	.84
23	.95*	.04	.77	.60
27	1.12*	.03	.91	.83
<u>Factor Variance and Covariance</u>				
Factor 1	.83*	.04	1.00	
Factor 2	.66*	.04	1.00	
Factor 1 and 2	.39*	.03	.52	

Note. $N = 411$. SE = standard error. R^2_{smc} = standardized multiple correlation. * $p < .05$.

Table 19

Weighted Least Squares Estimates for a One-Factor Model of the SIB Cognitive Content Measure

Parameter	Unstandardized	SE	Standardized	R^2_{smc}
	<u>Factor Loadings</u>			
1	1.00	---	.88	.78
5	1.11*	.03	.98	.97
9	1.08*	.03	.96	.91
24	.90*	.04	.80	.63
2	1.04*	.03	.92	.85
6	1.03*	.03	.91	.83
10	1.09*	.03	.96	.93
14	1.01*	.03	.89	.80
18	.99*	.03	.87	.76
25	1.00*	.03	.89	.79
28	1.08*	.03	.96	.91
8	.92*	.03	.82	.67
12	1.02*	.03	.90	.81
16	0.99*	.03	.87	.76
23	.87*	.04	.77	.59
27	1.04*	.03	.92	.85
	<u>Factor Variance</u>			
Factor 1	.78*	.04	1.00	

Note. $N = 411$. SE = standard error. R^2_{smc} = standardized multiple correlation. * $p < .05$.

Table 20

Maximum Likelihood Estimates for Variables in Models 1, 2, and 3

Predictor Variable	B	SE B	β	Significance	R^2_{smc}
<u>Model 1</u>					.07
Neuroticism → RSIB	1.84**	.33	.27**	$t(409) = 5.63**$	
<u>Model 2</u>					.38
Neuroticism → Ruminative	95.86**	6.07	.62**	$t(409) = 15.79**$	
<u>Model 3</u>					.08 [†]
Neuroticism → RSIB	1.33**	.41	.19**	$t(408) = 3.24**$	
Rumination → RSIB	.01*	.00	.12*	$t(408) = 1.99*$	
Neuroticism → Ruminative	95.69**	6.06	.62**	$t(408) = 15.80**$	

Note. $N = 411$. B = unstandardized estimate. SE B = standard error of the unstandardized estimate. β = standardized estimate. R^2_{smc} = squared multiple correlation for full model.

[†]Squared multiple correlation for RSIB. * $p < .05$. ** $p < .01$.

Table 21

Total, Direct, and Indirect Effects for Model 3 (Partial Mediation Model)

Parameter	Unstandardized	SE	Standardized
<u>Total effects</u>			
Neuroticism → RSIB	1.84*	.33	.27
Ruminative → RSIB	.01*	.00	.12
<u>Direct effects</u>			
Neuroticism → RSIB	1.33*	.41	.19
Ruminative → RSIB	.01*	.00	.12
Neuroticism → Ruminative	95.69*	6.06	.62
<u>Indirect effects</u>			
Neuroticism → RSIB	.50*	.26	.07

Note. $N = 411$. SE = standard error of the unstandardized estimate. RSIB = repeated self-injurious behavior. * $p < .05$.

Table 22

Maximum Likelihood Estimates for Moderation Analyses

Predictor Variable	B	SE B	β	Significance	R^2_{smc}
<u>Model 4: Cognitive Content 1</u>					.14
Ruminative → RSIB	.01**	.00	.15**	$t(407) = 3.15**$	
C1 → RSIB	.81**	.14	.29**	$t(407) = 5.75**$	
C1 x Ruminative → RSIB	.01	.01	.02	$t(407) = .43$	
<u>Model 5: Cognitive Content 2</u>					.12
Ruminative → RSIB	.01**	.00	.14**	$t(407) = 2.80**$	
C2 → RSIB	.73**	.15	.25**	$t(407) = 4.93**$	
C2 x Ruminative → RSIB	.02	.01	.06	$t(407) = 1.28$	
<u>Model 6: Cognitive Content 4</u>					.07
Ruminative → RSIB	.01**	.00	.20**	$t(407) = 3.87**$	
C4 → RSIB	.01	.01	.10	$t(407) = 1.92$	
C4 x Ruminative → RSIB	.00	.00	.00	$t(407) = .02$	
<u>Model 7: Cognitive Content 1 and 2</u>					.14
Ruminative → RSIB	.01*	.00	.12*	$t(407) = 2.51*$	
C1 and 2 → RSIB	.93**	.16	.30**	$t(407) = 5.85**$	
C1 and 2 x Ruminative → RSIB	.01	.01	.04	$t(407) = .89$	

Note. $N = 411$. B = unstandardized estimate. SE B = standard error of the unstandardized estimate. β = standardized estimate. R^2_{smc} = squared multiple correlation for full model. C1 = Cognitive Content 1. C2 = Cognitive Content 2. C4 = Cognitive Content 4. * $p < .05$. ** $p < .01$.

Table 23

Summary of the Goodness-of-Fit Statistics for the Path Analysis of the Full Model and Alternative Model

Model	Chi-Square	($p > .05$) p-value	df	(<.08) RMSEA	CI	(<.10) SRMR	(>.90) GFI	(>.90) CFI
8. Full	6.12	.047	2	.071	.007- .140	.028	.99	.99
9. Alt.	5.77	.016	1	.110	.037- .200	.027	.99	.99

Note. $N = 411$. Alt = alternative model. Cut-off scores based on Kline's (2011) recommendations are presented above each fit index in parentheses. RMSEA = Root Mean Square Error of Approximation. CI = confidence interval for RMSEA. SRMR = Standardized Root Mean Square Residual. GFI = Goodness of Fit Index. CFI = Comparative Fit Index.

