2015

My Own Worst Enemy: Exploring Factors that Predict Self-Harm

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Suggested Citation
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MY OWN WORST ENEMY: EXPLORING FACTORS THAT PREDICT SELF-HARM

BY

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A thesis submitted to the Department of Psychology in partial fulfillment of the requirements for the degree of Master of Arts in Psychology

April, 2015

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Acknowledgements

I would like to thank my mentor and advisor Dr. Tracy Alloway for her immeasurable support and guidance during every step of the creation of this document. I would also like to thank Dr. Brian Fisak for his flexibility in joining the committee and offering his experienced point of view to make the document as strong as possible.
Abstract

Current research on factors predicting self-harm focus on disparate factors and may not be able to comprehensively explain the mechanisms causing self-harm. The aim of the current study was to examine factors that may be related yet independently predict self-harm. Factors discussed include rumination, self-criticism, and working memory. A binary logistic regression found that the only factor that predicted the presence of self-harming behavior was a high level of self-criticism. Further, a Classification and Regression Tree found that the single strongest predictor of self-harming behavior was a belief that love needs to be continually earned from others. Our findings have implications for improving the efficacy of interventions aimed at preventing self-harm, which traditionally have been ineffective. Treatments incorporating ways to reduce self-criticism, such as a focus on improving self-compassion with Compassionate Mind Training, may address underlying mechanisms that can trigger self-harm behavior.

Keywords: rumination, self-criticism, working memory, depression, self-harm, self-compassion
My Own Worst Enemy: Exploring Factors That Predict Self-Harm

Self-harm is a growing health concern that is an important topic for study. It is a widespread problem, and for adolescents and young adults, has a high incidence rate. It has been recently estimated that more than 4% of adolescents in the United States self-harm (Selby, Bender, Gordon, Nock, & Joiner, 2012). Self-harm has many different names, including Non-Suicidal Self Injury (NSSI), Repetitive Self-Mutilation (RSM), Self-Injurious Behavior (SIB), or Deliberate Self-harm (DSH; Lieberman, 2004). Parasuicidal Behavior (PB) is a broader classification of self-harm that includes any self-destruction of body tissue, with the clear intent to end one’s life (attempted suicide), without the intent to end one’s life (DSH), or an ambivalence about ending one’s own life (Chapman, Gratz, & Brown, 2005). Common parasuicidal behaviors include cutting, scratching, burning, biting, bruising, and breaking bones. Self-harm typically includes any non-culturally sanctioned bodily injury inflicted on the self, but sometimes examinations of self-harm are limited to deliberate, direct destruction of body tissue, thus excluding certain behaviors such as self-poisoning or drug overdosing (Chapman et al., 2005). The focus of the present study is on parasuicial behavior, which we refer to as self-harm.

There are different reasons for engaging in self-harming behaviors. Most self-injurers reported that self-harm was used to regulate high levels of emotional distress and negative emotions, caused by anxiety or depression. Self-harming behaviors redirect attention away from the distressing thoughts and emotions toward the act itself (Klonsky, 2011; Tait, Brinker, Moller, & French, 2014). To a lesser extent, self-harm may also be used as a form of self-punishment for inappropriate thoughts or actions, a way to reconnect with the self or “feel something” in response to feelings of somatic dissociation, or to communicate sense of pain and desire for relief to others. In young adults, common factors contributing to emotional distress are family arguments, problems with romantic partners, or academic
difficulties. Some of these common factors may represent chronic difficulties relating to family, school and behavior (Harrington, 2001).

In a recent study, self-harm was related to maladaptive coping strategies in undergraduate students (Christian & McCabe, 2011). Self-harm is a particularly damaging way of emotional regulation because it has the potential to create a self-sustaining cycle: self-harm is performed to provide temporary relief of emotional distress, which upon later contemplation is the source of further emotional distress. This cycle indicates that persistent emotional distress is a major risk factor for the development of self-harm (Lundh, Wangby-Lundgh, Paaske, Ingesson, & Bjarehed, 2011).

However, to date, researchers have focused on disparate factors, such as rumination, depression, and self-criticism, rather than adopting a comprehensive examination of underlying mechanisms for self-harm. In order to integrate these different strands of research activity, the present study explores whether these factors are independent predictors of self-harm.

