EMPIRICAL RESEARCH

Check for updates

Trajectories of Suicidal Ideation from Middle Childhood to Early Adolescence: Risk and Protective Factors

Xinxin Zhu[1,2,3] · Lili Tian[1,2,3] · E. Scott Huebner[4]

Abstract

Suicidal ideation is considered to be the first step on the pathway to suicide. Despite the fact that suicidal ideation is surprisingly prevalent among preadolescent children in China and elsewhere, and despite its possible increase during the transition into adolescence, its developmental patterns and predictors during this period are unclear, thus precluding a meaningful understanding of its determinants and possible trajectories. Thus, this study aimed to identify suicidal ideation trajectories and multisystemic predictors covering the transition from middle childhood to early adolescence. A total of 715 Chinese elementary school students ($M_{age} = 8.95$, $SD = 0.71$; 54.5% was male) participated in assessments at six time points, using six-month assessment intervals. Growth mixture modeling analyses extracted three distinct trajectories of suicidal ideation: "low-stable" (86.4%), "moderate-increasing" (7.1%) and "high-start" (6.5%). Multivariate logistic regression analyses revealed that social anxiety and academic anxiety served as risk factors for the adverse developmental trajectories of suicidal ideation; whereas self-esteem, life satisfaction, and academic achievement served as protective factors for the positive developmental trajectory of suicidal ideation. The identification of three subgroups with unique predictors highlights the importance of individual difference considerations in understanding the progression of suicidal ideation in childhood and adolescence and the need for specific programs tailored to the unique characteristics of the relevant trajectories. Furthermore, given that suicidal ideation may start in a proportion of middle childhood youths and continue into adolescence, the middle childhood period should provide an important window of opportunity for large-scale screening and prevention of the escalation of suicidality in adolescence.

Keywords Suicidal ideation · Trajectories · Risk factors · Protective factors · Middle childhood · Early adolescence

✉ Lili Tian
paipaishu@163.com
974885572@qq.com

1 School of Psychology, South China Normal University, Guangzhou 510631, People's Republic of China

2 Center for Studies of Psychological Application, South China Normal University, Guangzhou 510631, People's Republic of China

3 Guangdong Key Laboratory of Mental Health and Cognitive Science, South China Normal University, Guangzhou 510631, People's Republic of China

4 Department of Psychology, University of South Carolina, Columbia, SC, USA

Introduction

According to the Centers for Disease Control and Prevention (CDC 2016), suicide is a leading cause of death among elementary school students, with devastating consequences for families. However, there is a lack of accurate statistics on the national suicide rate of children in China, despite the fact that China has the largest population of children in the world. Furthermore, although suicide appears to be less frequent in childhood compared to adolescence and adulthood, increasing evidence has revealed that suicidal ideation is surprisingly prevalent among preadolescent children in China and elsewhere (e.g., Kovess-Masfety et al. 2015; Tan et al. 2018; Whalen et al. 2015). Suicidal ideation has been considered to be the first step on the pathway to suicide (Klonsky and May 2015), and the emergence of it in childhood is associated with suicidal ideation in adolescence and adulthood as well as lifetime history of suicidal attempts and subsequent poor psychosocial adjustment

(e.g., Copeland et al. 2017; Herba et al. 2007; Whalen et al. 2015). Thus, given the accumulating evidence that has suggested that suicidal ideation can occur in childhood (Kovess-Masfety et al. 2015; Whalen et al. 2015), the transition from childhood to adolescence might represent a vulnerable period during which suicidal ideation may increase (Musci et al. 2016; Park 2013). Adolescence is characterized by many challenging cognitive, psychosocial and biological changes, as well as environmental changes, all of which may contribute to the overall mental health outcomes of adolescents (Steinberg 2019). Thus, it seems important to study the development nature of suicidal ideation across the childhood to adolescent transition, as this should offer a unique lens to observe its onset and continuity from a developmental perspective. Furthermore, the identification of multisystemic risk and protective factors predicting the development of suicidal ideation from childhood should facilitate a greater understanding of the development and maintenance of suicidal ideation as well as promote greater investment in upstream suicide prevention approaches to reduce the escalation of suicidality in adolescence (e.g., Sandler et al. 2016; Wyman 2014). In such a case, it is alarmed that there is key knowledge gap of the development nature of suicidal ideation and early predictors in this period. This study thus aimed to identify trajectories of suicidal ideation from middle childhood to early adolescence and to investigate key individual and environmental risk and protective factors that differentiate the identified trajectories.

Longitudinal Trajectories of Suicidal Ideation Among Youths

The majority of studies of the developmental trajectories of suicidal ideation have focused on the adolescent years. Most studies of the longitudinal patterns of suicidal ideation in adolescents have identified three trajectories as representing the best model. For example, using a community-based sample of American adolescents ($N = 552$) of ages 14, 15, and 17 years, Rueter et al. (2008) identified three different suicidal ideation trajectories: No ideation, decreasing ideation, and increasing ideation. For another example, Giletta et al. (2015) found three trajectories of suicidal ideation within a school sample of Chinese adolescents ($N = 565$) followed for two years during high school (Grade 10 at baseline): Low, moderate and high suicidal ideation subgroups. Based on students' reports of suicidal ideation from middle school to high school (i.e., from Grade 6 to Grade 12; $N = 463$), Kim et al. (2019) found that the three trajectories model was also applicable to a variety of students from different ethnic backgrounds, including African Americans, Asian Americans, and European Americans. These three different suicidal ideation trajectories included

no ideation, high (i.e., high-decreasing or high-fluctuating) ideation, and moderate (i.e., moderate-persistent or moderate-increasing) ideation. In contrast, Musci et al. (2016) followed up a sample of 581 African-American students from Grade 6 to Grade 10, identifying two trajectories of suicidal ideation, with one trajectory subgroup reporting no ideation and the other subgroup reporting suicidal ideation peaking in Grade 7 and a steady decline in ideation in subsequent Grades. Combined with the previously reported high (e.g., high-persistent/fluctuating/decreasing) suicidal ideation trajectory subgroups in early, middle, and later adolescence, the identification of the Musci et al. (2016) subgroup indicates that the pre-adolescent and early adolescent years may represent vulnerable periods for an increase in suicidal ideation. Thus, it seems necessary to investigate the development of suicidal ideation in pre-adolescent children as well as adolescent children.

Thus far, literature review showed that only one study had examined the development of suicidal ideation from childhood to adolescence. Park (2013) followed two cohorts of South Korean students; one from Grade 4 to Grade 8, and the other from Grade 8 to one year after high school graduation. Findings indicated that the percentage of youths with suicidal ideation increased during the transition from childhood to adolescence, continuing to middle adolescence, and decreasing in late adolescence. However, this study showed important limitations. The researcher used a cutoff value based on a single self-reported item measuring suicidal ideation, to classify participants into two groups: Those with and those without suicidal ideation. Thus, the degree of confidence in the results may be limited by the shortcomings of one-item measures (e.g., inability to estimate internal consistency reliability). Moreover, this study lacked sophisticated examination of the number and the developmental trends of suicidal ideation trajectory using statistical approaches such as growth mixture modeling, because the youths with suicidal ideation most likely contained identifiable subgroups rather than one subgroup, each with substantially distinct suicidal ideation trajectories, such as persistent ideation, increased ideation, or decreased ideation.

Moving beyond empirical research, in a recent commentary, Whalen et al. (2018) proposed the hypothesis there might be three trajectories of suicidal ideation from childhood to adolescence. With the exception of a non-suicidal ideation trajectory, these trajectories included two other trajectory groups: adolescence-onset and early-onset. The rationale for the escalation trajectory (i.e., adolescence-onset) involving children nearing adolescence was discussed above. The preliminary evidence for an early-onset trajectory was based on the identification of a group of young children (age range of 3–7 years old at baseline) within a sample of depressed children who reported suicidal

ideation, with most of them continuing to report suicidal ideation into school age (Whalen et al. 2015). However, the generalizability of this early-onset group to school-based populations is highly speculative, given that their conclusion was derived from one two-wave study employing a clinical sample of children. Thus, based on the bulk of the literature, this study investigated the trajectories of suicidal ideation in the relatively understudied group of youth from middle childhood through early adolescence in an effort to understand further the development of suicidal ideation.

The Risk and Protective Factors for Suicidal Ideation Trajectories

The investigation of multisystemic risk and protective factors that distinguish suicidal ideation trajectories should help identify which risk factors might act as warning signals for adverse developmental patterns of suicidal ideation during preadolescence and even throughout adolescence. It should also help identify which protective factors might act as inhibitors for adverse developmental patterns of suicidal ideation. More importantly, identification unique factors for each suicidal ideation trajectory could provide information about specific intervention strategies tailored to the unique characteristics of each trajectory. However, researchers have not well addressed risk and protective factors for suicidal ideation trajectories in pre-adolescence, although some studies have addressed such factors with samples of adolescents. For example, Nkansah-Amankra (2013) conducted a study employing a sample of 9421 secondary school students (Grades 7–12 at baseline), which examined risk (i.e., depressive symptoms) and protective (i.e., self-esteem, social support, religiosity) factors for suicidal ideation. However, the follow-up intervals for this study were relatively long (four assessments, with assessment intervals of 1, 6, and 6 years). A recent meta-analyses has shown that almost all longitudinal studies of suicide risk have follow-up intervals extending over a 5–10 year period; only 5% of the studies employed assessment intervals that were six months or less (Psychological Bulletin; Franklin et al. 2017). Over the longer course, some of the initial high-risk "signals" for suicidality may get lost in an ever-increasing cacophony of "noise". A more fruitful approach might be to attempt to identify the risk and protective factors predicting the developmental patterns of suicidal ideation across multiple assessments, with relatively short intervals between the assessments; such an approach would take into account both the relative shorter-term and longer-term effects of risk and protective factors. An additional, noteworthy study explored the trajectories of suicidal ideation and the multiple risk (i.e., depressive symptoms, externalizing problems, alcohol use, and impulsivity) and protective (i.e., social support) factors of these trajectories

(six assessments, with assessment intervals of six months) across early to middle adolescence (from age of 11–12 years to 15 years; Adrian et al. 2016). Nevertheless, Adrian et al. only addressed one protective factor, which reflects an important limitation considering that suicide prevention efforts have focused too much on mitigating risk factors, rather than incorporating more protective factors. Thus, more studies are needed that are specifically designed to identify multiple protective factors (see Franklin et al. 2017, for a review), especially in childhood.

