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THE PREVALENCE AND CORRELATES OF SUICIDALITY IN A SAMPLE OF ADOLESCENTS IN GUANGDONG, CHINA

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Background: Suicidality is a public health concern among Chinese adolescents. This study aimed to examine the prevalence and correlates of suicidal ideation and suicide attempts in a large sample of Chinese adolescents. **Methods**: A total of 30,644 Chinese students (56.7% male; Mage = 14.14 years) completed the questionnaires, and a multinomial logistic regression was conducted to analyze the data. **Results**: About 17.0% of the participants reported having suicidal ideation and 4.4% reported suicide attempts in the past year. Adolescents with more rumination, more severe depressive symptoms, more communication problems with their parents, and more feelings of burdensomeness were more likely to be suicidal ideators or suicide attempters rather than non-suicidal controls. Additionally, male adolescents, adolescents from incomplete families, adolescents whose parents have lower educational levels, and adolescents with less rumination, more severe depressive symptoms, less communication problems with their parents were more likely to be suicide attempters rather than suicidal ideators. **Discussion**: Suicidality is prevalent and correlates with various familial and individual factors in Chinese adolescents. Theoretical and clinical implications of the findings were discussed.
Keywords: suicide, prevalence, correlates, adolescent, China

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Suicidality, referring to the thoughts or behaviors of killing oneself (Nock, 2010), is a worldwide public health concern among adolescents (World Health Organization, 2014). Research have showed that as many as 3%–20% of adolescents worldwide reported having the thought of suicide (e.g., Joe, Baser, Neighbors, Caldwell, & Jackson, 2009; Liu, Cong, & Wang, 2009; Merrick, 2011; Singer, O'Brien, & Lecloux, 2017), and about 1%–10% of adolescents worldwide reported making suicide attempts during the past 12 months (e.g., Cheung et al., 2013; Joe et al., 2009; Liu et al., 2009; Merrick, 2011; Winterrowd, Canetto, & Chavez, 2011). In China, suicidality has also become a serious problem in adolescents. For example, research has showed that 10.7% of the Chinese adolescents had at least one episode of suicidal ideation (Liu, Chen, Liu, Wang., & Jia, 2017), and 2.94% had at least one incidence of suicide attempt in the past 12 months (see Hu et al, 2015, for a meta-analysis). Given the prevalence of suicidality, identifying the correlates of suicidality is highly significant.

Understanding demographic factors is a preliminary and important step for identifying correlates for suicidality. It has been suggested that suicide rates differ by age and gender. Research has indicated that suicide rate has a sharp increase during early adolescence (Arnett, 2013). With regard to gender difference, although rates of completed suicide are higher for males than females in adolescence (Roh, Jung, & Hong, 2017), most studies reported that female adolescents were more likely to engage in suicidal ideation and suicide attempts than their male counterparts partially due to their high rate of depression (e.g., Hu et al., 2015; Liu et al., 2017). Additionally, family factors, such as family structure, were also associated with suicidality, such that students from single parent families had significantly higher rates of suicide attempts than those from non-single parent families (i.e., intact families; Liang, Yan, & Xue-Yin, 2013; Liang et al., 2014). Another family factor may be parental educational level. Researchers have suggested that lower parental educational level may be a family cumulative risk factor that leads to adolescents' mental disorders and suicide (Brière, Rohde, Seeley, Klein, & Lewinsohn, 2015; Tang et al., 2009). Taken together, exploring the contributions of demographic factors to the development of suicidality may provide us valuable information.

Many theories and studies have emphasized the importance of both intrapersonal and interpersonal factors in predicting suicidality. For example, the escape theory of suicide (Baumeister, 1990) emphasizes the risk roles of deficient problem-solving ability, rumination, and depressive symptom in predicting suicide. The theory posits that individuals who have a negative self-awareness may experience distressing states such as depression and rumination. These negative states may then damage one's problem-solving ability and make suicide the only seemingly possible solution to the ending of unbearable psychological distress. Being different from the escape theory of suicide (Baumeister, 1990), Joiner's interpersonal-psychological theory of suicide (IPTS; Joiner, 2005) highlights the role of interpersonal factors. Joiner and his colleagues argue that thwarted belongingness (e.g., poor family climates and the feelings of isolation) and perceived burdensomeness (e.g., distress from liability and the feeling of burdensomeness on loved ones) may be proximal and sufficient causes for suicidal ideation (Joiner, 2005; Van Orden et al., 2010). Though thwarted belongingness and perceived burdensomeness are also indispensable contributors for suicide attempts, people may not attempt suicide without the capability for suicide (Joiner, 2005). Thus, the interpersonal factors emphasized in the IPTS may distinguish suicidal ideators and non-suicidal controls, but not suicide attempters and suicidal ideators.

Previous empirical studies have provided some supports for the impacts of intrapersonal and interpersonal risk on suicidality. For instance, previous studies have showed that suicidal individuals not only lacked the ability to generate effective solutions, but also possessed low evaluations of their abilities to cope with difficulties (Yang & Clum, 2011). Additionally, a meta-analytic review has found that rumination was significantly associated with both suicidal ideation and attempts (Rogers & Joiner, 2017). In some longitudinal studies of community adolescents, researchers have also demonstrated that high levels of depressive symptoms significantly predicted later suicidal ideation and attempts (Tatnell, Kelada, Hasking, & Martin, 2014; Zhang et al., 2017).

Regarding interpersonal factors, poor family communications and perceived burdensomeness are particularly important.

Members within families with poor communications always have difficulties in exchanging information, in expressing their needs, and in understanding the needs of other family members. These may then lead to suicidality through enhancing one's feelings of isolation (e.g., Appel, Holtz, Stiglbauer, & Batinic, 2012). Perceived burdensomeness was also regarded as a strong predictor of suicidality (Joiner, 2005; Van Orden et al., 2010), such that young adults and clinical adolescents who perceived more burdensomeness were more likely to engage in suicidality (e.g., Garza & Pettit, 2010; Horton et al., 2016).

