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Potential Mood Variation Following a Behavioral Analogue of Self-Injurious Behavior

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Abstract

Objective: Despite increased use of behavioral analogues to identify casual mechanisms of self-injurious behavior (e.g. suicide attempts; non-suicidal self-injury), little is known about the impact on participants. The current study examined the impact of a specific behavior analogue, Self-Aggressive Paradigm (SAP), on participant affect.

Methods: Community participants ($n = 507$) reported several affective ratings before and after completing SAP task procedures.

Results: Following the SAP, participants reported reductions in nervousness and fear and increases in calmness and anger ($d = .21$). Participants with a current anxiety disorder reported greater increases in happiness; those with a suicide attempt history reported greater increases in sadness.

Results: Findings demonstrate the SAP has no adverse mood effects, supporting its use in experimental research.

Keywords

suicide attempt; non-suicidal self-injury; behavioral analogues; laboratory tasks; negative mood

Self-injurious behaviors are of major public health concern (Center for Disease Control, 2014), with rates of suicide attempts estimated at almost 9% (Nock et al., 2008) and non-suicidal self-injury at approximately 18% (Muehlenkamp, Claes, Havertape, & Plener, 2012). Furthermore, recent research suggests these rates may be on the rise (Curtin et al., 2016). Given this, a large literature has aimed to identify many risk factors for both suicidal and non-suicidal self-injury (e.g. Nock et al., 2013); however, this research has relied almost

exclusively on correlational studies using self-report measures or interviews, or behavioral measures within quasi-experimental study designs. While these methods have provided valuable foundational knowledge about self-injurious behaviors, they are not intended to assess real-time behavior, thought to be representative of self-injury specifically.

To improve risk prediction, researchers have recently begun to incorporate behavioral analogues of self-injury in research studies. Behavioral analogues allow for the direct assessment of a behavior through a proxy or another strongly related behavior. Such analogues have been utilized in psychological research for many years (e.g. Taylor, 1967), but it is only more recently that the use of these methods has become increasingly common to investigate correlates and potential mechanisms of self-injurious behaviors (see Ammerman, Berman, & McCloskey, 2017 for review). Such work has included pain paradigms utilizing a variety of aversive stimuli (i.e. cold, heat, pressure, shock); however, the majority of this work has focused on subjective ratings of pain (e.g. McCoy, Fremouw, & McNeil, 2010; Schmahl et al., 2006) and / or the interaction of the aversive stimuli with self-injury correlates (e.g. Arntz, Dressen, & Merckelback, 1991; Hamza, Willoughby, & Armiento, 2014). A modest literature has examined affective changes following painful stimuli as a way to support affect regulation models of self-injury (i.e., self-injury helps an individual escape, manage or regulate emotions; Chapman, Gratz, & Brown, 2006; Nock & Prinstein, 2004; Spirito, Valeri, Boergers, & Donaldson, 2003). Taken together, these studies have suggested a reduction in negative affect and improved emotion regulation following painful stimuli, even among high-risk samples (e.g. those with a history of self-injury) (Bresin & Gordon, 2013; Bresin, Gordon, Bender, Gordon & Joiner, 2010; Bresin, Kling & Verona, 2018; Franklin, Hessel, Aaron, Heilbron & Prinstein, 2010; Reitz et al., 2015). A limitation to this research, however, is that it has not extended to paradigms where participants self-select the stimuli, nor have the interactions of several high-risk groups been explored.

One task explicitly designed for this research is the self-aggressive paradigm (SAP; Berman & Walley, 2003; McCloskey & Berman, 2003). The SAP is an analogue of self-injurious behavior masked as a reaction time task in which participants self-select shock. More specifically, participants are told they are competing in a reaction time task against an (unbeknownst to them, fictitious) opponent, and that on trials where they lose they are required to select a level of shock to administer themselves. Such design elements of the SAP permit participants to be in control of the level of pain they experience (similar to acts of self-injurious behavior), while also allowing researchers to collect information about the chosen level of shock (e.g. their self-aggressive responding). Though limited, research using this behavioral analogue has identified correlates and potential causal factors of self-injurious behavior. For instance, SAP performance was shown to correlate significantly with laboratory measures of behavioral impulsivity when self-reported non-suicidal self-injury history did not (McCloskey, Look, Chen, Pajoumand, & Berman, 2012), speaking to the utility of this analogue to tap into aspects of self-injury beyond those captured by self-report. Moreover, research employing the SAP has identified causal relationships with acute alcohol (Berman, Bradley, Fanning, & McCloskey, 2009; Berman et al., 2017; McCloskey & Berman, 2003) and drug (Berman, Jones, & McCloskey, 2005) intoxication, serotonin depletion (McCloskey, Ben-Zeeve, Lee, Berman & Coccaro, 2009), and social influences

