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# VALIDATING A SHORT VERSION OF THE SUICIDE INTENT SCALE IN CHINA

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## Abstract

As Beck's Suicide Intent Scale (SIS) gains popularity in various areas in the world, we are not sure whether the scale is an optimal measure of suicide intent in the Chinese culture. This study is to provide evidence to support the use of the Chinese shortened version of SIS (C-SIS) in Chinese societies. The data were from applying the C-SIS in a psychological autopsy (PA) study of 66 suicides in Dalian, China. Reliability and validity tests were performed on the C-SIS data. Internal consistency analysis showed excellent correlation coefficients for all items but one. Inter-rater reliability tests showed statistically significant correlations between each pair of informants for each item and for the total scores. Criterion validity analysis demonstrated a relatively high correlation between the scores on the Hamilton Depression Rating Scale (HAM-D) and C-SIS. Factor analysis produced three factors accounting for 66.77% of the total variance. The study suggested that C-SIS should be an appropriate instrument for detecting and measuring suicide intent in Chinese societies.

In China, the suicide rate is officially reported as 22.2 per 100,000 population (Yin, 2002). Suicide is the fifth largest cause of death in China, claiming nearly 300,000 lives each year in the country (Brown, 1997; Murray & Lopez, 1996; Phillips, Li, & Zhang, 2002; World Health Organization, 1988–1995; Zhang, 2000). Since China opened its door to the western world about 20 years ago, research on suicide has also been on the rise, and the methodology has become more and more sophisticated (Zhang, Jia, Wieczorek, et al., 2002).

In suicide literature, suicide intention has been demonstrated to be correlated with subsequent completed suicide acts (Beck & Steer, 1989; Beck, Steer, & Texler, 1989; Brent et al., 1988). As Beck's Suicide Intent Scale (SIS) (Beck, Schuyler, & Herman, 1974) gains popularity in various cultures in the world, it has started to be used by researchers in their suicide studies in China (He, 1997; Li et al., 2003; Wang et al., 2002; Zhang, Wieczorek, Jiang, et al., 2002). However, we are not sure whether the scale is an optimal measure of suicide intent in the Chinese culture, which is different from the Western society where the scale was originated, or whether the translated items in the instrument are reliable or valid for the targeted populations.

The original Suicide Intent Scale (SIS) consists of 20 items. Each of the first 15 items has three alternative statements graded in intensity from 0 to 2. The scale has three parts. The first part (items 1–9) is about the circumstances related to suicidal attempt, and deals mainly with factual aspects of the attempt and the events surrounding the individual. The second part (items 10–15) is a self report, used to record retrospectively the individual's thoughts and feelings at the time of the attempt. The third part (items 16–20) is not scored because the weighting of the alternatives is uncertain at each test (Beck, Schuyler, & Herman, 1974).

In Beck's original testing of the SIS, 45 consecutive patients were interviewed in a psychiatric hospital. The inter-rater reliability tests yielded a very high correlation coefficient ($r = 0.95$, $p < 0.001$) (Beck, Schuyler, & Herman, 1974). The correlation coefficients of the test items with the total score ranged from 0.18–0.77 for the first 15 items, while that for the first eight items ranged from 0.24–0.47. In another study of 73 patients, the correlation between the depression inventory and intent was 0.26, between intent and pessimism 0.47, and between pessimism and depression 0.69 (Beck, Schuyler, & Herman, 1974).

