

**Various forms of suicidality in clinically referred
depressed children and adolescents: relations of
temperament and emotion self-regulation and clinical
features**

Ph.D. Thesis

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Introduction

Childhood depression is associated with episode recurrence, multiple coexisting psychiatric disorders, and substantial psychosocial impairment, but suicidality represents its most adverse and clinically serious feature because suicidal behaviors are often repetitive and increase risk for completed suicide.

Much of the past body of research on suicidal behavior in children and adolescents has focused on the association of depression and suicidal behaviour, across diverse samples, and findings have consistently shown that depressed children have high rates of suicidal behavior and that suicidal children are likely to have depressive or mood disorders.

According to DSM, suicidality has long been considered one of the symptoms of major depressive disorder episodes. Suicidal ideation and suicide attempts have been the most often studied forms of suicidality, however suicidal behaviors also can manifest as recurrent thoughts of wanting to die or having made suicidal plans. Little is known about the differences on clinical parameters and characteristics, such as depressive symptom profile, severity of depression, illness duration and comorbid disorders between depressed but nonsuicidal children and adolescent and their peers representing one of these different forms of suicidality.

Beside clinical characteristics and features, there is a particular interest in identifying clinically useful correlates as well as risk and vulnerability factors also, as potential contributors to the different forms of suicidality. These have attracted attention because they are generally stable characteristics, and developmentally are likely to antedate the onset of suicidal psychopathology. Traits that have been found to be associated with suicidal behavior in youngsters include impulsivity, impulsive aggression, trait anxiety, and trait anger. Differences in temperament appear also early in life and are believed to remain reasonably stable. Temperament is a multidimensional construct, and there is an agreement, that negative emotionality is one of its key dimension. “Emotionality” specifies one’s tendency to become easily and intensely negatively aroused, and is one of four dimensions of temperament. In general, trait negative emotionality in childhood and adolescence has been shown to be associated with depression, but studies of temperament (including negative emotionality) and suicidal

behaviors have involved almost exclusively adults and older adolescents, and were limited to some and not to all forms of suicidal behaviors, moreover, they used a variety of temperament scales. It appears that individuals who exhibit suicidal behavior usually have higher levels of negative affectivity than various comparison groups. However, little is known about whether other dimensions of temperament, which are potentially maladaptive traits such as shyness or behavioral inhibition contribute and how influence the risk of some forms of suicidality.

Emotion regulation is another trait variable that has been attracting interest for its role in mood disorders. Emotion regulation describes the manner in which an individual self-regulates (modulates) negative emotion. ER has been defined as the processes involved in modifying the dynamic and temporal features of the given emotion and thus entails responses that can maintain and enhance, as well as subdue or inhibit it. Emotion self-regulatory responses start to unfold in early childhood, evidence stability within individuals, and have been shown to play an important role in adjustment. Emotion self-regulation strategies have been categorized as adaptive or maladaptive. Maladaptive ones are likely to exacerbate rather than lessen or ameliorate the dysphoric mood. Maladaptive emotion-regulation and depressive affect and disorders have been shown to be associated with one another in different samples of youths, however little is known about the relations of emotion self-regulatory responses and risk of suicidal behaviors among depressed youths.

To our knowledge, the temperament and emotion self-regulation have never been assessed in the same sample of clinically depressed youngsters and therefore it is not known to what extent each alone or together contribute to suicidal behaviors. Additionally, none of the studies of temperament and self-regulation in depression has examined the entire range of suicidal behaviors as specified by the DSM-IV.

Aims and hypotheses

We examined all the various forms of suicidality specified in DSM-IV (i.e., recurrent thoughts of death, recurrent suicidal ideation, suicide plan, and suicide attempts), and their relations with temperament and emotion regulation and clinical characteristics in two subsamples of a large clinical samples of children and adolescents with MDD.

Concerning personality traits as correlates of different types of suicidal behavior, we aimed to investigate whether trait negative emotionality (as an index of temperament) and aspects of emotion self-regulation contribute to the variability in suicidal behaviors among depressed children and adolescents.

Concerning to clinical characteristics, our purposes were to examine the age and sex effects on various forms of suicidal behavior, similarities and differences between nonsuicidal and suicidal children and adolescents, in terms of illness history, depressive symptom profiles, severity of depression, and comorbid psychiatric disorders, and whether these clinical parameters differ across children and adolescents with various forms of suicidality.

Association of temperament and emotion regulation with different type of suicidal behavior

Hypothesis 1.: The presence of any form of suicidal behavior (compared to its absence) is associated with:

- (a) higher level of trait negative emotionality,
- (b) more extensive deployment of maladaptive ER responses to dysphoria,
- (c) less extensive use of adaptive ER responses to dysphoria.

Hypothesis 2.:

- (a) Negative emotionality and
- (b) maladaptive ER is increasingly likely as suicidal behavior becomes more severe.

Hypothesis 3.: Adaptive ER responses to dysphoria attenuate the impact of negative emotionality on severity of suicidal behavior.

Furthermore, although our objectives about temperament (Hypothesis 1 (a), 2 (a), 3.) focus on negative emotionality, we aimed to examine other dimensions of temperament (activity, shyness, and sociability) in the context of exploratory analyses (both main effects and possible interactions with ER), how they may be related to ER or suicidality.

Clinical characteristics of depressed youths with different type of suicidal behavior

Hypothesis 4.:

- (a) All forms of suicidal behavior increase with age,
- (b) adolescent girls are more likely to have suicide ideations and attempts than boys.