Some common limitations in the studies mentioned above bear noted. They have mainly examined risk factors and/or protective factors representing a single system (e.g., individual). Besides, for school-aged students, academic-related risk or protective factors likely play an important role in the development of suicidal ideation (e.g., see Soole et al. 2015, for a brief review), however, such factors are rarely examined. Especially in China, the effects of academic-related factors may be more significant, considering Chinese traditional culture and socio-economic realities may promote the importance of students' learning toward extreme levels. Specifically, based on Confucian ideology, learning in China involves more than merely the pursuit of knowledge as it is often thought of in the West; the exertion of effort in the learning context (i.e., school) is viewed as a moral endeavor involving the lifelong task of self-improvement (e.g., van Egmond et al. 2013). Meanwhile, in China, there is a huge population, a shortage of educational resources, and limited job opportunities (e.g., Liu et al. 2018). Thus, good academic performance is the major stepping stone to obtain more education and more job opportunities, all of which contribute to the observation that Chinese families, schools, and society perhaps pay extraordinary attention to students' academic achievement, neglecting the heavy psychological burden on students, leading some students to experience negative emotions related to learning, such as academic anxiety, in turn increasing the likelihood of suicidal ideation.

Thus, this study investigated key individual, family, and school risk and protective factors for the development trajectories of suicidal ideation as early as middle childhood. Specifically, at the individual level, depressive symptoms and social anxiety might confer increased risk for elevated youths' suicidal ideation (e.g., see Bentley et al. 2016, for a review; Hill et al. 2018). Also, higher levels self-esteem and life satisfaction might operate as protective factors, buffering the effect on youths' suicidal ideation (e.g., Brausch and Decker 2014; Chang et al. 2019). In addition, the sex of youth also should be considered in the study of suicidal ideation trajectories, given the inconsistent findings with regard to its role in the development of suicidal ideation. For example, some studies have reported sex differences in the development of suicidal ideation (e.g., Adrian et al.

2016), whereas some studies have not (e.g., Giletta et al. 2015; Goldston et al. 2016). At the family level, family dysfunction, which occurs when one or more dimensions of family functioning (e.g., problem solving, communication, affective responsiveness) become impaired (Mousavi 2004; Mansfield et al. 2015), has been implicated as an important risk factor for youth who display higher levels of suicidal ideation (see Gallagher and Miller 2018, for a review). At the school level, basic psychological needs satisfaction at school (i.e., autonomy, competence, and relatedness), reflecting students' needs satisfaction as experienced specifically during school activities (or in the school environment; Tian et al. 2014), might be expected to serve as a protective factor, decreasing youths' suicidal ideation. This notion has been preliminarily supported by findings of protective effects of general basic needs satisfaction on suicidal ideation (see Rabon et al. 2018, for a brief review). Beyond these, academic anxiety and academic achievement might also serve as unique risk and protective factors respectively for school-age youths' suicidal ideation. This notion has been supported by studies suggesting that youths who died by suicide were more likely to experience academic failure or difficulties as a precipitating event to suicide (e.g., see Soole et al. 2015, for a brief review). Also providing some support for this notion, Tan et al. (2018), using cross-sectional design, found that academic anxiety correlated with suicidal ideation in Chinese elementary and secondary school students.

The Current Study

This study used a developmental perspective to investigate the suicidal ideation in Chinese students starting in middle childhood. The study addressed two major aims. First, it aimed to delineate unique developmental trajectories of suicidal ideation from middle childhood to early adolescence. Based on the majority of the existing findings related to adolescent and children samples, this study hypothesized the identification of three discrete suicidal ideation trajectories. Considering that a regular school sample was employed, this study hypothesized that a trajectory with low or no suicidal ideation would be identified. This study also hypothesized a trajectory with escalating suicidal ideation, given that the follow-up time of this study covered the transition to the adolescent period, which is associated with increasing suicidal ideation and suicide rate (e.g., Musci et al. 2016; Nock et al. 2013). Moreover, because such a trajectory with high suicidal ideation was identified in early, middle, and late adolescence (Giletta et al. 2015; Kim et al. 2019; Musci et al. 2016), it seems plausible that these youths are likely to show an increasing trend or high suicidal ideation as they approach adolescence. Finally, based

on the empirical findings and commentary reviewed above (Whalen et al. 2015; Whalen et al. 2018), this study hypothesized that a trajectory with an early-onset of suicidal ideation would be identified.

Second, this study aimed to identify key multisystemic risk factors that differentiated membership in these groups, as well as key protective factors. Specifically, this study hypothesized that the risk factors of depressive symptoms, social anxiety, academic anxiety, and family dysfunction would increase the likelihood of being in the adverse trajectories of suicidal ideation. Furthermore, the study hypothesized that the protective factors of self-esteem, life satisfaction, academic achievement, and the satisfaction of basic psychological needs in school would reduce the likelihood of being in the adverse trajectories of suicidal ideation. For the youth sex, the study did not make any hypothesis, given the inconsistent findings with regard to its role in the development of suicidal ideation (e.g., Adrian et al. 2016; Goldston et al. 2016).

Method

Participants

Participants included 715 students (54.5% male, $M_{age} = 8.95$, $SD = 0.71$) from elementary schools in a city located in southeast China. Given the cooperation of school authorities, overall student participation rates were close to 95%. Of the participating students, 50.6% were in Grade 3 and 49.4% were in Grade 4 at the start of the study. Students participated in assessments at six-month time intervals.

Of the total 715 students who had participated in the survey at Time 1 (T1), 616 (86.15%) at Time 2 (T2), 632 (88.39%) at Time 3 (T3), 645 (90.21%) at Time 4 (T4), 609 (85.17%) at Time 5 (T5), and 628 (87.83%) at Time 6 (T6) of the T1 participants were retained, respectively. The amount of missing data was 13.85% at T2, 11.61% at T3, 9.79% at T4, 14.83% at T5, and 12.17% at T6. The Missing Completely at Random (MCAR) test (Little 1988) was conducted for all variables. This analysis of the six waves of longitudinal data revealed a normed χ^2 (χ^2/df) of 1.29, which indicated that the pattern of missing data was not materially different from a random pattern (Bollen 1989). Full Information Maximum Likelihood (FIML) analyses in Mplus were applied for model estimations. In total, 715 cases were included in the analyses.

Procedure

This study was conducted after obtaining approval of the Human Research Committee of South China Normal

University, informed consent from parents, and assent from the students. A packet of self-report instruments was administered to all students in a regular classroom environment by a trained graduate assistant. Across all six occasions, the participants received identical verbal and written instructions. They were also informed of the nature of the study and confidentiality of their responses. Participants took as much time as needed to complete the questionnaires, knowing that they could stop participation at any time.

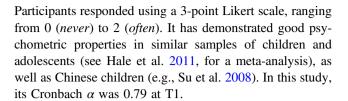## Measures

Suicidal ideation

Given that suicidal ideation is an internalizing problem that is not frequently observable by others in a child's environment, the self-report method typically is considered the primary means for conducting suicidal ideation assessments with children and adolescents (e.g., Miller 2018). Thus, the self-reported screening items of the Beck Scale for Suicide Ideation (BSI-Screen; Beck and Steer 1991) were employed to assess youths' suicidal ideation. The BSI-Screen serves as a brief, routine screener for suicidal thinking (e.g., Kliem et al. 2017; Li et al. 2011). The five items (e.g., "I wish to die.") were rated on a 3-point scale (0–2); responses were summed to create the BSI-Screen total score (e.g., Kliem et al. 2017; Li et al. 2011). The Chinese version of the BSI (including BSI-Screen) has proven to be psychometrically sound for adults and youths (e.g., Zhang and Brown 2007; Zhang et al. 2013). In this study, Cronbach αs were 0.76 (T1), 0.82 (T2), 0.84 (T3), 0.90 (T4), 0.88 (T5) and 0.87 (T6).

Depressive symptoms

Depressive symptoms were measured by the Chinese version of The Depression Self-Rating Scale for Children (DSRSC; Su et al. 2003). The DSRSC consists of 18 self-report items (e.g., "I don't think life is interesting."). Participants responded using a 3-point Likert scale, ranging from 0 (never) to 2 (often). Previous studies have shown support for its reliability and validity with Chinese youths (e.g., Yong et al. 2011). In this study, its Cronbach α was 0.85 at T1.

Social anxiety

Social anxiety was measured by the Social Anxiety Disorder subscale of the Screen for Child Related Emotional Disorders (SCARED)-Chinese Version (Su et al. 2008). This subscale comprises seven items (e.g., "I feel nervous with people I don't know well.") assessing social anxiety.

Participants responded using a 3-point Likert scale, ranging from 0 (never) to 2 (often). It has demonstrated good psychometric properties in similar samples of children and adolescents (see Hale et al. 2011, for a meta-analysis), as well as Chinese children (e.g., Su et al. 2008). In this study, its Cronbach α was 0.79 at T1.

