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Psychometric Properties of the Dickman Impulsivity Instrument in Suicide Victims and Living Controls of Rural China¹

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Abstract

Background—We are not aware of any of impulsivity trait for Chinese rural youths. This study evaluated the psychometric properties of Dickman Impulsivity Instrument in suicide cases and living controls in rural China.

Methods—The participants, 392 suicide victims and 416 controls were respectively selected, and the psychological autopsy method was used to collect information. The Exploratory Factor Analysis was processed to evaluate the construct validity. The Cronbach's alpha was computed to evaluate the internal consistency, and the Spearman Rank Correlation coefficients between STAI Trait Anxiety Inventory, Coping Responses Inventory and Dickman Impulsivity Instrument were calculated to evaluate the convergent validity.

Results—Dysfunctional and Functional impulsivity were extracted for both samples. The mean of DI scores in suicide cases was larger than that in controls, but it was reversed for FI. There were no significant differences between DI and FI in suicide cases, but in controls the mean of DI scores was significantly smaller than that of FI. The Cronbach's alpha was around .863 and .779 respectively for DI and FI scales in suicides, and it was around .746 and .680 in controls. The DI and FI were significantly correlated with each other. Both the DI and FI were correlated with Approach and Avoidance Coping Response Inventory, and both of the scales were grossly independent with Trait Anxiety Inventory in two samples.

Conclusion—The results indicated that the Dickman Impulsivity Instrument was adequate to measure impulsivity trait for suicide victims and living controls through proxy data in rural China.

Keywords

Dickman Impulsivity Instrument (DII); Psychometric Properties; Psychological Autopsy; Chinese Rural Youths; Suicide

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Introduction

Impulsivity can be defined as the tendency to deliberate less than most people of equal ability before taking action (Dickman, 1990), and it is considered as a major trait of personality. High correlations were reported between impulsivity and diverse suicide related disorders in different populations. For example, independent impact of impulsivity on suicidality in borderline personality disorder (BPD) was found (Rihmer & Benazzi, 2010), high impulsivity was found in the etiology of suicide in schizophrenia (Iulian, et al., 2010), and impulsivity could be one of the links between childhood trauma and suicidal behavior (Braquehais, et al., 2010). Impulsivity was found to be correlated with suicide ideation and suicide attempt (Baca-Garcia, et al., 2005; Carli, et al., 2010; Conner, et al., 2004; Dougherty, et al., 2009; Hull-Blanks, et al., 2004; Lester, 1993; Swann, et al., 2005; Wyder & De Leo, 2007), and it was also discovered to be one of the probable risk factors of suicide (Phillips, Yang, et al., 2002; J. Zhang, et al., 2010). It indicated that the impulsivity trait might be directly or indirectly correlated with suicidal behaviors.

In China, suicide is the leading cause of death for 15–34 years' rural people, and the Chinese suicide rate is 23.2 per 100,000 people and a total of about 287,000 suicide deaths per year (Phillips, Li, et al., 2002). Furthermore, the rural suicide rate is three times higher than the urban suicide rate, which is 27.1/100,000 versus 8.3/100,000 (Phillips, Li, et al., 2002). From 2005 to 2008, a case-control psychological autopsy (PA) study was conducted to investigate the mechanism behind the suicide of youth in rural China. We wanted to compare suicide risk factors between suicide cases and community living controls, and we tried to compare factors of suicide risk among different subpopulations. In this study, the Dickman Impulsivity Instrument (DII) (Dickman, 1990) was adopted to measure the impulsivity personality for Chinese rural youths.

There are various questionnaires from different theoretical points of view, for example, Barratt Impulsivity Scale was developed to measure impulsivity involving behavioral, cognitive and physiological components (Barratt & Patton, 1983), and Impulsiveness-Venturesomeness-Empathy questionnaire was used to process conception of impulsivity involving Venturesomeness and Impulsiveness as two distinct components (Eysenck, et al., 1985). Dickman stressed that the consequences of impulsivity are not always negative (Dickman, 1990). He proposed that individual differences in impulsivity would reflect differences in the degree to which attention tends to remain fixed once it is directed to a particular source of information (Dickman, 1996). High impulsive subjects' rapid responding has little cost in errors when the experimental task is very simple (Dickman, 1985), and high impulsive subjects are more accurate than others when the available time for making a decision is short (Dickman & Meyer, 1988). Dickman hypothesizes the existence of two different traits: Functional Impulsivity (FI) and Dysfunctional Impulsivity (DI). FI results in rapid, inaccurate performance in situations where this is optimal and DI results in rapid, inaccurate performance in situations where this is non-optimal. He successfully constructed the DII to discriminate within the self-report domain between those two traits, and demonstrated that both differ in their personality and cognitive correlates.

