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Gratitude and suicidal ideation and suicide attempts among Chinese Adolescents: Direct, mediated, and moderated effects

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A B S T R A C T

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In a sample of 1252 Chinese adolescents (mean age = 15.00 years), this study examined the direct relations between gratitude and adolescents' suicidal ideation and suicide attempts. This study also examined indirect relations between gratitude and suicidal ideation and suicide attempts via two self-system beliefs—coping efficacy and self-esteem. Finally, this study examined the extent to which stressful life events moderated the direct and indirect relations between gratitude and suicidal ideation and suicide attempts. The odds of suicidal ideation and suicide attempts were lower among adolescents who scored higher on gratitude, after controlling for demographic variables. Self-esteem mediated the relations between gratitude and suicidal ideation and suicide attempts, while the mediating role of coping efficacy was not significant. Moreover, stressful life events moderated the mediated path through self-esteem. This indirect effect was stronger for adolescents low on stressful life events than that for those high on stressful life events. This study discusses the theoretical and practical implications of these findings.

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With the advent of positive psychology, gratitude has received increasing attention among psychologists from social, personality, clinical, and developmental perspectives alike. A large body of research has shown that gratitude is positively associated with adults' subjective well-being, social behavior, and prosocial behavior, while it is negatively associated with depression and physical symptoms (see Wood, Froh, & Geraghty, 2010 for review). Recently, scholars have argued that it is necessary to explore the benefits of gratitude to adolescents' development (Froh, Miller, & Snyder, 2007). Several studies have found that gratitude is a viable path for promoting a variety of positive outcomes in adolescence, including increased academic achievement, better social and emotional functioning (Bono & Froh, 2009; Froh, Bono, & Emmons, 2010; Froh, Sefick, & Emmons, 2008; Froh, Yurkewicz, & Kashdan, 2009).

Nonetheless, our understanding of the association between gratitude and adolescent development is limited in several ways. First, work is needed that extends the indicators of adolescent development (Wood et al., 2010), as well as examines youth correlates of gratitude in cultural backgrounds other than the North American cultural context. Second, very few studies, if any, have examined the mediating processes between gratitude and adolescent development (Watkins, Van Gelder, & Frias, 2009; Wood et al., 2010; Wood, Joseph, & Linley, 2007). Finally, there is a paucity of research examining whether the direct and indirect associations between gratitude and adolescent development depend on other factors (Froh & Bono, 2008; Froh, Kashdan, Ozimkowski, & Miller, 2009; Froh, Yurkewicz et al., 2009; Watkins et al., 2009). For example, would youth under more stress harvest less benefit from gratitude compared to others who experience low stress? In the present study, we

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build on and contribute to the small adolescent gratitude literature in several respects. Specifically, we examine the gratitude and suicidal ideation and suicide attempts among Chinese adolescents. We second examine processes such as self-system beliefs that might explain relations between gratitude and suicidality. Finally, we tested the hypothesis that the direct or indirect associations between gratitude and suicidality would vary as a function of recent stressful life events.

Examining the link between gratitude and suicidality

Grateful disposition can be defined as “a generalized tendency to recognize and respond with grateful emotion to the roles of other people’s benevolence in the positive experiences and outcomes that one obtains” (McCullough, Emmons, & Tsang, 2002). As a kind of positive emotion, gratitude has been viewed as an important psychological resource for individuals. According to the broaden and build theory of positive emotions (Fredrickson, 2004), gratitude appears to broaden individuals’ momentary thought-action repertoires and build their enduring personal resources, thus promoting growth and development in their life. In support of this view, researchers have found that gratitude is associated with a wide variety of developmental indicators in adolescence, including subjective well-being, prosocial behavior, peer bonds, and physical symptoms (Bono & Froh, 2009; Froh et al., 2010, 2008; Froh, Yurkewicz et al., 2009).

One weakness in much of the extant research on gratitude and adolescent development has been a nearly exclusive focus on gratitude promoting the positive aspect of development instead of preventing negative outcomes. This is problematic because positive and negative developmental outcomes are often not two ends of a single continuum but two distinct and only partly related dimensions (Rashid & Anjum, 2007). The present study addresses this gap by incorporating suicidal ideation and suicide attempts into the examination of the association between gratitude and adolescent development. Suicidal ideation refers to “any self-reported thoughts of engaging in suicide related behavior”. Suicide attempts are “a potentially self-injurious behavior with a nonfatal outcome, for which there is evidence (either explicit or implicit) that the person intended at some (nonzero) level to kill himself/herself” (Goldsmith, Pellmar, Kleinman, & Bunney, 2002; O’Carroll et al., 1996). Both suicidal ideation and suicide attempts are associated with increased risk for future completed suicide. For convenience, we use the term “suicidality” throughout this paper to refer both suicidal ideation and suicide attempts, as context requires. Although the concept of suicidality is narrower than the concept of “negative aspect of development”, there are two reasons why we choose this variable. First, adolescent suicidality is a major public health problem not only in China but in many industrialized countries as well. As an illustration, the 2005 National Survey on Adolescent Health Risk Behavior estimated that 20.6%, 6.7%, and 3.0% of Chinese youth reported suicidal ideation, suicide plan, and suicide attempts, respectively (Ji & Chen, 2009). Second, no previous studies on gratitude have focused on this adolescent outcome and examining it may provide important insights for the generalizability of the benefits of gratitude. As was previously noted, gratitude has been shown to be positively associated with adolescents’ subjective well-being, prosocial behavior, and peer bonds, while negatively correlated with physical symptoms (Bono & Froh, 2009; Froh et al., 2008; Froh, Yurkewicz et al., 2009). Given that suicidality is one aspect of well-being, we tentatively anticipate that adolescents high in gratitude are at a decreased risk of developing suicidal ideation and suicide attempts.