Academic anxiety

Academic anxiety was measured by a subscale of the Mental Health Test (MHT; Zhou 1991). The MHT is a 100-item true-false self-report questionnaire, which was previously developed for assessing the general mental health of Chinese children and adolescents. Demonstrating good reliability and validity, it has been widely used in studies with Chinese adolescents and children (e.g., Chen 2002; Tan et al. 2018). The Academic Anxiety subscale consists of fifteen items (e.g., "Are you always worried when you are not doing well in your studies?"). In this study, its Cronbach α was 0.86 at T1.

Family dysfunction

Family dysfunction was measured by Chinese version of the General Function subscale from the Family Assessment Device (FAD; Shek 2002), which is based on the McMaster model of family functioning. The General Function subscale consists of 12 self-report items (e.g., "We avoid discussing our fears and concerns."). Participants responded using a 4-point Likert scale, ranging from 1 (strongly agree) to 4 (strongly disagree), with higher scores reflecting greater family dysfunction. This scale has been shown to be suitable for Chinese children (e.g., Chen et al. 2014). In this study, its Cronbach α was 0.82 at T1.

Self-esteem

Self-esteem was measured by the Chinese version of Rosenberg's Self-Esteem Scale (RSES; Wang et al. 1999), consisting of 10 self-report items (e.g., "I feel that I'm a person of worth, at least on an equal plane with others."). Participants responded using a 4-point Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). The RSES has shown good internal consistency reliability and validity with Chinese youths (e.g., Yang et al. 2019). In this study, its Cronbach α was 0.85 at T1.

General life satisfaction

General life satisfaction was measured by Chinese version of the Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS; Tian et al. 2015). The BMSLSS is a self-report questionnaire developed to assess domain-specific

and general (i.e., overall) life satisfaction of youths (ages 8–18). This scale consists of five items, each representing one of the five major life domains that has been shown to be important to children and adolescents (e.g., "I would describe my satisfaction with my family life as…"). Participants responded using a 7-point Likert scale, ranging from 1 (*terrible*) to 7 (*delighted*). This scale has demonstrated good psychometric properties with Chinese youths (e.g., Tian et al. 2015). In this study, its Cronbach α was 0.74 at T1.

Basic psychological needs satisfaction at school

Basic psychological needs satisfaction at school was measured by the Adolescent Students' Basic Psychological Needs at School Scale (ASBPNSS; Tian et al. 2014). There are three subscales. The Autonomy subscale (e.g., "I feel like I can pretty much be myself at school.") consists of five items assessing students' autonomy need satisfaction at school. The Relatedness subscale (e.g., "I get along well with my teachers and classmates at school.") consists of five items assessing students' relatedness need satisfaction at school. The Competence subscale (e.g., "I am capable of learning new knowledge at school.") consists of five items assessing students' competence need satisfaction at school. Response options reflected a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). This scale has been demonstrated good reliability and validity with Chinese children (e.g., Wang et al. 2019). In this study, its Cronbach α was 0.85 at T1.

Academic achievement

Academic achievement data were collected from objective information from school records, similar to previous studies (e.g., Liu et al. 2018; Zhang et al. 2019). Specifically, participants' final exam scores for Chinese, Mathematics, and English were graded on a continuous scale from 0 to 100 during elementary school (i.e., Grades 3–4 in this study). Given the differences in exam content across Grades, raw scores for the three school subjects were standardized within each Grade and summed to form a single index of academic achievement (e.g., Liu et al. 2018; Zhang et al. 2019). The Cronbach αs based on the scores for the three school subjects in each Grade ranged from 0.76 to 0.78.

Data Analysis

Preliminary analyses

First, to verify the one-factor structure on BSI-Screen and determine whether the five items of the BSI-Screen could be summed to create a total score (the BSI-Screen score), a one-factor model was tested using confirmatory factor analysis (CFA) in Mplus 8.0. CFA was estimated with the weighted least square mean and variance adjusted (WLSMV) method. WLSMV is a robust estimator that does not assume normal distributions and is appropriate for categorical data (e.g., Finney and DiStefano 2006). Second, measurement invariance tests were conducted using multigroup factor analyses across sex. Also, longitudinal measurement invariance was tested to determine the degree of consistent measurement across time. Differences in Comparative Fit Indexes (CFI) that did not exceed a threshold of 0.01 were considered indicative of invariant measurements (Cheung and Rensvold 2002). In addition, descriptive characteristics of suicidal ideation scores and all other study variables were examined.

Model fit was assessed by the chi-square statistic, the Tucker-Lewis Index (TLI), CFI, and the root-mean-square error of approximation (RMSEA) (Anderson and Gerbing 1988). Because the chi-square statistic is sensitive to large samples, other model fit indices were also considered necessary to evaluate model fit. Model fit was deemed acceptable if the CFI and TLI were close to or above 0.90 and the RMSEA was less than 0.08 (Hu and Bentler 1999).

Growth Mixture Modeling (GMM) Analyses

GMM was used to model possible heterogeneity among elementary school students in suicidal ideation using it to test if two or more classes of trajectories existed, with the goal of estimating the optimal class membership for each participant. This study followed a model building strategy as suggested by Jung and Wickrama (2008).

First, a single-class latent growth curve model (LGCM) was used to examine descriptive analyses of the overall trajectory of suicidal ideation, including linear and quadratic growth terms and comparisons of model fit to determine the optimal functional form (Singer and Willet 2003). Maximum likely robust estimation (MLR) was used because it gives the most accurate estimation of χ^2 when data are nonnormally distributed (Satorra and Bentler 1994). Prior to the GMM analyses, sex differences in the overall trajectory of suicidal ideation were evaluated by multi-group analysis. Specifically, an initial unconstrained model was estimated that allowed all trajectory parameters to vary for girls and boys, followed by an additional nested model estimated under restrictive constraints that set all parameters to be equal between girls and boys. Satorra-Bentler scaled chi-square difference tests were conducted to compare the fit of the unconstrained model to the constrained model. Notably, it is impossible to estimate multiple group GMMs or to conduct direct statistical tests on models estimated separately for girls and boys (Vannucci and Ohannessian 2017).

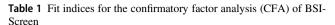Thus, GMMs were estimated utilizing the combined sample.

Subsequently, a series of GMMs was conducted to examine the presence of subgroups with distinct suicidal ideation trajectories. More detailed information of how the GMMs were conducted is provide in the supplementary materials. The determination of the optimal number of classes was informed by sample size adjusted BIC (BIC-Adjust), adjusted Lo-Mendell-Rubin likelihood test (Adj-LMR-LRT), bootstrap likelihood ratio tests (BLRT), entropy, average latent class probabilities, and sample size of the smallest class (≥5%; Wickrama et al. 2016). More importantly, extant research findings, and the theoretical justification and the usefulness and interpretability of the trajectories were considered (Nagin and Odgers 2010). Better fitting models generally produce lower absolute values of BIC and adjusted-BIC, high entropy (>0.80) and high average probabilities (>0.70), indicating clear class separation (Wickrama et al. 2016). The likelihood ratio tests (i.e., Adj-LMR-LRT and BLRT) compare two adjacent class models, with statistically significant p values indicating that the less parsimonious model is a better fit to the data (Wickrama et al. 2016).

Once the optimal model was selected, predictors of latent class membership were entered into the model using the 3-step approach, which is based on logistic regression analysis (Asparouhov and Muthén 2014). This approach first estimates the unconditional latent class model, and then takes class uncertainty rates into account prior to estimating the effects of the covariates. This procedure protects the formation of latent trajectory classes from the influence of predictors and covariates (Asparouhov and Muthén 2014). Each predictor was examined independently as well as its influence while controlling for the other predictors. Specifically, two steps were employed to examine each predictor effect. In step 1, bivariate models (in which only one predictor was considered at a time) were used to estimate each predictor's independent influence in predicting latent class membership for suicidal ideation. In step 2, multivariate models (in which all the significant (i.e., $p < 0.1$) predictors in step 1 were considered simultaneously) were used to examine each predictor's influence while controlling for the influence of the other predictors.

Results

Confirmatory Factor Analysis and Results for Invariance Testing

All CFAs at different times revealed very good fit parameters for the one-factor model of the BSI-Screen (see Table 1). CFA results for the BSI-Screen were similar to the

Table 1 Fit indices for the confirmatory factor analysis (CFA) of BSI-Screen

Model Fit	χ^2	df	CFI	TLI	RMSEA	[90% CI]
T1 CFA	16.021	5	0.988	0.977	0.056	[0.026–0.087]
T2 CFA	12.283	5	0.995	0.989	0.049	[0.014–0.084]
T3 CFA	15.671	5	0.995	0.989	0.058	[0.027–0.092]
T4 CFA	6.942	5	1.000	0.999	0.025	[0.000–0.064]
T5 CFA	13.122	5	0.998	0.996	0.052	[0.018–0.087]
T6 CFA	19.702	5	0.997	0.994	0.068	[0.038–0.101]

χ^2 WLSMV chi square, df degrees of freedom, CFI Comparative fit index, RMSEA Root mean square error of approximation, TLI Tucker-Lewis index, 90% CI 90% Confidence Interval for the RMSEA

results of Kliem et al. (2017) in Germany (CFI = 0.998; TLI = 0.995; RMSEA = 0.045 [90% CI: 0.030–0.061]). The fit indices for the tests of measurement invariance across sex and time are presented in Table 2. Regarding the CFI differences, strong invariance can be assumed for both sex and time.