**Rumination, Depression, and Self-Harm**

Rumination can be defined as a method of coping with negative mood that involves self-focused attention and self-reflection (Treynor, Gonzalez, & Nolen-Hoeksema, 2003). This emotional regulation strategy comprises of both positive (reflection) and negative (brooding) components and can increase understanding of one’s actions, evaluate their efficacy, and contemplate alternative behaviors for future similar circumstances. Brooding has been associated with increased negative emotions by decreasing mood stability and increasing the intensity and length of depressive symptoms (Brinker & Dozios, 2009). It has also been found to predict onsets of major depression across one year (Nolen-Hoeksema, 2000), as well decreases in positive mood (Ciarrochi, Scott, Dean, & Heaven, 2003). Those
who engage in rumination when depressed or dysphoric have longer and more severe periods of depression that those who do not (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008).

Rumination may be an independent predictor of self-harm because it can be a maladaptive coping strategy when excessive self-focus results in an increased salience of negative evaluations of one’s own thoughts and actions. According to the response styles theory developed by Nolen-Hoeksema (2008), rumination prolongs distress by prompting negative thoughts to interpret one’s surroundings, encouraging fatalistic thinking and feelings of powerlessness, and decreasing the likelihood of situation oriented instrumental behavior necessary to change one’s circumstances. This increase in negative feelings may be an impetus for the feelings of helplessness that often lead to self-harm.

Self-Criticism, Depression, and Self-harm

Self-criticism is defined as the tendency to react strongly against the self when there is a discrepancy perceived between the actual and ideal self. It is also often described as a risk factor for depression (Blatt, D’Afflitti, & Quinlan, 1976), yet it is a unique predictor of self-harm after controlling for depression (Glassman, Weierich, Hooley, Deliberto, & Nock, 2007). According to the Self-Discrepancy Theory by Higgins (1987), when one’s actual self does not match their personal ideal self, a feeling of internal dejection may result, which may lead to self-harming behavior. Carver and Ganellen (1983) found that self-criticism, along with unrealistically high standards and overgeneralization of failures, are the main factors that cultivate an overall self-punitive attitude. This predictive relationship was found to be unique to self-criticism, and not criticism in general.

Both self-criticism and self-harm are often linked to early childhood experiences of abuse or neglect (Gilbert et al., 2010). These early experiences can shape a self-critical style of thinking that can ultimately manifest as an internalizing psychological disorder, thus leading to self-harm (Irons, Gilbert, Baldwin, Baccus, & Palmer, 2006).
Working Memory, Depression, and Self-harm

Working memory is composed of multiple mental components that determine one’s ability to process and remember information. According to a widely used model, working memory is a brain system responsible for the control of attention and processing that is involved in a range of functions, including retrieval of information from long-term memory (Baddeley, 1992). Working memory can be divided into three main subcomponents: a central executive controlling processing and attention, a visuospatial sketch pad which manipulates visual images, and a phonological loop which stores speech-based information (Baddeley, 1992). Working memory performance is linked to a range of cognitive activities from reasoning tasks to verbal comprehension (Kane & Engle, 2002). Working memory is part of a constellation of executive function skills, including updating and monitoring information, as well as shifting between mental tasks, inhibiting inactive tasks, reasoning, and problem solving (Miyake, Friedman, Emerson, Witzki, & Howarter, 2000).

Research findings show that individuals lower in working memory capacity struggle more than others in regulating both their emotional experiences and expressions, which are essential elements of psychological well-being (Schmeichel, Volokhov, & Demaree, 2008). In addition, working memory performance has been linked to depression: Working memory may be associated with secondary control coping, which is an effort to adapt to a source of stress by cognitive restructuring or distraction. Andreotti et al. (2013) reported significant correlations between working memory abilities and reports of secondary control coping, and found evidence for secondary control coping as a predictor of symptoms of depression and anxiety. Joorman and Gotlib (2008) found that depressed participants had greater intrusion effects of emotional stimuli into working memory than a control group when memorizing lists of emotional words, indicating that people with depression have a more difficult time removing negative emotional content from working memory.
However, to date, there is very little research investigating working memory and self-harm, and the existing findings are mixed. For example, Miller, Nevado-Montenegro, and Hinshaw (2012) reported that working memory (backward digit recall) was not a significant predictor of self-harm. In contrast, Fikke (2011) found that males that performed “high-risk self-harm” made significantly more errors on a test of spatial working memory than males in the control group.