Table 24

Maximum Likelihood Estimates for Model 7 (Full Model)

Parameter	Unstandardized	SE	Standardized
<u>Direct Effects</u>			
Neuroticism → RSIB	.63	.43	.09
Ruminative → RSIB	.00	.00	.08
Neuroticism → Ruminative	95.69*	6.07	.62
C1 → RSIB	.60*	.17	.22
C2 → RSIB	.30	.19	.10
<u>Indirect Effects</u>			
Neuroticism → RSIB	.35	.25	.05
<u>Disturbance Variances</u>			
Neuroticism	.00*	.00	1.00
C1	.03*	.00	1.00
C2	.03*	.00	1.00
Ruminative	70.00*	4.91	.62
RSIB	.19*	.01	.85
<u>Disturbance Correlations</u>			
Neuroticism and C1	.00*	.00	.36
Neuroticism and C2	.00*	.00	.45
C1 and C2	.02*	.00	.65

Note. $N = 411$. SE = standard error of the unstandardized estimate. C1 = Cognitive Content 1. C2 = Cognitive Content 2. RSIB = repeated self-injurious behavior. * $p < .05$.

Table 25

Maximum Likelihood Estimates for Model 8 (Alternative Full Model)

Parameter	Unstandardized	SE	Standardized
<u>Direct Effects</u>			
Neuroticism → RSIB	.60	.43	.09
Ruminative → RSIB	.00	.00	.08
Neuroticism → Ruminative	95.69*	6.06	.62
C1 and 2 → RSIB	.89*	.16	.29
<u>Indirect Effects</u>			
Neuroticism → RSIB	.34	.25	.05
<u>Disturbance Variances</u>			
Neuroticism	.00*	.00	1.00
C1 and 2	.02*	.00	1.00
Ruminative	70.00*	4.90	.62
RSIB	.19*	.01	.86
<u>Disturbance Correlations</u>			
Neuroticism and C1 and 2	.00*	.00	.46

Note. $N = 411$. SE = standard error of the unstandardized estimate. C1 and 2 = Cognitive Content 1 and 2. RSIB = repeated self-injurious behavior. $*p < .05$.

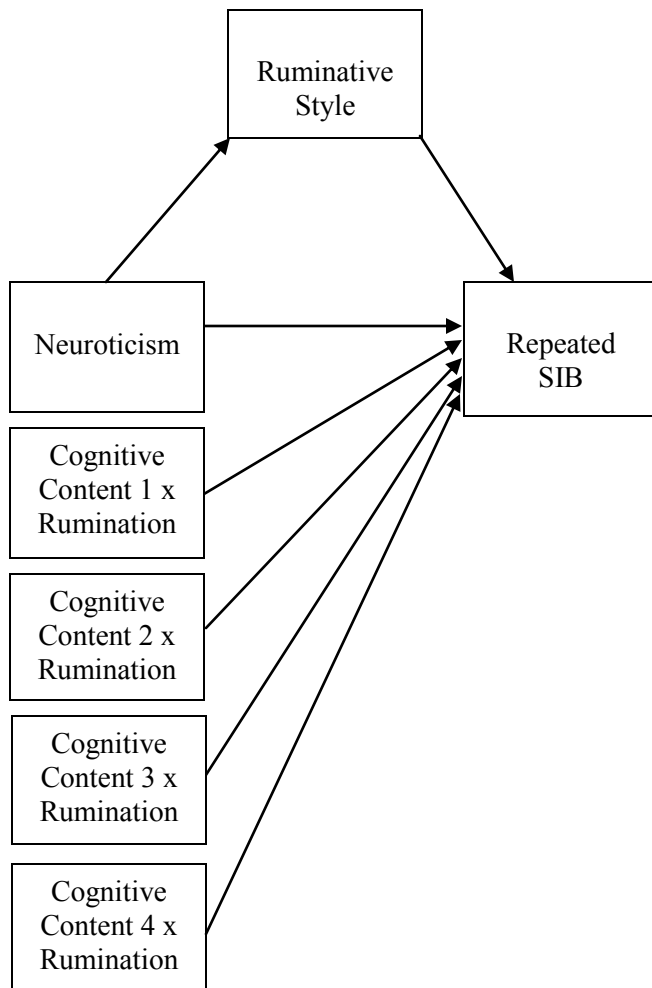


Figure 1. Proposed Conceptual Moderated Partial Mediation Model of Repeated Self-Injurious Behavior (RSIB).