Although the prevalence and a number of correlates of suicidality among adolescents have been explored, research in this field is still limited in some areas. First, most of the Chinese studies in this field included relatively small samples for prevalence studies (Hu et al., 2015). Second, most previous studies did not distinguish between suicide attempters and suicidal ideators when they examined correlates for suicidality. Given that the correlates for suicidal ideation and suicide attempts may be different (Joiner, 2005), it is better to explore the correlates separately for suicidal ideation and suicide attempts. To this end, we classified participants into three groups: non-suicidal controls, suicidal ideators, and suicide attempters. Non-suicidal controls consisted of participants reporting no suicidal ideation or suicide attempts; suicidal ideators consisted of participants reporting only suicidal ideation but no suicide attempts; and suicide attempters consisted of participants engaging in at least one suicide attempt regardless of ideation. The aims of the present study are twofold: (1) to examine the prevalence of suicidal ideation and attempts, and (2) to compare differences on various correlates (i.e., rumination, problem-solving ability, depressive symptoms, family communication problems, and perceived burdensomeness) for suicidality between suicidal ideators and non-suicidal controls, between suicide attempters and non-suicidal controls, and between suicide attempters and suicidal ideators in a sample of Chinese adolescents. We hypothesized that (1) suicidal ideation and attempts were prevalent in Chinese adolescents; (2) adolescents with lower levels of problem-solving ability, more rumination, more severe depressive symptoms, more communication problems, and more feelings of burdensomeness

TABLE 1. Demographic Characteristics for All Participants.

Variable	Total
	(*n* = 30,644)
Gender (%)	
Female	43.3 (*n* =13,254)
Male	56.7 (*n* = 17,390)
Age (Mean/*SD*)	14.14 (1.46)
Family category (%)	
Intact families	88.7 (*n* = 27,177)
Single-parent families	8 (*n* = 2,446)
Reconstituted family	2.1 (*n* = 638)
Other family structures	1.2 (*n* = 383)
Father's education	
Master's degree or above	0.9 (*n* = 280)
College education	8.9 (*n* = 2,730)
Junior or senior secondary school	68.8 (*n* = 21,098)
Elementary school education or even lower	21.3 (*n* = 6,536)
Mother's education	
Master's degree or above	0.8 (*n* = 254)
College education	7.1 (*n* = 2,169)
Junior or senior secondary school	65.3 (*n* = 20,014)
Elementary school education or even lower	26.8 (*n* = 8,207)

were more likely to be suicidal ideators or suicide attempters rather than non-suicidal controls; and (3) adolescents with lower levels of problem-solving ability, more rumination, more severe depressive symptoms were more likely to be suicide attempters rather than suicidal ideators; whereas according to IPTS, communication problems and feelings of burdensomeness would not distinguish between suicide ideators and suicide attempters.

METHOD

PARTICIPANTS

Data were from the Adolescent Mental Health Investigation designed by our research team and carried out by the Educational Authorities of the Zhongshan City, Guangdong Province, China, in the spring of 2017. The Zhongshan City is located in the

southeast of China, with a total population of 3.23 million. About 88.2% of its populations live in urban areas. This city is one of the top 100 cities in terms of comprehensive strength (indicted by economy development, public education services, public medical services, and ecological environment) in China (Warton Economic Institute, 2017).

There are in total 116 secondary schools in the Zhongshan city. From each town and residential district, the local educational authorities randomly selected about 50% secondary schools in that area, and finally resulted in 59 participating schools. All the classes in the participating schools were involved in the survey, and each student in the classes was invited to participate. The student participation rate was 82.88%. Attrition was mainly due to that some students did not present on the day of assessment and some chose to quit the assessment. The whole procedure resulted in a sample of 30,644 Chinese students (56.7% male; M age = 14.14 years, *SD* = 1.46). Participants' characteristics are presented in Table 1.

PROCEDURE

Participants were invited to complete an electronic set of questionnaires through computer during regular class time with the assistance of school teachers. The informed consents from participants' parents were obtained before the assessment. At the beginning of the assessment, participants were told that they could quit the assessment at any time when they felt uncomfortable or did not want to answer the questions. But if they chose to complete the questionnaires, they had to respond to every item because the computer-based questionnaire was programed to allow no skip of any item (so any student who completed the questionnaire had no missing data). Our study included some sensitive questions (e.g., items about suicidal ideation and suicide attempts), and participants could contact the school psychological counselors after the assessment if they felt uncomfortable with the questions. According to the agreement between our research team and the participating schools, if students were found to

have suicidal ideation and attempts, we would first contact the school psychological counselors (not the school administrators) and provide them with the information about these students for further assessment. The school administrators were also asked to ensure that only school psychological counselors were able to access and keep the list. All materials and procedure were approved by the Educational Authorities of the city and University's Institutional Review Board.

MEASURES

Problem-Solving Ability. The 11-item Personal Problem-Solving Inventory (PPSI; Heppner & Petersen, 1982) was used to assess participants' problem-solving ability. The ratings were made on a 6-point Likert scale, ranging from 1 (Strongly agree) to 6 (Strongly disagree). Higher scores of the PPSI indicate a lower problem-solving ability. Sample items of this scale include: "I am usually able to think up creative and effective alternatives to solve a problem." and "Many problems I face are too complex for me to solve". The PPSI displayed good convergent and discriminant validity and high internal consistency (Black & Frauenknecht, 1997; Heppner & Petersen, 1982). This scale had a Cronbach's alpha value of 0.89 in the present study.

Rumination. Ten items from the Ruminative Responses Scale (RRS; Treynor, Gonzalez, & Nolen-Hoeksema, 2003; Schoofs, Hermans, & Raes, 2010) were used to measure how often the person participates in a ruminative activity. Participants rated each item on a 4-point scale ranging from 1 (Almost never) to 4 (Almost always). Scores were calculated by summing up the responses, with higher scores indicating higher levels of rumination. Sample items include: "I think, why do I always react this way?" and "I think, why do I have problems other people don't have?" The 10 items used in the present study displayed good validity and good internal consistency in Chinese adolescents (Zhang & Zhou, 2015). In the present study, the Cronbach's alpha value is 0.93.

