Research report

“Impulsive” youth suicide attempters are not necessarily all that impulsive☆

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Abstract

Background: The relationship between impulsivity and suicide has been conceptualized in the literature as a direct one. In contrast, Joiner’s [Joiner, T.E., 2005. Why people die by suicide. Harvard University Press, Cambridge, MA.] theory posits that this relationship is indirect in that impulsive individuals are more likely to engage in suicidal behavior because impulsivity makes one more likely to be exposed to painful and provocative stimuli.

Method: Adolescents were selected from the Youth Risk Behavior Survey (YRBS) sample between the years of 1993–2003 who had planned for a suicide attempt but did not actually attempt (n=5685), who did not plan but did attempt (“impulsive attempters”; n=1172), and who both planned and attempted (n=4807). Items were selected from the YRBS to assess demographic variables, suicidal behaviors, and impulsive behaviors.

Results: Participants who had planned suicide without attempting were significantly less impulsive than those who had attempted without planning and than those who had both planned and attempted. Crucially, participants who had made a suicide attempt without prior planning were less impulsive than those who had planned and attempted.

Limitations: We were unable to conduct a multi-method assessment (i.e., measures were self-report); the measure of impulsivity consisted of items pulled from the YRBS rather than a previously validated impulsivity measure.

Conclusions: The notion that the most impulsive individuals are more likely to plan for suicide attempts is an important one for many reasons both theoretical and clinical, including that it may refine risk assessment and attendant clinical decision-making.

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The suicide rate for people between ages 15 and 24 has seen a dramatic increase in the past 60 years, with rates doubling for females and quadrupling for males, which indicates the importance of studying suicidal behavior in this developmental group (American Association of Suicidology, 2004). Studies examining common correlates of suicidal behavior consistently identify impulsivity as an important factor in suicide risk, where higher levels of impulsive personality characteristics are related to various indices of suicidal
behavior, including suicidal ideation (Hull-Blanks et al., 2004) and suicide attempts (Dougherty et al., 2004). There is also evidence of higher levels of impulsivity among those who die by suicide compared to those who do not (Maser et al., 2002), although the results on this front are somewhat inconsistent (Conner et al., 2001). Various biological and developmental factors put adolescents at particular risk for engaging in risky and impulsive behaviors, indicating that it may be particularly crucial to study impulsivity and suicide among this age group (Galvan et al., 2007). Indeed, the relationship between impulsivity and suicide has been demonstrated in adolescent samples. For example, researchers (Kingsbury et al., 1999) have examined inpatient adolescents who had engaged in self-poisoning (versus those who did not and community controls) and determined that the overdose group was more impulsive than either of the control groups, even when controlling for depressive symptoms.

Although the relationship between impulsivity and suicidal behavior has been well documented in the literature, the mechanism by which impulsivity confers risk is not clear. Most theories of suicidal behavior have indicated that impulsivity and self-harm are directly related. In other words, “spur of the moment” behavior is responsible for higher rates of suicidal behavior among impulsive people. For example, Baumeister (1990) conceptualized suicide as being an escape from meaningful awareness about negative interpretations one makes about the self, a state he refers to as “cognitive deconstruction.” Baumeister proposed that while individuals are in a state of cognitive deconstruction, their inhibitions are reduced, and they therefore may be unable to resist the impulse to attempt suicide. This approach implies that impulsivity may be a direct and proximal cause of suicidal behavior. Other researchers (Mann et al., 1999) have proposed a stress-diathesis model of suicidal behavior in which the hypothetical diathesis (i.e., tendency to experience more suicidal ideation and tendency to be more impulsive), in the presence of a stressor (i.e., mental illness), leads people to be more likely to act on suicidal feelings. Again, this hypothesis gives impulsivity a more proximal role in that it is thought to lead to a disinhibited state that is more conducive to impulsive suicidal behavior.

In contrast, Joiner’s (2005) interpersonal–psychological theory posits that it is possible for him or her to engage in suicidal behavior. This view, the link between impulsivity and suicidal behavior is indirect and distal, in that impulsive individuals may be more likely to have experiences associated with the process of acquiring the capability to die by suicide (i.e., painful/provocative experiences). This in turn leads to the acquired capability to die by suicide (a capability only – and rarely – utilized when an individual perceives serious and stable burdensomeness and [low] belongingness). Thus, impulsivity alone does not necessarily increase the likelihood that someone will “impulsively” engage in suicidal behavior in the face of a stressor. Rather, an individual’s impulsivity level leads to him or her acquiring the capability for suicide (i.e., through exposure to painful/provocative stimuli) that, once in place, makes it possible for him or her to engage in suicidal behavior should the desire arise.

