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Self-Mutilation and Symptoms of Depression, Anxiety, and Borderline Personality Disorder

Margaret S. Andover, MA, Carolyn M. Pepper, PhD, Karen A. Ryabchenko, PhD, Elizabeth G. Orrico, BA, and Brandon E. Gibb, PhD

The goal of this study was to examine the relationship between self-mutilation and symptoms of depression and anxiety in a nonclinical population. Self-mutilators reported significantly more symptoms of depression and anxiety than did the control group. When the group of self-mutilators was divided into individuals who cut themselves and individuals who harm themselves in other ways, we found that the between-group differences were primarily due to individuals with a history of cutting. Yet when symptoms of borderline personality disorder (BPD) were statistically controlled, all significant between-group differences in depressive and anxious symptoms were reduced to nonsignificant. These findings highlight the importance of assessing symptoms of BPD in self-mutilators, regardless of diagnosis.

Self-mutilation is defined as deliberate harm to the body without suicidal intent and includes acts such as cutting and burning (Favazza, 1998; Walsh & Rosen, 1988). Although the term also includes acts of self-harm such as scratching, skin picking, and interfering with wound healing (Favazza, 1998), these types of behavior have received little empirical attention. Studies of self-mutilation in clinical samples suggest that it is common, with 21 to 44% of these individuals reporting a history of self-mutilation (Briere & Gil, 1998; Nijman et al., 1999; Zlotnick, Mattia, & Zimmerman, 1999). Self-mutilation is also observed in community samples, with approximately 4% of the general adult population reporting a history of self-mutilation (Briere & Gil, 1998). The difference in prevalence between clinical samples and the general population may reflect the basic nature of the behavior, or simply that the behavior is difficult to detect in a non-clinical population. The daily functioning of most self-mutilators is at a level comparable to that of their peers (Walsh & Rosen, 1988), which aids in the concealment of the behavior among non-clinical populations. Therefore, the known prevalence of self-mutilation among non-clinical samples may be underestimated.

Research to date suggests that anxiety plays a major role in self-mutilation, as is evident by the tension reducing qualities associated with the behavior (Darche, 1990; Haines, Williams, Brain, & Wilson, 1995; Herpertz, 1995). For example, Brain, Haines, and Williams (1998) found that self-mutilators exhib-

Margaret Andover, Karen Ryabchenko, Elizabeth Orrico, and Brandon Gibb are affiliated with the Department of Psychology, Binghamton University. Carolyn Pepper is with the Department of Psychology, University of Wyoming.

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Address correspondence to Margaret S. Andover, MA, or Brandon E. Gibb, PhD, Department of Psychology, Binghamton University, Binghamton, NY 13902–6000; E-mail: mandove0@binghamton.edu or bgibb@binghamton.edu

ited decreases in respiration, skin conductancy level, and heart rate in response to self-mutilative imagery scripts. Studies have also shown increased levels of anxiety symptoms in individuals with a history of self-mutilation (Klonsky, Oltmanns, & Turkheimer, 2003; Penn, Esposito, Schaeffer, Fritz, & Spirito, 2003; Ross & Heath, 2002). In addition, one study found that 50% of self-mutilators in their sample reported anxiety and tension to have precipitated the self-mutilative behaviors (Bennum & Phil, 1983). The self-mutilators also showed more anxiety symptoms than both depressed patients without a history of self-mutilation and a nonpatient control group. Finally, one study found that the majority of self-mutilators reported a history of anxiety symptoms dating back to childhood (Fulwiler, Forbes, Santangelo, & Folstein, 1997).