(Berman & Walley, 2003; Sloan, Berman, Zeigler-Hill, & Bullock, 2009). The use of the SAP has increased our knowledge of potentially causal relationships with self-injurious behavior; however, a dearth of research has examined information at the participant level.

Beyond the potential theoretical implications of examining the affective response to completing behavioral analogues of self-injure, better understanding of the participant's subjective experience of completing these tasks is an important next step in this area of research as the study of self-injurious behavior is noted as a focus of concern for institutional review boards (IRB) (Lakeman & FitzGerald, 2009). For example, it was found that IRB members believed that suicide-related research has high potential to harm participants (Lakeman & FitzGerald, 2009), and that they may be reluctant to approve research about self-injurious behavior due to a move toward stricter interpretations of ethical standards to do no harm (e.g. Becker-Blease & Freyd, 2006). Despite previous research documenting that asking about suicidal behaviors does not increase distress or occurrence of such behavior (Smith, Poindexter, & Cukrowicz, 2010; Gould, Marrocco, Kleinman, Thomas, Mostkoff, Cote, & Davies, 2005; Muehlenkamp, Swenson, Batejan, & Jarvi, 2015), and that viewing self-injurious stimuli does not increase urges to engage in self-injurious behavior (Cha, Glenn, Deming, D'Angelo, Hooley, Teachamn, & Nock, 2016), more research is needed to understand how completing behavioral analogues of self-injurious behavior, such as the SAP, is experienced by participants.

Current Study

The current study aims to address this gap in the literature by examining the subjective experience of participants during the SAP. Specifically, participant's subjective experience may be evaluated in terms of changes to affective states reported across a laboratory procedure. It is believed that affective states are primarily characterized by their placement along the dimensions of valence (negative-positive) and arousal or activation level (low-high; e.g., Barrett & Russell, 1999; Yik, Russell, & Steiger, 2011). In keeping with this scheme, the present study will consider changes in high arousal negative affect (e.g., afraid, angry, nervous), low arousal negative affect (e.g., sad), high arousal positive affect (e.g., happy), and low arousal positive affect (e.g., calm) from before to after completion of the SAP.

Given the nature of research examining self-injurious behavior, the current study will include participants at varying levels of risk, with differing psychiatric risk factors and of both genders. First, the current study will include those presenting with and without psychiatric diagnoses, in addition to those with a history of self-injurious behavior. Given that the SAP aims to examine self-aggressive responding, which is not unique to one form of self-injurious behavior, participants reporting either non-suicidal self-injury or suicide attempts will be included. The current study will also focus on the psychiatric diagnoses of mood disorders, anxiety disorders, and borderline personality disorder as these diagnoses most commonly co-occur with self-injurious behavior (e.g. Braga & Goncalves, 2014; Bentley, Cassiello-Robbins, Vittorio, Saur-Zavala, & Barlow, 2015), making these populations most likely to be included in studies of self-injurious behavior. Finally, although there is evidence that women are more likely to engage in self-injurious behavior (Bresin &

Schoenleber, 2015; Kessler, Borges, & Walters, 1999), research in this area is often not exclusive to women, so gender will also be considered as an important factor in the current study. Despite the potential cited concerns of self-injurious behavior research by IRBs (e.g. Lakeman & FitzGerald, 2009), we anticipate that, in line with previous studies on the impact of research in this area (Cha et al., 2016), participants may report decreased high and low arousal positive affect, however, will not report increased high or low arousal negative affect, following the SAP procedures, regardless of personal characteristics. By examining changes in affect from pre- to post-SAP procedures across a range of participants, the current study will provide valuable information about the potential harm of utilizing behavioral analogues of self-injurious behavior in the laboratory.