Looking at executive function skills more generally and the link to self-harm, the findings are also mixed. On the one hand, deficits in some aspects of executive function have been reported in those who engage in self-harm, depending on the frequency and severity of self-harming behavior. Miller et al. (2012) found that in a young adult population, a global measure of executive function significantly predicted self-harm over and above IQ; a measure of inhibition (Continuous Performance test – errors of commissions) was also predictive of self-harm when controlling for IQ. This suggests that a range of executive function skills, including working memory, inhibition, sustained attention, as well as overall function of executive function, may be important in predicting self-harm. Adolescents who self-harmed were significantly impaired on a decision making task compared to those who did not (Oldershaw et al., 2009). Specifically, adolescents that self-harmed in a “low-risk” way performed significantly worse on the Stop Signal Task, used to measure motor inhibition, than those in a control group (Fikke, 2011). This pattern of deficits (working memory in high self-harm and inhibition in low self-harm) supports the emotional regulation hypothesis: self-harm is used to regulate emotions by decreasing the negative affective state of the user (Jacobsen & Gould, 2007). Working memory deficits may exist in groups that self-harm because of a difficulty using cognitively demanding tasks to distract from a negative mood for emotional regulation (Van Dillen & Koole, 2007).
However, other researchers have found that there are no executive function deficits in among those who engage in self-harming behaviors. In a population of adolescent females, there were no differences in measures of inhibition and planning (as measured by Stroop Task and Wisconsin Card Sorting Test, respectively) in those who self-harmed and those that did not (Ohmann et al., 2008). Similarly, no differences were found in measures of attention (Conners’ Continuous Performance Test) or cognitive impulsivity (Iowa Gambling Task and a delay discounting task) between those who did and did not self-harm (Janis & Nock, 2009).

Present Study

In the present study, we recruited 101 undergraduates at a British University, with 19% reporting an incident of self-harm in the past. We investigated the following factors: Depression (Centre for Epidemiological Studies Depression Scale), Self-criticism (Depressive Experiences Questionnaire), and Rumination (Ruminative Response Scale). Depression, self-criticism and rumination test responses were analyzed to explore correlations and ability to predict self-harm. Although not a major factor in our analysis, we expected a gender difference in the scores on the self-criticism, rumination, and depression mental health tests, based on the well-established gender differences in depression prevalence and symptom strength (Silverstein et al., 2012). The present study explores the following hypotheses:

- **Hypothesis 1**: Greater incidences of depressive symptoms are linked to greater incidences of self-criticism and rumination and lower working memory.
- **Hypothesis 2**: Working memory scores are negatively correlated with depression, self-criticism, and rumination.
- **Hypothesis 3**: Higher incidences of rumination and self-criticism are predictive of self-harming behaviors.
Method

Participants

Participants in the study were undergraduates at a British University. Of the 101 participants, 35 were male and 66 were female, whose ages ranged from 17 to 52, with a mean age of 21.76 (SD = 6.77). With reference to ethnicity, 93 were white, 2 were black, 2 were Asian and 4 described themselves as “other”.

Mental Health Measures

Depression. Twenty questions from the Centre for Epidemiological Studies Depression Scale (CES-D, Radloff, 1977) were used to measure each participant’s level of depression. Participants rate statements depending on how strongly they felt the statements applied to them during the past week. There were four options available for each statement: rarely, or none of the time (less than one day); some or a little of the time (1-2 days); occasionally or a moderate amount of time (3-4 days); most or all of the time (5-7 days). Some statements referred to negative feelings (e.g., “I was bothered by things that don’t usually bother me”), while others referred to more positive feelings (e.g., “I felt hopeful about the future”). Higher scores are associated with higher levels of depression (max score = 20), and any score of 16 or higher is considered depressed. The CES-D has been found to have excellent reliability, with an internal consistency of Cronbach’s $\alpha$ ranging from 0.88 to 0.91 and test-retest reliability ICC of 0.87 (Miller, Anton, & Townson, 2008). The CES-D has a low correlation with perceived pain (Pearson’s $r = 0.27$) and a high correlation with mental health (Pearson’s $r = 0.75$), indicating good validity (Kuptniratsaikul, Chulakadabba, & Ratanavijtrasil, 2002).