In contrast to the consistent support for the association between anxiety and self-mutilation, evidence for the relationship between depression and self-mutilation is mixed (for a review, see Suyemoto, 1998). Specifically, although there is some evidence that self-mutilators are more likely to experience major depression and symptoms of depression than individuals without a history of self-mutilation (Darche, 1990; Ennis, Barnes, Kennedy, & Trachtenberg, 1989; Garrison et al., 1993; Haines et al., 1995; Klonsky et al., 2003; Muehlenkamp & Gutierrez, 2004; Penn et al., 2003; Ross & Heath, 2002; Sampson, Mukherjee, Ukoumunne, Mullan, & Bullock, 2004), other studies have failed to support the link between a diagnosis of major depression and a history of self-mutilation (Ennis et al., 1989; Fulwiler et al., 1997; Herpertz, 1995; Langbehn & Pfohl, 1993). It should be noted, however, that Fulwiler et al. (1997) did find a relationship between self-mutilation and childhood dysthymia in their sample. Finally, specific symptoms of depression have been reported in self-mutilating samples, such as a negative cognitive schema (Bennum & Phil, 1983), suicidal ideation (Garrison et al., 1993), lower self-worth (Haines & Williams, 1997), and dysphoria (Herpertz, 1995).

Although these studies have provided us with information about the relationship of self-mutilation with both anxiety and depression, there are several limitations. For example, because previous studies have focused almost exclusively on clinical or forensic populations (see Suyemoto, 1998), little is known about the relationships of self-mutilation and both anxious and depressive symptoms in non-clinical populations. To address this gap in the literature, the current study focuses on a sample of undergraduate students. A second limitation of previous studies is the reliance on self-report questionnaires in the assessment of anxious and depressive symptoms (e.g., Klonsky et al., 2003; Penn et al., 2003; Ross & Heath, 2002). In this study, therefore, we utilized a combination of well-validated self-report and interviewer-administered measures of anxious and depressive symptoms.

A third limitation of previous studies is that symptoms of borderline personality disorder (BPD) often were not taken into account. This is problematic because symptoms or diagnoses of BPD are often reported in self-mutilating samples (Briere & Gil, 1998; Stanley, Gameroff, Michalsen, & Mann, 2001). Self-mutilation, indeed, is a criterial symptom of BPD (American Psychiatric Association, 2000). Thus, although many studies report the prevalence of BPD in their sample or use a diagnosis of BPD as part of their inclusion criteria (e.g., Herpertz, 1995; Stanley et al., 2001), few studies have investigated whether relations between self-mutilation and both depression and anxiety are due solely to the presence of BPD. To better understand the impact of BPD characteristics on the relationship between self-mutilation and levels of depression and anxiety, symptoms of BPD were assessed in this study and their effect upon the relationships among self-mutilation and depressive and anxious symptom levels were examined.

A fourth potential limitation of previous studies examining self-mutilation is that many have focused exclusively on individuals with a history of cutting (see Suyemoto, 1998). Forms of self-mutilation other than

cutting, such as scratching, interfering with wound healing, carving, self-hitting, needle sticking, and skin picking, are rarely a focus of research studies (for notable exceptions, see Keuthen et al., 2000; Neziroglu & Mancebo, 2001; Wilhelm et al., 1999). It is unclear, however, if there are differences between individuals who cut themselves and individuals who injure themselves by other methods, such as scratching or skin picking, but have never cut themselves. In the current study, therefore, we distinguished individuals who participate in self-mutilative behaviors into two groups: self-cutters, who have a history of cutting and may have engaged in other self-mutilative activities; and self-harmers, who engage in acts of self-mutilation but who have never cut. Analyses were conducted on these two separate groups to determine if levels of depressive and anxious symptoms differed based on type of self-mutilation. To avoid terminological confusion in this study, "self-cutting" will refer to acts of cutting, "self-harm" will refer to acts of self-mutilation other than cutting (e.g., carving, burning, self-hitting, scratching, or interfering with wound healing), and "self-mutilation" will be used to collectively refer to self-cutting and acts of self-harm.

The primary goal of this study is to provide a preliminary examination of factors that may be related to self-mutilation in a non-clinical population. In doing so, we examined whether symptoms of anxiety or depression were related to reports of self-mutilation. Rather than choosing an asymptomatic control group, we compared self-cutters and self-harmers to a non-mutilating control group matched for general psychological distress. By comparing mutilation groups to a non-mutilating group matched for distress, we were able to ensure that differences on depressive and anxious measures were not due to differences in general psychological distress. We hypothesized that individuals with a history of self-mutilation would report greater levels of depressive and anxious symptoms than distress-matched controls. In addition, because this study represents a first attempt to examine differences between self-cutting and other types of self-mutilation in terms of anxious or depressive symptoms, we made no specific hypotheses regarding differences between the two groups.