Method

Participants

Participants were 507 individuals (280 females; 55%) recruited from a Midwest urban community as part of a larger study. Participants ranged in age from 18 to 69 ($M = 36.02$; $SD = 9.86$); overall, 67.8% of participants reported being Caucasian, 21.5% reported being African-American, 5.2% reported being Hispanic, 3.5% reported being Asian or identified as “other”, and 2% preferred not to answer. Education levels ranged from partial high school training to graduate training: 2.3% of participants reported partial high school training, 9.6% reported completing high school, 32.4% reported partial college training, 35.3% reported completing college, 18.4% reported graduate training, and 2% preferred not to answer. In the current sample, 56 participants were diagnosed with a current mood disorder, 110 participants were diagnosed with a current anxiety disorder, and 87 individuals were diagnosed with borderline personality disorder. Forty-seven participants report a history of non-suicidal self-injury (25.50% reported 1 lifetime act; 38.30% reported 2-9 lifetime acts, and 36.20% reported 10 or more lifetime acts), and 48 participants reported at least one suicide attempt during their lifetime. While the presence of psychopathology may be higher than expected among research volunteers (e.g. Bunce, Noblett, McCloskey, & Coccaro, 2005), the current sample was recruited as part of a larger IRB-approved study on psychopathology, increasing the rates of high-risk participants.

Measures

Psychopathology.—The Structured Clinical Interview for DSM Disorders (SCID; First et al., 1997) is a semi-structured interview that was used to assess diagnostic criteria for current mood and anxiety disorders based on DSM-IV-TR criteria. The SCID’s psychometrics are supported (First et al., 1995). The Structured Interview for Diagnosis for Personality Disorders (SID-P; Pfohl, Blum, & Zimmerman, 1995) is a semi-structured interview that was used to assess for borderline personality disorder as defined by DSM-IV-TR criteria. Estimates of inter-rater reliability are adequate to strong (Pfohl et al., 1995).

History of Self-Injurious Behavior.—The Life History of Aggression (LHA; Coccaro, Kavoussi, Sheline, Lish & Csernansky, 1996; Coccaro, Kavoussi, Cooper & Hauger, 1997) is an 11-item measure that assesses self-directed aggression (non-suicidal self-injury, suicide attempts) through two items. Presence of each behavior was determined based on the

participants endorsing having ever engaged in the behavior and was coded dichotomously. The psychometrics of the LHA have been supported (Coccaro et al., 1996;1997).

Affect.—Visual Analogue Scales (VAS: Aitken, 1969) were used to assess participant's affect before and after the SAP. Participants were instructed to rate the following affective states: happy, nervous, sad, calm, fear, and angry. The VAS scales ranged from 0-100, in 5-point increments for a total of 20 potential response options.

Behavioral Analogue of Self-Injurious Behavior.—The Self-Aggressive Paradigm (SAP; Berman & Walley, 2003; McCloskey & Berman, 2003) was used as an analogue for self-injurious behavior through a series of reaction time trials against a fictitious opponent. After each trial the participant loses, he or she is asked to select a self-shock level. At the beginning of the task, an electrode is attached to the index and middle fingers of the participant's dominant hand. To control for inter-subject variation in pain threshold each participant sets their own pain threshold immediately prior to the task. The participant's shock-tolerance threshold is determined by administering increasingly intense shocks, at 100-mA intervals, until the participant reports that the shock is perceived as "very unpleasant". Participants complete 36 reaction time trials in which they select the level of shock to receive upon "losing" the reaction time trial (the number of "losing" versus "winning" trial is preset and consistent across participants). Levels of shock range from 0 to 10, where the 10-shock is equivalent to the tolerance-threshold current, the 9-shock is set at 95% of this maximum, the 8-shock at 90%, and so forth. There is also a 20-shock option, which the participant believes is twice the intensity of the 10-shock (though, in reality, it is the same intensity as the 10-shock). All SAP events were controlled by a Coulbourn Instruments L91-16 Habitest Super Linc, L18-16A adapter card, and L18-16S Linc Bus computer interface card. A Coulbourn Instruments L91-48 device controller regulated shock output from a Coulbourn Instruments E13-14 precision-regulated shocker with an E13-18 programmable board installed. The entire task, including completing the pain threshold procedures, takes approximately 18 minutes to complete. As previous research has reported group differences on shock selection (see McCloskey, Ben-Zeev, Lee, Berman, & Coccaro, 2009; McCloskey, Gollan, & Berman, 2008; McCloskey, Look, Chen, Pajoumand, & Berman, 2012), this information will not be included in the current study.