Descriptive Statistics

Table 3 contains descriptive statistics and correlations among study variables. Generally, the average level of suicidal ideation increased across T1–T6, indicating that the rate of suicidal ideation increased when the participants entered adolescence. The standard deviation also increased, indicating that the variation in scores on suicidal ideation among individuals also increased. In terms of variable correlations, depressive symptoms, social anxiety and academic anxiety significantly positively correlated with suicidal ideation at all assessment time points, respectively. Family dysfunction significantly positively correlated with suicidal ideation at T1 and T2. Self-esteem, life satisfaction, and academic achievement significantly negatively correlated with suicidal ideation at all assessment time points, respectively. Basic psychological needs satisfaction at school significantly negatively correlated with suicidal ideation at T1, T2, T3, T4, and T5.

Growth Mixture Modeling (GMM)

Analysis of single-class LGCM of suicidal ideation indicated that a quadratic (and a linear) model fit the data for suicidal ideation, $\chi^2 = 11.904$; $df = 12$; CFI = 1.00; TLI = 1.00; RMSEA = 0.00, 90% CI = [0.000, 0.038], better than a linear model $\chi^2 = 45.119$; $df = 16$; CFI = 0.908; TLI = 0.914; RMSEA = 0.050, 90% CI = [0.033, 0.068]. Subsequently, the Satorra-Bentler scaled chi-square difference test was used to formally test statistical differences between the two models, $\Delta\chi^2_{SB}(4) = 35.005$, $p < 0.001$. All estimated

Table 2 Fit indices for measurement invariance of BSI-Screen

Model Fit	χ^2	df	CFI	TLI	RMSEA	[90% CI]	ΔCFI
Gender measurement invariance test							
Configural invariance	21.625	10	0.989	0.978	0.057	[0.023, 0.090]	–
Weak invariance	29.050	14	0.986	0.980	0.055	[0.026, 0.083]	0.003
Strong invariance	36.309	18	0.983	0.981	0.053	[0.028, 0.078]	0.003
Longitudinal measurement invariance test							
Configural invariance	372.174	365	0.999	0.999	0.005	[0.000, 0.015]	–
Weak invariance	409.483	385	0.998	0.998	0.009	[0.000, 0.017]	0.001
Strong invariance	527.000	430	0.993	0.993	0.018	[0.012, 0.023]	0.005

χ^2 = WLSMV chi square, df degrees of freedom, CFI Comparative fit index, RMSEA Root mean square error of approximation, TLI Tucker-Lewis index, 90% CI 90% Confidence Interval for the RMSEA

Table 3 Descriptive and correlations among study variables

	Mean (SD)	T1 SI	T2 SI	T3 SI	T4 SI	T5 SI	T6 SI
T1 SI	0.56 (1.30)	–					
T2 SI	0.55 (1.40)	0.430***	–				
T3 SI	0.59 (1.40)	0.267***	0.380***	–			
T4 SI	0.59 (1.58)	0.139***	0.233***	0.613***	–		
T5 SI	0.67 (1.61)	0.157***	0.237***	0.489***	0.620***	–	
T6 SI	0.75 (1.62)	0.133***	0.228***	0.509***	0.508***	0.564***	–
Depressive symptoms	8.13 (5.96)	0.267***	0.275***	0.168***	0.112**	0.156***	0.088*
Social anxiety	3.90 (3.13)	0.274***	0.171***	0.200***	0.152***	0.167***	0.133***
Academic anxiety	6.03 (4.04)	0.242***	0.217***	0.210***	0.150***	0.186***	0.164***
Family dysfunction	21.96 (7.54)	0.158***	0.144***	0.051	0.063	0.02	0.037
Self-esteem	32.37 (5.87)	−0.316***	−0.293***	−0.243***	−0.153***	−0.242***	−0.166***
Life satisfaction	32.57 (3.68)	−0.402***	−0.358***	−0.230***	−0.106**	−0.175***	−0.120**
Academic achievement	0.00 (2.48)	−0.110**	−0.182***	−0.165***	−0.095*	−0.173***	−0.091*
BPNSS	72.91 (11.81)	−0.226***	−0.199***	−0.157***	−0.133***	−0.182***	−0.073

SI Suicidal Ideation, BPNSS Basic Psychological Needs Satisfaction at School, T1–T6 Time 1–Time 6 respectively

*p < 0.05; **p < 0.01; ***p < 0.001

variances in the intercept ($\sigma^2 = 1.219$, $p = 0.001$), slope factor ($\sigma^2 = 0.679$, $p < 0.001$) and quadratic factor ($\sigma^2 = 0.015$, $p < 0.001$) were significantly different from zero, suggesting individual differences in pathways of suicidal ideation. Therefore, a quadratic and a linear growth model were used to estimate GMMs. Additionally, multigroup analysis revealed no sex differences in growth parameters (e.g., both mean and variances of intercept, slope and quadratic factors; $\Delta\chi^2_{SB}(6) = 6.186$, $p = 0.403$), suggesting a similar overall trajectory of suicidal ideation over time for girls and boys.

As mentioned, a quadratic and a linear growth model were used to estimate GMMs. Table 4 displays the fit indices derived from unconditional GMMs investigating the relative fit of models ranging from two to five latent classes of suicidal ideation trajectories. Based on prior empirical work (e.g., Giletta et al. 2015), the usefulness of the

trajectory classes and these indices, a three-class model was chosen for suicidal ideation for this age group. Class 1 (see Fig. 1), hereafter referred to as low-stable (intercept = 0.263, $p < 0.001$; linear = 0.003, $p < 0.926$; quadratic = 0.006, $p = 0.575$) consisted of 86.4% of the children. Class 2, referred to as moderate-increasing (intercept = 0.649, $p = 0.066$; linear = 2.024, $p = 0.080$; quadratic = −0.234, $p = 0.348$), comprised 7.1% of the students. Class 3 comprised 6.5% of the students, and this class was referred to as high-start (intercept = 4.324, $p < 0.001$; linear = −2.311, $p < 0.001$; quadratic = 0.332, $p < 0.001$).

Predictors of Class Membership

Table 5 includes odds ratios (ORs) for sex, depressive symptoms, social anxiety, academic anxiety, family dysfunction, self-esteem, life satisfaction, academic

Table 4 Model fit statistics for growth mixture models

Classes	BIC-Adjust	Entropy	Adj-LMR-LRT	BLRT	APP	Smallest Group
2	12333.376	0.970	693.910	720.306***	0.946–0.995	7.0%
3	**11928.795**	**0.969**	**402.845***	**418.169*****	**0.953–0.993**	**6.5%**
4	11646.358	0.962	285.177	296.025***	0.953–0.990	3.8%
5	11405.722	0.968	244.909	254.225***	0.948–1.000	1.4%

Bold indicates final class solution

BIC-Adjus Adjusted BIC, *BLRT* Bootstrap Likelihood Ratio Tests, *Adj-LMR-LRT* Adjusted Lo-Mendell-Rubin Likelihood Test, *APP* Average Posterior Probabilities

*p < 0.05; ***p < 0.001

Fig. 1 Estimated means and posterior probabilities for 3-class growth mixture model. *Note*. T1–T6 represents Time 1–Time 6 respectively

achievement, and basic psychological needs satisfaction at school as independent predictors of trajectory class membership. The low-stable group was employed as the reference group. All factors were significant predictors of membership in the moderate-increasing group, except for family dysfunction. However, these results only remained statistically significant for academic anxiety, self-esteem, and academic achievement when accounting for the other variables. All factors were significantly predictive of membership in the high-start group, except for sex. However, these results only remained significant for social anxiety, self-esteem, and life satisfaction when accounting for the other variables.

Alternate Model Analyses

Cohort (i.e., Grade 3 and Grade 4) differences in the overall trajectory of suicidal ideation were evaluated by multigroup analysis. The result revealed no cohort differences; as a consequence, this study analyzed the data as a single cohort to maintain parsimony. To determine the most appropriate constraints for growth factor variances, a series of GMMs with increasingly lenient constraints was estimated. GMMs converged and yielded feasible, appropriate solutions when both growth factor variances were constrained to zero, as well as when the intercept factor was estimated but constrained to be class-invariant. However,

convergence issues and implausible negative variances emerged in more complex models. Thus, this study pursued the above strategy. More detailed information for the above analyses is provide in the supplementary materials.

Discussion

Suicide is a leading cause of death among elementary school students, with suicide ideation considered a major precursor. Because suicidal ideation can occur in childhood, the transition from childhood to adolescence might represent a vulnerable period during which suicidal ideation (and its associated consequences) may increase. Demonstrations of periods of emerging suicide risk should indicate the usefulness of a developmental approach in investigating differing developmental patterns (and their early individual and environmental predictors) in suicidal ideation from childhood to adolescence. Thus, this study modeled the developmental trajectories (and predictors) of suicidal ideation as youth transition from middle childhood into early adolescence. This study distinguished three meaningful patterns of suicidal ideation among youths during middle childhood and early adolescence: Youths with low-stable, moderate-increasing, and high-start of suicidal ideation. In the bivariate analyses, almost all of the baseline variables predicted risk subgroups membership compared to the low-stable subgroup. However, when the predictors were considered simultaneously, social anxiety, academic anxiety, self-esteem, life satisfaction and academic achievement remained statistically significant.