In addition, despite growing interest in gratitude and adolescent development, most studies have examined adolescents in the United States. Few studies have investigated gratitude and its association with adolescent development in Asian or African culture. Chinese people represent for example 20% of the world’s population whereas the United States population is 5 times smaller. In fact, researchers have recently called attention to the fact that although the United States represents only a small proportion of the world’s population, too many psychological research is on individuals from the United States. The narrowness of the sample upon which most psychological research has been conducted raises important questions about the generalizability of this research (Arnett, 2008; Heine & Buchtel, 2009). Furthermore, gratitude, like other emotions, is deeply embedded in cultural frameworks (Cohen, 2006). Compared with those from individualistic cultures, people in collectivistic cultures appear to tie gratitude to indebtedness and obligation to reciprocate others to a greater degree (Cohen, 2006; Kee, Chen, & Tsai, 2008). For example, one of the Chinese proverbs states “a drop of water shall be returned with a burst of spring” (滴水之恩, 当涌泉相报), which means to return the favor with all you can when others are in need, even if it was just a little help from others. In Chinese societies, this may help to maintain harmony within the group by creating and nurturing interpersonal relations. To date, only a handful of studies have empirically investigated the benefits of gratitude on adolescent well-being in Chinese cultural context. These studies found that adolescents who are high in gratitude are more likely to have higher life satisfaction, better academic achievement, less problem behaviors than those who are low in gratitude (Chen & Kee, 2008; Dai, Zhang, Li, Yu, & Wen, 2010; Wen, Zhang, Li, Yu, & Dai, 2010). More research of this kind is needed to examine the cross-cultural generalizability of emotional experience and expressions. In the current study, we sought to address this gap by examining the association of gratitude with Chinese adolescents’ suicidality.

Potential explanations for the link between gratitude and suicidality

Another drawback of research on gratitude and adolescent development is the dearth of studies on underlying mechanism to help understand how gratitude operates. Thus in addition to investigating links between gratitude and suicidality, we also examined processes that might explain the risks for suicidality observed among less grateful adolescents. The association of gratitude with adolescent development may operate through multiple psychological mechanisms. Wood et al. (2007), for example, found that coping styles partially mediated relations between gratitude and well-being. Since the direct relations between gratitude and well-being were partially mediated by coping styles, other possible mediators should be explored. In

the present study, we examined whether two self-system beliefs—coping efficacy and self-esteem mediate associations between gratitude and suicidality. Self-system beliefs refer to organized perceptions of the self in relation to the social context. Self-system beliefs are a salient source of influence on individual development. Although they may theoretically play a prominent role in explanations that link gratitude to adolescent development, few studies have empirically examined their mediation effects in the association between gratitude and suicidal ideation and suicide attempts.

Coping efficacy

Coping efficacy has been defined as “a global belief that one can deal with the demands made and the emotions aroused by a situation” (Sandler, Tein, Mehta, Wolchik, & Ayers, 2000). Coping efficacy includes the beliefs that one has dealt well with the stressors in the past and can deal effectively with the stressors in the future. Existing work shows that coping efficacy is an important predictor of psychological symptomatology following exposure to stress (Mosher & Prelow, 2007; Sandler et al., 2000). For example, Sandler et al. (2000) found that coping efficacy differentiated children who adapt well versus who adapted poorly to stress in a sample of children of divorce. Suicidal ideation and suicide attempts are intense expressions of maladaptation. Therefore, we anticipate that coping efficacy may also have a negative correlation with suicidal ideation and suicide attempts.

Theoretical and empirical evidence suggests that gratitude is associated with adolescents' coping efficacy. According to McCullough, Kilpatrick, Emmons, and Larson (2001), people who have been the recipients of sincere expressions of gratitude tend to act again in a prosocial fashion toward their beneficiaries. Thus, gratitude is crucial for enhancing adolescents' coping efficacy because it can help people build positive interpersonal relationship and strengthen social resources to cope with adversity (Emmons & Shelton, 2002; Froh, Yurkewicz et al., 2009; Wood et al., 2007; Wood, Maltby, Gillett, Linley, & Joseph, 2008). In addition, as a kind of positive emotion, gratitude can also broaden and build one's psychological and social resources that can be utilized in the next stressful period, thus promoting their coping efficacy. Consistent with this expectation, Rey (2009) found that gratitude was positively associated with both general and academic self-efficacy of college students.

To our knowledge, no research to date has examined the mediating role of coping efficacy in relations between gratitude and adverse outcomes including suicidality in youth. Based on the results of previous research, we expect that gratitude may be positively associated with coping efficacy, which in turn may be negatively associated with adolescent suicidal ideation and suicide attempts.

Self-esteem

Self-esteem refers to a person's global evaluation of his/her worth as a human being (Rosenberg, 1965). According to self-discrepancy theory of suicide behavior (Higgins, 1987), the discrepancy between actual self and self-evaluative standards has powerful influence on suicide behavior. Considerable empirical evidence suggests that low self-esteem is a risk factor for adolescents' suicidal ideation and suicide attempts (Evans, Hawton, & Rodham, 2004; Waldvogel, Rueter, & Oberg, 2008). For example, one study of Hong Kong Chinese adolescents found that low self-esteem was significantly associated with more suicidal ideation (Sun, Hui, & Watkins, 2006).

Theoretical and empirical evidence suggests that gratitude is associated with adolescents' self-esteem. According to moral affect theory, adolescents high in gratitude are more likely to attend how the benevolent actions of other people contribute to their well-being (McCullough et al., 2001). Therefore, they tend to feel being loved and cared for by others. Over time, they may develop a positive representational model of self as worthy and deserving of love. In this sense, gratitude can foster positive representations of the self, including high levels of self-esteem and self-worth. In support of this prediction, Toussaint and Friedman (2009) found that outpatients with high levels of gratitude were more likely to evaluate themselves positively. Similarly, Kashdan, Uswatte, and Julian (2006) found that in a sample of Vietnam War veterans, gratitude predicted greater daily self-esteem after controlling for post-traumatic stress disorder severity and dispositional negative and positive affect. To our knowledge, no data exists on the relations between gratitude, self-esteem, and adolescent suicidal ideation and suicide attempts.

Variation in the relation between gratitude and suicidality

Although many adolescents appear to benefit from gratitude, others may benefit only a little. Several researchers have noted the importance of examining moderators of gratitude as it impacts well-being (Froh & Bono, 2008; Yu, Zhang, Li, & Xiao, 2010). In the present study, we examined potential differences in the relations between gratitude and suicidality as a function of stressful life events.