Depressive Symptoms. The 7-item depression subscale was extracted from the Chinese version of the short Depression Anxiety Stress Scale (DASS-D; Taouk, Lovibond, & Laube, 2001). Responses were made on a 4-point scale, ranging from 0 (Does not apply to me at all) to 3 (Applies to me very much or most of the time). Scores were calculated by summing up the responses, with higher scores indicating higher levels of depressive symptoms. The Chinese version of the short DASS displayed good validity and good internal consistency in Chinese adolescents (Taouk et al., 2001; You & Lin., 2015). The Cronbach's alpha coefficient in this study was 0.93.

Family Communication Problem. The 10-item Problems Communication Subscale extracted from the Parent-Adolescent Communication Scale was used to assess participants' parent-adolescent communication (Olson et al., 1992). It was rated on a 5-point Likert scale ranging from 1(Strongly disagree) to 5 (Strongly agree), with a higher score indicating a higher degree of communication problems. The Problems Communication Subscale includes items such as "My mother/father has a tendency to say things to me which would be better left unsaid" and "When we are having problems, I often give my mother/father the silent treatment". The Parent-Adolescent Communication Scale demonstrated good validity and good internal consistency (Sales et al., 2007). The Cronbach's alpha coefficient of the Problems Communication Subscale in this study was 0.90.

Perceived Burdensomeness. Six items were extracted from the Interpersonal Needs Questionnaire (INQ; Van Orden, Cukrowicz, Witte, & Joiner, 2012) to assess participants' perceived burdensomeness. Participants rated each item on a 7-point scale, ranging from 1 (Not at all true for me) to 7 (Very true for me), with higher scores reflecting higher levels of perceived burdensomeness. The Perceived Burdensomeness Subscale displayed good validity and good internal consistency in Chinese adolescents (Kang et al., 2018). The Cronbach's alpha coefficient was 0.89 in this study.

Suicidal Ideation and Suicide Attempts. Two single items were used to assess participants' suicidal ideation and suicide attempts, respectively. Participants were asked "Have you had suicidal ideation in the past 12 months?" and "Have you attempted suicide in the past 12 months?" Responses were made on a 6-point scale, ranging from 1 (Never) to 6 (Five times or more). Since both items had a very large preponderance of responses at the scale minimum, their scores were dichotomized with 0 representing no suicidal ideation or suicidal attempt, and 1 representing having at least one incidence of suicidal ideation or suicidal attempt.

Before the assessments, a back-translation procedure was conducted to create the Chinese versions of the measures of problem-solving ability, rumination, family communication problem, and perceived burdensomeness. Two Chinese-English bilingual students who majored in psychology first translated the original English versions into Chinese. Translated Chinese versions were then back-translated into English by another bilingual student who majored in English. Finally, the original versions were compared with the back translations, and differences were then resolved by the discussion among the three students together.

DATA ANALYSES

First, descriptive analyses examining the prevalence of and gender differences in suicidal ideation and suicide attempts were performed. Then, means and standard deviations for all study variables were computed separately for non-suicidal controls, suicidal ideators, and suicide attempters. Finally, we conducted a multinomial logistic regression with all study variables being put into the model simultaneously, in order to identify the variables that could differentiate between: suicidal ideators and non-suicidal controls; suicide attempters and non-suicidal controls; and suicide attempters and suicidal ideators. All analyses were performed with SPSS 19.0.

TABLE 2. Descriptive Statistics of All Study Variables Separately for Non-suicidal Controls, Suicidal Ideators, and Suicide Attempters.

Variable	Non-suicidal controls (*n* = 25,349) Mean (*SD*)	Suicidal ideators (*n* = 3,956) Mean (*SD*)	Suicide attempters (*n* = 1,339) Mean (*SD*)
Demographic Factors			
Gender (female %)	40.9 (*n* = 10,379)	59.6 (*n* = 2,357)	38.7 (*n* = 518)
Age	15.12 (1.49)	15.21 (1.38)	15.25 (*n* = 1.48)
Family construct (intact families %)	89.6 (*n* = 22,712)	87.7 (*n* = 3,471)	82.2 (*n* = 1,100)
Father education (secondary school or above %)	78.2 (*n* = 19,812)	83.7 (*n* = 3,310)	73.6 (*n* = 986)
Mother education (secondary school or above %)	73.0 (18,510)	76.2 (*n* = 3,013)	68.3 (*n* = 914)
Intrapersonal factors			
Lack of problem-solving	28.51 (9.44)	32.99 (7.63)	33.57 (11.58)
Rumination	21.13 (7.05)	25.63 (6.51)	23.52 (7.55)
Depression symptom	9.15 (3.66)	11.84 (4.90)	15.39 (6.23)
Relationship factors			
Communication problem	23.81 (8.94)	31.00 (6.75)	28.66 (9.84)
Perceived burdensomeness	12.54 (6.82)	19.01 (8.46)	19.95 (9.16)

RESULTS

PREVALENCE AND CHARACTERISTICS OF SUICIDAL IDEATION AND SUICIDE ATTEMPTS

Of the sample (n = 30,644), 17.0% (n = 5,196) reported engaging in suicidal ideation (21.4% and 13.5% for females and males, respectively; $\chi^2 = 329.40$, $p < .001$) in the past year, with 6.8% (n = 2,090) reporting experiencing suicidal ideation once, 5.4% (n = 1,659) twice or three times, and 4.7% (n = 1,447) more than three times. Among adolescents who had suicidal ideation, 1,240 also had suicide attempts, resulting in 3,956 individuals with only suicidal ideation but not suicide attempts. Additionally, 4.4% (n = 1,339) of the participants reported engaging in suicide attempt in the past year (3.9% and 4.7% for females and males, respec-

TABLE 3. Results for the Multinomial Logistic Regression Examining Factors that Distinguished Between Non-Suicidal Controls, Suicidal Ideators, and Suicide Attempters.