Trajectories of Suicidal Ideation

As hypothesized, the findings indicated three differing developmental trajectories of suicidal ideation for youths in this age range. The subgroups differed in their mean levels, courses of suicidal ideation, and percentages of members. The most pervasive pattern in this study was a "low-stable" group (86.4%), followed by a "moderate-increasing" group (7.1%) and a "high-start" group (6.5%). Both the numbers and shapes of the trajectories were similar and reasonable

Table 5 Logistic regression of baseline predictors on suicidal ideation trajectory classes

Predictors	Step 1: Bivariate				Step 2: Multivariate			
	Moderator-Increasing		High-Start		Moderator-Increasing		High-Start	
	OR	SE	OR	SE	OR	SE	OR	SE
Sex	1.781†	0.313	1.113	0.319	1.723	0.347	0.979	0.350
Depressive symptoms	1.068**	0.023	1.115***	0.024	0.982	0.043	1.006	0.043
Social anxiety	1.176***	0.045	1.256***	0.047	1.071	0.059	1.176**	0.058
Academic anxiety	1.207***	0.044	1.162***	0.042	1.106†	0.056	1.033	0.053
Family dysfunction	1.027	0.018	1.062***	0.017	0.983	0.031	1.025	0.034
Self-esteem	0.882***	0.022	0.878***	0.026	0.890**	0.044	0.937†	0.039
Life satisfaction	0.921*	0.034	0.846***	0.032	1.059	0.064	0.913*	0.046
Academic achievement	0.848***	0.050	0.886**	0.044	0.892*	0.048	0.931	0.051
BPNSS	0.967**	0.011	0.959**	0.014	0.984	0.018	1.011	0.016

BPNSS Basic Psychological Needs Satisfaction at School

$^{\dagger}p < 0.1$; $*p < 0.05$; $**p < 0.01$; $***p < 0.001$

linked to previous findings on youths older than those of this study, namely adolescents (e.g., Kim et al. 2019; Rueter et al. 2008). Moreover, these three trajectories proved the previously reported hypothesis of three trajectories of suicidal ideation in this age rang, which put forward by a commentary noted above (Whalen et al. 2018). The identification of low-stable group is of course needless to say. The reasonableness of the other two identified risk groups of this study and their possible significance for comprehending and prevention the development of suicidal ideation in childhood and adolescence will be elaborated below.

As hypothesized, this study identified a moderate-increasing trajectory subgroup, in which suicidal ideation increased rapidly and then became stable as youths approached adolescence. This finding supported the notion that the adolescent transition creates a uniquely vulnerable time frame for the emergence and escalation of suicidal ideation, given changing biology, cognition, and social network reorganization (see Miller and Prinstein 2019, for a review). The developmental pattern for this subgroup linked to (or supported) previous findings of an increase in suicidality among children nearing adolescence (e.g., Musci et al. 2016; Nock et al. 2013), the previously reported hypothesis of adolescence-onset trajectory of suicidal ideation (Whalen et al. 2018), and previous findings that high suicidal ideation trajectories occur in adolescents (Kim et al. 2019; Musci et al. 2016). The emergence of the moderate-increasing subgroup should be helpful in comprehending the possible preadolescent progression of suicidal ideation of the aforementioned high ideation subgroups identified during adolescence, such as the possible time of onset (in middle childhood or earlier) and continuity into adolescence (rapid increases followed by stability). Furthermore, this finding also implies that

suicidal ideation in school-age children could continue through adolescence, serving as the beginning of a course of maladaptive coping, other than a transient developmental extreme. This finding underscores that the middle childhood is such a crucial period for screening suicide risk and an important intervention window to prevent the rapid escalation of suicide risk in adolescence. Furthermore, this finding might enlighten us that the earlier the intervention for suicidal ideation, the more effective it may be in reducing youths suicide risk.

Moreover, this study identified a high-start subgroup, in which suicidal ideation started at a relatively high level, decreased, and then increased slightly in early adolescence. The finding of high-start subgroup of suicidal ideation is consistent with an early-onset subgroup identified in early childhood (Whalen et al. 2015). The subsequent decreasing trend of this trajectory seems contrary to the reported general increasing trend in suicidal ideation among children entering adolescence (e.g., Park 2013; Nock et al. 2013). Nevertheless, it suggests the benefits of the person-centered approach of this study; that is the identification of meaningful subgroups of students' reports of suicidal ideation. Specifically, given that the percentage of youth reporting suicidal ideation with an increasing trend (7.1%) exceeded the percentage of youth reporting a decreasing trend (6.5%), and given that the average level of suicidal ideation across all students increased over time, these results supported the previously reported increasing trend in suicidal ideation across this age span. Thus, it can be inferred that the increasing trend of suicidal ideation based on youths' average levels may mask the deceasing trend of the high-start subgroup. This finding may increase the knowledge of the diversity of developmental patterns of suicidal ideation as youths transition from childhood to adolescence, not just
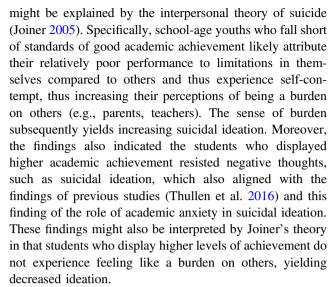
increasing pattern. Furthermore, the qualitative and quantitative shifts in the cognitive abilities of adolescents may enable them to think in more strategic ways than pre-pubescent children (e.g., Blakemore and Choudhury 2006), thus reducing their suicidal ideation and risk. Thus, the transition to adolescence does not always act as a catalyst for the increasing the suicidal ideation of all youths. However, according to the above interpretation of the trajectory of this group, one seemingly paradoxical finding was that the students' suicidal ideation increased during the final measurement wave, albeit by a modest amount. This finding might reveal a pattern of suicidal ideation, characterized by a fluctuating and recurring nature (e.g., Czyz and King 2015), reflecting a group of youth who are more vulnerable to later suicide risk, despite their increasing cognitive abilities. From this perspective, the high level of suicidal ideation observed in middle childhood appears to precede and indicate a possible risk for adolescents' suicidal ideation episodes rather than simply being a marker of concurrent or prior suicidal episodes. Nevertheless, given the slight increase observed during time frame of this study, a longer span of research with a larger sample is needed in the future to track changes in suicidal ideation among youths in this group.

Related Factors of the Moderate-Increasing Trajectory

The findings provide some reassurance to suicidologists and clinicians that the majority of children (86.4%) transition into adolescence with a relatively low risk of suicidal ideation. Nevertheless, it should be alarming that a group of children representing about 7% of the population is already on a trajectory of moderate-increasing suicidal ideation and steadily accumulating risk for suicide. However, it is worth noting that at T1, the difference in suicidal ideation between the moderate-increasing risk group and the stable low risk group was only marginally significant. What distinguished youth on the moderate-increasing trajectory from youth on the low-stable trajectory even in the absence of highly identifiable differences in suicidal ideation? The findings revealed that the presence of academic anxiety emerged as the most robust risk factor distinguishing the groups, when considering the multiple factors. Self-esteem and academic achievement emerged as the most robust protective factors for this group.

This study provided novel data suggesting the important role of academic anxiety as a risk factor on the increasing trajectory of suicidal ideation, further supporting cross-sectional data showing a significant positive relation between academic anxiety and school-age children's suicidal ideation (Tan et al. 2018). The finding that academic anxiety significantly predicted increasing suicidal ideation,

might be explained by the interpersonal theory of suicide (Joiner 2005). Specifically, school-age youths who fall short of standards of good academic achievement likely attribute their relatively poor performance to limitations in themselves compared to others and thus experience self-contempt, thus increasing their perceptions of being a burden on others (e.g., parents, teachers). The sense of burden subsequently yields increasing suicidal ideation. Moreover, the findings also indicated the students who displayed higher academic achievement resisted negative thoughts, such as suicidal ideation, which also aligned with the findings of previous studies (Thullen et al. 2016) and this finding of the role of academic anxiety in suicidal ideation. These findings might also be interpreted by Joiner's theory in that students who display higher levels of achievement do not experience feeling like a burden on others, yielding decreased ideation.

A major novel finding of this study concerned the risk associated with academic anxiety and the protection afforded by high academic achievement. Specifically, youths with higher levels of academic anxiety and lower levels of academic achievement were more likely to be in the moderate-increasing risk group, but not in the high-start risk group, compared to low-stable group. Possible interpretation is that the differences observed in the longitudinal associations between academic anxiety and suicidal ideation trajectories reflect increases in academic pressure, academic salience, and competitiveness, as elementary schools students move into the higher Grade levels. This interpretation is supported by the recent study of Zhang et al. (2019), which revealed an increasing magnitude in the relations between Chinese students' academic achievement and psychopathological symptoms as Grade levels increasing. These academic related factors findings may be of greater significance in China, considering that social and cultural factors in China may aggravate the effects of negative academic emotions (e.g., academic anxiety) in relation to the development of clinical levels of internalizing problem behaviors (e.g., suicidal ideation; Sun et al. 2012). Thus, in this cultural context, the protective role of academic achievement in remitting the adverse development of suicidal ideation is not surprising. Although speculative, these findings likely generalize to any culture and nation that emphasizes academic success as a crucial indicator of developmental success.

The findings also indicated that children reporting greater self-esteem predicted lower suicidal ideation from developmental perspective, after controlling for other factors. Previous studies have documented the inverse association between self-esteem and suicidal ideation (e.g., Brausch and Decker 2014). Positive self-esteem typically indicates affirmative feelings of self-worth and acceptance, which may help youths view their difficulties as temporary or

resolvable, again decreasing thoughts about suicide. In the context of Joiner's (2005) interpersonal theory of suicide, experiencing positive self-esteem seems to be inconsistent with feeling like a burden on others. However, this finding needs more attention given that a core task of the transition period from childhood to adolescence is the development of a more realistic picture of one's own values, beliefs, and competencies, and thus one's self (Eccles 1999). Such knowledge might be regarded as a precondition for the foundation of an adolescents' self-esteem (Wagner et al. 2018).

