#### Article

# How Would Different Types of Negative Life Events Predict Adolescents' Suicidal Ideation? An Empirical Study Based on the Western Region of China

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Abstract: Background: We attempted to find if there were gender differences in different types of Negative life events and Suicidal ideation among Chinese adolescents, then analyze the relationship between different types of Negative life events and Suicidal ideation among these young students. Methods: Based on the data from 6 middle-schools and 3 universities in 3 cities of Western China, the gender difference in different types of Negative life events and Suicidal ideation and their related factors were investigated and analyzed in the study. Results: Gender differences were found during different types of Negative life events and Suicidal ideation; Negative life events could predict the intensity of Suicidal ideation by gender, to some specific types. Conclusions: Negative life events were proved to be risk factors of adolescents' Suicidal ideation regardless of different gender stereotypes, but the specific classification of negative life events which had significant impact on adolescents' Suicidal ideation also indicated significant gender divisions. For males, negative life events of punishment and adaptation had a significant and boosting impact on their Suicidal ideation, the higher the scores of punishment and adaptation negative life events had, the greater intensity of male adolescents were to have Suicidal ideation. Thus, the above two types of negative life events may be the main stressors predicting male adolescents' Suicidal ideation; For females, in addition to punishment, other types of negative life events all had significant impacts on their Suicidal ideation, which can be treated as the main stressors to trigger female adolescents' Suicidal ideation; Additionally, parents' marital status of remarriage and divorce were proved to be significant indicators to adolescents' Suicidal ideation, the age variable was proved to be strongly correlated with Suicidal ideation among female adolescents.

Keywords: negative life events; suicidal ideation; suicidalogy; adolescents; gender difference

# 1. Introduction

Suicidal problem is one of the leading causes of human disability or death worldwide, accounting for 1.4% of the annual deaths globally [1]. Specifically, its risk and impacts are constantly worsening in the youth group [2]. In the past 40 years, suicidal behavior and its related factors have been paid more and more attention by scholars and researchers in various fields [3,4]. In China, the problem of suicide among adolescents, has been proved to be more severe compared to Western studies [5,6], yet its mechanism have been widely studied only in specific countries and regions (such as North America

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and Europe) where the majority of the population is Caucasian [3–6]. This has resulted in much of theory on suicidal behaviors as well as the clinical implications to be based on Western populations, which largely ignores the nuances found in other cultural contexts.

With the deepening of the impact brought by the acceleration of internationalization of research in related fields nowadays, studies on suicidal behavior has emerged in succession under the background of non-Western culture and data [7–11], which provided new results and ideas different from western research for the future development of research in this field. Relevant studies in China have found that the suicidal phenomenon of adolescents between 14–28 years old is particularly prominent among highschool students and university students, plus an obvious trend of younger age [12]. Not to be outdone, international studies indicated that adolescents were more likely to have suicidal behavior than other age groups [3,4]. Thus, the World Health Organization defines them as adolescents between 10 and 24 years old, belonging to the high-risk group prone to suicidal intitiatives and follow-up behavior [1].

However, the emergence of suicidal behavior is not immediately triggered by the occurrence of stressful life events or external stimulation events, but needs to get through a relatively slow cumulative process of mutual influence and transformation of both internal and external psychological factors. The National Institute of Health (NIH) of the United States divided suicidal behavior into suicidal tendency / ideation, suicidal attempt / failure and suicidal death according to different psychological stages within. Foremost among these is Suicidal ideation, which means that an individual has the desire and motivation to seek death, but has not yet taken any practical action. It is an early psychological initialization of suicide attempts and suicide death, which appears before the actual suicidal behavior as a precursor [13]. According to a follow-up study, 5% people who had suicide ideation would choose to engage actual suicidal behavior afterwards[14]. Therefore, suicidal ideation could possibly act as an predictive role in subsequent suicidal behavior, and this study on suicidal ideation and its impacting factors could be helpful to screen out high- risk groups among adolescents, then effective and timely preventions could be undertaken to reduce complications and mortality.

