Suicide Intent and Accurate Expectations of Lethality: Predictors of Medical Lethality of Suicide Attempts

Gregory K. Brown, Gregg R. Henriques, Daniella Sosdjan, and Aaron T. Beck
University of Pennsylvania

The degree of intent to commit suicide and the severity of self-injury were examined in individuals (N = 180) who had recently attempted suicide. Although a minimal association was found between the degree of suicide intent and the degree of lethality of the attempt, the accuracy of expectations about the likelihood of dying was found to moderate the relationship between suicide intent and lethality. Specifically, higher levels of suicide intent were associated with more lethal attempts but only for those individuals who had more accurate expectations about the likelihood of dying from their attempts.

Understanding the complexities of suicidal behavior is of crucial public health significance. Epidemiological research has found evidence that the prevalence of suicide attempts is increasing in the United States (Kessler, Borges, & Walters, 1999). In addition to being a major public health issue in its own right, attempted suicide constitutes one of the most powerful and clinically relevant risk factors for completed suicide (for a review, see Harris & Barraclough, 1997).

Efforts to identify and study individuals who have attempted suicide have been hampered by obfuscation in the definition and measurement of this behavior. In 1958, Stengel and Cook attempted to introduce greater conceptual clarity in the study of suicide behavior by distinguishing suicide intent from the physical consequences of the self-injury behavior. Subsequently, a National Institute of Mental Health Task Force developed a classification scheme for suicidal behavior (A. T. Beck et al., 1973). According to this classification system, suicide phenomena were categorized into three broad domains of completed suicides, suicide attempts, and suicide ideation.

In an attempt to build on this nomenclature and further improve communication and definitional consistency in the field, O’Carroll et al. (1996) provided specific definitions for commonly used terms in suicide research. In O’Carroll et al.’s article, a suicide attempt was defined as “a potentially self-injurious behavior with a nonfatal outcome, for which there is evidence (either explicit or implicit) that the person intended at some (nonzero) level to kill himself/herself” (p. 247). This definition, as well as the classification provided by A. T. Beck et al. (1973), clearly indicates that there are two separate dimensions that need to be assessed for identifying suicide attempts: (a) the nature and severity of the self-injury and (b) the degree of intent to commit suicide at the time of the act.

To measure these dimensions, A. T. Beck, Schuyler, and Herman (1974) developed and validated clinical scales for measuring suicide intent and the degree of medical lethality (i.e., the degree of danger to life resulting from a self-injury behavior; A. T. Beck, Beck, & Kovacs, 1975), and these measures have been used to assess the relationship between suicide intent and lethality. Although researchers have assumed that higher levels of suicide intent would result in more lethal attempts, research has not supported this common clinical view. In fact, several studies have reported low correlations between suicidal intent and medical lethality for those who attempted suicide (A. T. Beck et al., 1975; Goldney, 1981; Power, Cooke, & Brooks, 1985; Rosen, 1970).

Several variables, however, may moderate the relationship between suicide intent and the degree of medical lethality, with the most obvious being the attempters’ expectations about the likely outcome of their self-injury behaviors. In a previous study, A. T. Beck et al. (1975) found that higher levels of suicide intent were associated with more lethal attempts (r = .73) but only for those individuals who had more accurate expectations about the likelihood of dying from their attempts. This finding suggests that it may be possible to predict the degree of lethality of attempts when both the level of suicide intent and the specific expectations concerning the likelihood of dying from an attempt are examined. Because the finding by A. T. Beck et al. (1975) has not been replicated, we considered it timely to repeat the study in a different sample using multivariate techniques.

Method

Participants

A total of 180 adults participated in the study. The mean age of the sample was 34.40 years (SD = 9.90, range = 18–66 years). Of the participants, 58% were women and 42% were men. Ethnic membership was primarily African American (62%) and Caucasian (29%), and the remaining 9% was Latino, Asian American, Native American, or unspecified. Participants tended to be from an impoverished area of a large city, and 80% reported an annual income of less than $20,000.
Procedure