The DII was proved to have stable reliability and validity. The Cronbach's alpha was used to assess the internal consistency and it was .74 and .85 respectively for FI and DI scales in original American version. The correlation between FI and DI scales was significant ($r=.23$), and both FI and DI scales were correlated with all of the other impulsivity scales (Dickman, 1990). The DII was also translated and adapted in different language context within high reliability and validity. Two factors were also recovered both in males and females in French version, and the DI scale was correlated with the Barratt Impulsiveness Scale and both

scales were grossly independent from Spielberger's Trait-Anxiety Inventory (Caci, et al., 2003). The internal consistency was sufficient for Dutch version, which congruence coefficients were .88 for FI scale and .92 for DI scale, and the factors were also similar with the original version (Claes, et al., 2000). It also showed good reliability and validity for Spanish version (Chico, et al., 2003). All of the evidence seems to suggest that the DII is quite stable across languages and populations.

Though there were many studies on the quality of the Dickman Impulsivity Instrument, there were few studies concerning the impulsivity trait in Chinese rural youths especially in suicide victims. In this study, we wanted to evaluate the psychometric properties of DII in two Chinese rural young samples: suicide victims and community living controls.

Methods

Design

Psychological autopsy (PA) method was used to collect information of target persons. The psychological autopsy study is one of the best ways to disclose the official reason from biological, psychological, and social aspect by interviewing informants of suicide victims. It is a good and popular method in suicide research with high reliability and validity (Phillips, Yang, et al., 2002; Jie Zhang, et al., 2002). The case-control study method was also used in the study to optimize scientific validity, and suicide victims were compared to livings and non-suicidal people that were the same as or equal to the population from which suicide victims originated. To decrease discrepancies between the English and Chinese measurements, the 23 items of the DII (12 DI items which were odd numbered and 11 FI items which were even numbered) were translated into Chinese and then back-translated into English by independent English native collaborators. Differences between the original versions and the retractions were discussed in order to improve the quality of the Chinese translations.

Study Population

Liaoning Province, Hunan Province and Shandong Province in China were chosen as the research sites, and a total of 16 counties were randomly selected to recruit cases. In each county, we had a project coordinator in charge of the surveillance and the report of the suicide cases. Suicide cases that aged 15–34 years were selected consecutively from suicide victims which happened from October 2005 through June 2008. For each suicide case, we randomly selected community living controls from the same area aged between 15 to 34 years. At last, 392 suicide cases that consisted of 214 men and 178 women with a mean age of 26.8 ± 6.4 were selected, and 416 controls that consisted of 202 men and 214 women with a mean age of 25.7 ± 6.2 were selected from the same counties.

Informants and Data Collection

For each of the suicide victims we had two informants who knew the deceased person well. We selected the informants based on the context or environment, and the first informant was generally a relative of the deceased and the second informant was a good friend or neighbor in the case. For each control, we also interviewed two informants, and the principles of selection for control informants were the same as that for the suicide cases. The village doctors were trained to identify and report suicide cases to the county level of Center for Disease Control and Prevention (CDC) which monthly reported these suicide victims to the principal investigator in each province. All the informants should sign on the informed consent form or agreed to inform orally. Each interview was completed by one interviewer and one informant without the third person present.

Data Analysis

In this research, the information of two informants was combined as the proxy data for suicide victims and living controls. Then, the combined data were adopted to evaluate the Psychometric Properties of DII for different populations.

The Exploratory Factor Analysis was used to assess Construct Validity of the DII in this study. The criterion for determining the number of extracted factors was Parallel Analysis, which was one of the best methods for determining the number of components to retain (Glorfeld, 1995; Hayton, et al., 2004; Zwick & Velicer, 1986). The principle of the Parallel Analysis was to compare the eigenvalues derived from actual data sets with the 95th percentile of the distribution of eigenvalues (Glorfeld, 1995) that was extracted from random data sets that parallel the actual data sets with regard to the number of cases and variables. All of the procedures could be processed by SPSS 16.0 (O'Connor, 2000).