	Suicidal ideators vs. Non-suicidal controls			Suicide attempters vs. Non-suicidal controls			Suicide attempters vs. Suicidal ideators		
Variable	Wald	*p*	OR (95% CI)	Wald	*p*	OR (95% CI)	Wald	*p*	OR (95% CI)
Demographic Factors									
Female gender	406.96	.000	2.18 (2.02–2.35)	4.37	.110	0.92 (0.80–1.02)	92.40	.000	0.52 (0.46–0.60)
Age	.40	.525	0.99 (0.97–1.02)	.16	.687	0.99 (0.95–1.03)	.00	.993	1.00 (0.96–1.05)
Family construct[1]	.00	.985	1.00 (0.89–1.11)	14.03	.000	1.35 (1.15–1.58)	11.35	.001	1.40 (1.14–1.61)
Paternal education[2]	3.32	.069	0.91 (0.81–1.01)	9.74	.002	1.28 (1.11–1.49)	15.47	.000	1.41 (1.19–1.68)
Maternal education[3]	3.05	.081	0.92 (0.84–1.01)	11.29	.001	1.28 (1.11–1.48)	4.08	.043	1.18 (1.01–1.39)
Intrapersonal factors									
Lack of problem-solving	5.06	.024	1.01 (1.00–1.01)	.12	.730	1.00 (0.99–1.01)	3.23	.072	0.99 (0.99–1.00)
Rumination	385.08	.000	1.06 (1.05–1.06)	9.65	.002	1.01 (1.01–1.02)	76.29	.000	0.96 (0.95–0.97)
Depression symptom	140.82	.000	1.08 (1.07–1.09)	906.84	.000	1.27 (1.25–1.29)	332.91	.000	1.18 (1.15–1.20)
Relationship factors									
Communication problem	657.93	.000	1.07 (1.06–1.07)	39.81	.000	1.02 (1.02–1.03)	108.24	.000	0.96 (0.95–0.97)
Perceived burdensomeness	497.39	.000	1.06 (1.06–1.07)	173.44	.000	1.06 (1.05–1.07)	2.19	.139	0.99 (0.98–1.00)

Notes. [1]Intact families vs. single-parent families/reconstituted family/other family structures; [2]Fathers with education levels of secondary school or above vs. Fathers who only completed primary schools or without any diploma; [3]Mothers with education levels of secondary school or above vs. Mothers who only completed primary schools or without any diploma.

tively; $\chi^2 = 11.89$, $p < .001$), with 1.9% ($n = 583$) reporting attempting suicide once, 1.5% ($n = 474$) twice or three times, and 0.9% ($n = 282$) more than three times.

FACTORS ASSOCIATED WITH SUICIDAL IDEATION AND SUICIDE ATTEMPTS

We then classified participants into three groups (i.e., non-suicidal controls, suicidal ideators, and suicide attempters) in order to examine which variable(s) meaningfully distinguished each group. Descriptive statistics for all study variables were presented separately for the three groups in Table 2.

Results of a multinomial logistic regression (as shown in Table 3) showed that a test of the full model with all independent variables against a constant-only model was significant, χ^2 (20) = 6179.23, $p < .001$, indicating that the independent variables, as a set, reliably distinguished between the three groups. All independent variables together explained 27.2% (Nagelkerke R^2) of variance in suicide status.

Comparisons Between Suicidal Ideators and Non-Suicidal Controls

Regarding the pairwise comparisons, as showed in Table 3, the results indicated that female adolescents, adolescents with less problem-solving ability, more rumination, more severe depressive symptoms, more communication problems with their parents, and more feelings of perceived burdensomeness were more likely to be suicidal ideators rather than non-suicidal controls.

Comparisons Between Suicide Attempters and Non-Suicidal Controls

We also found that adolescents from incomplete families, adolescents whose parents had lower educational levels (i.e., only completing primary schools or without any diploma), and adolescents with more rumination, more severe depressive symptoms, more communication problems with their parents, and

more feelings of burdensomeness were more likely to be suicide attempters rather than non-suicidal controls.

Comparisons Between Suicide Attempters and Suicidal Ideators

Additionally, male adolescents, adolescents from incomplete families, adolescents whose parents had lower educational levels (i.e., only completing primary schools or without any diploma), and adolescents with less rumination, more severe depressive symptoms, and less communication problems with their parents were more likely to be suicide attempters rather than suicidal ideators.

DISCUSSION

PREVALENCE AND CHARACTERISTICS OF SUICIDAL IDEATION AND SUICIDE ATTEMPTS

This study examined the prevalence and correlates of suicidal ideation and suicide attempts in the largest sample of Chinese adolescents we ever knew. Overall, 17% (n = 5,196) of all participants reported having suicidal ideation and 4.4% (n = 1,339) reported having suicide attempts in the past year. These results are within the range of those from other studies on suicidality among adolescents worldwide (e.g., 3%–20% and 1%–10% for suicidal ideation and suicide attempts, respectively; e.g., Cheung et al., 2013; Joe et al., 2009; Liu et al., 2009; Merrick, 2011; Singer et al., 2017; Winterrowd et al., 2011). However, the prevalence rate of suicide attempts in this study was higher than its average level in China (2.94% as reported by Hu et al., 2015, for a meta-analysis). This may be due to the specificity of region. This study was conducted in only one city (i.e., the Zhongshan City) of China. The Zhongshan City is a manufacturing city. Many adolescents are immigrants moving from other areas with their parents. These adolescents may suffer more pressure and are more likely to attempt suicide. The same situation also occurs in other manufacturing cities, such as Guangzhou (with the adolescent suicide attempts rate being about 7.99%; Li, Zhang, Li, Li, & Ye, 2012), in Southeast China. In fact, the prevalence of mental

health problems in these areas is higher than those in other areas of China. For instance, according to a review in China, 26.78% of adolescents in Southeast China have psychological problems. This rate is higher than those in Mid-East China (i.e., 14.79%) and in Northeast China (i.e., 16.80%; Hu, 2016). Thus, the prevalence rates of suicide ideation and attempts observed in this study may not represent the situations in the other regions of China.