Data were collected as part of a randomized controlled trial that evaluated the effectiveness of cognitive therapy intervention for reducing subsequent suicide attempts. All individuals admitted to the Emergency Department at the Hospital of the University of Pennsylvania after having made a suicide attempt were approached for participation in the study. Of 292 eligible participants, 62% (n = 180) agreed to consent and 38% (n = 112) declined to participate in the study. A suicide attempt was defined as a self-injurious behavior for which there is evidence that the person intended to kill himself/herself. The exclusion criteria were as follows: (a) younger than 16 years of age, (b) inability to understand study procedures or to provide informed consent, and (c) significant medical impairment that would limit participation (such as organic brain damage). After identification in the Emergency Department, a trained bachelor's degree-level research assistant met with patients to determine eligibility. Eligible study participants were provided with a complete description of the study, and written informed consent was obtained from those who agreed to participate. As soon as medically and/or logistically possible following the index suicide attempt, a trained diagnostician conducted an extensive intake assessment, for which the participant was paid $50. A total of 180 participants received a baseline evaluation between December 1999 and September 2002 (approximately 1.25 patients per week). Measures included in the intake battery are described below.

Measures

The Suicide Intent Scale (SIS; A. T. Beck et al., 1974) is an interview-administered measure of the seriousness of the intent to commit suicide prior to the actual suicide attempt. The SIS consists of 15 items that quantify an attempter’s verbal and nonverbal behavior prior to a recent suicide attempt. Each item is rated on an ordinal scale from 0 to 2 with the total score ranging from 0 to 30. The first part of the SIS (Items 1–8) covers objective circumstances that surround the suicide attempt and includes items on the preparation and manner of execution of the attempt and the setting, as well as prior cues given by the patient that could facilitate or hamper the discovery of the attempt. This part of the scale can be completed, retrospectively, for patients who have committed suicides (e.g., through review of medical records). The second part of the SIS (Items 9–15) includes the attempter’s expectations of the method’s lethality, expectations about the possibility of rescue and intervention, the extent of premeditation, and the alleged purpose of the attempt. The SIS has high internal reliability (α = .95; A. T. Beck et al., 1974) and high interrater reliability, ranging from .81 (Miezczkowski et al., 1993) to .95 (A. T. Beck et al., 1974). The two subscales, Lethality of Intent and Planning, have also been found to possess adequate interrater reliability (.79 and .74, respectively; Miezczkowski et al., 1993). Total SIS scores differentiate repeat attempters from those who do not subsequently attempt suicide (R. W. Beck, Morris, & Beck, 1974; Ojehagen, Regnell, & Traskman-Bendz, 1991).

Medical lethality was measured with the Lethality Scale (LS; A. T. Beck et al., 1975). The LS is an interviewer-administered rating scale that measures the medical lethality of a suicide attempt on a scale from 0 (fully conscious and alert) to 10 (death). One of eight separate subscales may be rated according to method of the attempt. Lethality ratings are based on an examination of the patient’s physical condition on admission to hospital, review of the patient’s medical record, and consultation with the attending physician. Previous research has established an adequate level of interrater reliability (r = .80; Lester & Beck, 1975) and adequate concurrent validity with the Risk-Rescue Rating measure (Weisman & Worden, 1972).

Other clinician-administered measures included the 24-item Hamilton Rating Scale for Depression (Hamilton, 1960) and the Scale of Suicidal Ideation (A. T. Beck, Kovacs, & Weissman, 1979). Self-report measures included the Beck Depression Inventory-II (A. T. Beck, Steer, & Brown, 1996) and the Beck Hopelessness Scale (A. T. Beck & Steer, 1993). In addition, participants were diagnosed by trained diagnosticians with the Structured Clinical Interview for DSM-IV (First, Spitzer, Gibbon, & Williams, 1995), a diagnostic instrument based on Diagnostic and Statistical Manual of Mental Disorders (4th ed.; DSM-IV; American Psychiatric Association, 1994) criteria for Axis I disorders.

Analysis Plan

Given the minimal association between suicide intent and observed lethality in previous research, an index of the accuracy of the expectation of lethality was constructed on the basis of previous research (A. T. Beck et al., 1975). This index assesses the difference between the participant’s expectations about the outcome of the lethality of the attempt and the observed medical lethality. This expectation–outcome relationship allowed us to classify the participants according to the accuracy or inaccuracy of their expectations. As described by A. T. Beck et al. (1975), the sample was divided into three groups according to the patient’s expectation of the lethality of the attempt with Item 11 of the SIS: (a) “Did less to self than he or she thought would be lethal,” (b) “Wasn’t sure if what he or she did would be lethal,” and (c) “Equaled or exceeded what he or she thought would be lethal.”