Results

T-tests were used to examine changes in affect from pre- to post-SAP in the overall sample. Then, 2 (group) x 2 (pre-post) MANOVAs were used to examine the main effects and interactions of the characteristics of interest¹. Given the number of analyses conducted, $p \leq .01$ was utilized. See Table 1 for means and standard deviations of pre- and post-affect ratings. See Table 2 for main effects of pre- to post-SAP affect rating by characteristic of interest.

¹Changes in affect from pre- to post-SAP were also examined in consideration of participant's average shock selection during the SAP; these findings were not significant, F 's = .01-1.14, p 's = .054-.78."

Overall Sample

Participants reported significant affect variations from pre- to post-SAP. Based on affective ratings on the VAS scale (rating range: 0 – 100), participants reported feeling less nervous ($t(505) = 15.78, p < .001, d = .67$), calmer ($t(503) = -4.06, p < .001, d = .16$), less fearful ($t(504) = 13.04, p < .001, d = .60$), and angrier ($t(506) = -4.34, p < .001, d = .21$). There were no differences on ratings of happiness ($t(506) = 1.61, p = .11, d = .05$) or sadness ($t(506) = .09, p = .93, d = .003$). Overall, levels of high and low negative affect (e.g. nervous, fearful, angry, sad) tended to be low both before ($M = 4.88 - 26.00$) and after ($M = 4.85 - 11.10$) the SAP. See Figure 1.

Associated Factors

Gender.—Males reported higher ratings of happiness than females. There were no additional significant main effects of gender on affect ratings. There were no significant interactions, $F's = .03-1.83, p's = .07-.98, \eta^2's = .00-.003$.

Mood Disorder.—Those with a current mood disorder reported lower ratings of being happy, and higher ratings of sadness, being fearful, and being angry. There were no additional significant main effects of a current mood disorder on affect ratings. There were no significant interactions, $F's = .01-1.72, p's = .19-.98, \eta^2's = .00-.003$.

Anxiety Disorder.—Those with a current anxiety disorder reported lower ratings of happiness and calmness, and higher ratings of nervousness, sadness, fear, and anger. There were no additional significant main effects of a current anxiety disorder on affect ratings. There was a significant interaction of having a current anxiety disorder and ratings of being happy, $F(1, 505) = 9.53, p = .002, \eta^2 = .02$. Those with a current anxiety disorder reported a greater increase in happiness from pre- to post-SAP than those without an anxiety disorder. There were no additional significant interactions, $F's = 1.22-3.54, p's = .06-.27, \eta^2's = .002-.007$.

Borderline Personality Disorder.—Those with current borderline personality disorder reported lower ratings of happiness and calmness, and higher ratings of sadness, fear, and anger. There were no additional main effects of current borderline personality disorder on affect ratings. There were no significant interactions, $F's = .12-3.89, p's = .04-.73, \eta^2's = .00-.01$.

Self-Injurious Behavior

Non-suicidal self-injury.—Those with a history of non-suicidal self-injury reported lower ratings of happiness and calmness, and higher ratings of sadness and anger. There were no additional main effects of a history of non-suicidal self-injury on affect ratings. There were no significant interactions, $F's = .02-2.35, p's = .13-.88, \eta^2's = .00-.005$.

Suicide attempts.—Those with a history of suicide attempts reported lower ratings of happiness and calmness, and higher ratings of sadness and fear. There were no additional main effects of a history of suicide attempts on affect ratings. There was a significant interaction of having a history of suicide attempts on ratings of sadness, $F(1, 505) = 5.59, p$

$= .01$, $\eta^2 = .01$. Those with a history of suicide attempts reported a greater increase in sadness from pre- to post-SAP than those without a history of suicide attempts. There were no additional significant interactions, F 's = .01-2.67, p 's = .10-.91, η^2 's = .00-.005.