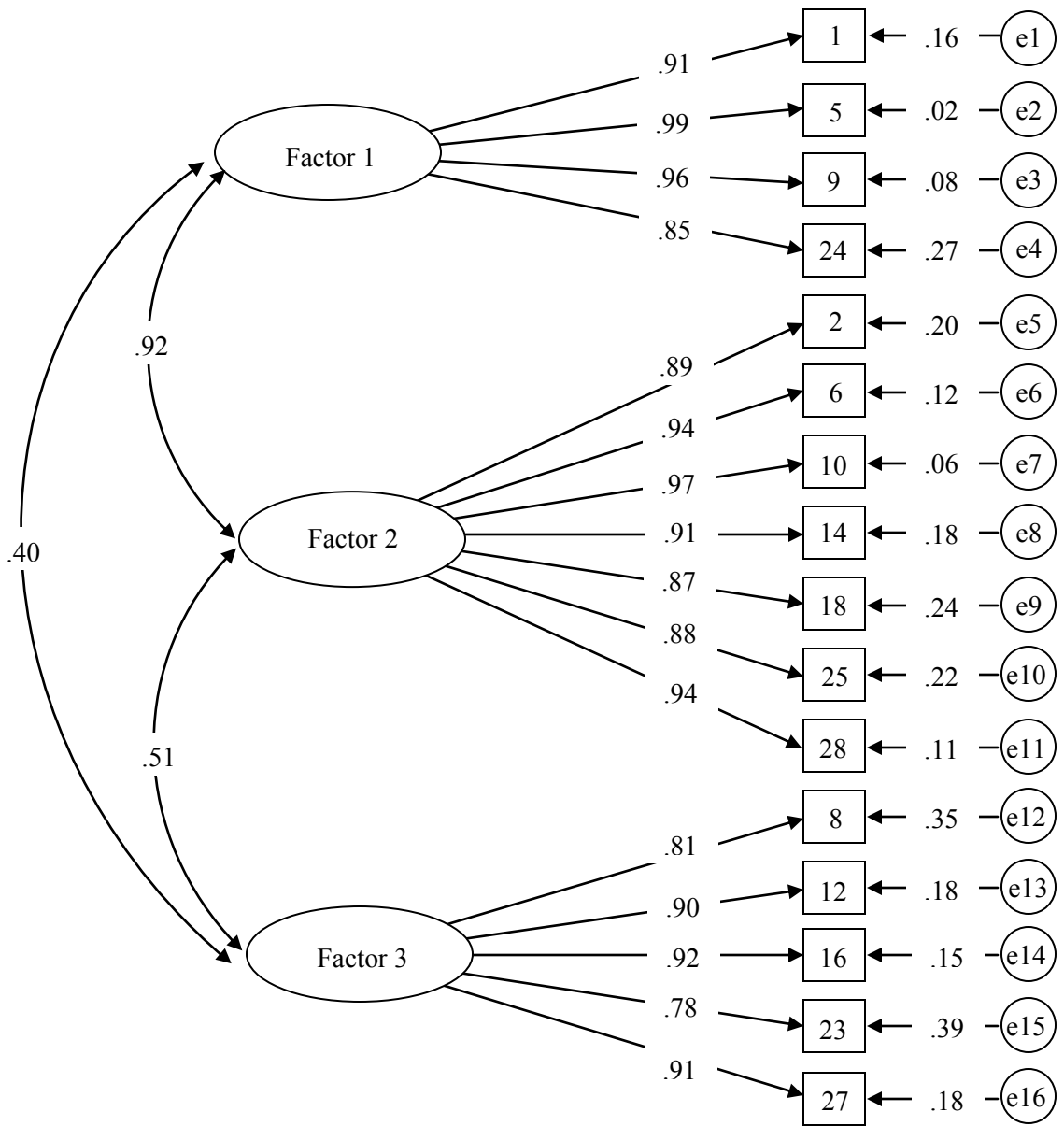


Figure 2. Standardized Estimates of a 3-Factor Model of the SCCM.

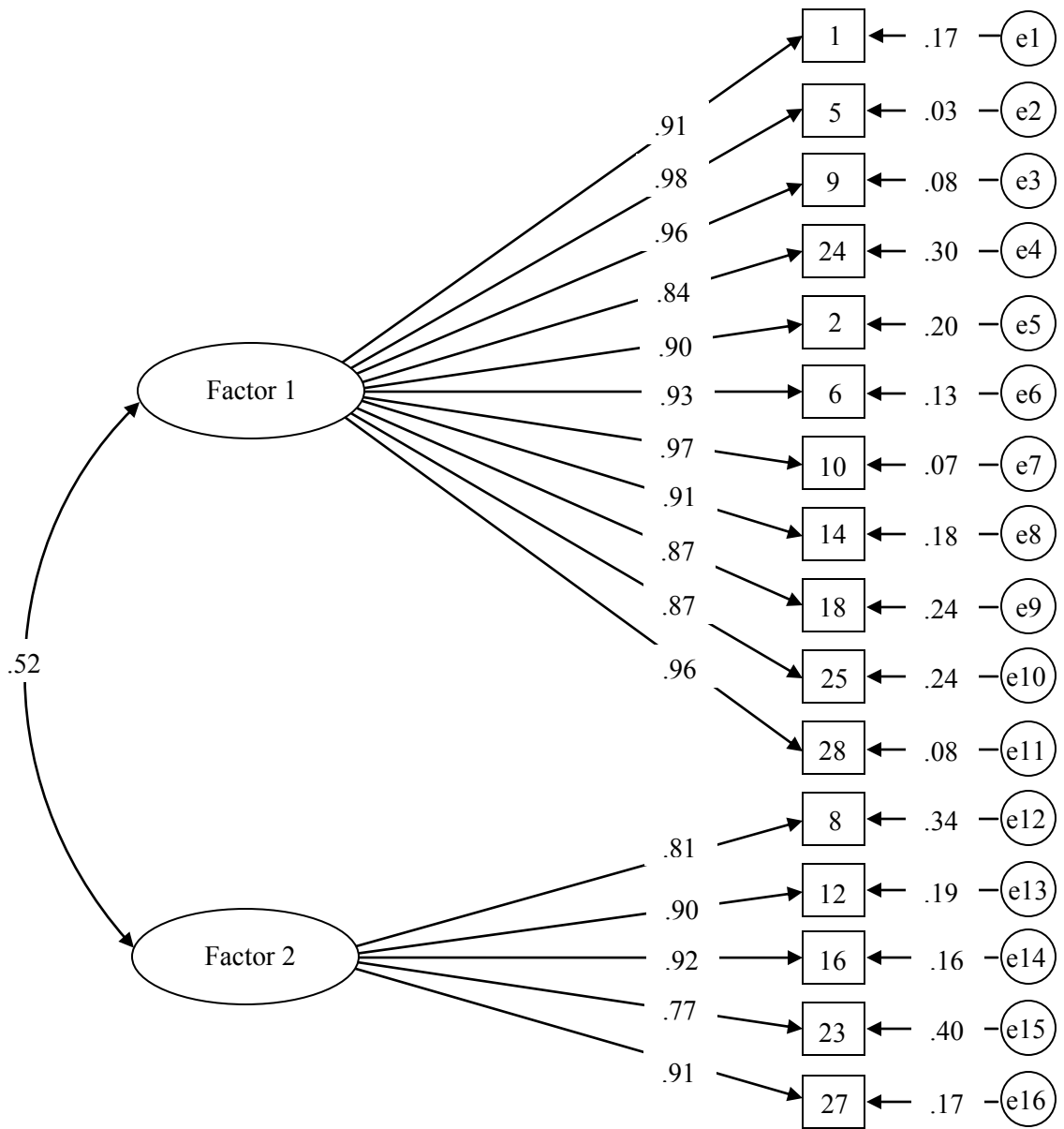


Figure 3. Standardized Estimates of a 2-Factor Model of the SCCM.