Cronbach's alpha was computed to evaluate the internal consistency, and the correlation coefficients between Coping Response Instrument (CRI) (Moos, et al., 1990), Spielberger's Trait-Anxiety Inventory (TAI) (Spielberger, et al., 1983) and DII were calculated to evaluate the convergent Validity. The CRI (48 items, true/false format) is used for measuring the individuals' coping skills, which includes two dimensions: Approach and Avoidance methods. The Trait-Anxiety Inventory (20 items) was part of State Trait Anxiety Inventory, which was used to measure trait anxiety personality.

In this study, all of the scores of reversely narrative items for each scale were reversely coded before analysis, and all of the data analysis was processed by SPSS 16.0.

Results

Demographic characteristics

Altogether 392 suicide victims and 416 living controls were obtained for this study. As shown in Table 1, suicide cases were slightly older than controls ($P=.010$), while there was no gender differences between cases and controls ($P=.086$). Suicide cases were less educated than controls ($P<.001$), and they were less likely to be married than the controls, but it was not significant at the .05 level. More suicide victims were at a lower family annual income level than controls ($P<.001$).

Construct Validity

1. Construct validity in suicide victims—The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's Sphericity Test were computed to evaluate whether Factor Analysis could be used for this data. The KMO measure of sampling adequacy was .905 which was close to 1 and the Chi-Square for Bartlett's Sphericity Test was significantly 2944, all of which indicated that Factor Analysis could be taken in the case group.

A series of random data matrices (392×23) for suicide group were generated, and all the eigenvalues were computed for the correlation matrices for the actual data and for the random data sets. The third eigenvalue (1.374) of random data sets was larger than the third eigenvalue (1.333) of actual data sets. Therefore, two components were retained through Parallel Analysis, which explained 40.4% of the total variance and represented the two expected factors of DII. Principal Component Analysis was used to extract common factors (number of factors = 2), and the Varimax method were used to rotate these common factors. All of 12 DI items and item 22 were gathered together in factor 1, and 10 FI items were gathered in factor 2. More details were shown in Table 2.

2. Construct validity in community living controls—Similarly, we conducted Exploratory Factor Analysis in control group. The KMO measure of sampling adequacy was .800. The Chi-Square for Bartlett's Sphericity Test was 1760 and it was significant also, which indicated that it was adequate to conduct Factor Analysis in control group.

A series of random data matrices (416×23) for controls were also generated. The third eigenvalue (1.36) of random data sets was larger than the third eigenvalue (1.275) of actual data sets. So, two components were also retained with the interpretation of 36.9% of the total variance, which also represented the two expected components of DII. Eleven DI items and item 22 were gathered together in factor 1, and 10 FI items and item 21 were gathered in factor 2. More details were shown in Table 2.

Reliability

The mean of DI score in suicide cases (around 6.78) was larger than that in controls (around 3.70), but it was reversed for FI (7.11 vs. 7.63). There were no significant differences between DI and FI in suicide cases, but in controls the mean of DI score was significantly smaller than that of FI. More details were shown in Table 3, 4 and 5.

1. Reliability for suicide cases—The results showed satisfactory internal consistency both for DI and FI scales for suicide group. As shown in Table 3, the mean of total score for the DI scale was 6.78 ± 3.67 , and it was 6.73 ± 3.73 and 6.84 ± 3.60 respectively for males and females. The Cronbach's alpha for the DI scale equaled .863 in the entire sample, .868 in males and .860 in females. The mean of total score for the FI scale was 7.11 ± 2.86 , and it was 6.98 ± 2.87 and 7.29 ± 2.83 respectively for males and females. The Cronbach's alpha for the FI scale was respectively .779 in the entire sample, .774 in males and .786 in females. It was also shown that the scores were not normally distributed according to Kolmogorov Smirnov test (*D* value) and Shapiro-Wilk test (*W* value).

2. Reliability for controls—The results showed sufficient internal consistency both for DI and FI scales for control group. As shown in Table 4, the mean of total score for the DI scale was 3.70 ± 2.73 , and it was 7.63 ± 2.32 for the FI scale. The Cronbach's alpha in the DI scale equaled .746 in the entire sample, and it was .680 for the FI scale. It was also shown that the scores were not normally distributed according to *D* and *W* values.