Discussion

The current study aimed to extend research using the self-aggressive paradigm (SAP) to better understand participant's experience of completing this behavior analogue, with a focus on affective changes from pre- to post-SAP. Across a range of participants, including those with a history of self-injurious behavior, the current study's hypotheses were mainly supported. Indeed, overall, the sample demonstrated reductions in the high arousal negative affect variables of nervousness and fear and increases in the low arousal positive affect variable of calmness. However, there were some, albeit small, increases in negative affect following the SAP.

In examining the overall sample, it was found that, in addition to decreases in some measures of negative affect and an increase in one measure of positive affect, participants reported feeling increased levels of anger following the SAP. Importantly, however, the effect size of this relationship was small ($d = .21$), illustrating a limited increase from pre- to post-SAP. Indeed, the average rating of anger was an 8.25 (on a 100-point scale) following the SAP, reflecting a 3.37-point average increase. This can be viewed, in contrast, to other laboratory tasks, such as the paced auditory serial addition task (PASAT), which is a measure of distress tolerance intended to increase participants' distress and frustration. Research using the PASAT demonstrates that participant reports of negative affect (particularly high arousal negative affect) increase approximately 35-points (on a 100-point scale) following task completion (e.g. Feldner, Leen-Feldner, Zvolnsky, & Lejuez, 2006). These findings, particularly when considering that the SAP is designed such that participants "lose" a greater number of trials at the end of the task compared to the beginning, may indicate that the resulting emotion after the SAP is comparable to the negative emotion experienced in daily life. On the other hand, participants, on average, reported a 15-point decrease in their ratings of nervousness from pre- to post-SAP (a medium effect size). This suggests that the anticipation of the task may be more distressing than the actual task itself. These results are in line with past research showing that viewing self-injurious stimuli results in minimal distress (Chat et al., 2016). Another potential explanation is that the pain experienced during the task serves an affect regulation function, even for those who do not have a history of self-injury, as suggested by previous research (Bresin & Gordon, 2013). Overall, the findings suggest no adverse mood effects due to the SAP, supporting its use in experimental research on self-injurious behavior.

Two significant interactions of participant characteristics on mood ratings from pre- to post-SAP were observed. First, those with a current anxiety disorder reported a greater increase in happiness from pre- to post-SAP compared to those without a current anxiety disorder. In considering this interaction, those with an anxiety disorder reported significantly lower happiness during both periods of mood rating, despite the increase in happiness post-SAP. As such, it is possible that their (three-point) increase in happiness ratings was a regression towards mean-level happiness ratings. It is also possible, however, that this increase in

happiness is capturing a state of relief following the SAP procedures. This interpretation is in line with past research demonstrating that following a shock-inducing pain paradigm, participants demonstrated increases in positive affect (e.g. Franklin, Lee, Hanna, & Prinstein, 2013). The current findings also demonstrated that those with a history of suicide attempts (compared to those without) reported greater increases in sadness ratings from pre- to post-SAP. This is an unexpected finding as most research utilizing behavioral analogues of self-injury find decreases in negative affect following similar tasks (see Ammerman, Berman, & McCloskey, 2017; Bresin, Kling, & Verona, 2018). Importantly, most of this research examines a composite score for negative affect. It is possible this finding is specific to the negative emotion of sadness. For example, it may be that the procedures of the SAP, which are designed to emulate self-injurious behavior, remind these participants of their past act(s) of suicidal behavior, in addition to the negative consequences of their behavior. It is also possible that the procedures of the SAP itself (e.g. an accumulation of “losing” trials across the task) may have an influence on feelings of sadness among those with a history of suicide attempts. Despite this increase in sadness, the average rating of sadness among suicide attempters following the SAP was reported to be 14.38 (on the 100-point scale), suggesting even though heightened, relatively low levels of sadness.

There were several observed main effects of gender, psychiatric diagnosis, and history self-injurious behavior factors on variations in participant mood; however, the majority of these effects were not surprising. For instance, participants with a current mood disorder reported lower ratings of happiness, and higher ratings of sadness, being fearful, and being angry than those without a current mood disorder. Given the presence of a current mood disorder during study procedures, we would expect that these participants would report higher levels of negative affect. Given the lack of significant interactions with mood ratings, these main effects seem to be capturing overall differences in participant mood, but do not suggest that certain characteristics make participants more sensitive to the SAP procedures.