Although the scope of the current study does not permit a full review, several behaviors traditionally associated with impulsivity can be viewed in terms of exposure to painful and provocative stimuli that might lead to an increased capability to die by suicide. Violent behavior, self-injecting drug use, and prostitution are all related to impulsive personality characteristics (Feshon et al., 2005; Madden et al., 1997; O’Sullivan et al., 1996). These behaviors are also known to be related to suicidal behavior (Darke and Ross, 2002; Kidd and Kral, 2002; Whitlock and Broadhurst, 1969). It is important to note that none of these studies allow an examination of whether impulsivity itself or exposure to painful and provocative stimuli is responsible for the link to suicidal behavior. Nevertheless, converging evidence that non-impulsive individuals who are exposed to painful stimuli demonstrate increased suicide risk (e.g., physicians, see Lindeman et al., 1996) and that individuals who have engaged in suicidal behavior display higher levels of pain tolerance (i.e., they may have habituated to pain through previous exposure; Orbach et al., 1996; Orbach et al., 2006) provides corroborative...
support for the theory’s view of an acquired capability to engage in suicidal behavior accruing via exposure to various painful or provocative stimuli, rather than impulsivity being directly linked to suicidal behavior. We recognize that the aforementioned types of painful and provocative experiences may differ from one another in significant ways, and although we consider this to be an important avenue for future research, it is beyond the scope of the current paper.

Recently Baca-Garcia et al. (2005) found that the impulsivity of the suicide attempt was negatively related to the lethality of the attempt and not related to the trait impulsivity of the attempter, although the authors did not provide a theoretical explanation for their results. Furthermore, anecdotal accounts provide evidence that even impulsive individuals frequently spend a great deal of time carefully planning their suicide attempts (Cross, 2001; Knipfel, 1999). These findings converge with the predictions of Joiner’s theory, which proposes that impulsivity is a distal risk factor for suicide, which operates via the exposure to painful and provocative experiences, and that impulsive people do not necessarily attempt suicide without prior planning. Furthermore, attempts that are made without prior planning tend to be less medically serious (Baca-Garcia et al., 2001; Baca-Garcia et al., 2005), which indicates that planfulness about the suicide attempt itself, which can be considered the opposite of impulsivity, increases the risk of serious harm.

In the current study, we focused on three groups of interest: 1) adolescents who have attempted suicide without prior planning (i.e., “impulsive” suicide attempters); 2) adolescents who have planned suicide but did not attempt; and 3) adolescents who have both planned and attempted suicide. Those who have planned for but have not attempted suicide, and even those who have attempted suicide “impulsively.”

1. Method

1.1. Sample

Data from the national school-based Youth Risk Behavior Survey (YRBS) were used for this study (years 1993–2003). These data are part of the public domain and are available on the internet for use by researchers (National Center for Chronic Disease Prevention and Health Promotion, 2006). The YRBS is one component of an epidemiologic study called the Youth Risk Behavior Surveillance System (YRBSS). It was established by the Centers for Disease Control and Prevention (CDC) to assess and monitor the prevalence of health-related behaviors among high school students (grades 9–12). Within the schools that agreed to participate in the YRBS (the response rate for schools ranged from 70 to 81%), the response rate for the individual students ranged from 83 to 90%. Data from 710 schools were combined, and a total of 87,626 questionnaires were completed between 1993 and 2003. The total number of items included in the YRBS ranged from 87 to 95, depending on the study year.

1.2. General survey procedures

The YRBS employs a three-stage cluster sample design to yield a nationally representative sample of high school students in both public and private schools (grades 9–12). Questionnaires were administered anonymously to protect the privacy of students. Participation was completely voluntary, and parental permission was obtained prior to survey administration. Students completed the self-report questionnaire during a regular class period. Responses were recorded on a scannable answer sheet.