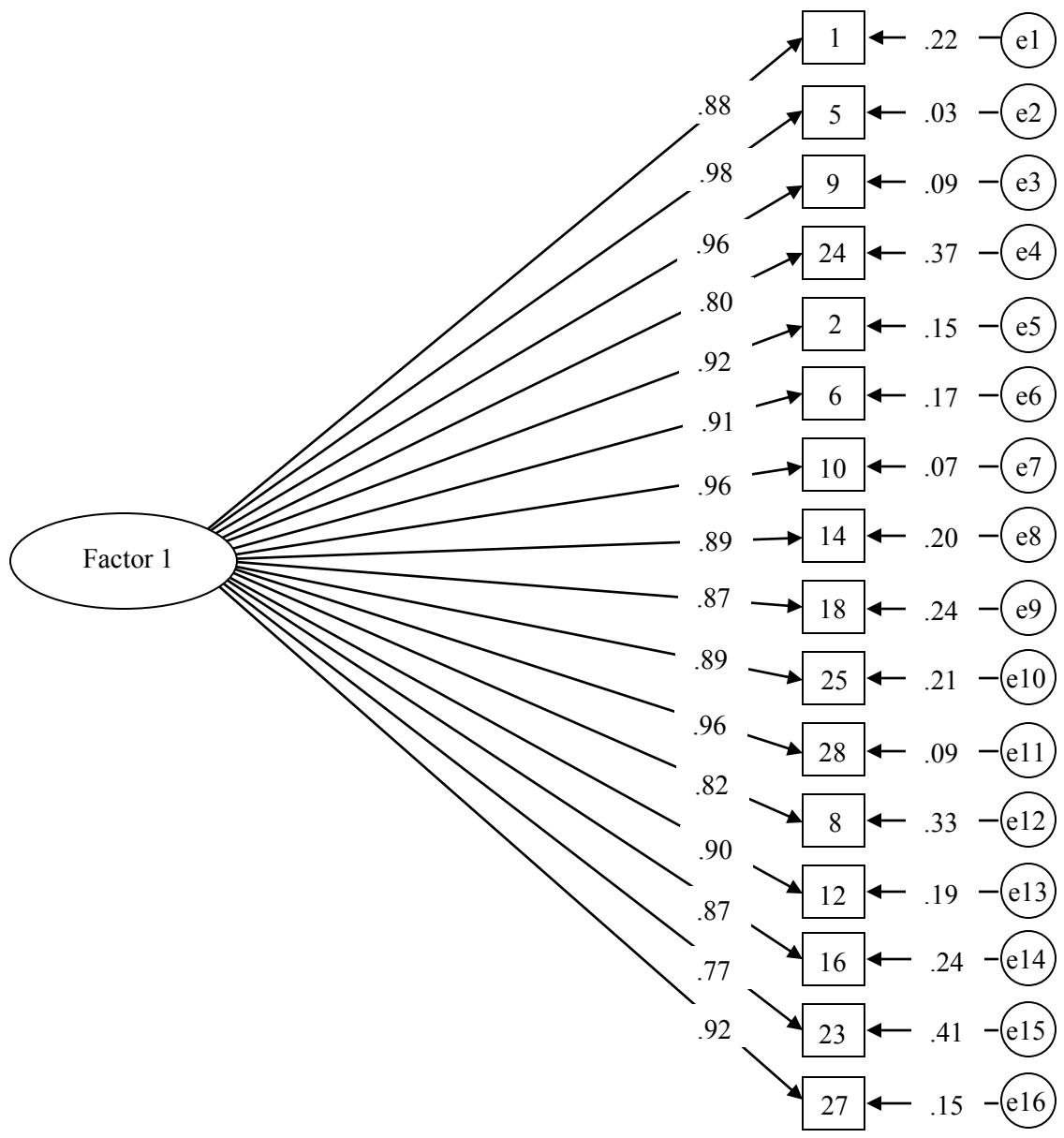


Figure 4. Standardized Estimates of a 1-Factor Model of the SCCM.

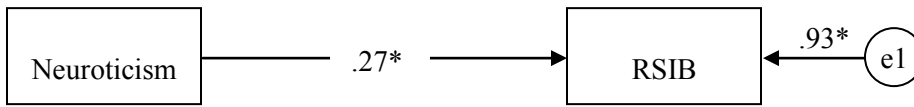


Figure 5. Model 1: Repeated Self-Injurious Behavior (RSIB) Regressed on Neuroticism.

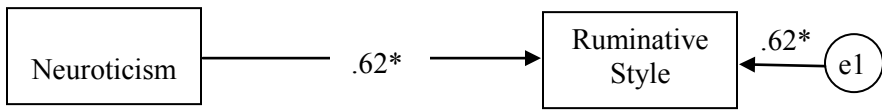


Figure 6. Model 2: Ruminative Style Regressed on Neuroticism.

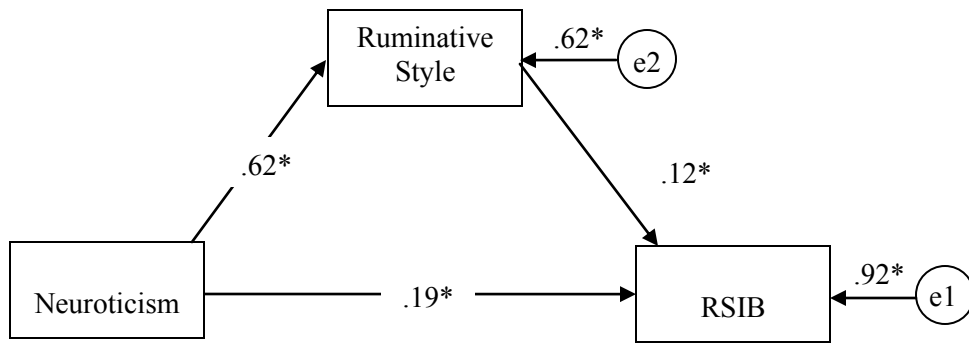


Figure 7. Model 3: Partial Mediation Model of Neuroticism, Ruminative Style, and Repeated Self-Injurious Behavior (RSIB).