Theorists who have adopted an Organism \times Environment interaction perspective emphasize that the benefits of gratitude may be context-dependent and vary with levels of contextual stress.¹ They disagree, however, about the nature of

¹ The Organism \times Environment interaction can be described in two different ways depending on whether one is interested in the moderation effect of environmental factors on the association between organism factors and developmental outcome or the moderation effect of organism factors on the association between environmental factors and developmental outcome. In contrast to most prior adolescent psychopathology studies, which usually focus on environmental-level factors and seek to identify individual factors that can moderate this effect, the present study focus on an individual level factor and sought to identify a possible environmental-level factor moderating this effect. Specifically, we are interested in whether the association of gratitude with adolescent development is moderated by stressful life events.

Gratitude \times Stressful Life Events interaction. Stress-buffering hypothesis holds that social or personal resources (in this case, gratitude) will ameliorate the potentially pathogenic effects of stressful life events (Wood et al., 2010). According to this perspective, adolescents with high levels of gratitude would demonstrate better adaptation (i.e., more positive self-system beliefs and less suicidality) than those with low levels of gratitude when exposed to severe but not mild stressful life events (see Fig. 1a). In accordance with this hypothesis, researchers found that older people high in gratitude were less vulnerable to stressful experiences, showing higher levels of adaptation than those low in gratitude in the context of environmental adversity (Krause, 2006, 2009). These studies support the view that gratitude is a promising index or source of adolescent resilience—relatively positive adaptation in the face of heightened risk for maladaptation (Fergus & Zimmerman, 2005; Luthar, 2006).

In recent years, however, a few researchers have challenged this traditional view, arguing that resilience appears to be rare at the highest levels of risk (Gutman, Sameroff, & Cole, 2003; Saegert & Evans, 2003; Vanderbilt-Adriance & Shaw, 2008). For example, Vanderbilt-Adriance and Shaw (2008) suggested that the likelihood of protective factors might be decreased at the highest levels of risk; and even in the context of identified protective factors, they might lose their ability to counteract risk once it reached a certain level. Therefore, it might be difficult for individuals exposed to severe adversity to demonstrate positive outcomes. From this perspective, in the context of low stressful life events, adolescents with high levels of gratitude would have better adaptation than those with low levels of gratitude; whereas in the context of high stressful life events, adolescents with both high and low levels of gratitude would show maladaptation (see Fig. 1b). Although few investigators have studied the interaction between gratitude and stressful life events in the prediction of adolescents' development, some indirect evidence provides preliminary support for such stress-vulnerability hypothesis. For example, Galvin (2004) found that for those who were able-bodied, gratitude might well comprise a comfortable and unproblematic response to kindness, but for disabled people it could signify an unbearable state of perpetual obligation.

We believe stressful life events will moderate the mediation effect of self-system beliefs. In particular, we expect the stress-vulnerability hypothesis will be supported by the data. Below is the relevant theoretical work that leads us to this hypothesis.

First, gratitude, like other positive emotions, seldom occurs in response to life-threatening situations (Fredrickson & Cohn, 2008). In the context of high stressful life events, adolescents with high levels of dispositional gratitude do not have much opportunity to experience this emotional state, thus they are not likely to derive more benefits from dispositional gratitude.

Second, in the context of high stressful life events, adolescents with higher levels of gratitude are more likely to feel like a failure in their daily life than those with lower levels of gratitude, because they are not able to reciprocate their benefactors.

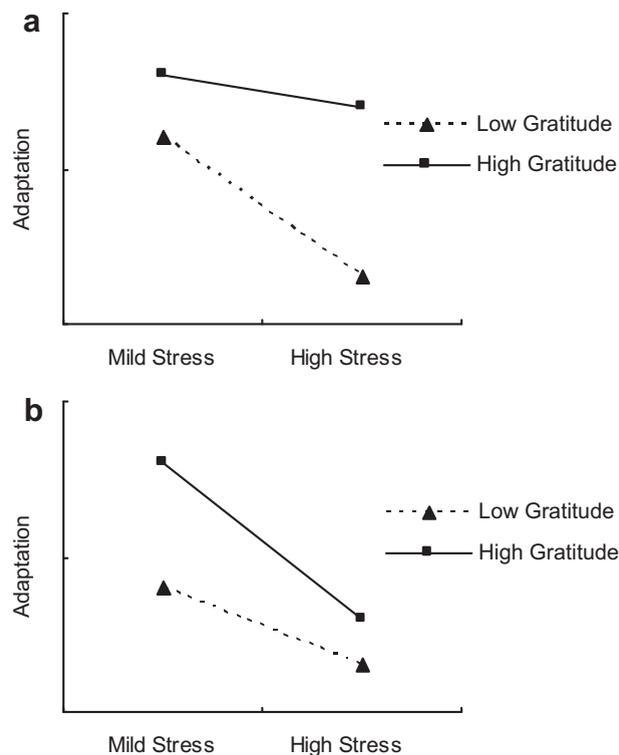


Fig. 1. Hypothetical Gratitude \times Stress interaction depicting (a) stress-buffering model (an interaction in which gratitude buffers adolescents from maladaptation in the face of stress), and (b) stress-vulnerability model (an interaction in which gratitude creates a stronger protective factor for adaptation in adolescents exposed to mild levels of stress than those exposed to severe levels of stress).

This tension might be particularly strong in a collectivist culture such as China where reciprocity and obligation are closely tied to gratitude (Cohen, 2006; Kee et al., 2008). This obligation is usually carried out by achieving success in one's own life (for example, gratitude to parents is one of the primary motivators for adolescents to do well at school to reciprocate their parents). When adolescents high in gratitude do not perform well in their lives (stressful life event), they may feel guilt, shamed, or indebted to the benefactors, and thus damage their self-system.

Third, in the context of adversity, gratitude is less likely to elicit benefactors' care and help in the future, because adolescents in higher risk situations often meet people who also lack resources to provide support and help to other persons. Therefore, we expect gratitude to be negatively related to suicidality at low levels of stress, whereas adolescents with higher gratitude will lose their advantage at high levels of stress. This prediction does not contradict previous findings in line with stress-buffering hypothesis.

