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Adolescent nonsuicidal self-injury: Examining the role of child abuse, comorbidity, and disinhibition

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ABSTRACT

The purpose of the study is to examine how several well-known correlates of nonsuicidal self-injury (NSSI) might work together to contribute to the occurrence of this behavior. Specifically, we examined models including child abuse, psychiatric comorbidity, and disinhibition, testing how these factors may work together to lead to NSSI in the past month. Participants ($n=194$; 144 female; age 13–18 years) were recruited from a short-term, acute adolescent residential unit. Within 48 hours of admission to the hospital participants completed structured clinical interviews assessing mental disorders and patterns of NSSI. Following the interviews, participants completed a self-report questionnaire assessing childhood abuse and a computerized continuous performance task. Consistent with study hypotheses, results revealed that the association between child abuse and NSSI is partially mediated by comorbidity. Although disinhibition is associated with comorbidity, contrary to our hypothesis, disinhibition does not mediate the relation between child abuse and NSSI. Collectively, these findings provide new information about how comorbidity may increase risk for NSSI, and critically, discuss the potential importance of creating targeted programs to reduce the prevalence of child abuse.

1. Introduction

Nonsuicidal self-injury (NSSI), the intentional destruction of one's body tissue without an intent to die, typically begins in early adolescence, and prevalence rates are approximately 13 to 23% in adolescent community samples (Jacobson and Gould, 2007; Nock, 2009) and 40% among adolescent inpatients (Klonsky and Muehlenkamp, 2007). As 50 to 75% of individuals reporting NSSI make a suicide attempt during their life course (Nock et al., 2006), understanding the factors that may lead to NSSI in youth is a pressing public health concern. The developmental unfolding of NSSI is likely equifinal, with a number of developmental and psychiatric factors shown to be predictive of NSSI (Klonsky, 2007; Nock, 2009). However, little is known about how these different risk factors may work together to produce NSSI. In the current manuscript, we examine the role of three potential correlates of adolescent NSSI: child abuse, psychiatric comorbidity, and disinhibition.

1.1. Disentangling the associations among child abuse, comorbidity, disinhibition, and NSSI

Child abuse is a strong predictor of adolescent NSSI; however, the specific pathways through which abuse may lead to NSSI are unclear (Nock, 2009). From a developmental perspective, early life adversity negatively affects neurogenesis, synaptic production and pruning, and myelination during developmentally sensitive periods, which impacts both structural and functional development within discrete areas of the brain (Teicher et al., 2003). These neurobiological consequences may contribute to the onset and maintenance of psychopathology in youth (Widom et al., 2007), and alternatively, abuse-related abnormalities, particularly within the amygdala and corpus callosum, may compromise executive functioning increasing the likelihood that adolescents act impulsively (Allman et al., 2001; Jollant et al., 2007; Lara et al., 2006; Monkul et al., 2007). Taken together, there may be two separate, but related, paths in which child abuse may lead to NSSI behaviors.

One possible pathway is that child abuse contributes to greater comorbidity, and greater comorbidity leads to adolescent NSSI behaviors. Specifically, child abuse contributes to the onset of depressive (Brown et al., 1999), anxiety (e.g., PTSD – Kingston and

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Raghavan, 2009; panic disorder – Goodwin et al., 2005), and personality (e.g., borderline personality disorder – Gunderson, 2009) disorders in youth. Widom et al. (2007) also have found that child maltreatment is associated with greater comorbidity in youth and young adults. Such psychiatric comorbidity stems, in part, from the fact that individuals with a history of maltreatment rarely experience a single traumatic event. Rather, these individuals typically experience several episodes, often across different types of abuse (i.e., emotional, physical, and sexual; Kessler, 2000), and Cloitre et al. (2009) assert that repeated or prolonged exposure to maltreatment results in a complex symptom presentation, especially as it relates to deficits regarding anxiety, anger, aggression, and avoidant behaviors.

Recent research has also explored clinical diagnostic correlates of NSSI, and although many think of NSSI as occurring primarily in the context of borderline personality disorder, studies have revealed that NSSI occurs in a wide range of mental disorders (Nock et al., 2006; Glenn and Klonsky, 2013). At the same time, psychiatric comorbidity appears to be the rule rather than the exception as the National Comorbidity Survey reports that 79% of psychiatric diagnoses in individuals with at least one lifetime psychiatric diagnosis were comorbid with other diagnoses (Kessler et al., 1994). Adolescent comorbidity negatively impacts cognitive (e.g., executive functioning, attention), physical (e.g., weight gain, fatigue), psychological (e.g., self-worth), and behavioral (e.g., persistence, motivation) functioning (e.g., Lewinsohn et al., 1995; Patel et al., 2007), and for some, these broad-based deficits may increase overall distress. In other cases, however, the difficulty of managing an intense range of symptoms coupled with associated interpersonal stress and academic decline, commonly present in the context of adolescent psychopathology, may foster feelings of helplessness and hopelessness (e.g., Abela et al., 2006; Auerbach et al., 2010). Some, but not all, adolescents may utilize NSSI to provide short-term relief from this distress (Nock, 2009). Consequently, we hypothesized that child abuse would predict greater psychiatric comorbidity, and moreover, psychiatric comorbidity may be associated with adolescent NSSI.