METHODS

Participants

Participants in this study were a subset of those participating in a larger study of self-mutilation. Participants were selected using a two-phase screening process. In the first phase, 510 university undergraduates completed a measure of general psychological distress (Symptom Checklist-90-Revised [SCL-90-R]; Derogatis, 1994). A Global Severity Index (GSI) score, the average symptom level across all dimensions of the SCL-90-R, was calculated for each participant, and was then used to match the self-mutilating groups with the control group. A screening measure for self-mutilative behaviors designed for the study (Frequency of Activities Scale; Andover & Pepper, 2002) was also administered at this time. Individuals reporting a history of self-mutilative behaviors were invited to participate in the second phase of the study. In addition, individuals reporting no history of self-mutilation but who were matched to the self-mutilation group in terms of general psychological distress, were also invited to participate in the second phase of the study. During the second phase of screening, participants completed an interview to assess for a history of self-mutilative behaviors. Group status was assigned based on responses to this interview. Self-cutters were defined as individuals whose self-mutilative behaviors included cutting and may have included other methods of self-mutilation as well. Self-harmers were individuals who did not cut, but who had a history of engaging in other methods of self-mutilation (i.e., burning, carving, self-hitting, scratching, interfering with wound healing, needle sticking, or other method). The control group consisted of individuals with no history of cutting, self-harm, or suicide attempts. Eighty-eight individuals par-

ticipated in the study. The sample consisted of 20 individuals with a history of self-cutting, 27 individuals with a history of self-harm, and 41 individuals with no history of self-mutilation who were matched to the self-mutilation groups on the Global Severity Index of the SCL-90-R. Self-cutters and self-harmers reported comparable lifetime frequencies of self-mutilative behaviors (self-cutters: $M = 396.08$, $SD = 1159.51$; self-harmers: $M = 124.71$, $SD = 281.10$; $t(41) = 1.11$, $p = .27$, $r = .17$). Each type of self-mutilation was represented in our sample of self-mutilators except intentional bone breaking (interfering with wound healing, 19.1%; self-hitting, 18.2%; cutting, 17.3%; scratching, 13.6%; burning, 8.2%; carving, 7.3%; needle sticking, 1.8%; other, 4.5%).

Measures

Symptom Checklist-90-Revised. The SCL-90-R (Derogatis, 1994) is a 90-item self-report inventory of current psychological symptoms. Participants rate each item on a five-point Likert-type scale, with higher scores indicating greater symptom severity. Items tap nine dimensions: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. In this study, participants' scores on the GSI, the average symptom level across all nine dimensions, were used to match individuals with a history of self-mutilation to a control group. The SCL-90-R has demonstrated good internal consistency and retest reliability in both clinical and non-clinical samples (Derogatis, 1994; Derogatis, Rickels, & Rock, 1976; Horowitz, Rosenberg, Baer, Ureño, & Villaseñor, 1988).

Frequency of Activities Scale. The Frequency of Activities Scale (Andover & Pepper, 2002) is a 25-item screening measure for self-mutilative behaviors developed for use in this study. The participant is asked if he or she has ever taken part in specific activities, and if so, how frequently (on a three-point Likert-type scale). Nine of the items assess suicidal and self-mutilative behaviors; these items are embedded within a series of more benign items. The methods of self-mutilation assessed by this measure were derived from Favazza (1998), and the measure was constructed by consensus among team members. Specifically, participants were instructed as follows: "Please indicate if you do any of the following things. Please read each item carefully and circle the number that best applies to you. The possibilities are 0 = have never done this, 1 = have done this only once, 2 = have done this only a couple of times, and 3 = have frequently done this, as well as approximately how many months ago you last performed the action. There are no right or wrong answers." Examples of self-mutilative items include "try to kill myself," "burn myself on purpose," and "carve designs, words, or symbols in my skin." Examples of benign items include "listen to music," "play sports," and "talk to myself when I'm alone."