1.3. Data analytic strategy

For the present study, six datasets (from alternating years between 1993 and 2003) were collapsed to form one database. Only those participants with complete data were included in our analyses (85.3% of the sample). In order to ensure that our results were not affected by the exclusion of individuals without complete data we also ran the analyses without four of the items, which had missing data for at least 500 of the participants. These items were During your life, with how many people have you had...
Dependent variables were selected according to the degree to which they reflected impulsive behaviors. Specifically, YRBS items were chosen that correspond with and resemble items on the The Impulsive Behavior Scale (IBS; Rossotto et al., 1998). These methods generated 10 final impulsivity items (i.e., *During the past 30 days, how many times did you drive a car or other vehicle when you had been drinking alcohol; During the past 30 days, how many times did you use marijuana; During the past 30 days, how many times did you use any form of cocaine, including powder, crack, or freebase; During your life, how many times have you used a needle to inject any illegal drug into your body; During your life, with how many people have you had sexual intercourse; The last time you had sexual intercourse, what one method did you or your partner use to prevent pregnancy; How many times have you been pregnant or gotten someone pregnant; During the past 30 days did you take any diet pills, powders, or liquids without a doctor's advice to lose or keep from gaining weight; During the past 30 days did you vomit or take laxatives to lose weight or keep from gaining weight*). Additionally, in a separate follow-up analysis, we utilized an item from the YRBS in order to assess the lethality of the reported attempts (*If you attempted suicide in the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or a nurse?*) and an item to...
assess depressive symptoms (*During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?*).

A multivariate analysis of variance (MANOVA) was conducted to determine whether group differences existed across impulsivity variables. Next, planned contrasts were performed to test the statistical significance of the proposed group differences. Finally, we conducted supplemental analyses to rule out alternative explanations for our results. All of the significance tests reported below were two-tailed.

### 2. Results

#### 2.1. Main analyses

Results were consistent with expectations; the groups significantly differed with regard to the selected impulsivity items (*F* (20, 23,304)=37.88, *p*<0.001). The effect size for this omnibus tests and all other tests were calculated using the procedure outlined by Olejnik and Algina (2000). The *ω*² value was 0.53, which can be considered a large effect. Planned contrasts on the first canonical variate revealed that each group was significantly different from one another. The correlations between the canonical variate and each dependent variable are presented in Table 2. The first variate had an eigenvalue of 0.062 and accounted for 93.9% of the variance among the dependent variables. The second variate had an eigenvalue of 0.004 and accounted for 6.1% of the variance. Inspection of the structure matrix reveals that all but one of the items (*During your life, how many times have you used a needle to inject any illegal drug into your body?*) loaded onto the first function. Interestingly, this is the only item for which the

![Table 2](#Table2)

<table>
<thead>
<tr>
<th>Item</th>
<th>Function</th>
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<tbody>
<tr>
<td>How many times used cocaine in past 30 days</td>
<td>0.65*</td>
<td>−0.05</td>
<td></td>
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<tr>
<td>Did you vomit to lose weight in past 30 days</td>
<td>0.61*</td>
<td>−0.03</td>
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<tr>
<td>How many days have 5+ drinks in past 30 days</td>
<td>0.54*</td>
<td>0.26</td>
<td></td>
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<tr>
<td>How many sex partners</td>
<td>0.54*</td>
<td>−0.09</td>
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<tr>
<td>Ever been/gotten someone pregnant</td>
<td>0.50*</td>
<td>0.07</td>
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<tr>
<td>Did you take a pill to lose weight in past 30 days</td>
<td>0.48*</td>
<td>−0.06</td>
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<tr>
<td>How many times used marijuana in past 30 days</td>
<td>0.48*</td>
<td>−0.12</td>
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<tr>
<td>Used birth control at last sex</td>
<td>0.39*</td>
<td>−0.27</td>
<td></td>
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<tr>
<td>How often drive while drinking in past 30 days</td>
<td>0.34*</td>
<td>0.18</td>
<td></td>
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<tr>
<td>How many times injected drugs</td>
<td>0.3</td>
<td>0.82*</td>
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*Largest absolute correlation between each variable and any discriminant function.

individuals with no plan and an attempt had a lower estimated marginal mean (i.e., the predicted means based on the specified linear model) than the individuals with a plan and no attempt (i.e., this item performed differently than the others). Nevertheless, this group still had a lower marginal mean than the group who had both planned for and attempted suicide.