Related Factors of the High-Start Trajectory

Youth (6.5%) in the high-start trajectory group of suicidal ideation displayed a very different pattern. These youths experienced high suicidal ideation even in middle childhood; perhaps suggesting greater clinical severity (Whalen et al. 2015). Furthermore, given that their suicidal ideation recurred somewhat in early adolescence, the identification of risk and protective factors for the development of suicidal ideation appears especially warranted. Consistent with previous findings (see Bentley et al. 2016, for a review), the results demonstrated that social anxiety was a risk factor for this subgroup. The relation between social anxiety and suicidal ideation could also be explained by the Joiner's (2005) interpersonal theory of suicide, in that socially anxious youths may be especially vulnerable to perceived burdensomeness and thwarted belongingness, leading to greater suicidality.

Regarding protective factors, higher levels of self-esteem and life satisfaction reduced the likelihood of being in this group, after controlling for the other factors. High self-esteem was the common protective factor for the two adverse suicidal ideation trajectories, namely, high-start and moderate-increasing trajectories. Thus, the protective role of self-esteem in decreasing the youths' suicidal ideation needs to be given special attention. Moreover, life satisfaction reports played a unique, protective role for the youths with high suicidal ideation, after controlling for the effects of multiple factors. This finding also is consistent with the resiliency effect of life satisfaction on suicidal ideation among older adolescents (Chang et al. 2019) and a large number of studies showing that high overall life satisfaction facilitates positive functioning and buffers against the development of psychopathology (see Proctor et al. 2009, for a review). Considering this finding along with the concerns of contemporary scholars, it is encouraging to note that more and more scholars realize the importance in contemporary society of youth attaining optimal levels of positive mental health rather than simply failing to display psychological symptoms (Shoshani and Steinmetz 2014).

Additional noteworthy results emerged in this study. First, based on the binary regression analyses, the variables

of sex, depressive symptoms, family dysfunction, and basic psychological needs satisfaction at school all significantly predicted both of the risk suicidal ideation trajectories, compared to low-stable trajectory. However, these factors were no longer statistically significant when considering other factors, so the role of these factors needs further study. Nevertheless, findings of some of the less robust predictors in this age group, such as depressive symptoms, is consistent with previous studies. For example, studies showed that childhood decedents less often experienced depressive symptoms compared with adolescent decedents (e.g., Sheftall et al. 2016). This finding also supports the differences between the suicide phenomenon of children and adolescents; and the above-discussed links between two groups in suicidal ideation should be comprehensively viewed. Second, it is also worth noting that the magnitudes of the longitudinal associations were relatively small. However, these findings converge with the conclusions of a recent meta-analysis of the studies of the predictors of suicidal ideation over the past 50 years. That is, almost all identified, statistically significant predictors have revealed modest longitudinal associations (Franklin et al. 2017), perhaps due to the low base rates of suicidality. Nevertheless, because of the seriousness of suicidal ideation, even factors with small, but robust effects on suicidal ideation may reveal critical information for the development of effective screening methods and interventions aimed to prevent or reduce suicidal ideation in children and adolescents.

Strengths, Limitations and Future Research

One major strength of this study was that using growth mixture modeling to model trajectories of suicidal ideation from middle childhood to early adolescence, it thus extended the research on the developmental trajectories of suicidal ideation to a much younger age range than previous studies. Another major strength of this study was its consideration of multisystemic risk and protective factors that could relate to different courses of suicidal ideation. Such analyses should inform the development of empirically-informed assessment methods and preventive or treatment programs. Finally, this study integrated variable- and person-centered approaches in the analysis of developmental trajectories of suicidal ideation and risk and protective factors for these trajectories.

Some limitations of this study bear noting. Although this study examined suicidal ideation in youths as young as middle childhood, it did not follow their development into middle or late adolescence. Future studies are required to replicate and extend these findings across the full range of adolescence. Additionally, Joiner's (2005) interpersonal theory of suicide could provide the theoretical foundation

for future studies of the prediction of suicidal ideation. Such studies would benefit from careful examination of the role of relevant constructs (e.g., burdensomeness, thwarted belongingness) that were not addressed in this study.

Implications

This study yielded several important implications for the assessment and prevention and treatment of suicidal ideation in youths. First, this study underscores that middle childhood is a crucial period for screening suicide risk as well as an important intervention window to prevent the escalation of suicide risk in adolescence. Second, the study identified particular risk and protective factors that should be addressed in comprehensive screenings of youth. Given that academic anxiety and social anxiety were robustly related to the more severe courses of suicidal ideation, school professionals and families should consider identifying youths with these two types of anxiety for prevention programs geared toward decreasing suicide risk among youths. Because cognitive behavior therapy (CBT) is a well-established treatment for multiple childhood anxiety disorders (see Warwick et al. 2017, for a meta-analysis review), early diagnosis and effective treatment of children with academic anxiety and social anxiety with cognitive behavior therapy may prevent anxiety from developing further and increasing the risk of suicide. Third, academic achievement, self-esteem and life satisfaction were robust protective factors against the development of suicidal ideation. The importance of academic performance is self-evident, especially in the Chinese context. However, instead of single mindedly emphasizing students' academic performance, it may be more important for parents and teachers to work together to facilitate greater effort and more strategic learning methods among students, so that students could increase their academic progress and sense of competence. Moreover, programs that teach specific skills related to the protective factors, such as self-esteem enhancement, are likely to benefit youth at risk for suicide (Tarrier et al. 2014). Enhancing youths' awareness of personal assets and positive aspects of self appears fundamental to building intrapersonal skills for coping with intrusive suicidal ideation (Sharaf et al. 2009). Additionally, some scholars have recently incorporated positive psychology into established treatments of suicide. According to Fredricksons' (2001) broaden-and-build theory of positive emotions, consideration of youths' life satisfaction as proxy for positive emotions, could provide a unique window of opportunity for the teaching and development of new problem-solving and coping skills (Jiang et al. 2016). These skills might then be drawn on when future negative moods or moments of suicidal ideation occur. Thus, schools and

families could employ specific intentional activities purposefully designed to increase life satisfaction through targeted facilitation of positive feelings, behaviors, or thoughts (Suldo et al. 2014). Although much has been written about the particular importance of these protective variables during adolescence in particular (e.g., see Harter 2012), the results suggest the importance of attention to these variables in middle childhood as well. Finally, the identification of three subgroups with unique predictors all argues against the "one size fits all" approach to intervention, suggesting the need for specific programs tailored to the unique characteristics of the relevant groups. Specifically, to address the escalation of suicidal ideation with those youths nearing adolescence, prevention should focus on decreasing their academic anxiety and improving their self-esteem and academic achievement. Moreover, to address youths' emergence of high levels suicidal ideation in middle childhood, interventions oriented to reduce youths' social anxiety and promoting their self-esteem and life satisfaction may be helpful.

Conclusion

Extant research has suggested that the onset of suicidal ideation in childhood is associated with a greater suicide risk in adolescence and other adverse outcomes in later life. Nevertheless, the nature of the trajectories of suicidal ideation between childhood and early adolescence, and the predictors of different trajectories have remained unclear. A greater understanding of these two facets would offer a unique lens to observe its onset and continuity from a developmental perspective and aid in effective development of upstream suicide prevention approaches. Using longitudinal data with six assessment points, this study identified three meaningful subgroups of trajectories of suicidal ideation and specific risk and protective factors for the risk trajectories. The first group consisted of youths were at low risk for suicidal ideation during childhood and remained at low risk as they approached adolescence. The second group comprised a high-risk group of members reporting increasing suicidal ideation as they approached adolescence. The third group comprised an additional high-risk group with member showing an initial relatively high level of suicidal ideation during middle childhood, followed by a decrease and then a moderate subsequent increase in suicidal ideation in early adolescence. Additionally, the study identified specific predictors of the different high-risk trajectories. Specifically, academic anxiety is risk factor, and self-esteem and academic achievement are the protective factors, of increasing suicidal ideation trajectory; social anxiety is risk factor, and self-esteem and life satisfaction

are the protective factors, of high start suicidal ideation trajectory. Notably, the identification of distinct suicidal ideation trajectories with unique predictors highlights the importance of individual difference considerations in understanding the developmental course of suicidal ideation in childhood and adolescence. Together, the findings increase understanding of the diversity of developmental patterns and predictors of suicidal ideation from middle childhood to early adolescence and argues against the "one size fits all" approach to intervention, suggesting the need for specific programs tailored to the unique characteristics of the relevant groups. Moreover, given that suicidal ideation may start in a proportion of middle childhood youths and steeply escalate with nearing adolescence, the middle childhood period should provide an important window of opportunity for large-scale screening and prevention of the escalation of suicidality in adolescence.

Compliance with Ethical Standards

References

Adrian, M., Miller, A. B., McCauley, E., & Vander Stoep, A. (2016). Suicidal ideation in early to middle adolescence: sex-specific trajectories and predictors. *Journal of Child Psychology and Psychiatry*, 57, 645–653. https://doi.org/10.1111/jcpp.12484.

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: a review and recommended two-step approach. *Psychological Bulletin*, 103, 411–423. https://doi.org/10.1037/0033-2909.103.3.411.

Asparouhov, T., & Muthén, B. (2014). Auxiliary variables in mixture modeling: three-step approaches using Mplus. *Structural Equation Modeling: A Multidisciplinary Journal*, 21, 329–341. https://doi.org/10.1080/10705511.2014.915181.

Beck, A. T., & Steer, R. A. (1991). *Beck Scale for Suicide Ideation: Manual*. San Antonio, TX: Harcourt Brace.

Bentley, K. H., Franklin, J. C., Ribeiro, J. D., Kleiman, E. M., Fox, K. R., & Nock, M. K. (2016). Anxiety and its disorders as risk factors for suicidal thoughts and behaviors: a meta-analytic review. *Clinical Psychology Review*, 43, 30–46. https://doi.org/10.1016/j.cpr.2015.11.008.