Limitations and Future Directions

The limitations of the current study should be noted. First, the current study only assessed a history of self-injurious behavior; it will be important for future research to examine the recency and frequency of such behavior as it may have an impact on the participant's experience of the SAP. The current study only considered a participant's subjective experience of the SAP immediately prior to and immediately following the task. One way to expand this research is to collect a more established baseline (e.g. longer prior to the start of SAP), in addition to using more objective measures of affect (e.g. startle-blink reactivity). Collecting participant-reported mood ratings throughout the task may also be useful in understanding mood trajectory across task completion. It will also be important for future research to compare the current findings to completion to similar, but less invasive paradigms, such as those that did not use a pain stimulus. Finally, these findings should be replicated in additional samples, including those with high rates of self-injurious behavior, to generalize the findings.

Despite these limitations, the current study has implications for the use of behavioral analogues of self-injurious behavior in experimental research. In line with previous research

(Cha et al., 2016; Gould et al., 2005; Muehlenkamp, et al., 2015; Smith et al., 2010), the current findings demonstrate that incorporating tasks aimed to replicate the experience of self-injurious behavior in the laboratory into research does not have adverse effects on participant mood, even among those who are at highest risk (those with a history of self-injurious behavior). This information is important to consider, particularly when working with IRB committees to ensure research is being conducted in an ethical manner that does not unduly distress participants.

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Figure 1.

Note: * indicates significant difference at $p < .001$

Table 1.

Means and Standard Deviations of Pre- and Post-SAP Affect Ratings

	<u>Happy</u>		<u>Nervous</u>		<u>Sad</u>		<u>Calm</u>		<u>Fear</u>		<u>Angry</u>	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Overall	59.38 (24.65)	58.21 (24.99)	26.01 (25.43)	11.14 (18.57)	6.78 (14.79)	6.73 (14.99)	53.53 (29.08)	57.98 (28.26)	15.11 (20.47)	4.85 (12.59)	4.88 (12.68)	8.25 (19.11)
Male	64.36 (23.30)	63.69 (22.69)	23.67 (24.53)	10.02 (16.51)	6.36 (14.56)	5.69 (12.89)	56.03 (29.31)	60.20 (29.25)	13.91 (19.64)	4.80 (11.92)	5.44 (12.92)	9.11 (19.94)
Female	55.48 (25.11)	53.95 (25.96)	28.03 (26.05)	12.11 (18.59)	7.13 (15.03)	7.61 (16.49)	51.58 (28.68)	56.13 (27.43)	16.18 (21.12)	4.93 (13.17)	4.45 (12.52)	7.61 (18.49)
Mood –	61.01 (24.08)	59.75 (24.28)	25.64 (24.72)	10.54 (17.76)	5.76 (13.39)	5.72 (13.65)	54.36 (28.58)	58.31 (27.92)	14.42 (19.59)	4.32 (11.16)	3.95 (11.31)	7.07 (17.99)
Mood +	46.25 (25.48)	45.89 (27.37)	28.93 (30.66)	15.89 (23.80)	14.91 (21.65)	14.82 (21.62)	46.73 (32.36)	55.27 (31.04)	20.63 (26.06)	9.11 (20.43)	12.41 (19.14)	17.77 (24.61)
Anxiety –	62.30 (23.78)	59.97 (24.06)	24.36 (24.72)	10.42 (17.55)	5.30 (12.29)	5.62 (13.36)	56.05 (28.96)	59.86 (28.20)	13.66 (19.10)	4.13 (11.62)	3.55 (10.31)	6.37 (16.56)
Anxiety +	48.82 (24.95)	51.86 (27.27)	31.95 (27.11)	13.73 (21.73)	12.09 (20.75)	10.73 (19.35)	44.39 (27.77)	51.15 (27.56)	20.32 (24.17)	7.45 (15.38)	9.68 (18.16)	15.05 (25.29)
BPD –	61.89 (24.21)	60.20 (24.62)	25.05 (24.83)	10.51 (17.91)	5.13 (12.27)	5.33 (13.35)	55.48 (28.55)	58.90 (28.46)	14.06 (19.38)	3.92 (10.82)	3.54 (11.02)	6.18 (16.89)
BPD +	48.74 (23.44)	50.00 (24.99)	30.69 (28.01)	14.25 (21.61)	14.54 (22.00)	13.39 (20.18)	44.94 (30.39)	54.36 (27.32)	20.00 (24.53)	9.14 (18.48)	10.92 (17.35)	17.59 (25.15)
NSSI –	60.53 (24.51)	59.33 (24.62)	25.90 (25.14)	11.33 (18.95)	6.10 (13.99)	6.22 (14.49)	54.74 (28.65)	58.64 (28.34)	15.08 (20.58)	4.78 (12.63)	4.30 (11.55)	7.51 (18.44)
NSSI +	48.09 (23.40)	47.34 (26.23)	27.02 (28.32)	9.26 (14.41)	13.40 (20.08)	11.70 (18.72)	41.81 (30.87)	51.49 (26.94)	15.43 (19.58)	5.53 (12.30)	10.53 (20.00)	15.53 (23.73)
SA –	60.84 (24.24)	59.43 (24.84)	25.45 (25.41)	10.96 (18.64)	6.42 (14.33)	5.93 (13.94)	55.16 (28.83)	59.06 (28.24)	14.50 (19.98)	4.27 (11.34)	4.67 (12.56)	7.64 (18.42)
SA +	45.42 (23.43)	46.56 (23.64)	31.35 (25.22)	12.81 (17.98)	10.21 (18.45)	14.38 (21.48)	38.02 (26.97)	47.71 (26.62)	20.94 (24.14)	10.42 (20.42)	6.88 (12.68)	14.17 (24.20)