Convergent Validity

1. Convergent Validity for suicide cases—As both the DI and FI scales were not normally distributed, Spearman Rank Correlation coefficients were computed to evaluate the convergent validity for DI and FI scales. The correlation between DI and FI was significant ($r = .513$) in suicide cases. The DI scale was significantly correlated with two subscales of the CRI and the TAI, and FI was just significantly correlated with CRI Approach and CRI Avoidance. More details were shown in Table 6.

2. Convergent Validity for controls—The Spearman Rank Correlation coefficients were also calculated for controls. As shown in Table 6, the correlation between DI and FI was also significant ($r = .250$). The DI was significantly correlated with two subscales of CRI and the TAI, and FI was significantly correlated with two subscales of CRI.

Both DI and FI were negatively correlated with Age in suicide and control groups. The DI for suicide was negatively correlated with Education Level, but the correlation for FI was positive. Both DI and FI for controls were not significantly correlated with Education Level. There were no significant correlations between impulsivity and Family Annual Income. More details were shown in Table 6.

Discussion

This study was designed to assess the reliability and validity of Dickman Impulsivity Instrument for its use among two sources of Chinese rural young people: suicide victims and community living controls. The results were similar to what had been reported in previous studies, which indicated that the Chinese adaption of the DII had satisfactory reliability and validity.

FI was described as a useful trait that enabled people to function better, and it is associated with enthusiasm and activity. In contrast, DI was described as a bad trait that leads to problems for the individual, and it is more strongly associated with disorderliness, and a lack of concern about hard facts (Brunas-Wagstaff, et al., 1995; Dickman, 1990). In this study, the mean of FI scores was around 7.63 and the mean of DI scores was around 3.70 in controls, all of which was analogous within other normal people. For example, in Spanish college students the mean of FI and DI scores respectively ranged from 4.76 to 5.58 and from 2.55 to 2.98 (Chico, et al., 2003; Vigil-Colet, 2007; Vigil-Colet & Codorniu-Raga, 2004); in French college students the mean of FI score was around 7.12 among different subgroups and it was around 2.85 for DI scale (Caci, et al., 2003); in English adults, it was 6.27 for FI scale and 2.84 for DI scale (Miller, et al., 2004); it also showed similar results in Dutch adults (Claes, et al., 2000).

In this study, the means of FI score in suicide cases (around 7.11) were similar to which in controls and other normal populations, but for DI scale the scores (around 6.78) were much larger than that in controls (around 3.70) and in other populations (range from 2.84 to 3.71). In other words, dysfunctional impulsivity was lower than functional impulsivity in controls but not in suicide victims, and dysfunctional impulsivity was higher in suicide victims than in controls, while functional impulsivity was lower in suicide victims than in controls. All of the evidence indicated dysfunctional impulsivity rather than functional impulsivity might be correlated with suicidal behaviors, and lack of functional impulsivity might also be an important risk factor for suicide. We could also find that dysfunctional impulsivity was increased with reducing education level, while functional impulsivity was decreased in suicide group. In this study, suicide victims had completed less education than controls. So, it might be inferred that education level was one of the causes that impulsivity differed between suicide and controls. Further evidence was required on this. We also found that as age increased impulsivity (both DI and FI) were decreased both for suicide victims and controls.

In this study, Exploratory Factor Analysis was adopted to assess the construct validity of Chinese adaption of DII, and Parallel Analysis was applied to determine the number of factors before conducting a factor analysis. There were some methods for determining the number of components to retain in an exploratory factor analysis, such as Horn's Parallel Analysis, Cattell's scree test, Bartlett's chi-square test, Velicer's minimum average partial and Kaiser's eigenvalues greater than 1, among which Parallel Analysis was the most nearly accurate one (Hayton, et al., 2004; Zwick & Velicer, 1986). We applied modified Horn's Parallel Analysis in this study (Glorfeld, 1995).

The two-factor structure of the DII was found for both suicide and control groups, which showed that the functional and dysfunctional constructs were valid in both of the populations. In suicide group, all of 12 odd items and item 22 were gathered together in factor 1 which clearly stood for the Dysfunctional Impulsivity, and the rest 10 even items were gathered in factor 2, which represented the Functional Impulsivity. It was similar to previous studies (Caci, et al., 2003; Chico, et al., 2003; Claes, et al., 2000; Dickman, 1990; Pedrero Perez, 2009). Item 22 "I try to avoid activities where you have to act without much

time to think first” belonged to FI subscale in Dickman’s study but it was extracted in DI subscale with the lowest loading value of .364 in this study.