Blakemore, S. J., & Choudhury, S. (2006). Development of the adolescent brain: implications for executive function and social cognition. *Journal of Child Psychology and Psychiatry*, 47, 296–312. https://doi.org/10.1111/j.1469-7610.2006.01611.x.

Bollen, K. A. (1989). A new incremental fit index for general structural equation models. *Sociological Methods & Research*, 17, 303–316. https://doi.org/10.1177/0049124189017003004.

Brausch, A. M., & Decker, K. M. (2014). Self-esteem and social support as moderators of depression, body image, and disordered eating for suicidal ideation in adolescents. *Journal of Abnormal Child Psychology*, 42, 779–789. https://doi.org/10.1007/s10802-013-9822-0.

Centers for Disease Control and Prevention. CDC, (2016). Leading causes of death. [Injury Prevention & Control: Data & Statistics (WISQARS™)]. https://www.cdc.gov/injury/wisqars/leading_causes_death.html.

Chang, Q., Xing, J., Ho, R. T., & Yip, P. S. (2019). Cyberbullying and suicide ideation among Hong Kong adolescents: the mitigating effects of life satisfaction with family, classmates and academic results. *Psychiatry Research*, 274, 269–273. https://doi.org/10.1016/j.psychres.2019.02.054.

Chen, C. (2002). A validation study of Mental Health Diagnose Test. *Journal of Ningbo University (Education Science)*, 24, 10–13.

Chen, J., Fan, X., Cheng, X., & Wang, S. (2014). Family functions and problem behaviors in rural left-behind children. *Chinese Journal of Clinical Psychology*, 2, 319–323.

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, 9, 233–255. https://doi.org/10.1207/S15328007SEM0902_5.

Copeland, W. E., Goldston, D. B., & Costello, E. J. (2017). Adult associations of childhood suicidal thoughts and behaviors: a prospective, longitudinal analysis. *Journal of the American Academy of Child and Adolescent Psychiatry*, 56, 958–965. https://doi.org/10.1016/j.jaac.2017.08.015.

Czyz, E. K., & King, C. A. (2015). Longitudinal trajectories of suicidal ideation and subsequent suicide attempts among adolescent inpatients. *Journal of Clinical Child & Adolescent Psychology*, 44, 181–193. https://doi.org/10.1080/15374416.2013.836454.

Eccles, J. S. (1999). The development of children ages 6 to 14. *The Future of Children*, 9, 30–44. https://doi.org/10.2307/1602703.

Finney, S. J., & DiStefano, C. (2006). Non-normal and categorical data in structural equation modeling. In G. R. Hancock &

R. D. Mueller (Eds.), *Structural equation modeling: A second course* (pp. 269–314). Charlotte, NC: Information Age Publishing.

Franklin, J. C., Ribeiro, J. D., Fox, K. R., Bentley, K. H., Kleiman, E. M., Huang, X., & Nock, M. K. (2017). Risk factors for suicidal thoughts and behaviors: a meta-analysis of 50 years of research. *Psychological Bulletin*, 143, 187–232. https://doi.org/10.1037/bul0000084.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: the broaden-and-build theory of positive emotions. *American Psychologist*, 56, 218–226.

Gallagher, M. L., & Miller, A. B. (2018). Suicidal thoughts and behavior in children and adolescents: an ecological model of resilience. *Adolescent Research Review*, 3, 123–154. https://doi.org/10.1007/s40894-017-0066-z.

Giletta, M., Prinstein, M. J., Abela, J. R., Gibb, B. E., Barrocas, A. L., & Hankin, B. L. (2015). Trajectories of suicide ideation and nonsuicidal self-injury among adolescents in mainland China: peer predictors, joint development, and risk for suicide attempts. *Journal of Consulting and Clinical Psychology*, 83, 265–279. https://doi.org/10.1037/a0038652.

Goldston, D. B., Erkanli, A., Daniel, S. S., Heilbron, N., Weller, B. E., & Doyle, O. (2016). Developmental trajectories of suicidal thoughts and behaviors from adolescence through adulthood. *Journal of the American Academy of Child and Adolescent Psychiatry*, 55, 400–407. https://doi.org/10.1016/j.jaac.2016.02.010.

Hale, W. W., Crocetti, E., Raaijmakers, Q. A., & Meeus, W. H. (2011). A meta-analysis of the cross-cultural psychometric properties of the Screen for Child Anxiety Related Emotional Disorders (SCARED). *Journal of Child Psychology and Psychiatry*, 52, 80–90. https://doi.org/10.1111/j.1469-7610.2010.02285.x.

Harter, S. (2012). *The construction of the self: developmental and sociocultural foundations.* New York: Guildford Press.

Herba, C. M., Ferdinand, R. F., & Verhulst, F. C. (2007). Long-term associations of childhood suicide ideation. *Journal of the American Academy of Child and Adolescent Psychiatry*, 46, 1473–1481. https://doi.org/10.1097/chi.0b013e318149e66f.

Hill, R. M., Del Busto, C. T., Buitron, V., & Pettit, J. W. (2018). Depressive symptoms and perceived burdensomeness mediate the association between anxiety and suicidal ideation in adolescents. *Archives of Suicide Research*, 22, 555–568. https://doi.org/10.1080/13811118.2018.1427163.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6, 1–55. https://doi.org/10.1080/10705519909540118.

Jiang, X., Lyons, M. D., & Huebner, E. S. (2016). An examination of the reciprocal relations between life satisfaction and social problem solving in early adolescents. *Journal of Adolescence*, 53, 141–151. https://doi.org/10.1016/j.adolescence.2016.09.004.

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

Jung, T., & Wickrama, K. A. S. (2008). An introduction to latent class growth analysis and growth mixture modeling. *Social and Personality Psychology Compass*, 2, 302–317. https://doi.org/10.1111/j.1751-9004.2007.00054.x.

Kim, J., Pike, K., McCauley, E., & Vander Stoep, A. (2019). Ethnic variations of trajectories in suicide ideation and attempt: From middle school to high school. *Suicide and Life-Threatening Behavior*, 49, 432–443. https://doi.org/10.1111/sltb.12441.

Kliem, S., Lohmann, A., Mößle, T., & Brähler, E. (2017). German Beck Scale for Suicide Ideation (BSS): psychometric properties from a representative population survey. *BMC Psychiatry*, 17, 389–397. https://doi.org/10.1186/s12888-017-1559-9.

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.

Kovess-Masfety, V., Pilowsky, D. J., Goelitz, D., Kuijpers, R., Otten, R., & Moro, M. F., et al. (2015). Suicidal ideation and mental health disorders in young school children across Europe. *Journal of Affective Disorders*, 177, 28–35. https://doi.org/10.1016/j.jad.2015.02.008.

Li, X. Y., Phillips, M. R., Zhang, Y. L., Xu, D., Tong, Y. S., & Yang, F. D., et al. (2011). Reliability and validity of the Chinese version of the Beck Suicide Ideation Scale (BSI-CV) among university students. *Chinese Mental Health Journal*, 25, 862–866.

Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, 83, 1198–1202. https://doi.org/10.2307/2290157.

Liu, J., Bullock, A., Coplan, R. J., Chen, X., Li, D., & Zhou, Y. (2018). Developmental cascade models linking peer victimization, depression, and academic achievement in Chinese children. *British Journal of Developmental Psychology*, 36, 47–63. https://doi.org/10.1111/bjdp.12212.

Mansfield, A. K., Keitner, G. I., & Dealy, J. (2015). The family assessment device: an update. *Family Process*, 54, 82–93. https://doi.org/10.1111/famp.12080.

Miller, D.N. (2018). Suicidal behavior in children: Issues and implications for elementary schools. *Contemporary School Psychology*, 1–10. https://doi.org/10.1007/s40688-018-0203-0.

Miller, A. B., & Prinstein, M. J. (2019). Adolescent suicide as a failure of acute stress-response systems. *Annual Review of Clinical Psychology*, 15, 425–450. https://doi.org/10.1146/annurev-clinpsy-050718-095625.

Mousavi, A. S. (2004). *Functional family therapy with a systemic approach*. 2nd Ed. Tehran: Alzahra University Press.

Musci, R. J., Hart, S. R., Ballard, E. D., Newcomer, A., Van Eck, K., Ialongo, N., & Wilcox, H. (2016). Trajectories of suicidal ideation from sixth through tenth grades in predicting suicide attempts in young adulthood in an urban African American cohort. *Suicide and Life-Threatening Behavior*, 46, 255–265. https://doi.org/10.1111/sltb.12191.

Nagin, D. S., & Odgers, C. L. (2010). Group-based trajectory modeling in clinical research. *Annual Review of Clinical Psychology*, 6, 109–138. https://doi.org/10.1146/annurev.clinpsy.121208.131413.

Nkansah-Amankra, S. (2013). Adolescent suicidal trajectories through young adulthood: prospective assessment of religiosity and psychosocial factors among a population-based sample in the United States. *Suicide and Life-Threatening Behavior*, 43, 439–459. https://doi.org/10.1111/sltb.12029.

Nock, M. K., Green, J. G., Hwang, I., McLaughlin, K. A., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2013). Prevalence, correlates, and treatment of lifetime suicidal behavior among adolescents: results from the National Comorbidity Survey Replication Adolescent Supplement. *JAMA Psychiatry*, 70, 300–310. https://doi.org/10.1001/2013.jamapsychiatry.55.

Park, S. (2013). Predictors of suicidal ideation in late childhood and adolescence: a 5-year follow-up of two nationally representative cohorts in the Republic of Korea. *Suicide and Life-Threatening Behavior*, 43, 81–96. https://doi.org/10.1111/j.1943-278X.2012.00129.x.