Present study

In the present study, our goals were: 1. to determine whether gratitude predicts less suicidality in a sample of Chinese adolescents; 2. to investigate whether coping efficacy and self-esteem mediate the relations between gratitude and suicidality; and 3. we examined whether the path between gratitude and suicidality would vary as a function of recent stressful life events.

Method

Participants

Participants were 1252 middle school students in Grades 7–11 in Guangzhou area, southern China, all of whom come from middle income families and schools. The mean age of these adolescents was 15.00 years ($SD = 1.20$, range = 12–19); 54.9% of them were females; 57% of their fathers and 72% of their mothers received less than high school education; 11% of their fathers and 34% of their mothers did not have a full-time job during the past year.

Measures

Gratitude

Adolescent gratitude was measured by the Gratitude Questionnaire–Six-Item Form (McCullough et al., 2002). These items reflected the gratitude intensity facet (e.g., “I feel thankful for what I have received in life”), the gratitude frequency facet (e.g., “Long amounts of time can go by before I feel grateful to something or someone”), the gratitude span facet (e.g., “I sometimes feel grateful for the smallest things”), and the gratitude density facet (e.g., “I am grateful to a wide variety of people”). We used the Chinese version translated by Leong and made slight adaptation in a pilot study. For each of the 6 items, adolescents indicated how much they agree with it on a 7-point scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. The mean was taken for the 6 items, with higher scores representing greater gratitude. GQ-6 is a unidimensional measure with good psychometric properties in adult sample (McCullough et al., 2002). Although more research is needed, preliminary evidence suggests that GQ-6 may be suitable for adolescents (Chen & Kee, 2008; Froh et al., 2011; Hou & Zhang, 2009). The Cronbach's α coefficient for the present sample was 0.83.

Coping efficacy

Adolescents completed the seven-item Coping Efficacy Scale (Sandler et al., 2000), which assesses their satisfaction with handling problems in the past six months (e.g., “Overall, how well do you think that the things you did during the last six month worked to make you feel better?”) and anticipated effectiveness in handling problems in the future (e.g., “Overall, how good do you think you will be at making things better when problems come up in the future?”). For each of the 7 items, adolescents indicated how true each statement is for themselves on a 6-point scale ranging from 1 = *not at all true* to 6 = *very true*. The mean was taken for the 7 items, with higher scores representing greater coping efficacy. The Cronbach's α coefficient for the present sample was 0.90.

Self-esteem

Adolescents' self-esteem was assessed by Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). The RSES has 10 items of which five items are negatively worded and five items are positively worded. The negative worded items are reverse scored. An example of an item is “I feel that I'm a person of worth, at least on an equal plane with others”. For each of the 10 items, adolescents are asked to indicate their agreement on a 4-point scale ranging from 1 = *strongly disagree* to 4 = *strongly agree*. The mean was taken for the 10 items, with higher scores representing higher self-esteem. The Cronbach's α coefficient for the present sample was 0.84.

Stressful life events scale

The stressful life events adolescents experienced during the past year were assessed with a 16 item questionnaire (Li, Zhang, Li, Zhen, & Wang, 2010). The items in this questionnaire represent several stress domains: family, school,

Table 1
Univariate and bivariate statistics for all study variables.

Variables	1	2	3	4	5	6	7	8	9
1. Age	–								
2. Gender	0.08**	–							
3. SES	0.01	–0.04	–						
4. Gratitude	0.05	–0.11***	0.09**	–					
5. Life events	0.12***	–0.08**	–0.12***	–0.09**	–				
6. Coping efficacy	0.18***	0.11***	0.04	0.36***	–0.20***	–			
7. Self-esteem	0.11***	0.13***	0.03	0.31***	–0.37***	0.62***	–		
8. Suicidal ideation	0.06*	–0.15***	–0.01	–0.10***	0.24***	–0.15***	–0.26***	–	
9. Suicide attempts	0.02	–0.10***	–0.02	–0.10***	0.20***	–0.10***	–0.22***	0.53***	–
<i>M</i>	15.00	0.45	0.00	5.86	1.76	4.13	2.89	0.19	0.10
<i>SD</i>	1.20	0.50	1.00	0.94	0.46	0.91	0.50	0.40	0.29

Gender was dummy coded such that 0 = female and 1 = male. SES = socioeconomic status.

* $p < .05$. ** $p < .01$. *** $p < .001$.

interpersonal, and individual. For each of the 16 items, adolescents indicated whether each event had occurred during the past year, if yes, they then indicated how stressful each event is for them, using a 6-point scale ranging from 0 = *did not occur* to 5 = *occurred and extremely stressful*.² The mean was taken for the 16 items, with higher scores representing greater stressful life events they had experienced during the past year. As evidence of criterion validity (Dai et al., 2010), this scale was significantly associated with both externalizing ($r = 0.24$, $p < .001$) and internalizing problem behaviors ($r = 0.36$, $p < .001$). The Cronbach's α coefficient for the present sample was 0.74.

Suicidality

Adolescents' suicidal ideation and suicide attempts were assessed with two questions, which were adapted from the Youth Self-Report (Achenbach, 1991). The two questions are "I think about killing myself" and "I deliberately try to hurt or kill myself". The latter item assesses not only suicidality but also self-harm behavior. In order to deemphasize the self-harm content and to strengthen the suicidal intent, we followed previous studies (Steinhausen, Bösiger, & Metzke, 2006; Steinhausen & Metzke, 2004) and slightly reworded the item in the Chinese translation in the following way: "I deliberately try to hurt myself or commit suicide". Participants were asked to answer each question on a 3-point scale: 0 = *not true*, 1 = *somewhat true*, and 2 = *very true* during the past six months. According to the definitions of suicidal ideation and suicide attempts developed by O'Carroll et al. (1996) and adopted by the Institute of Medicine (Goldsmith et al., 2002), adolescents who scored 1 or 2 on the first question were considered to have suicidal ideation, and those who scored 1 or 2 on the both questions were considered to have attempted suicide. This scoring approach has also been used in previous studies (e.g., Liu & Tein, 2005).