In control group, 11 odd items (except for item 21) and item 22 were gathered together in factor 1 which represented DI, and the other 10 even items and item 21 were gathered in factor 2 which represented FI. The loading value of item 21 “I am good at careful reasoning” was $-.481$ in FI component which was $.389$ in DI component for control sample. The loading values of item 21 in FI and DI components for suicide sample were also similar ($.441$ in DI factor and $.411$ in FI factor).

The factors in which item 21 and 22 were grouped were different with that of Dickman’s American version. One of the possible reasons was that the depiction of item 21 might lead to bidirectional understanding both for suicide victims and living controls in rural China or it might be because the relatively formal expression was adopted for Chinese version. For item 22, the double negative was used and it might cause confusion for Chinese rural youth. The Chinese version of the two items might be too obscure for rural youth who did not have much formal education. A very low coefficient of similarity for item 22 was also reported in French (Caci, et al., 2003).

The Cronbach’s alphas or KR-20 coefficients for DI and FI scales were also similar among different populations. In this study, the Cronbach’s alpha was around $.863$ in entire sample, males and females for DI scale and it was around $.779$ for FI scale in suicide group. The Cronbach’s alpha was relatively lower in control group and it was around $.746$ and $.680$ respectively for DI and FI scales. In American undergraduate students, the Cronbach’s alpha was $.85$ and $.74$ respectively for DI and FI scales (Dickman, 1990). In adults of United Kingdom, it was $.84$ and $.78$ respectively for DI and FI scales (Miller, et al., 2004). In French undergraduate students, the Kuder-Richardson KR-20 coefficient was around $.79$ for DI scale and it was around $.75$ for FI scale (Caci, et al., 2003). All of the evidence indicated that the internal consistency reliability of DII were quite stable among different populations.

The DI and FI scales exhibited relatively low correlations with each other. It was $.513$ for suicide group and $.250$ for control group. It was similar to that in Spanish adaption ($.32$) (Chico, et al., 2003), in United Kingdom adaption ($.25$) (Miller, et al., 2004), in French version ($.23$) (Caci, et al., 2003) and in American version ($.23$) (Dickman, 1990).

The CRI and TAI were used as the criterion measures to evaluate the convergent validity for DII. The CRI Approach was used to assess positive approach coping response and the CRI Avoidance was used to assess negative avoidance coping response for individuals (Moos, et al., 1990). The TAI was used to assess trait anxiety personality which denoted stable individual differences in anxiety proneness and referred to a general tendency to respond with anxiety to perceived threats in the environment (Spielberger, et al., 1983).

The Spearman Rank Correlation coefficients between these scales were computed to assess convergent validity. Both the DI and FI scales were negatively and significantly correlated with CRI Approach and both of them were positively and significantly correlated with CRI Avoidance in suicide victims and living controls. It demonstrated that impulsivity, no matter DI or FI, was negatively correlated with positive coping responses, and it was aligned with negative coping responses. It also indicated that though the FI might lead to positive consequences, the coping responses might be negative, which was also described by Dickman (1990). Caci et al. (2003) found that DI was slightly and positively correlated with anxiety and FI was slightly and negatively correlated with anxiety. In our study, both the DI and FI scales were slightly and negatively correlated with TAI. It indicated that impulsivity might be, in a minor extent, negatively correlated with trait anxiety personality.

The main shortcomings of our study might be that the sample size was relatively small and the reliability and validity results might differ while two samples (the suicide victims and community living controls) with different dysfunctional impulsivity levels were used. Some of other researchers have used many other impulsivity instruments as criterion measures to assess convergent validity, such as Eysenck Impulsivity Scale, Barratt Impulsiveness Scale and BIS/BAS scale, etc. Due to the time and financial constraints, we could not apply so many measures.

The current study provided preliminary evidence concerning the reliability and the validity of the Chinese adaption of Dickman Impulsivity Instrument. Its validation in both suicide victims and living controls samples was generally similar to those reported in the international literatures. The Chinese version of Dickman Impulsivity Instrument, with a little modification, may be used appropriately and successfully to measure impulsivity trait for Chinese rural people.

