



Preliminary communication

Impulsivity and suicidality: The mediating role of painful and provocative experiences

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ARTICLE INFO

Article history:

Received 25 March 2010

Received in revised form 21 June 2010

Accepted 17 July 2010

Available online 16 August 2010

Keywords:

Suicide

Acquired capability

Impulsive

Painful and provocative experiences

ABSTRACT

Background: Multiple studies have reported a link between high levels of impulsivity and suicidal behavior. Joiner's (2005) explanation for this link is that impulsive individuals have a greater tendency to experience painful and provocative events that habituate them to fear and pain, which leads to an acquired capability for engaging in suicidal behavior.

Methods: Study 1 tested Joiner's (2005) hypothesis in a sample of 182 undergraduate students who completed self-report questionnaires on impulsivity, frequency of painful and provocative events, and acquired capability for suicide. In addition to self-report, pain tolerance (an aspect of acquired capability for suicide) was measured with a pressure algometer.

Study 2 sought to replicate our findings from Study 1 in a sample of 516 clinical outpatients using a multi-faceted measure of impulsivity.

Results: Consistent with prediction, product of coefficients tests for mediation (MacKinnon et al., 2002) revealed that impulsivity has an indirect relationship with acquired capability for suicidal behavior, and that this relationship is mediated by painful and provocative events.

Limitations: Data from our studies are cross-sectional in nature, which does not allow for conclusions about the temporal ordering of our variables. In addition, self-report was used to measure most variables. Future research may benefit from a longitudinal design and the inclusion of other modes of assessment (e.g., behavioral measures of impulsivity).

Conclusions: Our findings suggest that the link between impulsivity and suicidal behavior occurs because impulsive people tend to have a greater capability for suicidal behavior, which they have acquired through experiencing painful and provocative events.

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Approximately one million people die by suicide every year around the world (World Health Organization, 2009). Deaths by suicide are often associated with agonizing emotional pain for the decedents' loved ones, and lead to financial and productivity costs to society as a whole (Lindqvist et al., 2008). Thus, suicide is a major public health concern, and research on the topic is imperative. Scientific research that illuminates the mechanisms by which specific risk factors lead to suicidal behavior may be particularly useful because of the potential to inform risk assessment and

prevention efforts. The current studies seek to identify a mechanism by which the risk factor impulsivity may lead to suicidality.

Multiple studies have found a link between high levels of impulsivity and suicidal behavior. For example, Gorlyn (2005) and Horesh (2001) reported that individuals with histories of suicide attempts scored higher on both self-report and laboratory measures of impulsivity than individuals without histories of suicide attempts. Similarly, Maser et al. (2002) found that levels of impulsivity differed between people who did not attempt suicide, people who attempted suicide, and people who died by suicide (with higher levels of impulsivity being related to attempts and deaths by suicide).

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Impulsivity is considered a risk factor for suicidality by many empirically informed risk assessment protocols (e.g., Joiner et al., 1999) and national suicide organizations list it as such (e.g., American Society for Suicide Prevention, 2009). Bourgeois (1991) suggested that low levels of serotonin, which are related to both impulsivity and suicidal behavior, may be an underlying biological factor that connects impulsivity to suicidality, but few studies have investigated other potential factors that could underlie this relationship.

Because impulsivity is considered a risk factor for suicidal behavior, some may view death by suicide itself as an impulsive act, carried out “on a whim” or “on the spur of the moment.” However, there is evidence that this is not the case. In a study of suicidal behavior in high school adolescents, participants who had made a suicide attempt without prior planning actually scored lower on measures of impulsiveness than those who had planned and attempted suicide (Witte et al., 2008). This finding suggests that impulsive individuals are more likely to plan for suicide, contrary to the “on a whim” notion. Witte et al. (2008) also found that less than a quarter of those attempting suicide did so impulsively (i.e., without planning ahead). Clearly, impulsive attempts are not the norm within adolescent population. Indeed, the specificity of plans for suicide has been implicated as a strong predictor for death by suicide, and is an integral aspect of assessing risk in clinical settings (Wingate et al., 2004).