In addition, the sample was divided into three groups according to scores on the LS: (a) individuals with low medical lethality (LS score < 2), (b) individuals with moderate lethality (LS score = 2–3), and (c) individuals with high lethality (LS score = 4–10). In defining the three categories for the LS, we used cutoff scores that were developed in the A. T. Beck et al. (1975) study. Patients were classified as having low, medium, or high lethality that approximated the frequency distribution of patient responses on Item 11 of the SIS. In addition, the classification of specific ranges of scores on the LS reflected similar levels of damage and need for medical care. Specifically, an LS score of 0 or 1 generally indicated no or very minimal physical damage. An LS score of 2 or 3 indicated some physical damage that required only a minimal level of medical care (e.g., first-degree burns). An LS score of 4 or greater indicated that there was a physical injury requiring immediate medical treatment (e.g., bullet lodged in extremity, second-degree burns, bleeding of a major vessel).

Expectations were defined as accurate when they matched the classification of the observed medical lethality of the attempt as follows: (a) if they had expected to die from the attempt (as indicated by endorsing the third statement on Item 11 of the SIS) and actually made a highly lethal attempt (as indicated by an LS score greater than 4), (b) if they were uncertain about the lethality of the attempt (as indicated by endorsing the second statement on Item 11 of the SIS) and they made an attempt of moderately lethality (as indicated by an LS score of 2 or 3), or (c) if they had not expected the attempt to be lethal (as indicated by endorsing the first statement on Item 11 of the SIS) and made an attempt with low lethality (as indicated by an LS score of 0 or 1). Patients were classified as having inaccurate expectations when the score on Item 11 of the SIS did not match the lethality classification derived from the LS. For example, patients who expected that the attempt would not be lethal but who actually made a highly lethal attempt were classified as having inaccurate expectations.

Hierarchical regression analysis was performed with this accurate versus inaccurate classification variable to replicate the findings described in the A. T. Beck et al. (1975) study. Using this model, we examined the main effects of clinical variables on LS scores and evaluated the moderating effect of accurate expectations and severity of suicide intent.

Results

Description of Methods of Attempts

The majority of the sample (52%) attempted suicide by overdose with a coma-producing substance. Other methods included overdosing with a noncoma-producing substance (20%); cutting...
(17%); jumping or similar behavior (7%); or other methods such as hanging, shooting, or drowning (4%). The mean score on the LS for the entire sample was 3.41 (SD = 2.10). A one-way analysis of variance was conducted on the mean LS scores among the four most common methods of self-injury (overdosing with coma-producing substances, overdosing with noncoma-producing substances, cutting, and jumping). The results reveal significant differences on LS scores by method of attempt, F(3, 163) = 5.33, p = .002. Scheffé post hoc comparisons indicate that individuals who ingested coma-producing (M = 3.69, SD = 2.20) or noncoma-producing substances (M = 3.56, SD = 1.60) had significantly higher lethality ratings than individuals who had cut themselves (M = 2.89, SD = 1.70).

Expected and Observed Lethality

For the entire sample, patients’ expectation of the lethality of their self-injury behaviors (as measured by SIS Item 11) was found to be unassociated with the observed medical lethality (r = .05). A cross-tabulation of the frequency distributions for the participants’ expected lethality and the observed medical ratings by expectation category is presented in Table 1. As noted in this table, individuals with accurate expectations were those whose level of expectations matched the classification of the observed medical lethality of the attempt (n = 82). Conversely, individuals with inaccurate expectations were those whose level of expectations did not match the classification of the observed medical lethality (n = 91).

We found no significant differences in the proportion of individuals with accurate or inaccurate expectations by gender, χ²(1, N = 172) = 1.61, p = .21; race, χ²(5, N = 173) = 5.40, p = .37; age, χ²(17) = 0.08, p = .93; marital status, χ²(4, N = 165) = 5.30, p = .26; or employment status, χ²(3, N = 167) = 0.96, p = .81. There were also no differences between the accurate and inaccurate groups with respect to scores on other measures of psychopathology such as the Beck Depression Inventory-II, t(170) = 0.93, p = .35; Beck Hopelessness Scale, t(169) = 0.24, p = .82; Hamilton Rating Scale for Depression, t(170) = 0.45, p = .86; SSI, t(162) = 1.11, p = .27; or Scale for Suicide Ideation, t(171) = 0.18, p = .86. In addition, there were no differences in the proportion of individuals with accurate and inaccurate expectations for any major Axis I diagnostic classification such as major depression, χ²(1, N = 173) = 2.68, p = .11, or substance use disorders, χ²(1, N = 173) = 2.64, p = .14.