On the other hand, negative life events, which refers to the unpleasant events that occured in one's living environment (e.g., family, study, work, etc.), then produce negative psychological, physiological and behavioral reactions or feedbacks to their own body and mind [15], were proved to perform a significant impact on the physical and mental health of individuals, moreover, were closely related to the occurrence of suicidal ideation and subsequent behaviors. The psychological cumulative effect which negative life events brought was found to be one of the most critical reasons for adolsecents to engage into actual suicidal acts [16]. Relevant studies have demonstrated that the life stress brought by negative life events played as a unique role throughout the whole mechanism of suicide behavior, indiacting that individuals with higher life stress tended to have a higher prevalence of suicidal ideation [17].

From the literature review of suicidal ideation and negative life events above, we might be able to infer that there is a close relationship existing between them. For instance, McAuliffe found that people who often experience great pressure or negative influence events in their daily life are more likely to have suicidal ideation [18]; Moreover, studies on different groups of people have proved that negative life events were closely related to individual suicidal ideation, and there might be a significant positive correlation existing [19–21]. Although we can infer from previous studies that negative life events could probably aggravate the possibility of suicidal ideation among adolescents to a certain extent, due to the complexity of the structure and source of negative life events, whether different types of negative life events could perform different effects on suicidal ideation of adolescents still needs to be further investigated and confirmed, meanwhile, gender different genders has not been compared yet.

As such, this study would like to do descriptive analysis of suicidal ideation and negative life events among adolescents of different genders as the first step. The direct effects of negative life events and their specific dimensions on the suicidal ideation of adolescents of different genders were about to be testified as the second step.

# 2. Materials and Methods

#### 2.1. Participants

Participants consisted of a total of 2018 highschool and university students (803 males, 1215 females,  $M_{age}$  = 17.8 years, age range: 11–25 years) who were recruited to complete questionnaires from 6 highschools and 3 universities in China. Parents or legal guardians gave permission for students' participation by signing consent forms. The study was approved by the institutional ethics review board within the university and the schools where the research was conducted.

#### 2.2. Measures

Suicidal ideation. The scale of Suicidal Ideation (SSI) developed by Beck (1979) was used to assess adolescents' Suicidal behaviors [22]. Consisting of 14 items measuring participants' suicidal ideation (e.g., I think suicide can end the current pain, I have taken some strange or dangerous drugs to suicide on purpose, etc) on a 5-point Likert scale, 1 means completely disagree, 5 means completely agree. Higher scores indicate stronger suicidal ideation intensity. The SSI ( $\alpha = 0.81$ ) have showed great reliabilities.

Negative life events. The Adolescent Self-Rating Negative Life Events Check-list (ASNLEC) was used to examine negative life events [23]. This scale consists of 27 items that contains 6 demensions including; interpersonal relationships (e.g., got misunderstood or wronged, got discriminated against or treated coldly), learning pressures (e.g., failure in the exam), punishment (e.g., got criticized or punished at school), loss (e.g., sudden death of relatives or friends, got stolen or lost items), adaptation (e.g., transfer or suspension, major changes in daily routines), and other (e.g., family financial problems). The original scale asks participants to rate each item on a 5-point likert scale in terms of the degree of impact each even had on their life from "no impact" to "extremely severe". The scale was adapted in the present study to accommodate participants' age and better distinguish the relative impact of negative life events. In this study, participants were asked to rate each life event on a 3-point Likert scale; "never happened", "happened with little effect", and "happened with mass effect". The total score of negative life was calculated as the sum of scores where higher scores indicated greater impact of negative life events indicated greater impact of negative life events indicated greater impact of negative life events indicated greater impact of negative life events.