The evidence that suicidal acts are rarely impulsive suggests that impulsivity could be related to suicidality through indirect means. Joiner's (2005) interpersonal–psychological theory of suicidal behavior has proposed an explanation for this relationship, captured in a variable referred to as *acquired capability for suicide*. The interpersonal–psychological theory emphasizes that the intentional ending of one's life involves overcoming a powerful motivation for survival and that one cannot subvert this fundamental motivation without “practicing up” to suicide. Within this theoretical framework, one can only acquire the fearlessness necessary to enact lethal self-injury by experiencing a series of painful and provocative events that lead to habituation to the fear and pain of suicide (which is consistent with multiple suicide attempters being at the greatest risk for suicide; Wingate et al., 2004). Joiner (2005) defined painful and provocative events as an occurrence that exposes an individual to pain and/or fear (e.g., physical abuse, tattoos, intravenous drug use, nonsuicidal self-injury). The interpersonal–psychological theory proposes that impulsive individuals are more likely to experience these types of painful and provocative events that habituate them to fear and death, and therefore, are more likely to have acquired the capability for suicide, should they desire it.

The interpersonal–psychological theory proposes that the habituation process occurs via mechanisms outlined by Solomon's (1980) opponent process theory (Joiner, 2005). Solomon (1980) argued that with repeated exposure, the effects of previously noxious or provocative stimuli (e.g., fear of death and the pain of inflicting self-injury) may recede. Meanwhile, with this repetition, the opposite effect of the stimuli (e.g., a sense of relief rather than fear) also becomes strengthened and amplified. Consistent with this notion, Orbach et al. (1997) found that suicidal inpatients had higher

levels of pain tolerance than nonsuicidal inpatients and controls, and Brain et al. (2002) found that individuals who had experienced five or more nonsuicidal self-injury episodes reported feeling more relieved and less afraid following an imagined self-injury episode than individuals who had less than five episodes of nonsuicidal self-injury.

Therefore, according to Joiner (2005), the connection between impulsivity and suicide is not related to suicide being an impulsive act, but rather an indirect risk factor related to acquiring the capability for suicide through exposure to painful and provocative events (see Fig. 1). The current studies directly test Joiner's (2005) theory prediction that individuals who are higher in impulsivity will experience a higher number of painful and provocative life events, and that this will lead to higher levels of acquired capability for suicide. It was predicted that trait impulsivity would have an indirect effect on the acquired capability for suicidal behavior both in terms of self-report (Study 1 and Study 2) and objective pain tolerance (Study 1), and that this relationship would be mediated by painful and provocative life events.

1. Study 1

In Study 1, we examined the relationship between impulsivity, painful provocative events, and acquired capability for suicidal behavior in a sample of undergraduate students. Acquired capability was measured both by self-report and by objective pain tolerance via an algometer task.

1.1. Methods

1.1.1. Participants

One hundred eighty-two undergraduate students participated in the study for class credit. The majority of the sample was female ($n=109$, 60%), and the mean age was 19 years ($SD=1.07$, range 17–34 years). The ethnic breakdown of the sample was 71% White, 14% Black or African American, 9% Hispanic, 1% Asian, and 2% identified themselves as “Other”. Smokers and left-handed participants were excluded from the study because of evidence that these factors affect pain tolerance (Murray and Hagan, 1973; Pomerleau et al., 1984). Participants were also instructed to refrain from ingesting any analgesics (e.g., aspirin), sugared food, or alcohol for 8 h prior to their appointment (Mercer and Holder, 1997). All participants completed self-report questionnaires with paper and pencil before and a pain tolerance assessment.

1.2. Measures

1.2.1. Impulsivity

The Barratt Impulsivity Scale (BIS; Patton et al., 1995) is a 30-item self-report measure used to assess an individual's dispositional impulsive traits. Higher scores indicate higher levels of trait impulsivity. The BIS is a commonly used scale to measure impulsivity and has been used in clinical (Paul et al., 2002) and non-clinical settings (Spinella, 2007). BIS scores correlate with both behavioral measures of impulsivity (e.g., risky sexual behaviors; Martins et al., 2004) and measures shown to be sensitive to neurological dysfunction related to

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