There have been at least six reports on factor analyses of the 15 items of the SIS (Beck & Lester, 1976; Diaz et al., 2003; Kingsbury, 1993; Mieczkowski et al., 1993; Spirito, Sterling, Donaldson, & Arrigan, 1996; Wetzel, 1977). Four of the six studies used large samples of over 100 cases each (Beck & Lester, 1976; Diaz et al., 2003; Spirito et al., 1996; Wetzel, 1977), three of them on suicide attempters (Beck & Lester, 1976; Diaz et al., 2003; Wetzel, 1977), and one on depressive patients selected in two university hospitals (Mieczkowski et al., 1993). Two were studies of adolescents (Kingsbury, 1993; Spirito et al., 1996), one included adolescents with overdoses (Kingsbury, 1993), and another on general and psychiatric adolescents (Spirito et al., 1996). These studies with different samples have yielded 2–4 factors from the 15 SIS items. They are: 1) precautions against intervention; 2) communication with others; 3) planning; and 4) attitude toward attempt. Although the names of factors vary in different studies and the items included in a factor were sometimes different, these factors were reasonably good predictors of suicide attempt severity. The series of construct validity tests was performed by Beck and colleagues at the initial development of the SIS instrument (Beck, Schuyler, & Herman, 1974). They used circumstantial data of the scale and tried to predict that the scores of fatal suicide attempts are higher than nonfatal attempts.

The above review indicates that the Beck's SIS is a good instrument for the assessment of the degree of suicide intent among suicidal individuals. Although some researchers have used the SIS to measure suicide intent with Chinese samples (Li et al., 2003; Wang et al., 2002), there have been no reports on the validation of the Chinese version of SIS with Chinese samples. This study aimed at validating the Chinese version of the SIS and providing researchers of Chinese suicides with a shortened Chinese version of the SIS.

## METHODS

### Subjects

Data for this study are from psychological autopsy interviews in two rural counties around Dalian, Liaoning Province, China. Completed suicide cases were consecutively selected in Jinzhou and two townships in Zhuanghe. Sixty-six completed suicides that occurred within one year prior to the interview were sampled (Zhang, Wieczorek, Jiang, et al., 2002; Zhang, Conwell, Zhou, & Jiang, 2004). Two informants were interviewed for each suicide case, with the first one as a family member and the second as a friend. For details of the subjects' selection, data collection, and interview procedures, please refer to the earlier publications such as Zhang, Wieczorek, Jiang, et al. (2002) and Zhang et al. (2004).

### Instruments

The interview questionnaire included demographic data, such as age, gender, residence location, marital status, education level, family size, and average yearly income. Two major instruments included in the questionnaire were the eight-item scale of suicide intent (C-SIS) shortened from Beck's original SIS (Beck, Schuyler, & Herman, 1974) and the Hamilton Depression Rating Scale (HAM-D) (Williams, 1988).

**C-SIS—**We decided to use the first eight items of Beck's original SIS to constitute the Chinese shortened version of suicide intent, C-SIS, as they straightforwardly deal with factual aspects of the attempt and the events surrounding the individual and have less subjective or culture-specific concerns. Earlier, Beck and Lester (1976) tested the validity of the SIS with only the eight items and yielded excellent results. The eight items are: isolation (SIS1), timing (SIS2), precautions against discovery and/or intervention (SIS3), acting to gain help during/after attempt (SIS4), final acts in anticipation of death (SIS5), degree of planning for suicide attempt (SIS6), suicide note (SIS7), and overt communication of intent before act (SIS8). Each item is graded on a scale with three categories: 0, 1, and 2. The total score of C-SIS should range from 0 through 16. The scale has been translated and back translated several times by English-Chinese bilinguals in the research team, to make sure the Chinese translation of the eight items matches the English original.

**HAM-D—**HAM-D is one of the most widely used depression severity rating scale in clinical trials (Williams, 2001). Hamilton (1960) first published 21 items as part of the HAM-D, and then the 24-item scale was formed by adding three more items: helplessness, hopelessness, and worthlessness. In our study, the 24 item HAM-D (Williams, 1988) was used in testing the criterion validity of the SIS. Also, translation and back translation of the scale were performed to ensure its accuracy.

### Data Collection Procedures

For each suicide case, there were two informants, one being the next of kin and the other the best friend of the suicide. Using two informants has many advantages (Kraemer et al., 2003). The interviewers were well–trained public health or mental health professionals and had been further trained in psychological autopsy (PA) methods. It took approximately six months and six interviewers to accomplish all the interviews, including interviewing the informants of the paired controls of the completed suicides. Each interview began with the reading and signing of the consent form and the whole interview lasted about 2.5h (Zhang et al., 2004). The response rate in the suicide case sample was 100%.