Meanwhile, the relevant factors were extracted by the principal component method, and then rotated by the maximum variance method. A total of 5 factors were extracted. Since then, our study found that the 5 - factor model also met the numerical requirements of the fitting index test without changing the original 6 - factor connotation previously defined by the original scale makers, and the fitting index result was more ideal than the 6 - factor model. The correlation coefficient of 5 - factor model was 0.694 ~ 0.788 (P < 0.01), and the structure validity was better. In terms of structure and content, compared with the original 6-factor model, the 5-factor model removes the "other types" factor. Therefore, it can be concluded that the negative life event scale used in the study is a first-order 5 dimensional scale in measuring the negative life event stress of adolescents. In the current study, the modified ASNLEC demonstrated excellent reliability ( $\alpha = 0.87$ ).

The measurement involves the following 5 types of Negative life events: 1) Punishments. The measurement indexes included punitive results such as criticism or punishment, violation of discipline and law, etc.; 2) Study stress. The measurement indexes include examinations, academic performance pressure, etc.; 3) Losing. The outcome measures included: the mental or actual loss of family members, such as serious illness, death or loss of property; 4) Interpersonal relationship. The measurement indexes mainly included the results of interpersonal relationship, such as being wronged, discriminated or ignored, tense relationship with family and friends, etc.; 5) Adaption. The measurement indexes mainly included the results of the sudden changes of life rules, the absence of family members and relatives, etc.

# 2.3. Data Collection

The present study employed a combination of convenience sampling to recruit teachers within 6 highschools and 3 universities who expressed interest in having their students participate in this study. Within the schools, stratified sampling was used to recruit participants to complete measures to ensure equal representation of gender as well as different grade levels within middle school (from grade 2 in middle school to grade 4 in university). All questionnaires were anonymous. A total of 2400 questionnaires were distributed and 2018 valid questionnaires were recovered therefore the consent rate in the present study was 87.83%.

### 2.4. Data Analysis Strategy

Single factor ANOVA analysis was adopted to analyze the gender differences in negative life events and suicidal ideation intensity amongst adolescents.

Furthermore, a a step-wise linear regression was used to examine whether negative life events (Step 1), and controlled demographic variables (Step 2) were predictive of Suicidal ideation (Model 1–2) for both genders.

Specifically, model 1–2 (M = male; F = female) regarded the score of suicidal ideation intensity as the dependent variable. Model 1 included negative life events as independent variables; model 2 included controlled demographic variables such as gender, age, whether the only child in the family or not and parents' marital status on the basis of model 1 for further regression analysis. Moreover, the impact of negative life events on suicidal ideation of both genders were established in model regression as well as its significance was verified. Please refer to Table A1 and Figure A1 for details.

# 3. Results

Table A2 illustrated the descriptive analysis results of suicidal ideation and different types of negative life events of adolescents for both genders. Significant gender differences were found in suicidal ideation and negative life events (F = 2.12, 9.198; p < 0.001); Moreover, as negative life events were divided into 5 different types, except for the demension of adaption reported no significant gender difference, other 4 types of negative life events all indicated male students with higher significance of gender difference than female students (F = 6.803, 2.777, 5.277, 9.924; p < 0.001, p < 0.1, p < 0.05, p < 0.01). Please refer to Table 2 for detailed information.

Table A3 demonstrated the impacts of negative life events on suicidal ideation among adolescents of different genders. As for male students, the results of model 1M and 2M indicated that only 2 types of negative life events had significant positive impacts on their suicidal ideation. Specifically, the impacts mainly focused on the punishments and adaption of negative life events (0.173, 0.175, P < 0.001), indicating that with more negative life events about punishments and adaption come more suicidal ideation intensity generated among males. With the addition of control variables afterwards, the coefficient and significance of punishments' positive impact on male students' suicidal ideation did not change significantly, but the coefficient and significance of adaption's positive impact on male suicidal tendency greatly decreased (0.130, P < 0.05). Among the control variables, parents' marital status as remarriage and divorce variables had significant positive impacts on males' suicidal ideation (0.061, P < 0.1; 0.084, P < 0.05). In addition, adjusted R<sup>2</sup> and F values increased significantly, which proved that with the addition of the control variables, the explanatory power of the related model got reinforced.