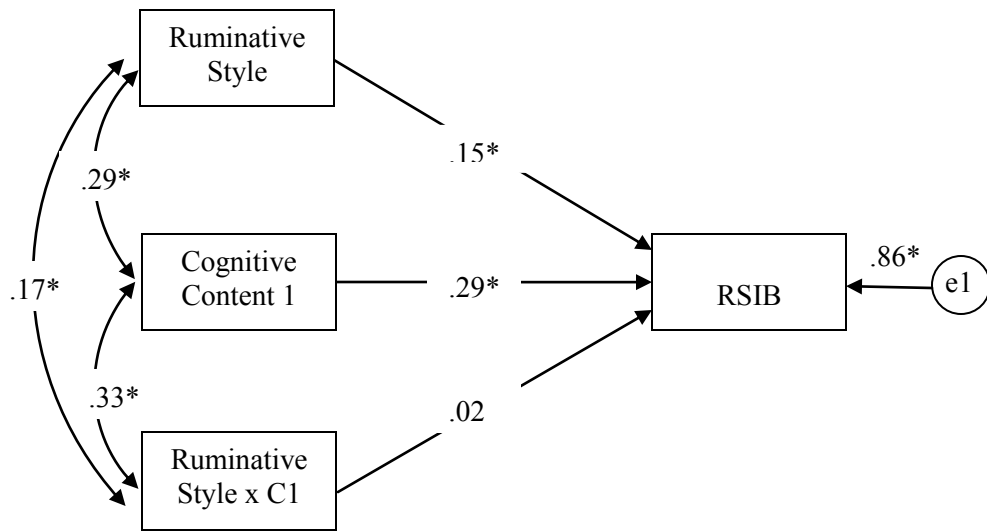


Figure 8. Model 4: Moderation Analysis of Cognitive Content 1 (C1) and Ruminative Style.

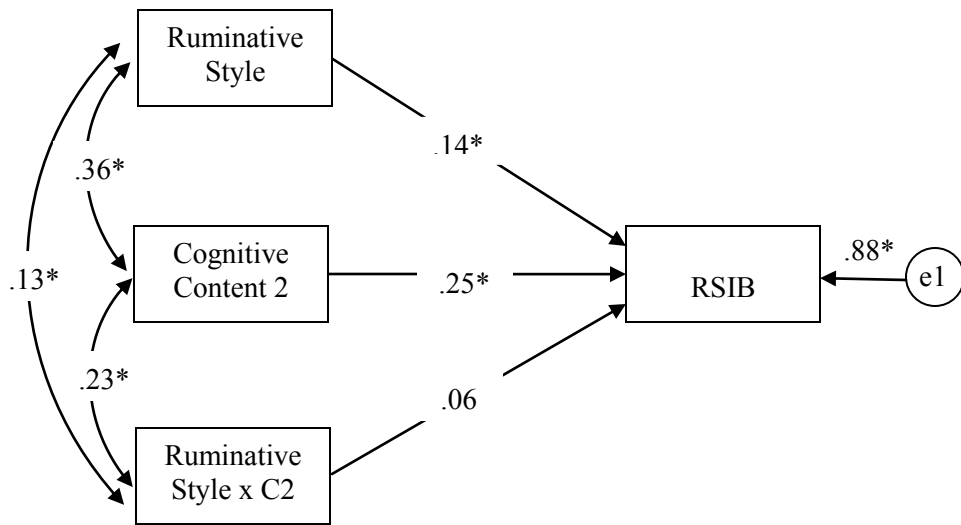


Figure 9. Model 5: Moderation Analysis of Cognitive Content 2 (C2) and Ruminative Style.

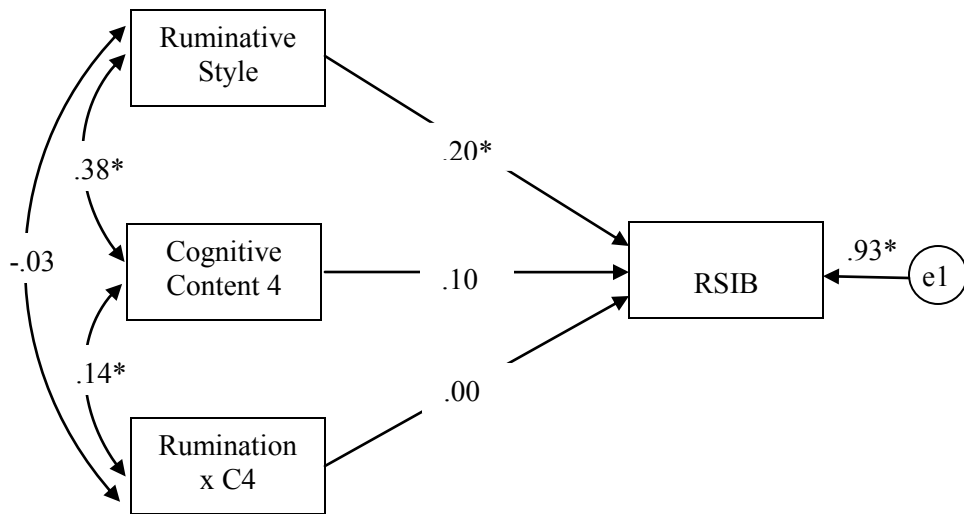


Figure 10. Model 6: Moderation Analysis of Cognitive Content 4 (C4) and Ruminative Style.

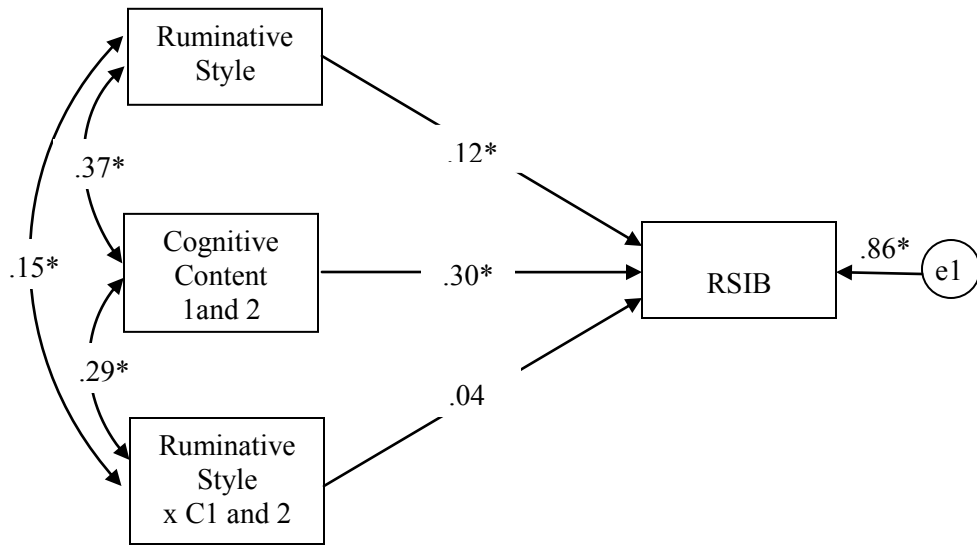


Figure 11. Model 7: Moderation Analysis of Combined Cognitive Content 1 and 2 and Ruminative Style.