Structured Interview Guide for the Hamilton Depression Rating Scale (SIGH-D). The SIGH-D (Williams, 1988) is a 17-item structured interview used to assess current severity of depressive symptoms. It is based on the Hamilton Depression Rating Scale (Hamilton, 1960). A number of studies have supported the reliability and validity of the SIGH-D (Hedlund & Vieweg, 1979). Interrater reliability for the measure is good, with coefficients of .84 (Hedlund & Vieweg, 1979). In this study, the SIGH-D exhibited good internal consistency ($\alpha = .82$).

Structured Interview Guide for the Hamilton Anxiety Rating Scale (SIGH-A). The SIGH-A (Shear et al., 2001) is a 14-item structured clinical interview based on the Hamilton Anxiety Rating Scale (HARS; Hamilton, 1959), developed to measure severity of current anxiety symptoms. Retest and interrater reliability for the measure is excellent, with coefficients of .89 and .99, respectively (Shear et al., 2001). The SIGH-A also correlated moderately with the Beck Anxiety Inventory ($r = .57$), as did the traditional HARS ($r = .53$; Shear et al., 2001). Internal consistency for the SIGH-A in this study was good ($\alpha = .86$).

Beck Depression Inventory-II (BDI-II). The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item self-report measure of depressive

symptoms. Symptoms are rated on a four-point Likert-type scale, with higher scores indicating greater symptom severity. Studies have supported the reliability and validity of the BDI-II in both clinical and nonclinical samples (e.g., Beck et al., 1996). For example, among undergraduates, the BDI-II had demonstrated good internal consistency ($\alpha = .92$ and .89 in Beck et al., 1996 and Steer & Clark, 1997, respectively) and retest reliability after a latency of one week (.93; Beck et al., 1996). The BDI-II also has good convergent validity (Beck et al., 1996). In this study, the BDI-II exhibited excellent internal consistency ($\alpha = .95$).

State-Trait Anxiety Inventory Form Y (STAI). The STAI (Spielberger, 1983) is a 40-item self-report measure that reflects both state (how the respondent feels currently) and trait (how the respondent generally feels) anxiety. Items are rated on a four-point Likert-type scale with higher scores indicating more anxiety. Test-retest reliability for trait anxiety is high, even after an interval of over 3 months (Spielberger, 1983). The STAI also demonstrates good concurrent, construct, and convergent and discriminant validity (Spielberger, 1983). Given recent evidence that the STAI-Trait scale includes items that assess depression as well as anxiety (Bieling, Antony, & Swinson, 1998), only the anxiety subscale of the STAI-Trait (STAI-A; cf. Bieling et al., 1998) was used in the current study. This subscale consists of the seven items from the STAI-Trait scale that were found by factor analysis to load more highly than other items on the anxiety content factor. In the current study, internal consistency for the STAI-A was good ($\alpha = .88$).

Structured Clinical Interview for the DSM-IV—Axis II Disorders (SCID-II). The SCID-II (First, Gibbon, Spitzer, Williams, & Benjamin, 1997) is a structured diagnostic interview used to assess the presence of Axis II disorders. Previous studies have supported the interrater reliability and internal consistency of the SCID-II modules (e.g., Maffei et al., 1997). In the current study, only the Borderline Personality Disorder Module was administered and dimensional scores, reflecting the sum of interviewer ratings for each symptom, were used in all analyses. To reduce construct overlap with our assessment of self-mutilation, ratings for the self-injury question were not included in calculations of BPD dimensional scores. In this study, BPD dimensional scores demonstrated fair internal consistency ($\alpha = .72$).

Procedure

All participants provided written informed consent to participate in this study. Following completion of the screening instruments, participants meeting inclusion criteria were invited into the laboratory to complete questionnaire and interview assessments. Participants received course credit for their participation. Procedures were approved by the Human Subjects Review Board of Binghamton University.

