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Non-suicidal self-injury and frequency of suicide attempts: The role of pain persistence

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ABSTRACT

Background: Non-suicidal self-injury (NSSI) and suicidal behavior exhibit a robust association with one another. Research on the contexts within which this relationship is stronger or weaker, however, is limited. The interpersonal theory of suicidal behavior (ITS) posits that NSSI influences suicidal behavior through a habituation to physical pain and, as such, pain tolerance has been theorized to play an important role. We tested whether pain persistence, the difference between pain threshold and pain tolerance, would moderate the relationship between frequency of NSSI and suicidal behavior in both an undergraduate and community sample.

Method: Study 1 assessed healthy undergraduates, whereas Study 2 was comprised of community members recruited largely based upon a history of suicidal behavior. Across both samples, participants completed self-report measures of NSSI and a structured interview on suicidal behavior. In both studies, pain was measured using a pressure algometer and, in Study 2, persistence was also assessed using the Enhanced Distress Tolerance Test (DTT-E).

Results: Consistent with the notion that suicidal behavior requires persistence amidst pain and distress, results indicated that the willingness to remain engaged with pain and distress may significantly influence the degree to which NSSI is related to suicidal behavior.

Limitations: Both studies were limited by a cross-sectional design, which precluded assessments of causality and directionally of effects.

Conclusions: These results call attention to the potential importance of persistence through pain and/or distress in the association between NSSI and suicidal behavior.

1. Introduction

A well-documented phenomenon noted in research on suicide has been that only a minority of individuals with suicidal ideation will attempt suicide. Of those who attempt, only a small minority will die by suicide (Center for Disease Control and Prevention [CDC], 2015). The interpersonal theory of suicide (ITS; Joiner, 2005) and three step theory of suicide (3ST; Klonsky and May 2015) both emphasize that, in addition to suicidal desire, an individual must develop the ability to make a lethal suicide attempt (Joiner, 2005), which facilities the progression from ideation to attempts (Klonsky and May, 2015). Capability has been consistently found to be acquired in part through repeated, potentially self-damaging behaviors (Joiner, 2005) involving physical pain, such as non-suicidal self-injury (NSSI), the direct and deliberate destruction of one's own body tissue in the absence of suicidal intent (Gratz, 2003; Nock et al., 2006). More recently, the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM–5; American Psychiatric Association [APA], 2013) proposed NSSI as a disorder independent from borderline personality disorder. The proposed NSSI disorder is characterized by five or more days of self-injury without suicidal intent over one year with the purpose of seeking relief from a negative state, achieving a positive state, or resolving an interpersonal difficulty (APA, 2013).

NSSI is a prevalent behavior, occurring in approximately 5.5% of adults (Swannell, Martin, Page, Hasking, and St. John, 2014) and approximately 18% of adolescents (Muehlenkamp et al., 2012) in the community. Amongst clinical populations, NSSI has been shown to occur in approximately 37 to 50% of adolescents and young adults (Zetterqvist, 2016) and 21–79% of psychiatric patients (Briere and Gil, 1998; Zanarini et al., 1989). Past research examining suicidality has demonstrated that NSSI is associated with suicidal ideation and related constructs (Laye-Gindhu and Schonert-Reichl, 2005; Lloyd-Richardson et al., 2007). For example, the frequency of NSSI has been associated with feelings of thwarted belongingness (Assavedo and

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Anestis, 2016). NSSI, particularly when engaged in repeatedly, has also been shown to be associated with future suicide attempts (Cooper et al., 2005; Whitlock and Knox, 2007; Nock, Joiner, Gordon, Lloyd-Richardson and Prinstein, 2006). Amongst individuals who self-injure, the frequency of NSSI and methods used for NSSI have been moderately correlated with a history of suicide attempts (Victor and Klonsky, 2014). Given these findings, although the two behaviors are distinct, past research has clearly shown that NSSI and suicidal behaviors are undoubtedly associated with one another.

Two key factors associated with NSSI are pain threshold, the minimum intensity of a pain-producing stimulus that an individual perceives as being painful, and pain tolerance, the maximum intensity of a pain-producing stimulus that an individual is willing to tolerate (IASP, 1994). Pain tolerance has been found to mediate the relationship between painful and provocative events (e.g., NSSI) and the acquired capability for suicide (Franklin et al., 2011). Indeed, multiple studies examining levels pain threshold, pain tolerance, and pain intensity in individuals who self-injure have found that individuals with a history of self-injury possess a lower sensitivity to and both higher threshold and tolerance for pain (Russ et al., 1992; Bresin and Gordon, 2011; Russ, Campbell, Kakuma, Harrison, Zanine, 1999; McCoy, Fremouw, McNeil, & Virginia, 2010; Hooley, Ho, Slater and Lockshin, 2010; Gratz et al., 2011; Koenig, Thayer, and Kaess, 2016). Furthermore, lack of physical pain during NSSI has been demonstrated to increase an individual's risk of dying by suicide (Nock et al., 2006; Turner, Layden, Butler, and Chapman, 2013), emphasizing the role of heightened pain perception in the capability for suicide.