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References

- Baca-Garcia E, Diaz-Sastre C, García Resa E, Blasco H, Braquehais Conesa D, Oquendo MA, et al. Suicide attempts and impulsivity. *European Archives of Psychiatry & Clinical Neuroscience*. 2005; 255(2):152–156. [PubMed: 15549343]
- Barratt, ES.; Patton, JH. Impulsivity: Cognitive, Behavioral, and Psychophysiological Correlates. In: Zuckerman, M., editor. *Biological Bases of Sensation Seeking, Impulsivity, and Anxiety*. Hillsdale, NJ: Erlbaum; 1983. p. 77-116.
- Braquehais MD, Oquendo MA, Baca-García E, Sher L. Is impulsivity a link between childhood abuse and suicide? [doi: DOI: 10.1016/j.comppsy.2009.05.003]. *Comprehensive Psychiatry*. 2010; 51(2):121–129. [PubMed: 20152291]
- Brunas-Wagstaff J, Bergquist A, Richardson P, Connor A. The relationships between functional and dysfunctional impulsivity and the Eysenck personality questionnaire. [doi: DOI: 10.1016/0191-8869(94)00202-4]. *Personality and Individual Differences*. 1995; 18(5):681–683.
- Caci H, Nadalet L, Baylé FJ, Robert P, Boyer P. Functional and dysfunctional impulsivity: contribution to the construct validity. *Acta Psychiatrica Scandinavica*. 2003; 107(1):34–40. [PubMed: 12558539]
- Carli V, Jovanović N, Podlešek A, Roy A, Rihmer Z, Maggi S, et al. The role of impulsivity in self-mutilators, suicide ideators and suicide attempters — A study of 1265 male incarcerated individuals. *Journal of Affective Disorders*. 2010; 123(1–3):116–122. [PubMed: 20207420]
- Chico E, Tous JM, Lorenzo-Seva U, Vigil-Colet A. Spanish adaptation of Dickman's impulsivity inventory: its relationship to Eysenck's personality questionnaire. *Personality & Individual Differences*. 2003; 35(8):1883.
- Claes L, Vertommen H, Braspenning N. Psychometric properties of the Dickman Impulsivity Inventory. [doi: DOI: 10.1016/S0191-8869(99)00172-5]. *Personality and Individual Differences*. 2000; 29(1):27–35.
- Conner KR, Meldrum S, Wiczorek WF, Duberstein PR, Welte JW. The Association of Irritability and Impulsivity with Suicidal Ideation Among 15- to 20-year-old Males. *Suicide & Life-Threatening Behavior*. 2004; 34(4):363–373. [PubMed: 15585458]
- Dickman SJ. Impulsivity and perception: Individual differences in the processing of the local and global dimensions of stimuli. *Journal of Personality and Social Psychology*. 1985; 48(1):133–149. [PubMed: 3981385]