Alternatively, as child abuse negatively affects psychobiological circuits implicated in impulsiveness (Braquehais et al., 2010), such abuse may increase impulsiveness, which then leads to adolescent NSSI behaviors. Interestingly, people who engage in NSSI have higher self-report of impulsivity than non-injurers; however, behavioral and biological tests of various dimensions of impulsiveness have failed to find any such differences (Simeon et al., 1992; c.f., Dougherty et al., 2009; Janis and Nock, 2009; Glenn and Klonsky, 2010). A majority of this research has examined these differences without considering the impact of child abuse, and as noted earlier, child abuse negatively impacts the development of both the corpus collosum and the amygdala (Braquehais et al., 2010). This is of particular importance as the corpus collusum is responsible for interhemispheric communication, while the amygdala is implicated in modulating arousal. Taken together, decreased hemispheric integration of information within the corpus collosum and hyper-reactivity in the amygdala may lead to greater disinhibition – a subdomain of impulsiveness that reflects acting without thinking (Reynolds et al., 2006). Historically, performance-based indices of disinhibition have not demonstrated differences among self-injurers and non-injurers. Nevertheless, based on mounting neurobiological research (e.g., Teicher et al., 2003), we hypothesized that child maltreatment may compromise neural circuitory that modulates disinhibition, as assessed through a performance-based task, and thus, resulting disinhibition may mediate the relationship between child abuse and adolescent NSSI behaviors.

1.2. Goals of the current study

Although there are many known risk factors associated with NSSI behaviors in youth, child abuse, disinhibition, and comorbidity are well-known correlates of NSSI behaviors that are also strongly associated with each other (e.g., Widom et al., 2007; Janis and Nock; Nock, 2009). We first tested whether those with a history of NSSI score higher on measures of these constructs. Next, we tested whether greater comorbidity mediates the association between past child abuse and NSSI frequency in the past month. Finally, we tested whether greater disinhibition mediates the association between child abuse and NSSI frequency in the past month.

2. Method

2.1. Participants

Participants in this study were recruited from an acute adolescent residential treatment program within the greater Boston area and included 194 adolescents (50 male, 144 female) with ages ranging from 13 to 18 (Mean = 15.53, S.D. = 1.34). The ethnic distribution included: 77.2% Caucasian, 9.8% Asian, 8.3% multicultural (i.e., greater than one race endorsed), 3.6% Black, 0.5% Native American, and 0.5% Native Hawaiian or Other Pacific Islander.

2.2. Procedure

The Institutional Review Board provided approval for this study, and the treatment of participants was in accordance with American Psychological Association ethical standards. Prior to participation, legal guardians and adolescents aged 18 years provided consent to participate, and adolescents aged 12–17 provided assent. During the hospital admission procedures, all individuals were explained the overarching aims of the current study, and all individuals were encouraged to participate. However, given privacy issues, study staff did not explore reasons of non-participation. The response rate was 72.1%. Within 48 h of admission to the hospital, participants completed two structured clinical interviews assessing psychopathology and patterns of self-harm and suicidality. Following the interviews, participants completed a computerized continuous performance task, and then, participants completed a self-report questionnaire assessing past childhood abuse.

2.3. Instruments

Childhood Trauma Questionnaire (CTQ) (Bernstein et al., 1994)

The CTQ is a 25-item self-report instrument designed to assess adolescents' experience of abuse and neglect in childhood. We examined the role of physical, sexual, and emotional abuse, and subscales pertaining to neglect were not utilized as prior research suggests that abuse is more strongly associated with NSSI (Glassman et al., 2007) Participants are instructed to answer each item based on their experiences growing up as a child or teenager and to rate each item on a 5-point scale ranging from 1 (never true) to 5 (very often true), with higher scores reflecting more self-reported child abuse. A total abuse score was created by summing subscales pertaining to physical, sexual, and emotional abuse (i.e., 15-items). Past research has demonstrated strong reliability and validity (Bernstein et al., 1997) In the current study, internal consistency for the total abuse scale (i.e., emotional, physical, and sexual abuse) was strong (Cronbach's $\alpha = 0.89$).

Mini International Neuropsychiatric Interview for children and adolescents (MINI-KID) (Sheehan et al., 2010)

The MINI-KID is a structured diagnostic interview used to assess current and past psychopathology in youth. Interviews were administered by trained research assistants to adolescent participants. Prior to administration, research assistants received approximately 25 h of training. In the current study, the number of diagnosed psychopathological disorders among adolescents ranged from 0–8 with higher scores corresponding to a greater total number of clinical disorders (Mean = 2.79, S.D. = 1.58). The MINI-KID has previously shown good reliability and validity in diagnosing psychiatric disorders in children and adolescents (Sheehan et al., 2010).

Gradual onset Continuous Performance Task (gradCPT) (Esterman et al., 2013)

Disinhibition was assessed using the gradCPT. Adolescents viewed randomly presented gray scale photographs of mountain scenes (10%) and city scenes (90%). The images gradually transition from one to the next, using a linear pixel-by-pixel interpolation, with each transition occurring over 800 ms. Images were presented to participants with Matlab using the Psychtoolbox extensions. Participants completed two 30-s practice blocks, followed by a single 6-min block containing 450 trials. Participants were instructed to respond to the visual target (e.g., city scenes) by pressing a computer key and withhold a response to the non-target (e.g., mountain scenes). Correct omissions were defined as when participants correctly inhibited responding (e.g., pressing a computer key) to mountain scenes, and commission