Procedures

This study was approved by the Human Research Ethics Committee, South China Normal University. In addition, appropriate permissions from the school boards and informed consents of the participants were obtained before the assessment was conducted. The trained data collectors explained to all participants the requirements of questionnaire using standard instructions and emphasized the anonymity, independence, and integrity of all answers. They also explained the confidentiality about all information collected. The data collectors were available during survey completion if participants had any questions about the questionnaire. The questionnaire was collected immediately upon completion.

Analysis plan

We first presented descriptive statistics for our variables of interest and control variables, followed by bivariate associations among these variables. Second, we used logistic regression to test the direct association hypothesis, because the outcome variables (suicidal ideation and suicide attempts) are dichotomous. Third, we followed MacKinnon's (2008) four-step procedure to establish the mediation effects of self-system beliefs, which requires (a) a significant association between gratitude and suicidality; (b) significant associations between gratitude and self-system beliefs; (c) significant associations between self-system beliefs and suicidality while controlling for gratitude; and (d) significant coefficients for the indirect paths between gratitude and suicidality through self-system beliefs. Fourth, we used Muller, Judd, and Yzerbyt's (2005) guidelines to test the moderated mediation hypotheses, which require estimating parameters for the following regression equations (see Table 3). Equation 1 involved estimating the moderation effect of stressful life events on the

² Because stressful life events may not carry the same weight in adolescents' lives, we asked participants to indicate the degree of seriousness of each life event. However, some researchers may argue that we should only analyze the number of objective stressors. Therefore, we have also analyzed the data using the number of stressors. In such analysis, we have obtained substantively similar results. These results are available from the authors upon request.

Table 2
Testing the mediation effects of gratitude on suicidal ideation and suicide attempts.

Predictors	Equation 1 (criterion suicidality)	Equation 2 (criterion CE)	Equation 3 (criterion SE)	Equation 4 (criterion suicidality)
	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)	<i>b</i> (SE)
Age	0.18 (0.06)** 0.12 (0.09)	0.12 (0.02)***	0.03 (0.01)**	0.22 (0.06)*** 0.14 (0.09)
Gender	−0.95 (0.16)*** −1.01 (0.24)***	0.25 (0.05)***	0.16 (0.03)***	−0.79 (0.16)*** −0.83 (0.25)***
SES	−0.01 (0.07) −0.07 (0.10)	0.01 (0.02)	0.00 (0.01)	0.01 (0.08) −0.05 (0.10)
G	−0.33 (0.08)*** −0.43 (0.11)***	0.35 (0.03)***	0.17 (0.01)***	−0.15 (0.08) −0.27 (0.12)*
CE				0.05 (0.11) 0.27 (0.15)
SE				−1.32 (0.19)*** −1.63 (0.27)***
R ²	0.07 0.06	0.17	0.13	0.15 0.14
<i>n</i>	1252	1252	1252	1252

Each column is a regression equation that predicts the criterion at the top of the column. Equations 1 and 4 are logistic, and Equations 2 and 3 are linear. In Equations 1 and 4, normal numbers are for suicidal ideation while bold numbers are for suicide attempts. Gender was dummy coded such that 0 = female and 1 = male. SES = socioeconomic status; G = gratitude; SLE = stressful life events; CE = coping efficacy; SE = self-esteem.

* $p < .05$. ** $p < .01$. *** $p < .001$.

relationship between gratitude and suicidality. Equations 2 and 3 involved estimating the moderation effects of stressful life events on the relationship between gratitude and self-system beliefs. Equation 4 allowed both the partial effects of self-system beliefs on suicidality and the residual effect of gratitude on suicidality to be moderated by stressful life events. Although it was not pertinent to study hypotheses, the Self-System Beliefs \times Stressful Life Events interaction term was included in Equation 4 to test for an alternative form of moderated mediation (see Muller, Judd, & Yzerbyt, 2005). For present purposes, moderated mediation is indicated if the equation estimation results meet two criteria: (a) in Equation 1, the overall effect of gratitude is significant and the magnitude of this effect does not depend on stressful life events. (b) In Equations 2, 3, and 4, the effects from gratitude to self-system beliefs depend on stressful life events, and the average partial effects of self-system beliefs on suicidality is nonzero. Prior to the analyses, all continuous measures were mean-centered.

Results

Descriptive analyses

In the total sample, 19.4% (243) of the participants reported thoughts about suicide and 8.0% (100) reported attempting suicide in the past six months. These rates are consistent with the Chinese national data (Ji & Chen, 2009) and recent international review (Evans, Hawton, Rodham, & Deeks, 2005). Table 1 contains univariate statistics and bivariate correlations for all study variables. Gratitude was negatively associated with adolescents' suicidal ideation and suicide attempts, suggesting that gratitude is an important psychological asset that decreases the possibility of suicidality among adolescents. Stressful life events were positively associated with suicidal ideation and suicide attempts, indicating that stressful life events are viable risks of adolescents' suicidality. The two self-system beliefs, coping efficacy and self-esteem, were negatively associated with suicidal ideation and suicide attempts. In addition, gratitude was positively associated with both self-system belief constructs, which is in line with our hypothesis.

Testing for direct associations

The first aim of this study was to determine whether a significant relationship exists between gratitude and suicidality. The results of logistic regression analyses (see Equation 1 of Table 2) showed that gratitude significantly predicted both suicidal ideation ($b = -0.33$, $SE = 0.08$, $p < .001$) and suicide attempts ($b = -0.43$, $SE = 0.11$, $p < .001$), even after controlling for adolescents' age, gender, and family socioeconomic status (a factor score of parents' education and employment status). Adolescents high in gratitude were less likely to have suicidal ideation and suicide attempts in the past six months than their counterparts low in gratitude. Therefore, our first hypothesis—that is, gratitude is associated with less suicidality—was supported by our data.

Testing for mediation effects

In order to test whether self-system beliefs mediate the relation between gratitude and suicidality, we followed the procedure proposed by MacKinnon (2008) to establish mediation. In the first step, logistic regression analyses indicated that gratitude was significantly associated with both suicidal ideation and suicide attempts (see Equation 1 of Table 2). In the

Table 3

Testing the moderated mediation effects of gratitude on suicidal ideation and suicide attempts.