Self-Criticism. Participants responded to 18 selected items from the Depressive Experiences Questionnaire (DEQ, Zuroff, Moskowitz, Wieglus, Powers, & Franko, 1983). An example item is: “I have a difficult time accepting weakness in myself”. Participants rated
whether they agreed or disagreed on a 7-point scale (Strongly Disagree = 1 and Strongly Agree = 7). Higher scores are associated with higher levels of self-reported criticism (max score = 126). The internal consistency reliability of the self-criticism factor of the DEQ has been found to be acceptable (Blatt et al., 1976), and test-retest reliability was found to be at acceptable levels over 13 week periods (Zuroff et al., 1983). The internal consistency reliability was also found to be in the high range with a Cronbach’s alpha of .75 in a college age sample (Zuroff, Quinlan, & Blatt, 1990). Considerable evidence supports the validity of the DEQ, such as a positive relationship with depressive affect and dysfunctional attitudes (Blatt, Schaffer, Bers, & Quinlan, 1992). Construct validity of the DEQ has also been supported by relating to measures of depression such as the Beck Depression Inventory (Blatt, Quinlan, Chevron, McDonald, & Zuroff, 1982).

Rumination. Participants responded to 10 selected items from the Ruminative Response Scale (RRS; Treynor et al., 2003). These 10 items were selected by the researcher to capture both the reflection and brooding components of rumination and to exclude the items assessing depression. Participants rated how often they engage in particular ruminative behaviors on a 4-point scale (Almost Never = 1 and Almost Always = 4). An example of an item measuring reflection is “[how often do you] go someplace alone to think about your feelings”; an example of an item measuring brooding is “[how often do you] think ‘Why can’t I handle things better?’” Higher scores are associated with higher levels of rumination about past events (max score = 40). The RRS has been found to be a reliable and valid measure of rumination (Roelofs, Muris, Huibers, Peeters, & Arntz, 2006).

Working Memory. Two working memory measures from the Automated Working Memory Assessment (AWMA; Alloway, 2007) were administered. In the listening recall task, the child verifies a series of sentences by stating ‘true’ or ‘false’ and recalls the final word for each sentence in sequence. In the spatial recall task, the participant views a picture
of two arbitrary shapes where the shape on the right has a red dot on it and identifies whether the shape on the right is the same or opposite of the shape on the left. The shape with the red dot may also be rotated. At the end of each trial, the participant recalls the location of each red dot on the shape in sequence by pointing to a picture with three compass points. Test-retest reliability for the listening recall is .88 and for the spatial recall task is .79 (Alloway, Gathercole, & Pickering, 2006; test validity is reported in Alloway, Gathercole, Kirkwood, & Elliott, 2009). Standard scores ($M=100, SD=15$) were recorded.

**Self-harm and suicidal history.** Participants took a self-harm measure developed by the authors of the study, assessing whether or not they had any incidents of self-harm or suicide in their past by indicating yes or no. Specifically, participants were asked if they had ever deliberately taken an overdose (e.g. pills or medication) or deliberately tried to harm themselves in any other way. Items assessing the intention, frequency, and the method of self-harm were also included, but due to a low response rate, were not included in analysis.

**Procedure**

This study was conducted in two phases. In Phase 1, participants completed the selected questions from the CES-D, DEQ, and RRS online to assess depression, self-criticism, and rumination, respectively. In Phase 2, participants went to a lab to take the AWMA to assess working memory.

**Results**

**Descriptive Statistics**

The means and standard deviations of the mental health measures are provided in Table 1. The sample mean scores for the working memory (AWMA), self-criticism (DEQ), depression (CES-D), and rumination (RRS) assessments are all in average range for a nonclinical population in this age range. An independent t-test did not show any significant differences between males and females on the depression score [$t(99) < 1, p = .97$], self-
criticism score \[ t(99) = 1.32, p = .19] \], or the RRS brooding component score \[ t(99) < 1, p = .58] \]. However, there was a significant difference between males and females on the RRS reflection component score \[ t(99) = 2.22, p = .028] \).