- Dickman SJ. Functional and dysfunctional impulsivity: Personality and cognitive correlates. *Journal of Personality and Social Psychology*. 1990; 58(1):95–102. [PubMed: 2308076]
- Dickman, SJ. Adverse (and Beneficial) Consequences of Impulsivity Behavior. In: Feldman, RS., editor. *The psychology of adversity*. Amherst: The University of Massachusetts Press; 1996. p. 208
- Dickman SJ, Meyer DE. Impulsivity and speed-accuracy tradeoffs in information processing. *Journal of Personality and Social Psychology*. 1988; 54(2):274–290. [PubMed: 3346814]
- Dougherty DM, Mathias CW, Marsh-Richard DM, Prevette KN, Dawes MA, Hatzis ES, et al. Impulsivity and clinical symptoms among adolescents with non-suicidal self-injury with or without attempted suicide. *Psychiatry Research*. 2009; 169(1):22–27. [PubMed: 19631392]
- Eysenck SGB, Pearson PR, Easting G, Allsopp JF. Age norms for impulsiveness, venturesomeness and empathy in adults. [doi: DOI: 10.1016/0191-8869(85)90011-X]. *Personality and Individual Differences*. 1985; 6(5):613–619.
- Glorfeld LW. An Improvement on Horn's Parallel Analysis Methodology for Selecting the Correct Number of Factors to Retain. *Educational and Psychological Measurement*. 1995; 55(3):377–393.
- Hayton JC, Allen DG, Scarpello V. Factor Retention Decisions in Exploratory Factor Analysis: a Tutorial on Parallel Analysis. *Organizational Research Methods*. 2004; 7(2):191–205.
- Hull-Blanks EE, Kerr BA, Robinson Kurpius SE. Risk Factors of Suicidal Ideations and Attempts in Talented, At-Risk Girls. *Suicide & Life-Threatening Behavior*. 2004; 34(3):267–276. [PubMed: 15385181]
- Iulian I, Ehud B, Suzana R, Anna Piccone S, Amir P, Moshe K. Impulsivity, Aggression and Suicide Risk among Male Schizophrenia Patients. *Psychopathology*. 2010; 43(4):223–229. [PubMed: 20424503]
- Lester D. Functional and dysfunctional impulsivity and depression and suicidal ideation in a subclinical population. *Journal of General Psychology*. 1993; 120(2):187–188. [PubMed: 8245919]
- Miller E, Joseph S, Tudway J. Assessing the component structure of four self-report measures of impulsivity. *Personality & Individual Differences*. 2004; 37(2):349–358.
- Moos RH, Brennan PL, Fondacaro MR, Moos BS. Approach and avoidance coping responses among older problem and nonproblem drinkers. *Psychology and Aging*. 1990; 5(1):31–40. [PubMed: 2180432]
- O'Connor BP. SPSS and SAS programs for determining the number of components using parallel analysis and. *Behavior Research Methods, Instruments, & Computers*. 2000; 32(3):396.
- Pedrero Perez EJ. Assessment of functional and dysfunctional impulsivity in substance-addicted patients by means of Dickman's Inventory. *Psicothema*. 2009; 21(4):585–591. [PubMed: 19861103]
- Phillips MR, Li X, Zhang Y. Suicide rates in China, 1995–99. *The Lancet*. 2002; 359(9309):835–840.
- Phillips MR, Yang G, Zhang Y, Wang L, Ji H, Zhou M. Risk factors for suicide in China: a national case-control psychological autopsy study. *The Lancet*. 2002; 360(9347):1728–1736.
- Rihmer Z, Benazzi F. Impact on suicidality of the borderline personality traits impulsivity and affective instability. *Annals of clinical psychiatry*. 2010; 22(2):121–128. [PubMed: 20445839]
- Spielberger, CD.; Gorsuch, RL.; Lushene, RE. *Manual for the State-Trait Anxiety Inventory (Form Y)*. Palo Alto, CA: Consulting Psychologists Press, Inc; 1983.
- Swann AC, Dougherty DM, Pazzaglia PJ, Pham M, Steinberg JL, Moeller FG. Increased Impulsivity Associated With Severity of Suicide Attempt History in Patients With Bipolar Disorder. *American Journal of Psychiatry*. 2005; 162(9):1680–1687. [PubMed: 16135628]
- Vigil-Colet A. Impulsivity and decision making in the balloon analogue risk-taking task. *Personality & Individual Differences*. 2007; 43(1):37–45.
- Vigil-Colet A, Codorniu-Raga MJ. Aggression and inhibition deficits, the role of functional and dysfunctional impulsivity. [doi: DOI: 10.1016/j.paid.2004.01.013]. *Personality and Individual Differences*. 2004; 37(7):1431–1440.
- Wyder M, De Leo D. Behind impulsive suicide attempts: Indications from a community study. *Journal of Affective Disorders*. 2007; 104(1–3):167–173. [PubMed: 17397934]

- Zhang J, Wieczorek W, Conwell Y, Tu XM, Wu BYW, Xiao S, et al. Characteristics of young rural Chinese suicides: a psychological autopsy study. *Psychological Medicine*. 2010; 40(4):581–589. [PubMed: 19656428]
- Zhang J, Wieczorek WF, Jiang C, Zhou L, Jia S, Sun Y, et al. Studying suicide with psychological autopsy: Social and cultural feasibilities of the methodology in China. *Suicide and Life-Threatening Behavior*. 2002; 32(4):370–379. [PubMed: 12501962]
- Zwick WR, Velicer WF. Comparison of five rules for determining the number of components to retain. *Psychological Bulletin*. 1986; 99(3):432–442.