Predictors	Equation 1 (criterion suicidality)	Equation 2 (criterion CE)	Equation 3 (criterion SE)	Equation 4 (criterion suicidality)
	<i>b</i> (<i>SE</i>)	<i>b</i> (<i>SE</i>)	<i>b</i> (<i>SE</i>)	<i>b</i> (<i>SE</i>)
Age	0.13 (0.06)* 0.07 (0.09)	0.14 (0.02)***	0.05 (0.01)***	0.18 (0.07)** 0.09 (0.09)
Gender	–0.91 (0.16)*** –0.96 (0.24)***	0.21 (0.05)***	0.13 (0.03)***	–0.79(0.17)*** –0.83 (0.25)***
SES	0.08 (0.08) 0.02 (0.10)	–0.00 (0.02)	–0.01 (0.01)	0.08 (0.08) 0.01 (0.10)
G	–0.28 (0.08)*** –0.43 (0.12)***	0.34 (0.03)***	0.16 (0.01)***	–0.10 (0.09) –0.30 (0.14)*
SLE	1.20 (0.16)*** 1.32 (0.22)***	–0.34 (0.05)***	–0.38 (0.03)***	0.97 (0.18)*** 1.04 (0.27)***
G × SLE	–0.17 (0.16) 0.08 (0.21)	–0.20 (0.05)***	–0.09 (0.03)**	–0.33 (0.18) –0.01 (0.23)
CE				0.04 (0.12) 0.27 (0.18)
SE				–1.15 (0.22)*** –1.38 (0.32)***
CE × SLE				–0.10 (0.22) –0.09 (0.29)
SE × SLE				0.62 (0.38) 0.40 (0.50)
<i>R</i> ²	0.14 0.13	0.21	0.26	0.18 0.16
<i>n</i>	1252	1252	1252	1252

Each column is a regression equation that predicts the criterion at the top of the column. Equations 1 and 4 are logistic, and Equations 2 and 3 are linear. In Equations 1 and 4, normal numbers are for suicidal ideation while bold numbers are for suicide attempts. Gender was dummy coded such that 0 = female and 1 = male. SES = socioeconomic status; G = gratitude; SLE = stressful life events; CE = coping efficacy; SE = self-esteem.

* $p < .05$. ** $p < .01$. *** $p < .001$.

second step (see Equations 2 and 3 of Table 2), multiple regression analyses indicated that gratitude were significantly associated with both coping efficacy ($b = 0.35$, $SE = 0.03$, $p < .001$) and self-esteem ($b = 0.17$, $SE = 0.01$, $p < .001$). In the third step (see Equation 4 of Table 2), when we controlled for gratitude, coping efficacy was not significantly associated with suicidality, whereas self-esteem was significantly associated with both suicidal ideation ($b = -1.32$, $SE = 0.19$, $p < .001$) and suicide attempts ($b = -1.63$, $SE = 0.27$, $p < .001$). Finally, Sobel tests indicated that the indirect effects of coping efficacy were not significant for suicidal ideation ($b = 0.02$, $SE = 0.04$, $p > .05$) and suicide attempts ($b = 0.09$, $SE = 0.05$, $p > .05$). In contrast, the indirect effects of self-esteem were significant for both suicidal ideation ($b = -0.23$, $SE = 0.04$, $p < .01$) and suicide attempts ($b = -0.28$, $SE = 0.05$, $p < .01$). Overall, MacKinnon's (2008) four criteria for establishing mediation were met for self-esteem but not for coping efficacy. Therefore, our mediation hypothesis was supported for self-esteem but not for coping efficacy.

Testing for moderated mediation

As Table 3 illustrates, Muller et al.'s (2005) criteria for establishing moderated mediation were met for self-esteem but not for coping efficacy. Specifically, the results from Equation 1 indicated overall effects of the independent variable, gratitude, on the outcome variables, suicidal ideation and suicide attempts. These effects were not moderated by stressful life events.

In Equation 2, the mediator, coping efficacy, was the criterion. Here, there was a significant main effect of gratitude and a significant Gratitude × Stressful Life Events interaction effect. For descriptive purposes, we plotted the predicted coping efficacy against gratitude, separately for low and high levels of stressful life events (1 *SD* below the mean and 1 *SD* above the mean, respectively). As indicated in the left panel of Fig. 3, for adolescents high in stressful life events, higher gratitude led to a slightly higher coping efficacy score ($b = 0.25$, $SE = 0.03$, $p < .001$). However, for adolescents low in stressful life events, there was more of an effect of gratitude on coping efficacy ($b = 0.44$, $SE = 0.04$, $p < .001$).

In Equation 3, the mediator, self-esteem, was the criterion. Here, there was a significant main effect of gratitude and a significant Gratitude × Stressful Life Events interaction effect. As in the previous case, we plotted the predicted self-esteem against gratitude, separately for low and high levels of stressful life events (1 *SD* below the mean and 1 *SD* above the mean, respectively). As shown in the right panel of Fig. 3, for adolescents high in stressful life events, higher gratitude led to a slightly higher self-esteem score ($b = 0.12$, $SE = 0.02$, $p < .001$). In contrast, for adolescents low in stressful life events, there was more of an effect of gratitude on self-esteem ($b = 0.20$, $SE = 0.02$, $p < .001$).

Finally, the last equation in Table 3 showed that the effects of coping efficacy on both suicidal ideation and suicide attempts were non-significant, and these effects were not moderated by stressful life events (the Coping Efficacy × Stressful Life Events coefficients were not significant). In contrast, there were significant effects of self-esteem on both suicidal ideation ($b = -1.15$, $SE = 0.22$, $p < .001$) and suicide attempts ($b = -1.38$, $SE = 0.32$, $p < .001$), although these effects were not moderated by stressful life events (the Self-Esteem × Stressful Life Events coefficients are not significant).