**Hypothesis 1: Greater incidences of depressive symptoms are linked to greater incidences of self-criticism and rumination and lower working memory.** Participants were divided into two groups based on their depressive symptoms on the CES-D, according to the scoring criteria suggested by the scale’s authors: scores of 16 or higher were considered “depressed” and scores of 15 or less were not considered as depressed. An independent t-test confirmed that there was a significant difference in depression scores between these groups: \[ t(73.32) = -14.27, p < .001] \.

Multiple t-tests comparing these two groups found higher scores in the following associated with the depressed group: self-criticism \[ t(98.21) = -7.60, p < .001] \), reflection \[ t(99) = -3.88, p < .001] \), and brooding \[ t(99) = -4.52, p < .001] \). An independent t-test did not find any significant difference between the verbal or visual working memory scores in the depressed and non-depressed groups \[ t(99) = .496, p = .621; t(99) = .454, p = .651] \).

**Hypothesis 2: Working memory scores are negatively correlated with depression, self-criticism, and rumination.** Pearson correlation coefficients between the assessments are given in Table 2. There was no significant correlation between verbal working memory recall and depression \( r = .02, p = .88 \), self-criticism \( r = .04, p = .726 \), reflection \( r = .11, p = .295 \), and brooding \( r = .15, p = .139 \). Similarly, visuospatial working memory recall was not significantly correlated with depression \( r = -.05, p = .63 \), self-criticism, \( r = .05, p = .63 \) and brooding \( r = .19, p = .06 \). However, visuospatial working memory was significantly correlated with reflection \( r = .28, p = .004 \).

The mental health measures were significantly related with each other: depression was significantly correlated with self-criticism \( r = .69, p < .001 \), as well as both reflection \( r =
.44, p < .001) and brooding (r = .43, p < .001), and self-criticism was also significantly correlated with both reflection (r = .52, p < .001) and brooding (r = .67, p < .001).

**Hypothesis 3: Higher incidences of rumination and self-criticism are predictive of self-harming behaviors.** Given the previous research connecting depressive symptoms with self-harming behaviors, we split the sample based on the CES-D scores as described previously: 29.5% of the participants in the CES-D depressed group indicated that they had self-harmed, compared with only 10.5% of the participants in the non-depressed group.

A binary logistic regression analysis using working memory, depression, self-criticism, and reflection and brooding aspects of rumination to predict self-harm found that only self-criticism significantly predicts self-harm. The $B$ coefficient is -.087 ($p < .001$). The model predicts 82.2% of the cases accurately. Rumination did not significantly predict self-harm ($\beta = -.052, p = .611$), and neither did verbal working memory performance nor visual spatial working memory performance ($\beta = -.032, p = .580; \beta = .057, p = .559$).

*Regression Tree.* In order to find out which variable would best predict self-harm, we used a Regression Tree model known as the Classification and Regression Tree (CART). This model has been successfully used to make predictions in medical and clinical settings, and has also been used in psychology for decision-making (see Steadman et. al., 2000). This non-parametric procedure is based on a questions-decision-tree model where questions are asked on a sequential basis in order to identify the best set of predictors for a specified outcome.

The present sample was split into two branches based on an initial predictor variable, and subsequent branches are identified until reliable subgroups of self-harm outcomes were represented as nodes. The initial predictor variable identified was an item from the DEQ examining the belief that love must be earned: *One must continually work to gain love from another person, that is, love has to be earned.* If a participant strongly agreed to this item
(with a response greater than 5.5), then the tree predicted that 26% of the participants reported inflicting self-harm. Of those who did not strongly concur with this statement, 74% reported not engaging in self-harming behaviors.

**Discussion**

The aim of this study was to examine mechanisms that predicted self-harm. The main findings were that neither working memory nor rumination predicted self-harming behaviors; however, self-criticism, specifically the notion that love must be earned, was a significant predictor of self-harm in a nonclinical college-aged population.