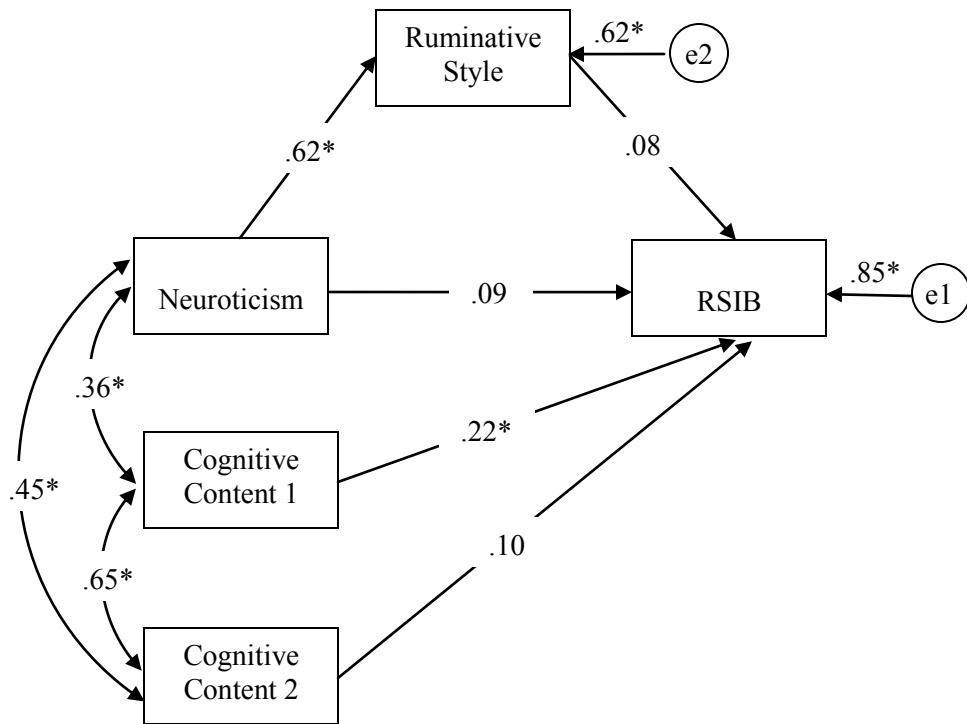


Figure 12. Model 8: Path Analysis of the Full Model.

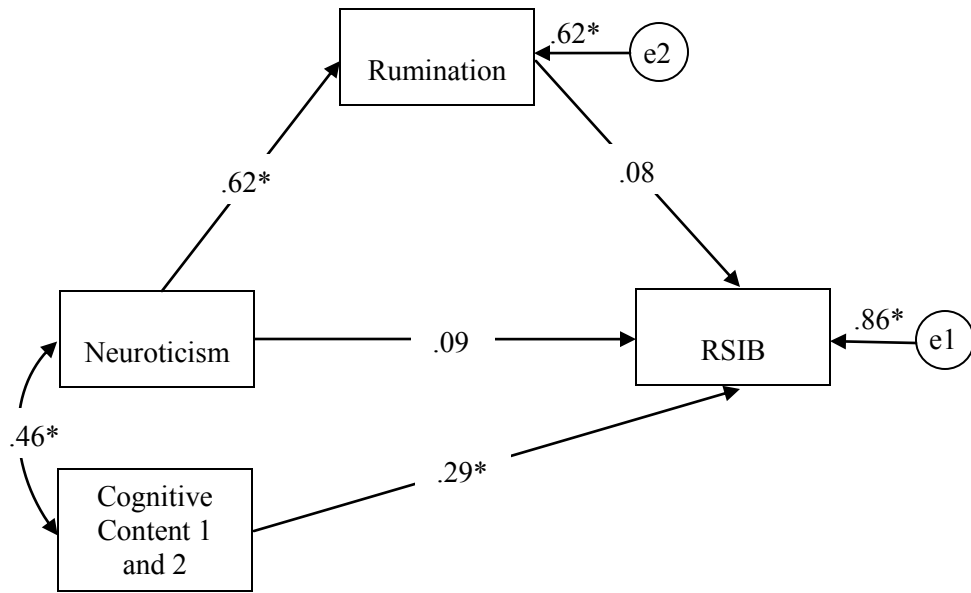


Figure 13. Model 9: Path Analysis of the Alternative Full Model.

APPENDIX B

SIB COGNITIVE CONTENT MEASURE- TRIAL (SCCM-T) FOR STUDY 1

Directions: Carefully read and think about each statement. Rate how much you agree with each statement from strongly disagree to strongly agree.

Circle “**SD**” if the statement is definitely false or if you **strongly disagree**.

Circle “**D**” if the statement is mostly false or if you **disagree**.

Circle “**N**” if the statement is about equally true or false, if you cannot decide, or if you are **neutral** on the statement.

Circle “**A**” if the statement is mostly true or you **agree**.

Circle “**SA**” if the statement is definitely true or if you **strongly agree**.