### Statistical Analysis

Data were analyzed using the latest version of Statistical Package for Social Sciences (SPSS 14.0). Descriptive statistics were computed to examine the distribution of the data. Reliability of C-SIS was examined from the internal consistency and computation of Cronbach's coefficient alphas (Cronbach, 1951). Paired *t*-tests of items' scores between two informants were adopted to examine inter-rater reliability. Criterion validity of the C-SIS was examined by computing the correlation between the total score of C-SIS and HAM-D, and construct validity analysis by factor analysis.

## RESULTS

### General Description of the Data

The sample consists of 48 male and 18 female suicides with a male to female ratio of 2.67:1. Of the 66 suicides, 65 (98.5%) were living in a rural area. The age range was 13–85 years old, with the mean and standard deviance (*SD*) being 45.45 (17.08). Of the completed suicides, 4 cases (6.1%) were illiterate, 23 cases (34.8%) had attended elementary school, 31 cases (47.0%) had attained high school, and 8 cases (12.1%) reached college level or above. Nine cases (13.6%) were single, 53 cases (80.3%) were married and cohabiting, 1 case (1.5%) was married but separated, and 3 cases (4.5%) were widowed. The mean family size was 3.2 (*SD* = 1.0) persons. The mean family income was 11,902 Chinese *Yuan* (*SD* = 11709).

The total C-SIS score ranged from 1–14, with a mean of 7.44 (*SD* = 2.50). The majority of the cases (65.1%) had a C-SIS total score ranging between 6 and 9. There were no statistically significant differences between males (7.48 ± 2.51) and females (7.33 ± 2.54) in the total C-SIS score ($t = 0.209$, $p = 0.835$).

### Reliability of the Scale

The mean and SD of each item and total score, *r* and *p* value between each item and the C-SIS total score for the 66 completed suicides are listed in Table 1. Only one of the eight items, SIS4 (acting to gain help during/after attempt) was not significantly correlated with the total score ($r = 0.021$, $p = 0.870$). Otherwise, all items had acceptable *r* values with the total score (from 0.270 to 0.665, all $p = 0.000$).

The Cronbach's coefficient alpha was 0.322, and the standardized item alpha was 0.393. The result of scale mean, squared multiple correlation, and Cronbach's coefficient alphas if each item were deleted are listed in Table 2. In the Cronbach's coefficient alpha values, the value of Cronbach's coefficient alpha when SIS4 was deleted was the largest, which showed the deletion of SIS4 affected the scale much more than others when they were deleted. Again, it indicated that SIS4 (acting to gain help during/after attempt) may not fit the scale of C-SIS for Chinese populations. Or the translation of the item into Chinese had created the unfit result.

Inter-rater reliability analysis was carried out between pairs of informants. The results of the mean (SD) of the C-SIS and their paired *t*-test, *p* value between informant one and informant two of the 66 completed suicides are listed in Table 3. There were higher correlation coefficients (*r* values from 0.424 to 0.733, all *p* values lower than 0.001) between two informants. In the paired *t*-test analysis, there was a significant difference only in SIS3 (precautions against discovery and/or intervention) between two informants (paired $t = -2.193$, $p = 0.032$).

### Validity of the Instrument

The HAM-D scale (Williams, 1988) was used as a criterion against the C-SIS. The total HAM-D score in the sample of 66 suicides ranged from 0 to 50, with a mean score of 18.61 (*SD* = 13.14). For the male suicides in the sample, the mean was 18.96 (*SD* = 13.60) and for the female suicides, 17.67 (*SD* = 12.16). There was no statistical significance between these two groups in the HAM-D mean ($t = 0.353$, $df = 64$, $p = 0.725$). As predicted, the data showed a high correlation coefficient between the total scores for the HAM-D and C-SIS ($r = 0.406$, $p = 0.001$).