With regard to gender differences, suicidal ideation was found to be more likely to affect females, while suicide attempts were more likely to affect males. The higher female-to-male ratio of suicidal ideation in this study is consistent with those of some previous studies conducted in China (e.g., Zhai et al., 2015). The lower female-to-male ratio for suicide attempts, however, is inconsistent with some studies in Chinese adolescents (Hu et al., 2015; Liu et al., 2017). For example, a meta-analysis on the prevalence of suicide attempts showed that Chinese girls (3.17%) were significantly more likely than boys (2.50%) to attempt suicide (Hu et al., 2015). Liu and colleagues (2017) also found that 1.8% of girls and 1.3% of boys had suicide attempts in the past year from a survey of 11,831 Chinese adolescents in the Shandong province. The discrepancy in gender difference on suicide attempts maybe due to the characteristics of participants and region differences. As we mentioned above, this study was conducted in a single city of China. So the findings observed in this study may not represent the situations found in China, as a whole. Further studies are warranted to investigate the gender differences on suicide attempts between adolescents from different cultural backgrounds and different regions, in particular, to explore whether geographic locations and cultural backgrounds have moderating effects on suicidality.

FACTORS ASSOCIATED WITH SUICIDAL IDEATION AND SUICIDE ATTEMPTS

Comparisons Between Suicidal Individuals and Non-Suicidal Controls

As suggested by in previous studies (e.g., Baumeister, 1990; Brausch & Gutierrez, 2010; Klonsky & May, 2015; Nock, 2010;

Rogers & Joiner, 2017; Tatnell et al., 2014), the present findings showed that adolescents who had suicidal thoughts possessed lower problem-solving ability and experienced more rumination and depressive symptoms compared to non-suicidal controls. Some researchers have suggested that suicidal ideators habitually ruminate on negative events and feelings, which may induce emotional distress such as depression (Baumeister, 1990). These individuals, on the one hand, long to end this unbearable psychological distress and on the other hand, cannot find adaptive or constructive methods to cope with distress because of their impaired problem-solving abilities. Ultimately, suicide may be considered the only possible solution to ending this unbearable psychological distress. We need to note that, however, though the p value ($p = .024$) was significant for the difference between controls and ideators on lack of problem-solving, the Wald value (Wald = 5.06) was comparatively small and the confidence interval (i.e., between 1.00 and 1.01) for the OR value suggest the difference between the groups may not be clinically meaningful although the difference is statistically significant due to our large sample size. Therefore, we need to be cautious when explaining this result.

Additionally, though we found that suicide attempters also experienced higher levels of rumination and depressive symptoms than non-suicidal controls, we did not find differences between suicide attempters and non-suicidal controls in problem-solving ability. As suggested by some researchers (Joiner, 2005; Van Orden et al., 2010), suicide is fearsome and daunting, and individuals need to become competent at, fearless with, and courageous about death to actually attempt suicide. Therefore, after having taken a long time thinking about, rehearsing, and planning suicide, individuals who eventually attempt suicide may consider suicide an effective solution to end pain. They may also become self-efficient and decisive, and may have comparable levels of problem-solving ability as compared to non-suicidal controls.

Apart from intrapersonal factors, the results also showed that both suicidal ideators and attempters experienced more communication problems with their parents and more feelings of burdensomeness than non-suicidal controls. This is consistent with the results of previous studies (e.g., Garza & Pettit, 2010; Horton et al., 2016; Joiner, 2005; Van Orden et al., 2010) sug-

gesting that people who feel lonely and burdensome are more likely to engage in suicidality. According to these findings, adolescents who experience more family communication problems and more feelings of burdensomeness may lack reciprocal care and/or support from others, feel disconnected from others, and even believe that their death is worth more than their life to others. These individuals may consider suicide a method to end the distress of loneliness and to make others' lives easier (Van Orden et al., 2010).

Comparisons Between Suicide Attempters and Suicidal Ideators

Though some researchers have suggested that depressive symptoms can only enhance the risk for having suicide ideation but not for the risk for having suicide attempt (May & Klonsky, 2016), we found that suicide attempters experienced more severe depressive symptoms than suicidal ideators. Depressive symptoms have traditionally been regarded as important risk factors for suicidal attempts (Baumeister, 1990). It may be that the more emotional pain accumulated, the more likely people make actual suicide attempts to escape from their emotional distress. Indeed, some previous study has found that depressive symptoms were predictive of overall self-injurious behaviors, including NSSI, suicide threat, suicide gesture, and suicide attempts (Ireland & York, 2012). These results highlight the crucial role of depressive symptoms in overall suicidality.

Unexpectedly, we also found that suicide attempters experienced less rumination and family communication problems than suicidal ideators. With regard to rumination, it is possible that unlike suicidal ideators, who hesitate to die, suicide attempters may become more decisive than suicidal ideators and firmly believe that suicide is the only effective way to solve their problems (Joiner, 2005; Van Orden et al., 2010). It also may be that suicide attempters pay more attention to thinking about suicide rather than the negative events and feelings. Thus, suicide attempters may have lower levels of rumination as compared to suicidal ideators.

We also found that suicide attempters experienced less communication problems with their parents than suicidal ideators.

Although this result is unexpected, it is probably because parents may change their parenting behaviors when they know their children have attempted suicide. Some researchers have suggested that family caregivers play a key role in preventing their suicidal relatives from attempting suicide again (Chiang, Lu, Lin, Lin, & Sun, 2015). Thus, it is possible that in order to prevent the recurrence of suicide attempt, parents display more care to their children and use more appropriate ways to communicate with them. Because of the cross-sectional nature of our study, we cannot know the causal relationships between our study variables. Thus, we encourage future studies to use the longitudinal design or interviews to find out whether students' depressive symptoms and low quality of family connections occurred before their suicide attempts, or were consequences of their suicide attempts.