1.	It is ok to physically hurt myself on purpose. (C1)	SD	D	N	A	SA
2.	I hate my body and feel disgusted with it at times. (C2)	SD	D	N	A	SA
3.	I need to take action when I’m stressed out or upset in an effort to feel better. (C3)	SD	D	N	A	SA
4.	It’s easy for me to communicate how I am feeling to others. (C4)	SD	D	N	A	SA
5.	Sometimes, intentionally hurting my body is necessary. (C1)	SD	D	N	A	SA
6.	I deserve to have good things happen to me. (C2)	SD	D	N	A	SA
7.	When I’m extremely stressed out, it becomes overwhelming and I need to do something to make it go away. (C3)	SD	D	N	A	SA
8.	Sometimes I feel like I have to do something to show others how upset I am. (C4)	SD	D	N	A	SA
9.	Sometimes I have to deliberately hurt myself physically. (C1)	SD	D	N	A	SA
10.	I should be punished for who I am as a person. (C2)	SD	D	N	A	SA
11.	I can tolerate unpleasant feelings without having to take action to try to make them go away. (C3)	SD	D	N	A	SA
12.	The only way others understand how upset I am is if I do something to show them. (C4)	SD	D	N	A	SA
13.	Physically hurting myself on purpose is necessary at times. (C1)	SD	D	N	A	SA
14.	I feel good about who I am and I am worthy of having good things happen in my life. (C2)	SD	D	N	A	SA
15.	When things keep piling up on me, I feel like I need to do something to keep me from feeling bad or upset. (C3)	SD	D	N	A	SA

16.	I feel like others understand how much I hurt. (C4)	SD	D	N	A	SA
17.	It is not all right to harm my body on purpose. (C1)	SD	D	N	A	SA
18.	I deserve the bad things that happen to me. (C2)	SD	D	N	A	SA
19.	I do not get overwhelmed by negative feelings. I can handle them. (C3)	SD	D	N	A	SA
20.	When I am really upset, I can tell other people and they understand me. (C4)	SD	D	N	A	SA
21.	There is never a good reason to intentionally hurt my body. (C1)	SD	D	N	A	SA
22.	I'm ok with my body despite my imperfections. (C2)	SD	D	N	A	SA
23.	The only way to reduce overpowering negative feelings is to take some kind of action. (C3)	SD	D	N	A	SA
24.	When I am extremely upset, I need to do something to express my feelings to others. (C4)	SD	D	N	A	SA
25.	Deliberately hurting myself physically is unacceptable. (C1)	SD	D	N	A	SA
26.	Sometimes I feel disgusted with myself and feel like I deserve the bad things that happen to me. (C2)	SD	D	N	A	SA
27.	When I'm feeling incredibly distressed, I try to do something to make me feel better. (C3)	SD	D	N	A	SA
28.	I feel like people don't take me seriously when I'm upset unless I do something to show them how upset I am. (C4)	SD	D	N	A	SA

29. Were any questions confusing to answer?

Y

N

30. Please type in the item number of any confusing question and a quick note about why it was confusing.

APPENDIX C

DEMOGRAPHIC QUESTIONNAIRE

1. Please indicate your age _____
2. Please indicate your gender
 - a. Male
 - b. Female
3. Please indicate your marital status
 - c. Never married
 - d. Married/ Civil Union
 - e. Divorced/ Separated
 - f. Widowed
4. Please indicate your race/ethnicity (Select all that apply)
 - g. African American
 - h. Asian
 - i. Caucasian (not Hispanic)
 - j. Hispanic
 - k. Native American/ Native Alaskan/ Native Hawaiian
 - l. Middle Eastern
 - m. Other _____

APPENDIX D

FUNCTIONAL ASSESSMENT OF SELF-MUTILATION (FASM)

Have you ever intentionally engaged in the following behaviors in order to hurt yourself and WITHOUT INTENT TO KILL YOURSELF? (check all that apply):

	No	Yes	How many times in the past YEAR?	How many times IN YOUR LIFETIME ?	Have you gotten medical treatment? Y/N
1. Cut or carved your skin on purpose					
2. Hit yourself on purpose causing bruising or leaving a mark					
3. Pulled your hair out to hurt yourself					
4. Gave yourself a tattoo in order to hurt yourself					
5. Picked at a wound to hurt yourself					
6. Burned your skin (i.e., with a cigarette, match or other hot object)					
7. Inserted objects under your nails or skin					
8. Bit yourself (e.g., your mouth or lip) with intent to hurt yourself					
9. Picked areas of your body to the point of drawing blood to hurt yourself					
10. Scraped your skin on purpose					
11. "Erased" your skin to the point of drawing blood					
12. Other (specify):					

13. While doing any of the above acts, were you trying to kill yourself? **Yes** **No**

14. How long did you think about doing the above act(s) before actually doing it?

15. Did you perform any of the above behaviors while you were taking drugs or alcohol?

Yes No

16. Did you experience pain during this self-harm?

_____ Severe pain
 _____ Moderate pain
 _____ Little pain
 _____ No pain

17. How old were you when you first harmed yourself in this way?

18. Do you intend to harm yourself again? Yes No

Did you harm yourself for any of the reasons below? (check all that apply):

0 Never	1 Rarely	2 Sometimes	3 Often
-------------------	--------------------	-----------------------	-------------------

Reasons:	Rating
<i>1a.</i> To avoid school, work, or other activities	
<i>2a.</i> To relieve feeling “numb” or empty	
<i>3a.</i> To get attention	
<i>4a.</i> To feel something, even if it was pain	
<i>5a.</i> To avoid having to do something unpleasant you don’t want to do	
<i>6a.</i> To get control of a situation	
<i>7a.</i> To try to get a reaction from someone, even if it’s a negative reaction	
<i>8a.</i> To receive more attention from your parents and friends	
<i>9a.</i> To avoid being with people	
<i>10a.</i> To punish yourself	
<i>11a.</i> To get other people to act differently or change	
<i>12a.</i> To be like someone you respect	

13a.	To avoid punishment or paying the consequences	
14a.	To stop bad feelings	
15a.	To let others know how desperate you were	
16a.	To feel more a part of a group	
17a.	To get your parents to understand or notice you	
18a.	To give yourself something to do when alone	
19a.	To give yourself something to do when with others	
20a.	To get help	
21a.	To make others angry	
22a.	To feel relaxed	
23a.	Other (specify):	

APPENDIX E

PERSERVERATIVE THINKING QUESTIONNAIRE (PTQ)

In this questionnaire, you will be asked to describe how you *typically* think about negative experiences or problems. Please read the following statements and rate the extent to which they apply to you when you think about negative experiences or problems.