As for female students, the results of model 1F and 2F reported that several types of negative life events also had significant positive impacts on the suicidal ideation, but the specific types of impacts were distinct with males. Particularly, the impacts were mainly concentrated in study stress, interpersonal relationship, losing and adaptation (0.138,

0.162, p < 0.001, 0.061, 0.045, p < 0.05), indicating that with more negative life events about study stress, interpersonal relationship, losing and adaption come more suicidal ideation intensity generated among females. With the addition of control variables afterwards, the coefficient and significance of adaption' positive impact on female students' suicidal ideation increased (0.116, P < 0.01), while the impact and significance of other negative life events on female students' suicidal ideation did not change significantly. Among the control variables, only age and parents' marital status had significant impact on female students' suicidal ideation. In addition, adjusted R<sup>2</sup> and F values significantly increased, which indicated that with the addition of the control variables, the explanatory power of the related model got reinforced as well.

# 4. Discussion

The results from different genders confirmed that negative life events could act as risk factors for the aggravation and deterioration of adolescents' suicidal ideation. The results of this study were proved to be consistent with relevant studies. In daily activities, people who often encounter negative life events, especially teenagers, were more likely to have suicidal ideation [18] [24] as a stressor of malignant psychology and behavior.

However, differ from existing studies, this study found that male students tended to engage suicidal behaviors according to the degree of significant influence of negative life events as following orders: punishments and adaptation. While other types of negative life events indicated no significant impact on their suicidal ideation. Possible explanations to the results above might be as follows: firstly, it is related to the personality characteristics of different genders. Male students usually act lively, rebellious and difficult to discipline, while female students usually behave more obedient than the former. In the school environment that emphasizes collective discipline and order and the family with strict family education, male students could be therefore naturally punished more frequently than females, which led to more vulnerability to the impact of punishments from negative life events, and thus more prone to suicidal ideation than females [25]; Secondly, it might be related to the "gender stereotype" that has always been considered in Chinese social culture. Mass subconsciousness from the society would prefer to regard that males have stronger psychological endurance and aggressiveness than females. Women are generally considered to be gentle and mild. This kind of gender stereotype has just led to people's preconceived biased thinking or behavior towards female students. The education and lessons of male students in China could be more severe, which may lead to male students being exposed to more frequent and severe punishment events. In other words, the impact of punishing negative life events on male students' suicidal ideation were more significant and frequent than that of females' [26]. In addition, the adaptive negative life events represented by long-term seperation from family members and inability to reunite also had a significant positive impact on male adolescents' suicidal ideation, which could be fully explained in relevant studies: Taking the study of Zhao as an example, among adolescents who had long-term distance from family members, males were more likely to have mental health problems because of more introverted and neurotic [27]. Moreover, male students were not as good as females in terms of intellectual development and environmental adaptability as age growed, and they were more likely to become withdrawn, self abased and have lower anticipation in self-evaluation. The above psychological factors are the risk factors that could trigger adolescents' health risk behaviors and even suicidal ideation. However, no gender difference was found in adolescents who spent more time living with their families [28].