Proctor, C. L., Linley, P. A., & Maltby, J. (2009). Youth life satisfaction: a review of the literature. *Journal of Happiness Studies*, 10, 583–630. https://doi.org/10.1007/s10902-008-9110-9.

Rabon, J. K., Hirsch, J. K., & Chang, E. C. (2018). Positive psychology and suicide prevention: an introduction and overview of

the literature. *A positive psychological approach to suicide*. (pp. 1–15). Cham: Springer.

Rueter, M. A., Holm, K. E., McGeorge, C. R., & Conger, R. D. (2008). Adolescent suicidal ideation subgroups and their association with suicidal plans and attempts in young adulthood. *Suicide and Life-Threatening Behavior*, 38, 564–575. https://doi.org/10.1521/suli.2008.38.5.564.

Sandler, I., Tein, J. Y., Wolchik, S., & Ayers, T. S. (2016). The effects of the family bereavement program to reduce suicide ideation and/or attempts of parentally bereaved children six and fifteen years later. *Suicide and Life-Threatening Behavior*, 46, S32–S38. https://doi.org/10.1111/sltb.12256.

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.), *Latent variables analysis: applications for developmental research* (pp. 399–419). Thousand Oaks, CA, US: Sage Publications, Inc.

Sharaf, A. Y., Thompson, E. A., & Walsh, E. (2009). Protective effects of self-esteem and family support on suicide risk behaviors among at-risk adolescents. *Journal of Child and Adolescent Psychiatric Nursing*, 22, 160–168. https://doi.org/10.1111/j.1744-6171.2009.00194.x.

Sheftall, A. H., Asti, L., Horowitz, L. M., Felts, A., Fontanella, C. A., Campo, J. V., & Bridge, J. A. (2016). Suicide in elementary school-aged children and adolescents. *Pediatrics*, 138, e20160436. https://doi.org/10.1542/peds.2016-0436.

Shek, D. T. (2002). Assessment of family functioning in Chinese adolescents: the Chinese version of the Family Assessment Device. *Research on Social Work Practice*, 12, 502–524. https://doi.org/10.1177/1049731502012004003.

Shoshani, A., & Steinmetz, S. (2014). Positive psychology at school: a school-based intervention to promote adolescents' mental health and well-being. *Journal of Happiness Studies*, 15, 1289–1311. https://doi.org/10.1007/s10902-013-9476-1.

Singer, J. D., & Willet, J. B. (2003). *Applied longitudinal data analysis: modeling change and event occurrence*. New York: Oxford University Press.

Soole, R., Kolves, K., & De Leo, D. (2015). Suicide in children: a systematic review. *Archives of Suicide Research*, 19, 285–304. https://doi.org/10.1080/13811118.2014.996694.

Steinberg, L. (2019). *Adolescence*. 12th Ed. New York, NY: McGraw-Hill.

Su, L., Wang, K., Fan, F., Su, Y., & Gao, X. (2008). Reliability and validity of the screen for child anxiety related emotional disorders (SCARED) in Chinese children. *Journal of Anxiety Disorders*, 22, 612–621. https://doi.org/10.1016/j.janxdis.2007.05.011.

Su, L., Wang, K., Zhu, Y., Luo, X., & Yang, Z. (2003). Norm of the depression self-rating scale for children in Chinese urban children. *Chinese Mental Health Journal*, 17, 547–549.

Suldo, S. M., Savage, J. A., & Mercer, S. H. (2014). Increasing middle school students' life satisfaction: efficacy of a positive psychology group intervention. *Journal of Happiness Studies*, 15, 19–42. https://doi.org/10.1007/s10902-013-9414-2.

Sun, J., Dunne, M. P., & Hou, X. Y. (2012). Academic stress among adolescents in China. *Australasian Epidemiologist*, 19, 9–12.

Tan, L., Xia, T., & Reece, C. (2018). Social and individual risk factors for suicide ideation among Chinese children and adolescents: a multilevel analysis. *International Journal of Psychology*, 53, 117–125. https://doi.org/10.1002/ijop.12273.

Tarrier, N., Kelly, J., Maqsood, S., Snelson, N., Maxwell, J., & Law, H., et al. (2014). The cognitive behavioural prevention of suicide in psychosis: a clinical trial. *Schizophrenia Research*, 156, 204–210. https://doi.org/10.1016/j.schres.2014.04.029.

Thullen, M. J., Taliaferro, L. A., & Muehlenkamp, J. J. (2016). Suicide ideation and attempts among adolescents engaged in risk behaviors: a latent class analysis. *Journal of Adolescent Research*, 26, 587–594. https://doi.org/10.1111/jora.12199.

Tian, L., Han, M., & Huebner, E. S. (2014). Preliminary development of the adolescent students' basic psychological needs at school scale. *Journal of Adolescence*, 37, 257–267. https://doi.org/10.1016/j.adolescence.2014.01.005.

Tian, L., Zhang, J., & Huebner, E. S. (2015). Preliminary validation of the brief multidimensional students' life satisfaction scale (BMSLSS) among Chinese elementary school students. *Child Indicators Research*, 8, 907–923. https://doi.org/10.1007/s12187-014-9295-x.

van Egmond, M. C., Kühnen, U., & Li, J. (2013). Mind and virtue: the meaning of learning, a matter of culture? *Learning, Culture and Social Interaction*, 2, 208–216. https://doi.org/10.1016/j.lcsi.2013.06.002.

Vannucci, A., & Ohannessian, C. M. (2017). Self-competence and depressive symptom trajectories during adolescence. *Journal of Abnormal Child Psychology*, 46, 1089–1109. https://doi.org/10.1007/s10802-017-0340-3.

Wagner, J., Lüdtke, O., Robitzsch, A., Göllner, R., & Trautwein, U. (2018). Self-esteem development in the school context: the roles of intrapersonal and interpersonal social predictors. *Journal of Personality*, 86, 481–497. https://doi.org/10.1111/jopy.12330.

Wang, Y., Tian, L., & Huebner, E. S. (2019). Basic psychological needs satisfaction at school, behavioral school engagement, and academic achievement: longitudinal reciprocal relations among elementary school students. *Contemporary Educational Psychology*, 56, 130–139. https://doi.org/10.1016/j.cedpsych.2019.01.003.

Wang, X., Wang, X., & Ma, H. (1999). *Mental health assessment scale (revised edition)* (pp. 318–320). Bei Jing: Chinese Mental Health Magazine Press.

Warwick, H., Reardon, T., Cooper, P., Murayama, K., Reynolds, S., Wilson, C., & Creswell, C. (2017). Complete recovery from anxiety disorders following Cognitive Behavior Therapy in children and adolescents: a meta-analysis. *Clinical Psychology Review*, 52, 77–91. https://doi.org/10.1016/j.cpr.2016.12.002.

Whalen, D. J., Dixon-Gordon, K., Belden, A. C., Barch, D., & Luby, J. L. (2015). Correlates and consequences of suicidal cognitions and behaviors in children ages 3 to 7 years. *Journal of the American Academy of Child and Adolescent Psychiatry*, 54, 926–937. https://doi.org/10.1016/j.jaac.2015.08.009.

Whalen, D. J., Luby, J. L., & Barch, D. M. (2018). Highlighting risk of suicide from a developmental perspective. *Clinical Psychology: Science and Practice*, 25, 1–4. https://doi.org/10.1016/j.jaac.2015.08.009.

Wickrama, K. A. S., Lee, T. K., O'Neal, C. W., & Lorenz, F. O. (2016). *Higher-order growth curves and mixture modeling with Mplus: A practical guide*. New York, NY: Routledge.

Wyman, P. A. (2014). Developmental approach to prevent adolescent suicides: research pathways to effective upstream preventive interventions. *American Journal of Preventive Medicine*, 47, S251–S256. https://doi.org/10.1016/j.amepre.2014.05.039.

Yang, Q., Tian, L., Huebner, E. S., & Zhu, X. (2019). Relations among academic achievement, self-esteem, and subjective well-being in school among elementary school students: a longitudinal mediation model. *School Psychology*, 34, 328–340. https://doi.org/10.1037/spq0000292.

Yong, N., Wang, H., Hu, H., Meng, H. Q., Chen, P., Du, L., & Qiu, T. (2011). Relationship among child-abuse, depressive symptoms and sleep quality in grade 4–6 primary students. *Chinese Mental Health Journal*, 25, 616–621.

Zhang, J., & Brown, G. K. (2007). Psychometric properties of the scale for suicide ideation in China. *Archives of Suicide Research*, 11, 203–210. https://doi.org/10.1080/13811110600894652.

Zhang, J., Lester, D., Zhao, S., & Zhou, C. (2013). Suicidal ideation and its correlates: testing the interpersonal theory of suicide in Chinese students. *Archives of Suicide Research*, *17*, 236–241. https://doi.org/10.1080/13811118.2013.805643.

Zhang, W., Zhang, L., Chen, L., Ji, L., & Deater-Deckard, K. (2019). Developmental changes in longitudinal associations between academic achievement and psychopathological symptoms from late childhood to middle adolescence. *Journal of Child Psychology and Psychiatry*, *60*, 178–188. https://doi.org/10.1111/jcpp.12927.

Zhou, B. C. (1991). *Mental health test (MHT) manual*. Shanghai, China: East China Normal University.

Xinxin Zhu is a graduate student at South China Normal University. Her major research interests include youth development, mental health and positive psychology.

Lili Tian is a Professor at South China Normal University. Her major research interests include youth development, school psychology and positive psychology.

E. Scott Huebner is a Professor at University of South Carolina. His major research interests include school psychology, positive psychology, youth development, and mental health.