RESULTS

Descriptive statistics for our sample are presented in Table 1. The groups did not differ significantly from each other in terms of sex, age, or ethnicity. Group means on SIGH-D and SIGH-A fell below the recommended clinical cutoff scores of 15 and 14, respectively (Maier, Buller, Philipp, & Heuser, 1988; Reynolds & Kobak, 1995), and scores on the BDI-II fell in the minimal to mild range. These scores are typical of a non-clinical undergraduate sample (cf. Beck, Steer, & Brown, 1996).

Preliminary analyses revealed that scores on each of the symptom measures exhibited significant skew. Therefore, the data were transformed (e.g., square root, logarithm) to satisfy assumptions of normality prior to further analysis. Next, given that missing data were observed for each of the variables, we examined whether the data were missing at random, thereby justifying the use of data imputation methods for estimating missing values (cf. Schafer & Graham, 2002). Specifically, we conducted Littles missing completely at random (MCAR) test (Little & Rubin, 1987), which we found to be nonsignificant, $\chi^2(26) = 29.32$, $p = .30$, providing support for

TABLE 1
Group Means on Relevant Variables

	Self-Cut ($n = 20$)	Self-Harm ($n = 27$)	Control ($n = 41$)	*df*	χ^2/F
Sex (% women)	75.0	48.1	56.1	2	3.51
Ethnicity (% Caucasian)	65.0	66.7	75.0	12	14.99
Age (years)	18.85 (1.66)	18.26 (0.59)	18.41 (0.84)	2	2.00
SIGH-D	8.05 (5.03)[a]	5.88 (4.33)[a]	3.68 (4.40)[b]	2, 88	7.89***
BDI-II	17.76 (11.84)[a]	12.71 (11.53)[a,b]	8.27 (10.37)[b]	2, 88	6.36**
SIGH-A	9.12 (6.31)[a]	6.72 (5.54)[a,b]	4.82 (6.21)[b]	2, 88	5.25*
STAI-A	17.40 (4.49)[a]	14.29 (3.61)[b]	13.78 (4.23)[b]	2, 88	6.27**
BPD	4.30 (3.89)[a]	3.39 (2.75)[a]	1.21 (1.94)[b]	2, 87	9.34***

Notes. Unless otherwise specified, values in cells represent means, and values in parentheses represent standard deviations. Means with different superscripts differ significantly ($p < .05$). Chi-square tests were used for tests involving sex and ethnicity; all other analyses were conducted using omnibus ANOVAs. BPD = Score on the Borderline Personality Disorders module of the Structured Clinical Interview for DSM-IV–Axis II, not including self-mutilation item. SIGH-D = Structured Interview Guide for the Hamilton Depression Rating Scale. BDI-II = Beck Depression Inventory-II. SIGH-A = Structured Interview Guide for the Hamilton Anxiety Rating Scale. STAI-A = Anxiety items from the State-Trait Anxiety Inventory, Trait version.

*$p < .01$, **$p < .005$, ***$p < .001$.

imputing missing values. Therefore, maximum likelihood estimates of missing data were computed and used in all analyses (see Schafer & Graham, 2002).

In analyzing data from this study, we first conducted MANOVAs to determine the relationship between participant group and each of the symptom types (i.e., depression and anxiety). Significant results from these analyses were then followed by ANOVAs for each symptom measure. The pattern of significant findings from these tests was then evaluated using Student-Neuman-Keuls post hoc tests.

We first combined individuals who self-cut and individuals who self-harm into one group of individuals exhibiting self-mutilative behaviors. We found an overall effect of group on depressive symptoms, $F(2, 85) = 7.43$, $p < .005$. Examining the individual depressive symptom scales, we found significant group effects for scores on both the SIGH-D, $F(1, 88) = 12.86$, $p < .001$, and BDI-II, $F(1, 88) = 10.38$, $p < .005$, with the self-mutilation group reporting significantly more depressive symptoms than the control group. We also found an overall effect of group for anxiety measures, $F(2, 85) = 4.15$, $p < .05$. Specifically, the self-mutilation group reported significantly more symptoms of anxiety on both the SIGH-A, $F(1, 88) = 8.33$, $p < .005$, and the STAI-A, $F(1, 88) = 6.10$, $p < .05$, than the control group.