LIMITATIONS AND FUTURE DIRECTIONS

Our findings should be considered with several limitations in mind. First, though a large sample was recruited and logistic regression was used, the cross-sectional design precludes conclusions about the causal relationships between variables. Prospective designs involving a variety of psychosocial correlates are needed. As mentioned above, the longitudinal design and interview may also be used to find out whether there are differences on individual and familial factors before and after adolescents' suicidality, and whether changes in these factors facilitate or prevent suicide attempts. Second, all information was obtained from self-report, which is easily influenced by response bias. Additionally, some assessments used in the present study are not validated in China. Thus, future studies are encouraged to use assessments that have demonstrated good validity in China. Third, we relied on single-item measures to represent suicidal ideation and suicide attempts. The reliability of these single-item measures may be questionable. For example, though we added explanations of "the thought of/acting on ending life by yourself" following the questions assessing suicidal ideation and attempts ("Have you had suicidal ideation?" and "Have you attempted suicide?") when we conducted the assessment, the meaning of

suicidal ideation and attempts may still be vastly different across students. To avoid this kind of confusion, future work using multiple-item assessments may be beneficial. Fourth, in order to compare differences on various correlates for suicidality between suicide attempters, suicidal ideators, and non-suicidal controls, we categorized participants into these three separate groups of the same names. Specially, as long as participants reported suicide attempts, they would be classified into the suicide attempt group, even if they also reported suicide ideation. Thus, participants in the suicide attempt group actually had both suicide attempt and suicidal ideation. Since risk for suicidality most likely occurs on a continuum, this method used in the present study may not make full use of the data. Nevertheless, comparing between participants in the suicide attempt group who had both suicide attempt and suicidal ideation and those in the suicidal ideation group who had only suicidal ideation may provide us the information about which variables could differentiate suicide attempters from suicide ideators. Fifth, the computer-based procedure used in the present study did not allow participants to skip any item. This procedure, though can provide us more information about adolescents' mental health and suicidality, may also introduce response bias. Last but not least, this study was conducted in only one city of China. The findings of the present study may not be generalized to other regions in China.

CLINICAL IMPLICATIONS

Taken together, this study examined the prevalence of suicidality and investigated the associations between a variety of psychosocial correlates and suicidality based on data from a large sample of Chinese adolescents. This large sample of 30,644 students enabled us to get a better understanding of adolescent suicidality and helped clinical organizations and educational agencies design programs that can prevent adolescent suicidality. First, our study found that both suicidal ideation and attempts are fairly prevalent among Chinese adolescents. These high rates of adolescent suicidality call for more attentions to youth's mental health problems. Second, suicide correlates, especially more severe depressive symptoms, should be given special attention in clinical screening and intervention because they have been

found to be associated with both suicidal ideation and attempts, as well as the ability to facilitate the transition from suicidal ideation to suicide attempts. Moreover, since the development of suicidal ideation and the progression from ideation to attempts are two different processes, identifying which suicidal ideators are at the greatest risk of acting on their thoughts is a critical issue in suicide prevention (Klonsky & May, 2014; Klonsky, Qiu, & Saffer, 2017). Given the results that adolescents with less rumination, more severe depressive symptoms, and fewer communications problems with their parents were more likely to be suicide attempters rather than suicidal ideators, questions about suicidal ideators's rumination, depressive symptoms, and family communications may assist in determining high-risk versus low-risk individuals who may attempt suicide. Furthermore, school administrators should pay more attention to adolescent suicidality, because adolescents spend more time at school (Arnett, 2013). Specifically, they may use interventions and clinical techniques, such as Cognitive Behavioral Therapy for suicide, to improve adolescents' problem-solving skills, (Bryan, 2015). Also, we found that family communication plays an important role in the occurrence of both suicidal ideation and suicide attempts, school administrators should keep in touch and work with students' parents to improve parent-child relationship and decrease the risk for adolescent suicide.

REFERENCES

Antony, M. M., Bieling, P. J., Cox, B. J., Enns, M. W., & Swinson, R. P. (1998). Psychometric properties of the 42-item and 21-item versions of the depression anxiety stress scales in clinical groups and a community sample. *Psychological Assessment, 10*, 176–181. https://doi.org/10.1037/1040-3590.10.2.176

Appel, M., Holtz, P., Stiglbauer, B., & Batinic, B. (2012). Parents as a resource: Communication quality affects the relationship between adolescents' internet use and loneliness. *Journal of Adolescence, 35*, 1641–1648. https://doi.org/10.1016/j.adolescence.2012.08.003

Arnett, J. J. (2013). *Adolescence and emerging adulthood: A cultural approach.* New Jersey: Pearson Education.

Baumeister, R. F. (1990). Suicide as escape from self. *Psychological Review, 97*, 90–113. https://doi.org/0033-295X/90/S00.75

Black, D. R., & Frauenknecht, M. (1997). Developing entry-level competencies in school health educators: Evaluation of a problem-solving curriculum for stress management. *Education and Treatment of Children, 20*, 404-424.

Brausch, A. M., & Gutierrez, P. M. (2010). Differences in non-suicidal self-injury and suicide attempts in adolescents. *Journal of Youth and Adolescence, 39*, 233–242. https://doi.org/10.1007/s10964-009-9482-0

Brière, F. N., Rohde, P., Seeley, J. R., Klein, D., & Lewinsohn, P. M. (2015). Adolescent suicide attempts and adult adjustment. *Depression and Anxiety, 32*, 270–276.

Bryan, C. J. (2015). Cognitive behavioral therapy for preventing suicide attempts. NY: Taylor & Francis.

Cheung, Y.T.D., Wong, P.W.C., Lee, A. M., Lam, T. H., Fan, Y.S.S., & Yip, P.S.F. (2013). Non-suicidal self-injury and suicidal behavior: Prevalence, co-occurrence, and correlates of suicide among adolescents in Hong Kong. *Social Psychiatry and Psychiatric Epidemiology, 48*, 1133–1144.