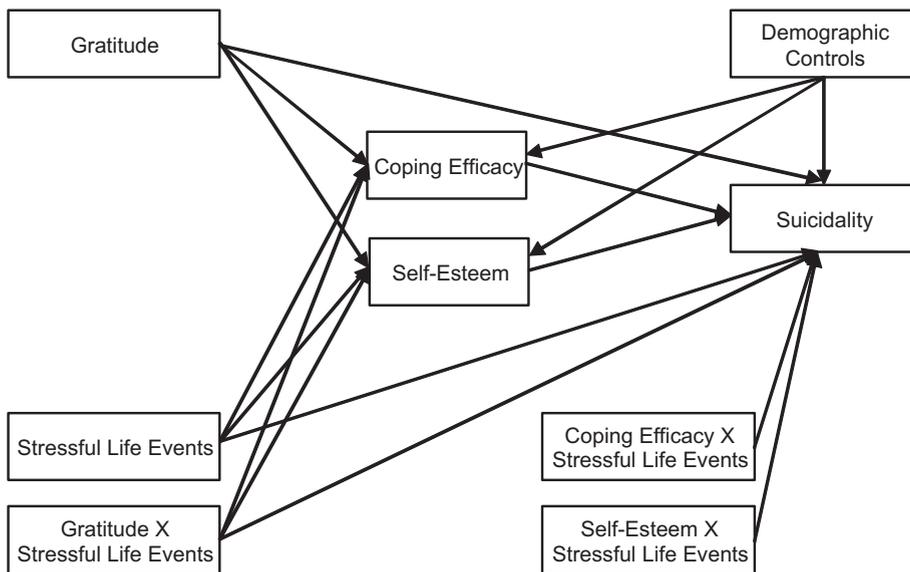


Fig. 2. Conceptual model illustrating all possible direct and indirect paths between gratitude and suicidality. Interactions are included to examine whether stressful life events moderate (a) the direct association between gratitude and suicidality, (b) the relations between gratitude and both self-system belief constructs, and (c) the relations between both self-system belief constructs and suicidality.

Overall, the indirect effects of gratitude on suicidal ideation and suicide attempts through self-esteem were moderated by stressful life events. For adolescents low in stressful life events, gratitude had protective effects on their suicidal ideation ($b = -0.23, SE = 0.05, p < .01$) and suicide attempts ($b = -0.27, SE = 0.07, p < .01$), through an increase in self-esteem. In contrast, gratitude had smaller effects on those who experienced high levels of stressful life events during the past year (for suicidal ideation, $b = -0.14, SE = 0.03, p < .01$; and for suicide attempts, $b = -0.16, SE = 0.05, p < .01$).

In addition, although females and males have been found to differ in suicidality, differences in mean levels do not necessarily translate into differences in association. To test this view, we examined whether any of the associations in the conceptual model (see Fig. 2) differed as a function of gender. The results indicated that these associations were statistically comparable across gender. That is, gender did not serve as a moderator in the proposed conceptual model. These results are available from the authors upon request.

Discussion

The role of gratitude in adolescent development has garnered considerable theoretical and empirical attention, but most work has occurred in North America so the generalizability is limited. Furthermore, the mediating processes underlying these associations remain largely understudied. Moreover, we do not know if adolescent experiences of stressful life events might moderate these processes. We discuss each of our research questions in light of the new findings.

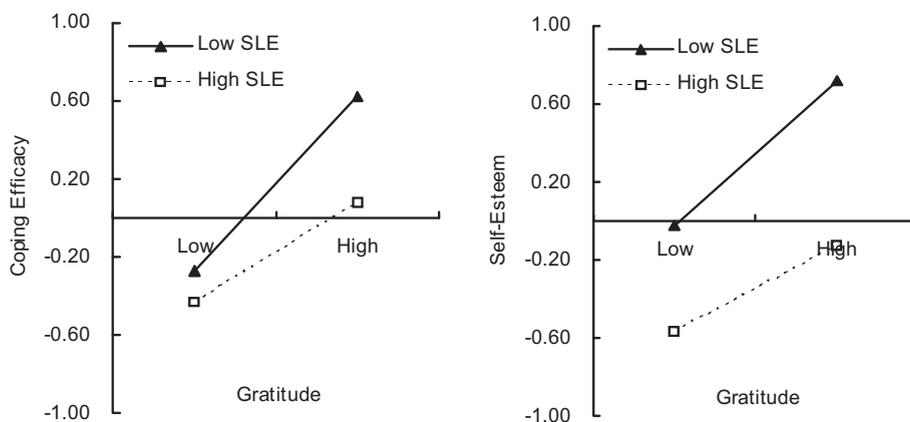


Fig. 3. Coping efficacy (left panel) and self-esteem (right panel) among adolescents as a function of gratitude and stressful life events. Functions are graphed for two levels of stressful life events: 1 standard deviation above the mean and 1 standard deviation below the mean. Note that the graphs are for descriptive purposes only. All inferential analyses maintained the continuous values of gratitude and stressful life events. SLE = stressful life events.

Prior research has found that gratitude is associated with a variety of positive outcomes including increased academic achievement and better social and emotional functioning. However, these findings leave open a critical question: whether the benefits of gratitude can be generalized to adverse developmental indicators and whether gratitude impacts function similarly for adolescents who live in nonwestern countries? In the present study, we build on previous work and extend it in two directions. One, we demonstrate that gratitude is uniquely associated with suicidality, an important but relatively neglected aspect of adjustment during adolescence, over and above the effects of demographic variables. Two, we provide preliminary data about the benefits of gratitude in an understudied population (i.e., Chinese adolescents). We found support for our hypothesis that gratitude is associated with less suicidality among Chinese adolescents. These findings are consistent with the broaden and build theory of positive emotions (Fredrickson, 2004). This theory argues that gratitude can broaden and build one's psychological and social resources, thus promoting growth and development in later life. Current findings also provide empirical support for the supposition that gratitude is a source of human strength (Emmons & Crumpler, 2000).