		Never	Rarely	Some- times	Often	Almost always
1.	The same thoughts keep going through my mind.	0	1	2	3	4
2.	Thoughts intrude into my mind.	0	1	2	3	4
3.	I can't stop dwelling on them.	0	1	2	3	4
4.	I think about many problems without solving any of them.	0	1	2	3	4
5.	I can't do anything else while thinking about my problems.	0	1	2	3	4
6.	My thoughts repeat themselves.	0	1	2	3	4
7.	Thoughts come to my mind without me wanting them to.	0	1	2	3	4
8.	I get stuck on certain issues and can't move on.	0	1	2	3	4
9.	I keep asking myself questions without finding an answer.	0	1	2	3	4
10.	My thoughts prevent me from focusing on other things.	0	1	2	3	4
11.	I keep thinking about the same issue all the time.	0	1	2	3	4
12.	Thoughts just pop into my mind.	0	1	2	3	4
13.	I feel driven to continue dwelling on the same issue.	0	1	2	3	4
14.	My thoughts are not much help to me.	0	1	2	3	4
15.	My thoughts take up all my attention.	0	1	2	3	4

APPENDIX F

SIB COGNITIVE CONTENT MEASURE (SCCM) FOR STUDY 2

Directions: Carefully read and think about each statement. Rate how much you agree with each statement from strongly disagree to strongly agree.

Circle “**SD**” if the statement is definitely false or if you **strongly disagree**.

Circle “**D**” if the statement is mostly false or if you **disagree**.

Circle “**N**” if the statement is about equally true or false, if you cannot decide, or if you are **neutral** on the statement.

Circle “**A**” if the statement is mostly true or you **agree**.

Circle “**SA**” if the statement is definitely true or if you **strongly agree**.

1.	It is ok to physically hurt myself on purpose. (C1)	SD	D	N	A	SA
2.	I feel so disgusted with my body at times that I think about abusing or mistreating it. (C2)	SD	D	N	A	SA
3.	I must take action to decrease unpleasant feelings or solve the current crisis. (C3)	SD	D	N	A	SA
4.	It’s easy for me to communicate how I am feeling to others. (C4)	SD	D	N	A	SA
5.	Sometimes, intentionally hurting my body is necessary. (C1)	SD	D	N	A	SA
6.	I respect myself and my body and I should be treated well. (C2)	SD	D	N	A	SA
7.	When I’m feeling really bad, I need to do something to help make those feelings go away. (C3)	SD	D	N	A	SA
8.	Sometimes I feel like I have to do something to show others how upset I am. (C4)	SD	D	N	A	SA
9.	Sometimes I have to deliberately hurt myself physically. (C1)	SD	D	N	A	SA
10.	I should be punished for who I am as a person. (C2)	SD	D	N	A	SA
11.	I can deal with unpleasant feelings without having to take action to try to make them go away. (C3)	SD	D	N	A	SA
12.	The only way others understand how upset I am is if I do something to show them. (C4)	SD	D	N	A	SA
13.	Physically hurting myself on purpose is necessary at times. (C1)	SD	D	N	A	SA
14.	I feel good about who I am and I am worthy of having good things happen in my life. (C2)	SD	D	N	A	SA
15.	When things keep piling up on me, I feel like I need to do something to keep me from feeling bad or upset. (C3)	SD	D	N	A	SA

16.	I feel like others do not really understand how upset I am unless I show them. (C4)	SD	D	N	A	SA
17.	It's wrong for people to hurt themselves on purpose. (C1)	SD	D	N	A	SA
18.	I deserve the bad things that happen to me. (C2)	SD	D	N	A	SA
19.	I do not get overwhelmed by negative feelings. I can handle them. (C3)	SD	D	N	A	SA
20.	When I am really upset, I can tell other people and they understand me. (C4)	SD	D	N	A	SA
21.	I never feel disgusted with myself or my body. (C2)	SD	D	N	A	SA
22.	The only way I can get rid of overpowering negative feelings is to take some kind of action. (C3)	SD	D	N	A	SA
23.	When I am extremely upset, I need to do something to express my feelings to others. (C4)	SD	D	N	A	SA
24.	Deliberately hurting myself physically is unacceptable. (C1)	SD	D	N	A	SA
25.	Sometimes I feel disgusted with myself and feel like I deserve the bad things that happen to me. (C2)	SD	D	N	A	SA
26.	When things go so wrong that I feel overwhelmed by upsetting emotions, I need to try to do something to make me feel better. (C3)	SD	D	N	A	SA
27.	I feel like people don't take me seriously when I'm upset unless I do something to show them how upset I am. (C4)	SD	D	N	A	SA
28.	Sometimes I think that, because I'm a bad person, it's ok to take it out on myself. (C2)	SD	D	N	A	SA

APPENDIX G

INFREQUENCY SCALES (IFS)

Instructions: Answer each question by choosing "YES" or "NO". There are no right or wrong answers, or trick questions. Work quickly and don't think too much about the exact meaning of the questions.

On some mornings, do you get out of bed when you wake up?	Yes	No
Have there been a number of occasions when people you have known said hello to you?	Yes	No
Have there been times when you have dialed a telephone number only to find that the line was busy?	Yes	No
At times when you were ill or tired, have you felt like going to bed early?	Yes	No
On some occasions, have you noticed that some other people are better dressed than you?	Yes	No
Is driving from New York to San Francisco generally faster than flying between these cities?	Yes	No
Are most light bulbs powered by electricity?	Yes	No
Do you go at least once every two years to visit either northern Scotland or some part of Scandinavia?	Yes	No
Can you remember a time when you talked with someone who wore glasses?	Yes	No
Sometimes when you walk down the sidewalk, do you see children playing?	Yes	No
Have you ever combed your hair before going out in the morning?	Yes	No
Do you often walk with a limp, which is the result of a skydiving accident?	Yes	No
Can you remember a single occasion when you have ridden on a bus?	Yes	No