Table 1

Demographic Characteristics of the Samples

Demographic Variable	Suicide Group (n=392)	Control Group (n=416)	<i>P</i>
Age	26.84±6.37	25.69±6.17	.010
Gender			
Male	214 (54.59%)	202 (48.56%)	.086
Female	178 (45.41%)	214 (51.44%)	
Education Level (years)	7.38±2.77	9.15±2.40	<.001
Marital Status			
Never married	161(41.07%)	144 (34.62%)	.058
Ever married	231(58.93%)	272 (65.38%)	
Family Annual Income			
Low (RMB<10000)	158 (40.31%)	79 (18.99%)	<.001
Middle (10000R≤RMB<20000)	134 (34.18%)	126 (30.29%)	
High (RMB≥20000)	91 (23.21%)	169 (40.63%)	

Table 2

Rotated Component Matrix: Factor Loadings for Suicide and Control Samples

Items	Suicide		Control	
	DI	FI	DI	FI
Item 11 Without thinking carefully before acting	.790		.677	
Item 23 Without considering consequences before acting	.762		.561	
Item 9 Without considering situation to make up mind	.741		.558	
Item 13 Get in trouble because of no thinking	.737		.619	
Item 15 Plans failed because of careless thinking	.675		.578	
Item 19 Carefully weigh pros and cons before acting	.663		.524	
Item 1 Speak without thinking	.662		.509	
Item 7 Shop without thinking about whether affordable	.621		.445	
Item 3 Enjoy working out problems slowly and carefully	.455		.426	
Item 21 Good at careful reasoning	.441		-.481	
Item 17 Get involved in projects without considering	.431		.367	
Item 5 Make appointment without thinking	.424		.381	
Item 22 Avoid activities that people have no time thinking	.364		.354	
Item 20 Admired by others because of thinking quickly		.739		.677
Item 6 Put thought into words quickly		.736		.661
Item 4 Good at taking advantage of opportunities		.711		.632
Item 12 Not like doing things quickly		.595		.349
Item 10 Like taking part in fast-paced conversation		.505		.515
Item 14 Enjoy jobs that required making fast decision		.492		.566
Item 2 Not like making decision quickly		.491		.327
Item 16 Like sports or games that required fast move		.459		.593
Item 18 Miss out opportunities because of no fast mind		.371		.310
Item 8 Feel uncomfortable if making up mind quickly		.355		.341

Extraction Method: Principal Component Analysis. Rotation Method: Varimax.

Lower loadings in each component were excluded.

Table 3Total Mean Scores and the Cronbach's α of the DII for Suicide Group

	DI			FI		
	Entire Sample	Male	Female	Entire Sample	Male	Female
Mean	6.78	6.73	6.84	7.11	6.98	7.29
Std. Deviation	3.67	3.73	3.60	2.86	2.87	2.83
α	.863	.868	.860	.779	.774	.786
<i>D</i>	.137***	.153***	.127***	.118***	.121***	.130***
<i>W</i>	.925***	.922***	.927***	.942***	.944***	.939***

* $P < .05$,** $P < .01$,*** $P < .001$.

Table 4Total Mean Scores and the Cronbach's α of the DII for Control Group

	DI			FI		
	Entire Sample	Male	Female	Entire Sample	Male	Female
Mean	3.70	3.69	3.71	7.63	7.88	7.39
Std. Deviation	2.73	2.87	2.59	2.32	2.24	2.38
α	.746	.770	.720	.680	.660	.696
D	.166***	.188***	.170***	.141***	.140***	.140***
W	.915***	.911***	.911***	.942***	.934***	.948***

* $P < .05$,** $P < .01$,*** $P < .001$.

Table 5

Comparing Total Mean Scores for DI and FI in Suicide and Control Groups

	DI		FI		Suicide		Control	
	Suicide	Control	Suicide	Control	DI	FI	DI	FI
Mean	6.78	3.70	7.11	7.63	6.78	7.11	3.70	7.63
<i>t</i>	13.26		2.72		1.87		26.21	
<i>P</i>	< .001		.007		.063		< .001	

Table 6

Spearman Rank Correlation Coefficients for Suicide and Control Groups

	DI	FI	CRI Approach	CRI Avoidance	TAI	Age	Education	Family Income
Suicide group	DI	1	.513**	-.267**	-.108*	-.158**	-.103*	.024
	FI	.513**	1	-.100*	-.046	-.209**	.104*	.079
Control group	DI	1	.250**	-.297**	-.117*	-.153**	-.080	-.033
	FI	.250**	1	-.124*	-.088	-.152**	-.079	-.002

* $P < .05$,** $P < .01$ (two tailed).