Looking first at working memory, neither verbal nor visual spatial working memory performance significantly predicted self-harm. This pattern was contrary to the emotional regulation hypothesis, where students with lower executive function overall would likely have poor working memory performance and poor emotional regulation leading to a higher likelihood of self-harm. While past research is mixed on whether or not deficits in inhibition, impulsivity, and executive function exist in those who self-harm, our results support the idea that working memory in those who self-harm did not differ significantly from those who did not self-harm. This pattern may occur because self-injury typically occurs under extreme emotional stress. In contrast, lab studies often do not induce stress, and thus may not capture the complexities of an executive functioning or working memory deficit (Janis & Nock, 2009). It is possible that in circumstances of high stress, the cognitive skills of those who self-harm may be more impaired than those who do not.

The next finding relates to rumination -- even though rumination is a predictor of depression, in our sample it was not a significant predictor of self-harm. This is consistent with Nolen-Hoeksema’s conceptualization that rumination is not necessarily a negative behavior because it can eventually lead to adaptive behavior. Rumination may be used as a pleasant reflection on past events, which may improve a person’s mood and result in a more
lucid thought process and better ability to effectively problem solve (Nolen-Hoeksema et al., 2008). Watkins (2008) presents multiple possible constructive consequences of repetitive thoughts, including adaptive preparation and anticipatory planning of similar events by preparing a concrete strategy, and the ability to process and recover from upsetting events by viewing them as an experience that provides an opportunity for learning and future growth.

Only self-criticism predicted self-harm in our sample (in 82.2% of the cases), which is consistent with findings from adult populations (Sachs-Ericsson, Verona, Joiner, & Preacher, 2006). This pattern is also consistent with a study of adolescents that reported that the link between childhood maltreatment and NSSI was mediated by self-criticism (Glassman et al., 2007). Many children who are abused have a difficult time developing a sense of worthiness. In our study, the results from the regression tree highlighted the importance of a belief that love must be earned. Those who feel that love must been may use self-harm as a mechanism to relieve feelings of pressure that they have not done enough to earn love from another. The choice to self-harm may stem from experiencing physical abuse or trauma in their childhood.

Mixed results have been found on whether depression predicts self-harm (Klonsky, Oltmanns, & Turkheimer, 2003), with some studies citing elevated levels of depression in self-harmers (Stanley, Gameroff, Michalsen, & Mann, 2001), but others finding no link (Simeon et al., 1992). In the present study, there was a greater incidence of self-harming behaviors among those who demonstrated higher depressive symptoms; however, depression scores did not directly predict these behaviors. There are two possible explanations for this pattern. The first is that we recruited a nonclinical sample, so participants’ depression levels were lower compared to a clinically depressed population. As such, it might be difficult to explore the predictive nature of depression to self-harm. The second possible explanation is that self-criticism may mediate the relationship between depression and self-harm, where
higher levels of self-criticism may be the root cause of elevated levels of both depression as well as self-harm.

**Future directions**

Future studies could look at a clinical sample of depressed individuals and examine if self-criticism is still the most important predictor of self-harm. Populations with higher levels of depression may elucidate the link between depression and self-harm. Also, incorporating an emotional stressful situation into future studies may capture a more realistic appraisal of the likelihood of self-harming behavior. This could be accomplished by a naturalistic observation of major life changes that cause stress, such as the death of a family member or a divorce, or by using emotional stimuli or scenarios to create an emotionally stressed state in a laboratory study. Additionally, measures examining other components of executive function such as inhibition may examined for their connection self-harm as other researchers found a link between the two. For example, adolescents that self-harmed performed significantly worse on a task on measure motor inhibition (Fikke, 2011). Updating the contents of working memory and inhibiting dominant responses are frequently postulated in cognitive literature as important yet distinct executive functions (Miyake et al., 2000), so perhaps a lack of motor inhibition may be a stronger predictor of self-harm risk than working memory due to the physical actions needed to complete an act of self-harm. In a review by Piccinelli and Wilkinson (2000), depression is more common in women than men in adolescent and adult populations, so future studies may examine if there are any sex differences in self-criticism’s predictive power, and if it has any mediating influence on depression.