A common factor analysis was conducted for extracting the factors in the data. The criterion value for item inclusion was a loading of 0.40. Items with loading on more than one factor were included only in interpretation of the factor with the highest loading. The results are shown in Table 4. Three factors were produced by factor analyses accounting for 66.8 % of the total variance. Factor 1, named "planning," included three items, SIS5, SIS6, and SIS7, which accounted for 23.80% of the total variance. Factor 2, named "communication with others," included SIS4 and SIS8, with 22.7 % of the total variance. Factor 3, named "precautions against intervention," included SIS1, SIS2, and SIS3, accounting for 20.3 % of the total variance.

## DISCUSSION AND CONCLUSION

The major purpose of the study was to test the reliability and validity of the shortened Chinese version of a suicide intent scale (C-SIS), selected and translated from the original Beck's Suicide Intent Scale (SIS). The findings include the following: 1) There is no gender

difference on the total score of C-SIS in the sample of 66 completed suicides. 2) All of the eight items but one, SIS4 (acting to gain help during/after attempt), fit well into the scale with significant correlations with the total score of C-SIS. 3) The item analysis shows a similar phenomenon, SIS4 affecting the whole scale much more than any other one. 4) Internal consistency analysis shows excellent fit of all the items except for SIS4. 5) Inter-rater reliability analysis demonstrates good consistency between each two informants in reporting the suicide intent on all items except for SIS3. 6) The validity of the C-SIS is supported by the high correlation coefficient between the total score of C-SIS and the HAM-D, which is used as an external criterion for the validity of the C-SIS. 7) Factor analysis produces three factors that together account for 66.8% of the total variance.

The tests for inter-rater reliability yielded a relatively high correlation coefficient in the study, although a little lower than that reported by Beck, Schuyler, and Herman (1974) with Western samples. However, the inter-rater reliability test in this psychological autopsy (PA) study was somewhat different from that in other interviewing settings.

Regarding the C-SIS scale's internal consistency, item SIS4 stands out as less fitted to the scale. This item asks if the individual did anything to get help, and there are three choices: 0) notified potential helper regarding attempt; 1) contacted but did not specifically notify potential helper regarding attempt; 2) did not contact or notify potential helper. The inadequate Chinese translation of the item may have misled a person low on suicide intent to choose (2), which indicates the highest level of intent for the item, because the low intent person does not need help at all. The problem results from the English word "potential," which cannot be fully comprehended by a native Chinese unless after some long and awkward translation. Therefore, we recommend that this item (SIS4) be removed from the C-SIS until further research is conducted for a better translation of the term.

Depression is associated with greater planning of acts of suicide (Brown et al., 1991; Scocco et al., 2000; Simon et al., 2001). HAM-D, one of the most widely used depression severity rating scale in clinical trials (Williams, 2001), is regarded as the preferred criterion of C-SIS. The high correlation coefficient between the total scores of HAM-D and the C-SIS indicates that C-SIS is a valid measure of suicide intent for the sample.

The factor analysis of the scale of C-SIS produces three factors—1) "planning"; 2) "communication with others"; 3) "precautions against intervention"—which together explain about 66.8 % of the total variance. It suggests that C-SIS has a high construct validity and further provides evidence that C-SIS is a qualified measure of the intent and severity of suicide behavior in Chinese population.

In sum, the current C-SIS as translated into Chinese can be used as a measure of suicide intent in Chinese populations. Item-total consistencies of the scale are recommended before any statistical analyses are reported, due to the possible inappropriateness of the item SIS4 in the sample. If the lack of fit of the problematic item occurs, we suggest that the item be removed and researchers should use the remaining seven items of the scale.

This current study must be noted for its weaknesses. We used only HAM-D as the criterion for the validity test of C-SIS, and there could be many more criterion scales, such as the hopelessness scale (Beck, Weissman, Lester, & Trexler, 1974), suicide ideation scale (Beck, Kovacs, & Weissman, 1979), etc. that could play the same role. Although we can argue that HAM-D is better and more acceptable than all the others, other criterion scales should be included in future validity tests of the new C-SIS. Another concern of the study may be the sample size, which could be larger in future studies. Usually, ten cases per item are considered necessary to obtain stable factors that may reflect the dimension underlying the

scale (Child, 1990). However, we hope that this study has provided a useful tool in Chinese suicidology or started a new area of instrument research.