Planned contrasts revealed that participants who had planned suicide without attempting were significantly less impulsive than those who had attempted without planning (*F* (10, 11,652)=8.37, *p*<0.001; *ω*²=0.01, small effect size) and than those who had both planned and attempted (*F* (10, 11,652)=13.97, *p*<0.001; *ω*²=0.06, medium effect size). Crucially, participants who had made a suicide attempt without prior planning were *less* impulsive than those who had both planned and attempted (*F* (10, 11,652)=71.83, *p*<0.001; *ω*²=0.01, small effect size). Estimated marginal means for each individual item can be found in Table 3. These results remain statistically significant when using a Bonferroni correction (i.e., reducing alpha to 0.0125).

#### 2.2. Supplemental analyses

In order to provide further validation for results, we ran a number of supplemental analyses. Due to the supplemental nature of these analyses, we do not correct for Type I error. First, we ran the analyses separately for each individual survey sample. For the 1999 and 2001 samples, the pattern of results was identical to the larger sample. Each group was significantly different from one another, and those with both a plan and a suicide attempt were the most impulsive, whereas those with a plan but no attempt were the least impulsive. For the 1993, 1997, and 2003 samples, the pattern was similar with the exception that participants with a plan and no suicide attempt were not significantly different from those with no plan and a suicide attempt. It is important to note that those with both a plan and an attempt were significantly more impulsive than both of the other groups in all of these samples. The 1995 sample was unique, in that the only significant contrast was between participants with a plan and an attempt and those with a plan and no attempt. Even in this sample, those with both a plan and an attempt had higher levels of impulsivity than those with an attempt with no plan, though not significantly so. Thus, the analyses on the total sample clearly support our hypothesis, as does the preponderance of analyses on the yearly subsamples.

Inspection of the demographic characteristics of each group (Table 1) reveals that the group that had both planned and attempted suicide and the “impulsive” suicide attempter group were both comprised mostly of
females (70.5% and 64.1% respectively) whereas there was a more even split between the genders in the group that had planned for but not made a suicide attempt (56.9% female). In order to rule out the possibility that our obtained results were due to differential proportions of males and females in the attempter groups, we repeated the MANOVA described above with the modification that we examined whether there was a significant interaction between gender and group (i.e., plan and no attempt; no plan and attempt; plan and attempt). The interaction was significant ($F[20, 23,242]=13.11, p<0.001; \omega^2=0.49$). In order to determine the precise nature of the interaction, we repeated the above analyses separately (including the planned contrasts) for both males and females. A similar pattern of results was obtained for both males and females; the attempter groups were significantly different from one another, with the group who had planned but not attempted having the lowest score on the impulsivity variable and the group that had planned and attempted having the highest score. Again, the group that had both planned and attempted was significantly more impulsive than the group who had attempted without prior planning (i.e., the “impulsive” attempters). Thus, our pattern of results does not appear to be accounted for by differences in the gender composition of the attempter groups.

We also wanted to determine whether ethnicity moderated our results given that a larger proportion of the group that had planned for but not attempted suicide was Caucasian (49.4%) than the group who had

<table>
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<th>Table 3</th>
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<td>Estimated marginal means for each group</td>
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<td>Dependent variable</td>
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<td>How often drive while drinking in past 30 days</td>
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<td>How many times used marijuana in past 30 days</td>
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attempted without planning (30.2% Caucasian) and the group that had planned for and attempted suicide (36.2%). The interaction was significant (F [140, 94,855]=1.72, p<0.001; ω²=0.88). Similar to our inspection of the gender interaction, we repeated the MANOVA within each of the three large ethnic groups in the sample. The pattern of results for African Americans/Blacks, Hispanics/Latinos, and Caucasians was identical to the results of the combined sample.

Unfortunately, we were unable to obtain psychiatric diagnoses for the participants. Nevertheless, for the participants whose data were collected between 1999 and 2003, there is an item that serves as a proxy variable for depressive symptoms (During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?). We re-ran the MANOVA to determine whether this variable interacted with the attempter group variable. The interaction was significant (F [20, 10,180] =2.13, p<0.01; ω²=0.50). Similar to the above analyses, we re-ran the MANOVA and planned contrasts separately for those who reported depressive symptoms in the past 12 months and for those who did not report such symptoms. The pattern of results for depressed and non-depressed participants was similar to our over-arching pattern. Those who had planned for and made a suicide attempt were significantly more impulsive than either of the other two attempter groups. The group who had attempted without prior planning was significantly more impulsive than the group who had planned for but had not made a suicide attempt.