<table>
<thead>
<tr>
<th>Expected lethality</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>6 (19)ᵃ</td>
<td>1 (2)ᵇ</td>
<td>12 (12)ᵃ</td>
<td>19 (11)</td>
</tr>
<tr>
<td>Uncertain</td>
<td>10 (32)ᵇ</td>
<td>16 (36)ᵃ</td>
<td>25 (26)ᵇ</td>
<td>51 (30)</td>
</tr>
<tr>
<td>High</td>
<td>16 (50)ᵇ</td>
<td>27 (61)ᵇ</td>
<td>60 (62)ᵃ</td>
<td>103 (60)</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>44</td>
<td>97</td>
<td>173</td>
</tr>
</tbody>
</table>

Note. Values in parentheses indicate percentage of total for medical lethality group.

ᵃ Accurate expectations (n = 82, 47%). ᵇ Inaccurate expectations (n = 91, 53%).

Table 1
Frequency Distributions of Expected and Observed Lethality

Prediction of Lethality Scores

A hierarchical regression analysis procedure (Cohen & Cohen, 1983) was used to determine whether the accuracy of the expectations variable was associated with lethality while controlling for other clinical characteristics. Independent variables were entered in the regression analysis in a series of steps: (a) clinical variables (suicide intent, expectation of lethality, hopelessness, depression, suicide ideation, and previous multiple attempts), (b) the accurate expectations of lethality variable, and (c) the interaction of accurate expectations and severity of suicide intent. The interaction term was created by multiplying the z score of the accurate expectation variable (accurate vs. inaccurate) by the z score of the SIS total score. The correlation coefficients among the independent variables ranged from a minimal (e.g., r = −0.01) for the accurate expectation variable and the SSI to a moderate degree of association (e.g., r = .47 for the Beck Hopelessness Scale and the SSI). The interaction term was minimally associated with the accurate expectation variable (r = .06) and the SIS (r = −.06).

As indicated in Table 2, the combination of suicide intent, expectation of lethality, hopelessness, depression, suicide ideation, and previous multiple attempts accounted for less than 1% of the variance in lethality. As anticipated, the SIS accounted for a minimal amount of variance of the LS (r² = .01). Accurate expectations accounted for an additional 12% of the variance in lethality, and the interaction term accounted for an additional 13% of the variance in lethality while we controlled for the main effects of these variables. This significant interaction, presented in Figure 1, is graphed similarly to an analysis of variance model. In this figure, mean lethality values were plotted for patients with accurate or inaccurate expectations by high or low levels of suicide intent with a median SIS cutoff score of 20. The figure illustrates that patients made more lethal suicide attempts when they had accurate expectations of the lethality of the attempt and when they also had a high level of intent to commit suicide. Similar to the A. T. Beck et al. (1975) study, a positive and moderate correlation (r = .45, p < .001) between suicide intent and observed lethality was found for those patients with accurate expectations (n = 82). Conversely, a negative and moderate correlation (r = −.34, p < .001) between suicide intent and lethality was revealed for those with inaccurate expectations (n = 91).

Discussion

In the present study, we found a minimal association between the degree of suicide intent and the extent of medical lethality for patients who attempted suicide. However, for patients who had accurate expectations about the likelihood of dying from their attempts, the resulting degree of danger to their lives was proportional to the degree of suicide intent. The results of the present study support the findings from a previous study with a similar sample of suicide attempters (A. T. Beck et al., 1975). In the present study, we also found a significant interaction between the accuracy of expectations and the degree of suicide intent on the severity of the self-injury. Specifically, patients were more likely to make a lethal suicide attempt when they had both an accurate expectation of the lethality of the attempt and a higher level of intent to commit suicide. These findings were obtained even when other risk factors for suicide (multiple suicide attempts, depres-
sion, hopelessness, and suicide ideation) were controlled. Further research is needed to replicate these findings when controlling for other known risk factors such as drug abuse, psychosis, and so forth.