Meanwhile, different types of negative life events that perfomed significant impacts on female students' suicidal ideation varied considerably from males, which could be summarized as follows: interpersonal relationship, study stress, losing and adaptation. The possible explanation to interpret could be: firstly, compared with male students, females' psychological sensitivity and obedience were reported to be higher. Thus, male students might simplify the problem solving and would not have a greater impact on their own psychological condition after the conflict occured, but female students' weakening and absorbing ability of interpersonal conflict is worse because of their higher psychological sensitivity. Their psychological state is more likely to be significantly affected by negative life events such as interpersonal relationship, which could lead to suicidal ideation afterwards [29]. Secondly, female students were reported to be more obedient to school system management than males as mentioned above. In the face of negative life events such as study stress, male students might also took resistance and other ways to deal with them, while female adolescents would be more obedient. More female students have chosen to accept the impact of negative life events from school, whether the impact could be harmful or not, so they would bear the impact of greater study stress on their psychological state. If their own psychological adjustment was not appropriate, they were more likely to engage suicidal ideation [30]. Thirdly, in the face of negative life events such as the death of relatives or the loss of items, females were more vulnerable to negative psychological impacts because of their higher psychological sensitivity and weak psychological endurance, thus enhancing the possibility and risk of emerging suicidal ideation [31]. Lastly, notwithstanding relevant studies have found that male students who often got affected by adaptive negative life events were more likely to emerge suicidal ideation, studies have also found that female students who were negatively affected by adaptive negative life events could engage health risk behaviors and even suicidal ideation, only lower risky level and significance comparing with male students. However, it is sufficient to prove that adaptive negative life events could be one of the risk factors threatening female students' suicidal ideation [32].

Additionally, parents' marital status from demographic variables perfromed a significant impact on the suicidal ideation of both genders. Specifically, the risky level of suicidal ideation of the adolescents whose parents' marital status was remarried or divorced was found to be higher comparing with the students whose parents' marital status was first marriage. This result is consistent with relevant studies showing that the growth and development of children's psychological status might be affected by their parents' marital status. For instance, children from non-native families would probably express more psychological anxiety, hostility, loneliness, impulsivity, difficulty in communicating with others, etc.; as they were more likely to show problematic personality traits such as neuroticism or concealment; in terms of personality traits, they might also show too introverted or extroverted, which could easily lead to polarization of personality traits. The above psychological factors would also lead to the negative coping style of adolescents in the background of non-native families, which would possibly cause higher suicidal ideation [33,34]. These results indicate that the mental health status of adolescents in remarried or single parent families should be paid more attention, especially their suicidal behaviors. Meanwhile, the impact of age on the suicidal ideation of different genders was found to be quite different. As for males, age didn't perform a significant impact on their suicidal ideation. Contrarily, older female students were less likely to emerge suicidal ideation than younger ones. This conclusion is in line with the research expectation and could be supported with the development of physical condition and the maturity of the psychological level, older adolescents tended to solve problems in a rational and non extreme way, rather than hurting themselves or even emerging suicidal ideation, thoughts or attempts [35].

# 5. Conclusions

To conclude, negative life events were proved to be indispensable risk factors for adolescents' suicidal ideation of both genders, but the specific classification of negative life events that had significant impacts on adolescents' suicidal ideation also had obvious discrepencies due to gender differences.

Firstly, for male students, the impact of punishments and adaptive negative life events on their suicidal ideation were proved to be positive and significant, the higher the score of punishments and adaptive negative life events, the greater the possibility and risk of male adolescents' suicidal ideation could emerge. Therefore, the above two types of negative life events were found to be the main stressors of male adolescents' suicidal ideation.

Secondly, other negative life events have significant positive impacts on female students' suicidal ideation except for punishments, which could be triggered as the main stressors to impact female adolescents' suicidal ideation.

Thirdly, parents' marital status of remarriage and divorce were proved to be significant indicators to adolescents' suicidal ideation, the age variable was proved to be strongly correlated with suicidal ideation among female adolescents.

### 6. Implications and Contributions

This is the first evidence-based study revealed differences by gender in the relationship between different types of negative life events and suicidal ideation among adolescents in Western China. The results revealed a gender pattern in the relationship of different types of negative life events with suicidal ideation among Chinese adolescents. We found gender difference in suicidal ideation and different categories of negative life events will change into different risk factors. These findings will be helpful to enrich existing literature on negative life events and health risk behaviors especially suicidal behaviors among Chinese adolescents, and emphasize the need for continued efforts to explore life-threatning behaviors across various cultures and societies. Results also emphasized the need for gender-specific interventions for Chinese adolescents.