Note: Mood = current mood disorder; Anxiety = current anxiety disorder; BPD = current borderline personality disorder; NSSI = history of non-suicidal self-injury; SA = suicide attempt; – = absent; + = present

Table 2.

Main Effects of Pre- to Post-SAP Affect Ratings by Group

	<u>Happy</u>		<u>Nervous</u>		<u>Sad</u>		<u>Calm</u>		<u>Fear</u>		<u>Angry</u>	
	<i>F</i>	<i>n</i> ² (CI)	<i>F</i>	<i>n</i> ² (CI)	<i>F</i>	<i>n</i> ² (CI)	<i>F</i>	<i>n</i> ² (CI)	<i>F</i>	<i>n</i> ² (CI)	<i>F</i>	<i>n</i> ² (CI)
Gender	20.38**	.04 (.02,.07)	3.39	.01 (0,.02)	1.25	.002 (0,.01)	3.37	.007 (0,.02)	.85	.002 (0,.01)	1.05	.002 (0,.01)
Mood	19.21**	.04 (.01,.07)	2.43	.01 (0,.02)	24.21**	.05 (.02,.08)	2.08	.004 (0,.02)	7.22**	.01 (.002,.04)	25.75**	.05 (.02,.08)
Anxiety	18.92**	.04 (.01,.07)	6.76*	.01 (.002,.03)	17.58**	.03(.01,.06)	13.54**	.03 (.01,.05)	10.37**	.02 (.005,.04)	26.62**	.05 (.02,.08)
BPD	18.58**	.04(.01,.07)	4.14	.01 (0,.03)	32.22**	.06 (.03,1.0)	6.07*	.01 (0,.03)	10.84**	.02 (.01,.05)	36.55**	.07 (.04,.11)
NSSI	11.83**	.02 (.01,.05)	.03	.00 (0,.004)	9.91*	.02 (.004,.04)	6.48*	.01 (.002,.03)	.06	.00 (0,.01)	11.87**	.02 (.01,.05)
SA	16.30**	.03 (.01,.06)	1.71	.003 (0,.02)	9.24*	.02 (.004,.04)	13.46**	.03 (.01,.05)	8.29*	.02 (.002,.04)	4.48	.01 (0,.03)

Note: Mood = current mood disorder; Anxiety = current anxiety disorder; BPD = current borderline personality disorder; NSSI = history of non-suicidal self-injury; SA = suicide attempt;

** = $p < .001$;

* = $p < .01$;

CI = 90% confidence intervals