Chiang, C. Y., Lu, C. Y., Lin, Y. H., Lin, H. Y., & Sun, F. K. (2015). Caring stress, suicidal attitude and suicide care ability among family caregivers of suicidal individuals: A path analysis. *Journal of Psychiatric and Mental Health Nursing, 22*, 792–800.

Conoley, J. C. (1995). Multicultural family assessment. In J. C. Conoley & E. B. Werth (Eds.), *Family assessment* (pp. 103–129). Lincoln, NE: Buros Institute of Mental Measurements.

Garza, M. J., & Pettit, J. W. (2010). Perceived burdensomeness, familism, and suicidal ideation among mexican women: Enhancing understanding of risk and protective factors. *Suicide and Life-Threatening Behavior, 40,* 561–573. https://doi.org/10.1521/suli.2010.40.6.561

Heppner, P. P., & Petersen, C. H. (1982). The development and implications of a personal problem-solving inventory. *Journal of Counseling Psychology, 29*, 66–75.

Horton, S. E., Hughes, J. L., King, J. D., Kennard, B. D., Westers, N. J., Mayes, T. L., & Stewart, S. M. (2016). Preliminary examination of the interpersonal psychological theory of suicide in an adolescent clinical sample. *Journal of Abnormal Child Psychology, 44*, 1133–1144. https://doi.org/10.1007/s10802-015-0109-5

Hu, J., Dong, Y., Chen, X., Liu, Y., Ma, D., Liu, X., . . . He, W. (2015). Prevalence of suicide attempts among Chinese adolescents: A meta-analysis of cross-sectional studies. *Comprehensive Psychiatry, 61*, 78–89. https://doi.org/10.1016/j.comppsych.2015.05.001

Hu, Z. K. (2016). Meta-analysis of the results of the mental health survey of middle school students in China from 2006 to 2016. M.A. Thesis. Liaoning: BOHAI University.

Ireland, J. L., & York, C. (2012). Exploring application of the Interpersonal-Psychological Theory of Suicidal Behaviour to self-injurious behaviour among women prisoners: Proposing a new model of understanding. *International Journal of Law and Psychiatry, 35*, 70–76. https://doi.org/10.1016/j.ijlp.2011.11.006

Joe, S., Baser, R. S., Neighbors, H. W., Caldwell, C. H., & Jackson, J. S. (2009). 12-month and lifetime prevalence of suicide attempts among Black adolescents in the national survey of american life. Journal of the American Academy of Child & Adolescent Psychiatry, *48*, 271–282.

Joiner, T. E. (2005). Why people die by suicide. Cambridge, MA: Harvard University Press.

Joiner, T. E., Pettit, J. W., Walker, R. L., Voelz, Z. R., Cruz, J., Rudd, M. D., & Lester, D. (2002). Perceived burdensomeness and suicidality: Two studies on the suicide notes of those attempting and those completing suicide. Journal of Social and Clinical Psychology, 21, 531–545.

Kang, N., You, J., Huang, J., Ren, Y., Lin, M. P., & Xu, S. (2018). Understanding the pathways from depression to suicidal risk from the perspective of the interpersonal-psychological theory of suicide. *Suicide and Life-Threatening Behavior*, 49, 684-694.

Klonsky, E. D., & May, A. M. (2014). Differentiating suicide attempters from suicide ideators: A critical frontier for suicidology research. *Suicide and Life-threatening Behavior, 44*, 1–5. https://doi.org/10.1111/sltb.12068

Klonsky, E. D., & May, A. M. (2015). The three-step theory (3ST): A new theory of suicide rooted in the "Ideation-to-Action" framework. *International Journal of Cognitive Therapy, 8*, 114–129. https://doi.org/10.1521/ijct.2015.8.2.114

Klonsky, E. D., Qiu, T., & Saffer, B. Y. (2017). Recent advances in differentiating suicide attempters from suicide ideators. Current Opinion in Psychiatry, 30, 15–20. https://doi.org/10.1097/YCO.0000000000000294

Law, B.M.F., & Shek, D.T.L. (2013). Self-harm and suicide attempts among young Chinese adolescents in Hong Kong: Prevalence, correlates, and changes. *Journal of Pediatric and Adolescent Gynecology, 26,* S26–S32.

Li, D., Zhang, W., Li, X., Li, N., & Ye, B. (2012). Gratitude and suicidal ideation and suicide attempts among chinese adolescents: Direct, mediated, and moderated effects. J*ournal of Adolescence, 35*, 55–66.

Liang, S. G., Yan, J., & Xue-Yin, F. U. (2013). Family function among middle school students with suicide attempt. Chinese *Journal of School Health, 1*, 49–51

Liang, S. G., Yan, J., Zhang, T., Zhu, C., Situ, M., Du, N., Fu, X., & Huang, Y. (2014). Differences between non-suicidal self injury and suicide attempt in Chinese adolescents. *Asian Journal of Psychiatry, 8*, 76–83. https:/doi.org/10.1016/j.ajp.2013.11.015

Liu, F. X., Cong, G. X., & Wang, X. (2009). Analysis on prevalence of suicide behaviors among middle school students in Hebei district, Tianjin. *Chinese Journal of Prevention and Control of Chronic Diseases, X*, 616–618.

Liu, X. C., Chen, H., Liu, Z. Z., Wang., J. Y., & Jia, C. X. (2017). Prevalence of suicidal behavior and associated factors in a large sample of Chinese adolescents. *Epidemiology and Psychiatric Sciences, 12,* 1–10. https://doi.org/10.1017/S2045796017000488

May, A. M., & Klonsky, E. D. (2016). What distinguishes suicide attempters from suicide ideators? A meta-analysis of potential factors. *Clinical Psychology: Science and Practice, 23*, 5-20.