The groups also differed in terms of the lethality of their suicide attempt; 32% of those who both planned and attempted suicide required medical attention compared to 24% of those who attempted without planning. This difference was statistically significant (χ² [1, n=7080]=40.73, p<0.001). In order to counter the potential criticism that our analyses were performed on just two groups (i.e., those who had attempted with and without prior planning). Our results were statistically significant (F [10, 1669]=3.71, p<0.001; ω²=0.01), with the group who had both planned and attempted suicide exhibiting a significantly higher impulsivity score than the group who had attempted suicide without prior planning.

Finally, we ran these analyses on a larger sample that also included individuals who had never attempted suicide and had not experienced suicidal ideation or depressive symptoms in the past 12 months (n=6991). The pattern of results was identical to our main analysis, and the individuals who had not experienced any form of suicidal behavior or depression exhibited significantly lower levels of impulsivity overall than each of the other three groups.

In sum, our results demonstrated that the group of participants who had planned for and attempted suicide had engaged in significantly more impulsive behaviors in other arenas than those who had not planned for their attempt and than those who had planned for, but not attempted suicide. Although gender, ethnicity, and presence of depressive symptoms had significant interactions with attempter group to predict impulsive behaviors, the pattern of results was similar within gender, ethnicity, and presence of depressive symptoms. Additionally, the pattern of results was similar for those participants whose suicide attempt had necessitated medical treatment. Furthermore, as would be expected, individuals who had not made any suicide attempts or had not experienced suicidal ideation or depression in the past 12 months were significantly less impulsive than the other three groups.

3. Discussion

The purpose of the current study was to pit two competing views against one another. If impulsivity’s involvement in suicide attempts relates to “spur of the moment” behavior, our group who attempted but did not plan a suicide attempt should be at least as impulsive as the group that planned and attempted. If, on the other hand, the mechanism through which impulsive people are at high suicide risk is through their exposure to repeated painful and provocative experiences, the group that showed the most serious suicidal behavior (i.e., planned and attempted) also should show the most impulsivity. Results seemed more supportive of this latter view; individuals who had planned and enacted their suicide attempt were significantly more likely to have engaged in other impulsive and risky behaviors than both those who had attempted suicide without prior planning and those who had planned for but did not make a suicide attempt. These findings are notable in that they do not seem very consistent with the view that impulsivity has a direct relationship with suicidal behavior.

Only 10% of our total sample – and less than a quarter of all attempters in the sample – had attempted “impulsively,” indicating that impulsive suicide attempts are not the norm, at least not among adolescents. Other researchers have estimated the rate of impulsive suicide
against our hypothesis, which nevertheless was sup-
scores than those who had attempted suicide
with prior planning had significantly higher impulsivity
that had required medical care provided further support
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size ensures that there were individuals in our sample who
this is the case. Nevertheless, we feel that our large sample
impulsivity. It is this exposure to pain itself, not the
experiences than are less impulsive individuals. This
exposure engages opponent processes (Solomon, 1980;
Corbit, 1974) by which the fear-inducing aspects of the behavior are diminished through repetition
as the more rewarding aspects (e.g., soothing, analgesia)
are strengthened. The individuals in our sample who are
further along the trajectory toward death by suicide (i.e.,
those who planned and attempted) have been exposed to
more painful/provocative experiences (e.g., drug use,
promiscuity), probably due in part to higher levels of
impulsivity. It is this exposure to pain itself, not the
individual’s level of impulsivity per se, that puts him or her
at higher risk for death by suicide, according to this model.