To determine whether the two self-mutilation groups differed in terms of symptom levels, we re-ran analyses after classifying individuals as self-cutters, self-harmers, or controls (see Table 1). Focusing first on depressive symptoms, we found an overall effect of group, $F(4, 168) = 3.94$, $p < .005$. Examining the individual depressive symptom scales, we found significant group effects for scores on both the SIGH-D, $F(2, 88) = 7.89$, $p < .001$, and BDI-II, $F(2, 88) = 6.36$, $p < .005$. Post hoc tests revealed that self-cutters and self-harmers reported more depressive symptoms on the SIGH-D than did participants in the control group, but the two groups did not differ significantly from each other. On the BDI-II, self-cutters reported

significantly more depressive symptoms than controls, but self-harmers did not differ significantly from either of the other two groups.

Next, we examined group differences in terms of anxious symptoms and again found an overall effect of group, $F(4, 168) = 3,76$, $p < .01$. Examining the individual anxious symptom scales, we found significant group effects for scores on the SIGH-A, $F(2, 88) = 5.25$, $p < .01$, and the STAI-A, $F(2, 88) = 6.27$, $p < .005$. Post hoc tests revealed that self-cutters reported significantly more anxiety on the SIGH-A than controls and that self-harmers did not differ significantly from the other two groups. On the STAI-A, self-cutters reported significantly more anxiety than both self-harmers and controls, whose reported anxiety levels did not differ significantly.

Because symptoms of borderline personality disorder are often evident in people who self-mutilate (Briere & Gil, 1998; Stanley et al., 2001), as well as being related to symptoms of depression and anxiety (Comtois, Cowley, Dunner, & Roy-Byrne, 1999), we next investigated differences between groups on BPD symptom levels. When comparing self-mutilating individuals to non-self-mutilating individuals, we found that self-mutilators reported significantly more borderline symptoms than controls, $t(86) = 4.31$, $p < .001$. When we examined the two self-mutilation groups separately, we again found significant differences when comparing self-cutters, self-harmers, and controls, $F(2, 87) = 9.34$, $p < .001$, with self-cutters and self-harmers reporting similar levels of borderline symptoms, but more than non-self-mutilating controls.

We then evaluated whether the group differences in depressive and anxious symptoms were maintained once BPD symptom levels were statistically controlled. All overall effects of group in the MANOVAs were reduced to nonsignificant when comparing self-mutilative individuals to a control group (depressive symptoms: $F(2, 84) = 1.67$, $p = .19$; anxious symptoms: $F(2, 84) = 0.84$, $p = .44$). When classified according to category of self-mutilative behavior, overall effects of group were again reduced to nonsignificant (depressive symptoms: $F(4, 166) = 1.47$, $p = .21$; anxious symptoms: $F(4, 166) = 1.83$, $p = .13$).

DISCUSSION

The purpose of this study was to investigate differences in depressive and anxious symptom levels between individuals with versus without a history of self-mutilation in a non-clinical sample. We found that individuals reporting any type of self-mutilative behavior (self-cutting or self-harm) reported higher depressive symptom levels than did our control group, adding to the growing body of literature supporting the link between depressive symptoms and self-mutilation (e.g., Darche, 1990; Klonsky et al., 2003). In addition, consistent with the results of previous studies (e.g., Haines et al., 1995; Penn et al., 2003), we found that individuals with a history of self-mutilation reported higher anxious symptoms than those with no history of self-mutilation.

This study is the first to investigate differences between individuals who cut (self-cutters) and individuals who self-mutilate in other ways (self-harmers), an important first step in understanding self-mutilative behaviors. Self-cutting individuals reported higher levels of anxiety than controls on both self-report and structured interview measures and higher levels of anxiety than self-harmers during the interview. In terms of depressive symptoms, self-cutters and self-harmers reported similar symptom levels. Compared to controls, self-cutters reported more symptoms of depression on both self-report and interview measures and self-harmers reported more depressive symptoms during the interview.