As indicated by A. T. Beck et al.’s (1973) and O’Carroll et al.’s (1996) definitions of a suicide attempt, both suicide intent and the lethality of the self-injury behavior need to be assessed to identify suicide attempts. The present study supports this definition and suggests that suicide intent and lethality are independent dimensions of suicide attempt behavior and both of these characteristics require careful assessment for accurately identifying suicide attempters. The present study suggests that the assessment of medical lethality is not necessarily indicative of the seriousness of a patient’s intent to commit suicide, given that 52% of patients in this study had inaccurate expectations of the lethality of their attempts. Furthermore, it is important to recognize that a patient’s intent to commit suicide may not be associated with medical lethality, given that the actual physical outcome of an act of self-injury may be influenced by the means or methods that are available at the time of the attempt (Hawton, 2001).

The finding regarding the moderating effect of the accuracy of expectations on lethality has implications for those studies that have examined the predictive validity of the SIS for completed suicides. These studies include two prospective studies that evaluated the predictive validity of the SIS for completed suicide for patients who attempted suicide during a 10-year period. In both studies, the SIS did not predict completed suicide (A. T. Beck & Steer, 1989; Tejedor, Díaz, Castillon, & Pericay, 1999). The current findings raise the possibility that the SIS may have predictive validity for completed suicide or nearly lethal attempts but only for those attempters with accurate expectations of fatal outcomes. Further research is needed to test the predictive validity of the SIS for this population.

There are several limitations of the present study. The findings are limited to those individuals who provided informed consent for a randomized controlled trial. Different results may have been obtained if potential participants were recruited for an evaluation study without the possibility of receiving treatment. However, the replication of the results of an earlier study, based on an unselected sample (A. T. Beck et al., 1975), supports the validity of the present findings. Findings are also limited to populations with similar demographic characteristics of the study sample (e.g., urban, low income, minority status, and adult) and may not apply to other demographic groups. Specifically, these findings are limited to those individuals who tend to make lethal suicide attempts and who seek a medical evaluation in a hospital setting. In addition, patients in this study were assessed during an acute psychiatric crisis, raising the issue of subjective distortion in patients’ recall of suicide behaviors. However, the use of semistructured interviews that specifically assess suicidal behaviors has been demonstrated to be more comprehensive and accurate than routine clinical assessment or documentation of suicidal behavior in medical records (Malone, Haas, Sweeney, & Mann, 1995). Nonetheless, caution is advised regarding the interpretation of results derived from self-report data for patients in crisis. Notwithstanding these limitations, the present study provides some explanation for why suicide intent has been found to be unassociated with the degree of medical lethality of suicide attempts. Specifically, the accuracy of expectations about the likelihood of dying was found to moderate the relationship between suicide intent and medical lethality. Patients were more likely to make more lethal suicide attempts when they had both an accurate expectation of the lethality of the attempt and a higher level of intent to commit suicide.

Table 2
Hierarchical Multiple Regression of Attempt Lethality

<table>
<thead>
<tr>
<th>Predictor</th>
<th>β</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suicide Intent Scale</td>
<td>.01</td>
<td>.15</td>
<td>.88</td>
</tr>
<tr>
<td>Expectation of Lethality (SIS Item 11)</td>
<td>.01</td>
<td>.13</td>
<td>.90</td>
</tr>
<tr>
<td>Previous multiple attempts</td>
<td>−.01</td>
<td>−.11</td>
<td>.91</td>
</tr>
<tr>
<td>Beck Hopelessness Scale</td>
<td>.05</td>
<td>.59</td>
<td>.55</td>
</tr>
<tr>
<td>Hamilton Rating Scale for Depression</td>
<td>−.02</td>
<td>−.17</td>
<td>.86</td>
</tr>
<tr>
<td>Scale for Suicide Ideation</td>
<td>−.01</td>
<td>−.09</td>
<td>.93</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Accurate expectations</td>
<td>.33</td>
<td>4.48</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Step 3</td>
<td></td>
<td></td>
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<tr>
<td>Accurate Expectations X Suicide Intent Scale</td>
<td>.37</td>
<td>5.17</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Note. $R^2 < .01, F(6, 153) = 0.19, p = .98$ for Step 1. $F_{change}(1, 152) = 20.06, p < .001$ for Step 2. $F_{change}(1, 151) = 26.71, p < .001$ for Step 3. SIS = Suicide Intent Scale.

References


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