Second, previous work has examined relations between gratitude and adolescent development, but not examined why they are related. Self-system beliefs appear to be underlying psychological mechanisms that explain why gratitude predicts suicidality. In particular, gratitude predisposes individuals to higher levels of self-esteem, which in turn is associated with lower levels of suicidal ideation and suicide attempts. In accordance with predictions derived from moral affect theory (McCullough et al., 2001) and attachment theory (Bowlby, 1982), adolescents with high levels of gratitude are more likely to perceive other people as supportive and available, and feel being loved and cared for by others, thus promoting their self-esteem. Further, consistent with the expectation of self-discrepancy theory of suicide (Higgins, 1987), self-esteem has a powerful influence on adolescents' suicidality. The mediating role of self-esteem is consistent with previous research showing that positive and negative cognitions and thoughts about self mediated the relationship between gratitude and well-being of psychotherapy outpatients (Toussaint & Friedman, 2009). Taken together, these findings can be interpreted to support the notion that adolescents' self-system beliefs (self-esteem) are one class of processes that help to explain how adolescents' gratitude may promote their well-being (Watkins et al., 2009). This finding is important because it highlights the importance of self-esteem in adolescents' lives that has often been neglected in collectivistic cultures. For example, cross-culture research finds that East Asians have far less motivation to view themselves positively than do North Americans (Heine & Buchtel, 2009). However, this could predict more suicide in collective cultures.

In addition, it is worth noting that the mediating role of coping efficacy between gratitude and suicidality was not significant in this study. Coping efficacy did not predict suicidality in the regression analysis. This result matches previous research between ecological risk and depressive symptoms (Prelow, Weaver, & Swenson, 2006).

Third, our results offer support for the moderating role of stressful life events on the indirect link between gratitude and suicidality. Consistent with the stress-vulnerability hypothesis, we found that the mediation effect of self-esteem between gratitude and suicidality is stronger in adolescents who experienced less stressful life events than those who experienced more stressful life events. In other words, high stressful life events attenuated the relationship between gratitude, self-esteem, and suicidality through the link between gratitude and self-esteem. These findings support our model that the link between gratitude and suicidality is complex and dependent on other factors. As noted in the introduction, in the context of high stressful life events, even adolescents who have high levels of dispositional gratitude may not have much opportunity to experience gratitude, may be more likely to feel like a failure, or may be less likely to elicit benefactors' help in the future. Thus, they may lose the advantage of associated self-system beliefs such as self-esteem. On the other hand, adolescents experiencing low stressful life events can benefit from dispositional gratitude because it affords enhanced self-esteem. In fact, a clinical psychologist commented that, in the face of heightened stressful life events, a large number of adolescent suicide victims in China did express gratitude to other people in their suicide notes. However, the grateful emotion cannot offset the deleterious effects of the serious stress (Y. Huang, personal communication, March 22, 2010). Certainly, our findings do not negate the possible beneficial effects of gratitude for high-risk adolescents. However, our results suggest that gratitude, like other personal attributes, may not be sufficient to protect adolescents from maladaptation in the face of serious stress (Gerard & Buehler, 2004; Gutman et al., 2003). There are limits to the stress-buffering properties of gratitude, and the beneficial effects of this character strength may be overwhelmed by highly stressful life experiences (Krause, 2009).

To some extent, our moderation findings may help explain why there are inconsistencies in the benefits of gratitude across studies. Some researchers find that gratitude is negatively associated with negative affect in adolescence (Froh, Emmons, Card, Bono, & Wilson, 2011; Froh et al., 2008), whereas others find no significant correlations between these two constructs (Froh, Yurkewicz et al., 2009; Hou & Zhang, 2009). According to the finding of the present study, the benefits of gratitude are more likely to be observed in the face of low stressful life events. Because of the cross-sectional design of the present study, the moderation effect of stressful life events on the association between gratitude and negative affect is speculative. Future studies should assess this possibility directly with an intervention study and with negative affect as outcome measure.

A viable alternative model not tested in this study is one in which stressful life events are influenced by gratitude and might mediate the relations between gratitude and developmental outcomes (i.e., self-system beliefs and suicidality). Evidence suggests that gratitude is related to lower levels of subjective stress (Wood et al., 2010). In the current study, gratitude was indeed related to lower levels of stressful life events ($r = -0.09, p = .002$), which were in turn related to lower levels of self-system beliefs and more suicidal ideation and suicide attempts. However, the association of gratitude with stressful life events was modest, which means any mediated effect would be quite small. It is likely that stressful life events are partially influenced by gratitude, and at the same time moderate the relations between gratitude and developmental outcomes. However, we cannot test these two mechanisms simultaneously in a single model.

There are also important practical implications of this research. First, although more research is needed, our results imply that gratitude intervention may help reduce the incidence of suicidal ideation and suicide attempts in adolescents low in gratitude. Second, our results may help clinicians understand pathways by which gratitude affects adolescents' adjustment, suggesting an area for targeting treatment. For example, helping adolescents develop positive self-esteem may ameliorate the negative effects of being low in gratitude. Third, our results should not be interpreted as an attack on the benefits of gratitude. Gratitude intervention may still be promising for adolescents who do not experience too many stressors. Finally, intervention programs are likely to be more effective for youth experiencing considerable stressors, if they do not focus solely on strengthening gratitude.

Several limitations must be considered when interpreting the results of the present study. First, our mediation model implies causal relationships between gratitude, self-system beliefs, and suicidality. However, our current research design does not allow us to conclude definitively that gratitude leads to more positive self-system beliefs. To better ascertain causality, future studies could seek the power of longitudinal research that would better establish the direction of relationships posited in our model. Second, due to the large sample size, all measures in this study were based on adolescents' self-report. Although self-administered scales can offer valuable information about suicidality (Shain & American Academy of Pediatrics Committee on Adolescence, 2007), future research should use multiple informants and multiple methods simultaneously to collect data, thereby measuring these constructs more effectively. Third, we analyzed a population-based sample, and thus our results should not be extended to clinical populations. Fourth, because self-system beliefs are likely to be one component of a multitude of mediational pathways involved in the link between gratitude and adolescent development, testing the role of other attributes as explanatory mechanisms is an important direction for future research.

Despite these limitations, the present study makes several important contributions. It underscores the importance of gratitude in suicidal ideation and suicide attempts among Chinese adolescents. Further, it demonstrates that self-system beliefs can serve as a mechanism by which gratitude is associated with suicidality. Lastly, it shows that gratitude appears to have less beneficial effects for adolescents experiencing heightened stressful life events.

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