**Practical Applications**

One application of this information is improving the efficacy of self-harm interventions, both in the general population and in high-risk groups. Traditional inpatient and outpatient treatments for those who engage in self-harming behaviors are typically
education- and resource-based and are generally not highly effective (Bennewith et al., 2002). If self-criticism is an antecedent of self-harm, interventions could be developed that lower levels of self-criticism by improving one’s ability to express self-compassion. A lack of focus on diminishing self-criticism may be the reason why low levels of efficacy have been observed in traditional treatments. One way to combat self-criticism is foster self-compassion, specifically self-kindness, which emphasizes being kind and understanding toward oneself in instances of pain or failure rather than self-critical (Neff, 2003). By allowing oneself to fail and not believe it is indicative of an unworthiness to be loved, a person may not feel the need to use dysfunctional strategies to regulate one’s emotional state. These treatments may significantly reduce the amount of self-harm performed if administered to high-risk groups, such as victims of abuse, adolescents, or individuals diagnosed with borderline personality disorder.

A specific type of treatment developed for people with chronic high levels of self-criticism is Compassionate Mind Training (CMT). Compassionate Mind Training is based on concepts from Cognitive Behavioral Therapy and Dialectical Behavior Therapy including thought and affect monitoring, acceptance, source recognition, and psycho-education (Gilbert & Procter, 2006). This training involves recognizing that self-critical self-talk is an internal response that is activated when dealing with setbacks and failures. The next step is to replace it with a self-compassionate way to deal with distress: by learning to tolerate and accept setbacks and failures as a part of life and as opportunities to improve in the future. Gilbert and Procter (2006) have found that CMT can significantly reduce self-criticism and depression and can be very helpful for those from traumatic backgrounds (Gilbert & Procter, 2006).

In summary, self-harm is a prevalent problem among adolescents and young adults. Little is known about the determinants of the behavior and the pathways that can possibly
lead to self-harm (Glassman et al., 2007). This lack of understanding has made it difficult to create programs to effectively prevent self-harm or intervene in the general population, and multiple studies have found that typical inpatient and outpatient treatments for those who self-harm are ineffective (see Christian & McCabe, 2011, for a review). The results from the analysis of Hypothesis 1 support the idea that greater incidences of depressive symptoms are linked to greater incidences of self-criticism and rumination, but not lower working memory. The results from the analysis of Hypothesis 2 do not support the idea that working memory scores are correlated with depression, neither negatively nor positively. Finally, the results from the analysis of Hypothesis 3 support the idea that higher incidences of self-criticism are predictive of self-harming behaviors, but higher incidences of rumination do not. Exploring the antecedents of self-harm is critical to improve the efficacy of current treatments, as insight into specific predictors and an increased overall understanding of the mechanisms responsible for self-harm can lead to more targeted interventions.
Table 1

*Descriptive statistics of mean scores on mental health measures*

<table>
<thead>
<tr>
<th>Measure</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = 101</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N = 66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verbal Working Memory</td>
<td>100.23 (12.93)</td>
<td>101.27 (13.34)</td>
<td>99.78 (12.78)</td>
</tr>
<tr>
<td>Visual Spatial Working Memory</td>
<td>97.61 (14.22)</td>
<td>101.23 (15.43)</td>
<td>95.69 (13.27)</td>
</tr>
<tr>
<td>Self-Criticism (DEQ)</td>
<td>67.97 (19.06)</td>
<td>71.41 (16.86)</td>
<td>66.15 (20.00)</td>
</tr>
<tr>
<td>Depression (CES-D)</td>
<td>14.91 (9.50)</td>
<td>15.00 (9.37)</td>
<td>14.86 (9.64)</td>
</tr>
<tr>
<td>Reflection (RRS)</td>
<td>9.55 (3.13)</td>
<td>10.49 (3.62)</td>
<td>9.06 (2.73)</td>
</tr>
<tr>
<td>Brooding (RRS)</td>
<td>10.55 (3.19)</td>
<td>10.80 (3.27)</td>
<td>10.42 (3.16)</td>
</tr>
</tbody>
</table>
Table 2

Pearson correlation coefficients for mental health measures

<table>
<thead>
<tr>
<th></th>
<th>Verbal Working Memory</th>
<th>Visual Spatial Working Memory</th>
<th>Self-Criticism (DEQ)</th>
<th>Depression (CES-D)</th>
<th>Reflection (RRS)</th>
<th>Brooding (RRS)</th>
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<td>Reflection (RRS)</td>
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<td>.28*</td>
<td>.52*</td>
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<td>Brooding (RRS)</td>
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</table>
References


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**EDUCATION**

Miami University, Oxford, OH
B.S. Systems Analysis, 2007
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