There are several limitations that should be considered
in interpreting our findings. First, all data of the current
study were self-report, including the items utilized to
classify study participants into groups. It has been
suggested (Alvarez, 1971) that some individuals might
experience regret or shame following a suicide attempt
and, for that reason, falsely claim that they had not
planned for the attempt beforehand. The nature of the data
used in the current study does not allow us to determine if
this is the case. Nevertheless, we feel that our large sample
size ensures that there were individuals in our sample who
attempted suicide, and who truly did so without prior
planning. Moreover, the misclassification of true plan-
and-attempters as no-plan-attempters should work
against our hypothesis, which nevertheless was sup-
ported. Another limitation of the current study’s reliance
on self-report is that we were unable to confirm the
severity of the participants’ suicide attempts. Neverthe-
less, our analysis only among those who reported attempts
that had required medical care provided further support
for our hypotheses (i.e., those who had attempted suicide
with prior planning had significantly higher impulsivity
scores than those who had attempted suicide “impulsively”). Although it is possible that participants may not have
been entirely accurate when reporting the severity of their
suicide attempts, we have no reason to believe that those
who had attempted suicide without prior planning would
be more or less likely to falsely report a severe suicide
attempt than those who had attempted with prior planning.

A further limitation of the current study is that our
measure of impulsivity was derived from the YRBS, and
as such, was not designed for these purposes. That being
said, the structure of the canonical variate indicates that the
items were fairly unidimensional measures of impulsivity
(i.e., nine of the items accounted for more than 93% of the
variance), with the exception of the item pertaining to
injecting drug use. Furthermore, the content of the items
coincides with widely accepted facets of impulsive
behavior (e.g., risky sexual behavior, drug use, etc.).
Thus, although the measure was not ideal, it is workable
for the purposes of the present study. We expect that these
results would hold with other measures of impulsivity as
well, and we look forward to future studies that might use a
behavioral measure of impulsivity either instead of or in
addition to a self-report measure. An additional limitation
is that the current study examines suicide attempters rather
than those who have died by suicide. Although it would
clearly be ideal to clarify the relationship between suicidal
behavior and impulsivity in individuals who die by suicide
rather than attempters, we feel that the advantage of using
such a large sample outweighs the disadvantages of
studying suicide attempters rather than suicide decedents.
Furthermore, assessing the planfulness of a fatal suicide
attempt would be much more difficult, as it would not be
possible to utilize self-report. In addition, 24% of those in
our sample who attempted without prior planning and 32%
of those who planned and attempted required medical
attention for injuries resulting from their suicide attempts,
indicating that a substantial minority of our participants
engaged in serious suicidal behavior. This provides
additional support for our proposition that those who
planned and attempted are further along the continuum of
severity for suicidal behavior given that a significantly
larger portion of these individuals required medical
treatment for their attempt.

Another limitation of the current study is that we are
unable to characterize the groups in a very detailed
manner. That is, we do not have data on other variables
that might explain our pattern of results (e.g., Axis I
diagnosis). That being said, we were able to demonstrate
that our pattern of results persisted within the group of
participants who had reported depressive symptoms as
well as within the group who had denied depressive
symptoms in the past 12 months. Additionally, it is
possible that participants may have endorsed planning a
suicide attempt at one point in time, whereas the attempt in
which they engaged was conducted “impulsively.” In
order to rule out this possibility, it would be necessary to conduct interviews with the adolescents in the sample to determine if this was the case. Unfortunately, this was not a possibility for us given that the data are available anonymously, and we do not have access to the participants themselves. Still, the proportion of impulsive attempts in our sample maps on to the proportion found by an independent group of researchers (Lewinsohn et al., 1996), which provides some support for our group designations. A final limitation worth noting is the fact that one of the individual years of survey data produced unique results. However, one pattern of results was consistent across all analyses—those who had attempted suicide “impulsively” were never the most impulsive in terms of other behaviors.

In addition to the limitations delineated above, there are several strengths of the current study that should be noted as well. Aside from being one of the first studies to explore this particular issue, the parsimonious nature of the analysis and the large and diverse sample (57% non-Caucasian) provide corroborative, albeit not definitive, support for Joiner’s theory. Furthermore, unlike other studies that examine lifetime suicide attempts, the current study only evaluated rather recent suicidal and impulsive behaviors, as the questionnaire targeted behaviors that occurred over the past twelve months. Finally, the current study provides important information about adolescent suicidal behavior—crucial, given that suicide is the third leading cause of death for people ages 15–24 (Anderson, 2002) and that suicide rates among our nation’s youth generally have increased over the past few decades (United States Public Health Service, 1999).

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Conflict of interest
The authors of this manuscript have no conflict of interest in the publication of this manuscript.

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