Pain perception is a complex interplay between biological, physiological, emotional, cognitive, behavioral and social components such as genetics, number of nociceptors in the body, socialization of pain, and pain communication (Gatchel, 2005; Klossika et al., 2006). Much prior research has focused on the threshold at which one first detects pain and the threshold at which one can no longer tolerate pain as an indicator of pain response. Given the complexity of pain perception, however, as well as the likelihood that innate thresholds for pain onset and tolerance may not be distributed normally in the population, it would be difficult to use these thresholds, independently, as indicators of the capability for suicide. A meta-analysis of studies examining the relationship between pain threshold, pain tolerance, and self injurious behaviors found that individuals who engage in self-injurious behaviors tend to demonstrate a greater pain threshold and tolerance, as well as lower ratings of pain intensity, than their counterparts who do not self-injure (Koenig et al., 2016). Although pain threshold and tolerance may be associated with the capability for suicide, an individual who tolerates a higher intensity of a painful stimulus but who did not detect pain until it was at a higher threshold, might not truly be tolerating more pain than an individual with a moderately high pain tolerance who detects pain at a lower threshold. It is also important to note that calculation of pain tolerance can differ across various studies examining pain. Some studies define pain tolerance as the maximum exposure time or the maximum intensity of the pain stimulus (Braid and Cahusac, 2006; Lacourt, Houtveen, and van Doornen, 2012; Myrtveit et al., 2016). Other studies, however, operationalize pain tolerance as the difference between the the onset of pain and the maximum exposure or intensity of the pain stimulus (Pool et al., 2007). The former calculation speaks to the nature of the stimulus, whereas the second speaks to the individual's persistence through what he or she perceives of as increasing levels of physiological pain. Particularly in the field of suicide and self-injury research, pain tolerance has been consistently calculated as the maximum intensity/exposure time of the pain stimulus (McCoy, Fremouw, McNeil, & Virginia, 2010; Bresin, Gordon, Bender, Gordon, and Joiner, 2010; Bender, Gordon, Bresin, and Joiner, 2010; Gratz et al., 2011; Triñanes, González-Villar, Gómez-Perretta, and Carrillo-de-la-Peña, 2015). As such, it is important to differentiate between pain tolerance, the intensity of pain tolerated by an individual, and pain persistence, an individual's willingness to persist from the onset of pain to the maximum intensity of pain they can tolerate. Specifically, the ability to persist through pain and distress to achieve a particular goal is potentially a non-redundant variable with pronounced theoretical relevance to NSSI and suicidal behavior.

Across various samples and methodologies, it has been found that an elevated distress tolerance, the ability to experience and endure negative psychological states (Simons and Gaher, 2005), amplifies the relationship between painful and/or provocative experiences like NSSI and the capability for suicide (Anestis and Joiner, 2012; Anestis et al., 2013). Similarly, pain persistence has been found to be higher in individuals who self-injure when compared to their counterparts who do not self-injure (Hooley et al., 2010). Relative to this notion of willingness to persist through pain and distress, past research has found that individuals with high-lethality suicide attempts were more willing to delay future rewards and wait for larger rewards compared to their counterparts with low-lethality attempts (Dombrovski et al., 2011). Furthermore, Anestis, Soberay, Hernandez, Gutierrez, and Joiner (2014) proposed that, different from NSSI, suicidal behavior emerges specifically through the pursuit of death rather than the escape from acute physiological and/or emotional discomfort. In other words, those with suicide attempts of higher lethality may be more likely to persist through adverse states (e.g., pain, distress) in order to reach their desired goal (death), putting them at a higher risk for suicide.

The relationship between distress tolerance, NSSI, suicidal behavior is complex. Past studies have suggested that individuals with low levels of distress tolerance and high levels of emotion regulation may be motivated to use NSSI to escape from emotional distress (Chapman et al., 2006). In terms of suicidality, individuals who have a lower capacity to tolerate distress have been found to be at greater risk for suicidal ideation, while those who have greater capacity to tolerate distress have been found to have an elevated capability for suicide (Law, Khazem, and Anestis, 2015). A review of extant literature on suicidality and emotional distress has suggested that the repeated use of NSSI to manage emotional distress may be a pathway by which individuals who are low in distress tolerance are able to increase their ability to tolerate distress, thereby elevating the capability for suicide (Whitlock et al., 2013; Law et al., 2015). Although there have been several studies considering pain and distress tolerance in NSSI and suicidality, there has been a dearth of literature examining the role of persistence through pain and distress in suicidal behavior. Thus, the aim of the present studies is to determine the role of persistence through pain and distress on the relationship between NSSI and past suicide attempts. Study 1 aims to examine the role of persistence through pain in influencing the relationship between NSSI and past suicide attempts using an undergraduate student sample. Study 2 replicates and extends the findings of Study 1 to include persistence through distress in addition to pain while using a more clinically relevant sample of adults drawn from the community.

2. Methods

2.1. Participants

In Study 1, the sample consisted of 145 undergraduates (M_{age}=21.39, *SD*=4.88, 71.2% female, 52.7% Caucasian, 41.8% African American) taking part in a larger IRB approved study examining the role of persistence amidst aversive physical and affective states in NSSI and suicidal behavior. We did not draw data from the experimental portion of this study, as it was not related to our hypothesis but examined baseline pain tolerance instead. In this sample, 8.1% (*n* =12) of the sample had at least one prior suicide attempt. Of those reporting at least one prior attempt, the median number of attempts was 2 (*SD*=19.56) and total lifetime attempts ranged from 1 to 8. All of those with at least one previous suicide attempt reported engaging in NSSI at least once. Furthermore, 27% (*n* =40) of respondents endorsed at least one prior episode of NSSI.