**Author Contributions:** M.X. contributed to the conceptualization of this study as well as data collection, translation, and drafted the manuscript. X.Y. contributed to the funding of this project. K.L. contributed to data collection and analysis. All Authors had read and approved the manuscript as well as agreed about its content and the decision to submit for publication.

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**Institutional Review Board Statement:** The study was conducted according to the guidelines of the Declaration of Helsinki, and approved by the School of Public Policy and Management, Xi'an Jiaotong University (Protocol Number: 18225; approved on May 1, 2017; exempt protocol approval expiry–May 1, 2022).

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** The data that support the findings of this study are available from the Institute for Population and Development Studies at Xi'an Jiaotong University, but ethical restrictions of Xi'an Jiaotong University apply to the availability of these data, which contains privacy variables that might affect the growth of adolescents' mental health and were used under license for the current study, and so are not publicly available. Data are however available from the corresponding author upon reasonable request and with permission of the Institute for Population and Development Studies at Xi'an Jiaotong University.

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Conflicts of Interest: The authors all declare that they have no competing interests.

#### Appendix **B**

Table A1. Specific information of related models and steps.

Dependent Variables	Models	Independent Variables
Suicidal Ideation	Model 1M (Step 1)	Negative Life Events (5 TYPES)

# Intensity Model 2M (Step 2) Model 1F-2F

Negative Life Events (5 TYPES) + Demographic variables (Gender, age, only child or not, parents' marital status) Same procedure as above



Figure A1. Impacting model of 5 types of Negative Life Events on Suicidal Ideation amongst Adolescents.

Table A2. Descriptive analysis results.

	Male ( <i>N</i> = 803)		Female ( <i>N</i> = 1215)	
	Min/Max	Mean (SD)	Min/Max	Mean (SD)
Suicidal ideation inten- sity	1/5	1.53 (0.88)	1/5	1.41 (0.68)
-		F = 2.1	12***	
Negative life events (Overall)	1/5	1.79 (0.65)	1/5	1.67 (0.57)
	$F = 9.198^{***}$			
Punishments	1/5	1.60 (0.71)	1/5	1.36 (0.51)
	$F = 6.803^{***}$			
Study stress	1/5	2.24 (0.77)	1/5	2.18 (0.69)
	F = 2.777 +			
Losing	1/5	1.63 (0.62)	1/5	1.58 (0.54)
	$F = 5.277^*$			
Interpersonal relationship	1/5	2.18 (0.74)	1/5	2.08 (0.65)
	$F = 9.924^{**}$			
Adaption	1/5	1.85 (0.71)	1/5	1.82 (0.59)
		F = 1.	.135	

+ p < 0.1; \* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

Table A3. Impacts of different types of negative life events on suicidal ideation.

Independent variables	Suicidal ideation for males ( <i>N</i> = 803)		Suicidal ideation for females (N = 1215)	
Dependent variables	Model 1M	Model 2M	Model 1F	Model 2F
Punishments	0.173***	0.197***	0.057	0.030

Study stress	0.009	0.014	0.138***	0.107***
Losing	0.055	0.021	0.061*	0.078*
Interpersonal relationship	-0.006	0.014	0.162***	0.143***
Adaption	0.175**	0.130*	0.045*	0.116**
<b>Control variables</b>				
Age		0.031		-0.149**
Studying period: University (Highschool)		0.059		0.013
Only child or not: no (yes)		0.016		-0.004
Parents' marital status: Re- marriage (First marriage)		0.061+		0.013*
Divorced (First marriage)		0.084*		0.022**
Widowed (First marriage)		0.042		0.028
df	5	11	5	11
Adjusted R <sup>2</sup>	0.133	0.236	0.136	0.148
F	25.671***	46.494***	39.267***	48.675***
Observations	802	802	1214	1214

M = male; F = female. All regression coefficients reported are standard. + p < 0.1; \* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

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