Findings from this study suggest that individuals traditionally classified as self-mutilators (i.e., those with a history of cutting themselves; see Suyemoto, 1998) may differ from individuals with a history of engaging in other forms of self-mutilation in terms of anxiety, though they may experience similar levels of depression. The differences between

these groups emphasize the importance of identifying the specific types of self-mutilative behaviors performed. More research is needed to investigate the differences between specific types of self-mutilative behaviors in terms of correlates and precipitants.

Given the strong relation of BPD symptoms to depression and anxiety as well as self-mutilation (Abela, Payne, & Moussaly, 2003; Benjamin, Silk, Lohr, & Westen, 1989; Briere & Gil, 1998; Shearer, Peter, Quaytman, & Wadman, 1988), we evaluated whether the significant relationships observed between self-mutilation and symptom levels would remain after statistically controlling for the impact of BPD symptoms. We found that all of the relations between self-mutilation and depressive and anxious symptoms were reduced to nonsignificant once BPD symptoms were statistically controlled. These results suggest that differences in depressive and anxious symptoms between individuals with and without a history of self-mutilation may be due to the presence of BPD symptoms, generally, rather than to histories of self-mutilation, specifically. Although some researchers have included BPD or borderline characteristics in their study—by making a diagnosis of the personality disorder an inclusionary criteria, for example (e.g., Stanley et al., 2001)—many studies have not. The findings of the present study highlight the importance of investigating borderline characteristics in self-mutilating individuals, even if it is not the primary focus of the study.

Despite the strengths of this study, there were several limitations as well. First, consistent with previous studies (e.g., Darche, 1990; Ennis et al., 1989; Klonsky et al., 2003), we analyzed the presence versus absence of self-mutilation rather than the frequency with which individuals participated in self-mutilative behaviors. Therefore, the self-cutting and self-harming groups consisted of individuals who reported acts of self-harm ranging from one time to over 5,000 times. It is possible that differences existed within the groups themselves. For example, as frequency increased, anxious and depressive symptoms may have increased as well. Future studies should consider the frequency of self-mutilative behaviors.

A second limitation of this study is that our assessment of anxiety was limited to general symptoms of anxiety. There is some evidence, however, that self-mutilation is most strongly related to a specific symptom of anxiety—physiological arousal (Haines et al., 1995). Future studies, therefore, should consider including specific measures of physiological arousal as well as general measures of anxious symptoms. Additionally, the characteristics of the current sample (i.e., sample size, ethnicity, age, non-clinical status) may limit the generalizability of these findings. Future studies, therefore, should seek to replicate the current findings in more severely impaired samples (e.g., psychiatric inpatients). Finally, results of this study suggest that there may be differences between individuals who cut and individuals who engage in other methods of self-harm. Future studies should continue to explore potential differences between these groups. Future studies are also needed to more fully explore the relation between self-mutilation and suicidal behavior. For example, it may be that individuals exhibiting the highest levels of both anxiety and depression are at increased risk not only for self-mutilation, but also suicide attempts. In addition, self-mutilative behaviors may themselves contribute increased risk to both attempted and completed suicide.

In conclusion, the present findings yield important information regarding the significance of borderline characteristics in individuals who self-mutilate. Although none of the individuals participating in this study endorsed enough symptoms to qualify for a diagnosis of BPD on the SCID-II, significant differences in depressive and anxious symptoms between the groups were completely accounted for by differences in borderline symptoms. This finding holds implications for the research and treatment of self-mutilative behaviors. It is important that future research replicate this finding across different populations, focusing on levels of borderline symptoms, as well as diagnoses of borderline personality disorder. In terms of treatment,

therapies used for BPD, such as dialectical behavior therapy (see Linehan, 1993), may prove effective in the treatment of self-mutilating individuals, regardless of Axis II diagnosis. DBT already has been used effectively both in the treatment of suicide and self-harm in a prison setting (Eccleston & Sorbellow, 2002) and suicide in adolescent inpatients (Katz, Cox, Gunasekara, & Miller, 2004). This is clearly an important line of future research.

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