Merrick, J. (2011). Trends in adolescent suicide in Israel. *International Journal of Adolescent Medicine and Health, 12*, 245–248. https://doi.org/10.1515/IJAMH.2000.12.2-3.245

Nock, M. K. (2010). Self-injury. *Annual Review of Clinical Psychology, 6*, 1–25. https://doi.org/10.1146/annurev.clinpsy.121208.131258

Olson, D. H., McCubbin, H. I., Barnes, H., Larsen, A., Muxen, M., & Wilson, M. (1992). *Family inventories* (2nd revision). St Paul, MN: Family Social Science, University of Minnesota.

Rogers, M. L., & Joiner, T. E. (2017). Rumination, suicidal ideation, and suicide attempts: A meta-analytic review. *Review of General Psychology, 21*, 132–142. https://doi.org/10.1037/gpr0000101

Roh, B. R., Jung, E. H., & Hong, H. J. (2017). A comparative study of suicide rates among 10–19-year-olds in 29 oecd countries. *Psychiatry Investigation, 15,* 376–383.

Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton University Press, New Jersey.

Sales, J. M., Milhausen, R. R., Wingood, G. M., Diclemente, R. J., Salazar, L. F., & Crosby, R. A. (2007). Validation of a parent-adolescent communication scale for use in STD/HIV prevention interventions. *Health Education and Behavior, 35*, 332–345. https://doi.org/10.1177/1090198106293524

Schoofs, H., Hermans, D., & Raes, F. (2010). Brooding and reflection as subtypes of rumination: Evidence from confirmatory factor analysis in nonclinical samples using the dutch ruminative response scale. *Journal of Psychopathology and Behavioral Assessment*, *32*, 609–617.

Singer, J. B., O'Brien, M. M., & Lecloux, M. (2017). Three psychotherapies for suicidal adolescents: Overview of conceptual frameworks and intervention techniques. *Child and Adolescent Social Work Journal, 34*, 95–106.

Shen, Z. L., & Cai, T. S. (2008). Disposal to the 8th item of rosenberg self-esteem scale (Chinese Version). *Chinese Mental Health Journal, 22*, 661–663

Stewart, J. G., Esposito, E. C., Glenn, C. R., Gilman, S. E., Pridgen, B., Gold, J., & Auerbach, R. P. (2017). Adolescent self-injurers: Comparing non-ideators, suicide ideators, and suicide attempters. *Journal of Psychiatric Research, 84*, 105–112. https://doi.org/10.1016/j.jpsychires.2016.09.031

Tang, T. C., Ko, C. H., Yen, J. Y., Lin, H. C., Liu, S. C., Huang, C. F., & Yen, C.-F. (2009). Suicide and its association with individual, family, peer, and school factors in an adolescent population in southern taiwan. *Suicide and Life-Threatening Behavior, 39*, 91–102.

Taouk, M., Lovibond, P. F., & Laube, R. (2001). *Psychometric properties of a Chinese version of the short depression anxiety stress scales (DASS21)*. Paper presented at the Sydney: New South Wales Transcultural Mental Health Centre, Cumberland Hospital.

Tatnell, R., Kelada, L., Hasking, P., & Martin, G. (2014). Longitudinal analysis of adolescent NSSI: The role of intrapersonal and interpersonal factors. *Journal of Abnormal Child Psychology, 42*, 885–896. https://doi.org/10.1007/s10802-013-9837-6

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research, 27*, 247–259. https://doi.org/10.1023/A:1023910315561

Van Orden, K. A., Cukrowicz, K. C., Witte, T. K., & Joiner, T. E. (2012). Thwarted belongingness and perceived burdensomeness: Construct validity and psychometric properties of the interpersonal needs questionnaire. *Psychological Assessment*, *24*, 197–215. https://doi.org/10.1037/a0025358

Van Orden, K. A., Witte, T. K., Cukrowicz, K. C., Braithwaite, S. R., Selby, E. A., & Joiner, T. E., Jr. (2010). The interpersonal theory of suicide. *Psychological Review, 117*, 575–600. https://doi.org/10.1037/a0018697

Warton Economic Institute. (2019). China's Top 100 Cities List. http://www.warton.com.cn/hdbd/index_34.html

Winterrowd, E., Canetto, S. S., & Chavez, E. L. (2011). Friendship factors and suicidality: Common and unique patterns in Mexican American and European American youth. *Suicide and Life-threatening Behavior, 41*, 50–65. https://doi.org/10.1111/j.1943-278X.2010.00001.x

World Health Organization. (2014). Mental Health: Suicide data. http://www.who.int/mental_health/prevention/suicide/suicideprevent/en/

Yang, B., & Clum, G. A. (2011). Life stress, social support, and problem-solving skills predictive of depressive symptoms, hopelessness, and suicide ideation in an Asian student population: A test of a model. *Suicide and Life-Threatening Behavior, 24,* 127–139.

You, J., & Lin, M. P. (2015). Predicting suicide attempts by time-varying frequency of nonsuicidal self-injury among Chinese community adolescents. *Journal of Consulting and Clinical Psychology, 83*, 524–533. https://doi.org/10.1037/a0039055

Zhai, H., Bai, B., Chen, L., Han, D., Wang, L., & Qiao, Z., . . . Yang, Y. (2015). Correlation between family environment and suicidal ideation in university students in China. *International Journal of Environmental Research and Public Health, 12*, 1412–1424. https://doi.org/10.3390/ijerph120201412

Zhang, C. L., & Zhou Z. K. (2015). passive social network site use, social anxiety, rumination and depression in adolescents. *Chinese Journal of Clinical Psychology, 26*, 490–497.

Zhang, D. Y., Zhu, Z. G., Liu, G. Z., & Li Y. (2019). The relationship between social support and problem behavior of adolescents: Mediating roles of psychological quality and self-esteem. *Journal of Southwest University, 45*, 99–104.

Zhang, X., Ren, Y., You, J., Huang, C., Jiang, Y., Lin, M. P., & Leung, F. (2017). Distinguishing pathways from negative emotions to suicide ideation and to suicide attempt: The differential mediating effects of nonsuicidal self-injury. *Journal of Abnormal Child Psychology, 45*, 1609–1619. https://doi.org/10.1007/s10802-017-0266-9