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**Table 1**

The Mean and *SD* of Each Item and the Total Score, with the *r* and *p* Values between Each Item and Total Score of the C-SIS for the 66 Suicide Cases

| Item | Mean | *SD* | *r* between each item and total score | *p* value of *r* |
|---|---|---|---|---|
| SIS1 | 1.80 | 0.50 | 0.437 | 0.000 |
| SIS2 | 0.97 | 0.72 | 0.450 | 0.000 |
| SIS3 | 1.03 | 0.58 | 0.425 | 0.000 |
| SIS4 | 1.14 | 0.91 | 0.021 | 0.870 |
| SIS5 | 0.48 | 0.75 | 0.665 | 0.000 |
| SIS6 | 0.76 | 0.78 | 0.627 | 0.000 |
| SIS7 | 0.52 | 0.85 | 0.568 | 0.000 |
| SIS8 | 0.74 | 0.81 | 0.270 | 0.029 |
| Total score | 7.44 | 2.50 | | |

**Table 2**

The Results of Mean, Squared Multiple Correlation, and Cronbach's Coefficient *Alphas* if Item Deleted from the C-SIS Scale for the 66 Suicide Cases

| Item | Scale mean if item deleted | Squared multiple correlation | Cronbach's Alpha if item deleted |
|---|---|---|---|
| SIS1 | 5.64 | 0.199 | 0.252 |
| SIS2 | 6.47 | 0.294 | 0.267 |
| SIS3 | 6.41 | 0.186 | 0.262 |
| SIS4 | 6.30 | 0.509 | 0.555 |
| SIS5 | 6.95 | 0.556 | 0.106 |
| SIS6 | 6.68 | 0.492 | 0.141 |
| SIS7 | 6.92 | 0.310 | 0.202 |
| SIS8 | 6.70 | 0.512 | 0.397 |

**Table 3**

Inter-Rater Consistency Tests for Each Pair of Informants on the C-SIS

| | Informant 1 | | Informant 2 | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Item** | **Mean** | ***SD*** | **Mean** | ***SD*** | ***t*** | ***p*** | ***r*** | ***p* of *r*** |
| SIS1 | 1.80 | 0.56 | 1.80 | 0.50 | 0.000 | 1.000 | 0.733 | 0.000** |
| SIS2 | 1.03 | 0.66 | 0.97 | 0.72 | 0.664 | 0.509 | 0.424 | 0.000** |
| SIS3 | 0.88 | 0.60 | 1.03 | 0.58 | −2.193 | 0.032* | 0.545 | 0.000** |
| SIS4 | 1.11 | 0.88 | 1.14 | 0.91 | −0.270 | 0.788 | 0.482 | 0.000** |
| SIS5 | 0.53 | 0.79 | 0.48 | 0.75 | 0.536 | 0.594 | 0.600 | 0.000** |
| SIS6 | 0.76 | 0.82 | 0.76 | 0.79 | 0.000 | 1.000 | 0.573 | 0.000** |
| SIS7 | 0.53 | 0.84 | 0.52 | 0.85 | 0.148 | 0.883 | 0.516 | 0.000** |
| SIS8 | 0.68 | 0.75 | 0.74 | 0.81 | −0.600 | 0.551 | 0.447 | 0.000** |
| SIS total | 7.30 | 2.70 | 7.44 | 2.50 | −0.463 | 0.645 | 0.579 | 0.000** |

*The significant level was 0.05.

**The significant level was 0.001.

**Table 4**

Factor Loadings of the C-SIS with the 66 Suicide Cases

| Item | Factor 1 | Factor 2 | Factor 3 |
|---|---|---|---|
| SIS1 | | | 0.757 |
| SIS2 | | | 0.803 |
| SIS3 | | | 0.616 |
| SIS4 | | −0.838 | |
| SIS5 | 0.918 | | |
| SIS6 | 0.847 | | |
| SIS7 | 0.486 | | |
| SIS8 | | 0.889 | |
| Percent of the total variance | 23.80 | 22.67 | 20.30 |