Compared with nonsuicidal peers, suicidal children and adolescents:

- (c) are more severely depressed,
- (d) have different depressive symptom profile,
- (e) are more likely to have comorbid psychiatric disorders

Methods

Participants

Samples included into the analyses comes from a study that evaluated the genetic liability and psychosocial risk factors in childhood-onset depression. The subjects were recruited from 23 clinical sites across Hungary between April 2000 and December 2003 (N=407) to analyse Hypothesis 1., 2. and 3. with a continued recruitment until December 2004 that enlarges the sample with 146 subjects (N=553) to evaluate Hypothesis 4.

Enrollment and assessment procedures

Children presenting at each site were scheduled for a research assessment if they met the following criteria: 7.0 years to 14.9 years old, not mentally retarded, no evidence of major systemic medical disorder, had available at least one biologic parent and a 7–17.9 year-old sibling. Children were scheduled for a 2-part evaluation. The first part of the evaluation entailed administration of the “Mood Disorder Module” of a diagnostic interview, as well as the Intake General Information Sheet (IGIS), and participants also completed self-rated scales. The second part of the evaluation involved the full diagnostic interview and the completion of additional self-rated scales.

Sample selection for testing the association of temperament and emotion regulation with different type of suicidal behavior

Between April 2000 and December 2003, 407 children and adolescent met diagnostic criteria for MDD, either “current” and / or “past” episode: 53.6% were boys, aged 11.7 years on average (SD = 2.0 years, range of 7.3–14.9 years).

Sample selection for testing clinical characteristics of depressed youths with different type of suicidal behavior

Between April 2000 and December 2004, 635 youth met criteria for MDD, either “current” and / or “past” episode. To be more comparable to those reported in prior studies, we restricted this sample of 635 youth to subjects in a current episode of MDD. This sample therefore included 553 currently depressed children and adolescents; of whom 55.2% were boys, mean age was 11.7 (SD = 2.0) years (range, 7.3–14.9)

Measurements

Interview Schedule for Children and Adolescents - Diagnostic Version (ISCA-D)

ISCA-D is a semi-structured interview to assess lifetime psychiatric disorders and current psychiatric status in youths from 7 up to ~age 19. The ISCA-D organizes symptoms into disorders, includes most DSM-IV Axis-I diagnoses and allows assessment of “current” and “lifetime” disorders. The ISCA-D is completed by interviewing separately the parent (or other adult informant) about the youth, and then the youth about him/herself. For each symptom, the clinician thus has a rating derived from the adult informant interview and one from the child interview: the clinician’s final rating of each symptom serves as the basis for diagnoses.

Suicidality rating

The ISCA-D’s depressive disorders section contains four items on suicidal behavior (as per DSM criteria) in the following order: (a) recurrent thoughts of death (repeatedly thinking about one’s own death and dying); (b) recurrent suicidal ideation (specific thoughts of wanting to kill oneself); (c) suicidal plan (having formulated a plan and a method to kill oneself); (d) attempted suicide (an executed behavior, with the goal of killing oneself, which can be of varying degrees of lethality). Each of these items is rated as not present or present. Symptom ratings are recorded for (a) the current or most recent episode of depression, and (b) the first episode of depression (if the current episode is

not the first episode). For both current and past ratings, the symptoms are rated for the worst point in that episode.

Concerning the analyses of trait personality factors (temperament and emotion regulation, notably Hypothesis 1., 2. and 3. and its correlations with suicidal behaviour), we categorised the sample of 407 youth: we assigned each subject an overall “suicidal behavior” classification using the “current” and/or “past” episode of MDD and assuming a hierarchy of severity.

Since methodological consideration, for testing Hypothesis 4., we analysed a sample of currently depressed youth (namely, 553 subjects). To do that, we restricted the overall sample of 635 youth (included into the program project until December 2004) to the sample of 553 subjects “currently” in MDD episode. To assign each subject a suicidal behaviour classification, even if they had had MDE in the “past” also, only the “current” MDD episode’s suicidality items were included into our analyses, and not the information on the suicidality endorsed (or not) during the “past” episode of MDD. It’s a different approach as for testing Hypothesis 1., 2. and 3. where an “overall”, that is “lifetime suicidal behaviour” classification was used, based on “current” and “past” episodes, assuming a hierarchy of severity.

In both samples, each subject was assigned to only one suicidal group, namely, those with a history of suicidal attempt, or suicidal plan, or suicide ideation, or recurrent thoughts of death, or without evidence of suicidal behavior. If more than one type of item had been endorsed (i.e., both suicidal ideation and suicide attempt), the “more severe” behavior determined the child’s classification.

Severity of current depressive symptoms

The ISCA-D includes 17 DSM-IV criterion symptoms (depressed mood, irritable mood, anhedonia, weight loss, weight gain, insomnia, hypersomnia, psychomotor agitation, psychomotor retardation, fatigue, feelings of worthlessness, inappropriate guilt, diminished ability to think or concentrate, and the 4 forms of suicidality) and 3 additional DSM-III symptoms (diurnal variation of mood, lack of reactivity, and distinct sadness). Symptoms were rated on a severity scale as follows: no symptom (0), subthreshold (1), or threshold (2). Based on the clinicians’ overall ratings, a composite score of depression severity was calculated by adding the “current episode” summary

scores on 16 ISCA-D depressive symptoms excluding the 4 suicidality items (thus the summary score ranges from 0 up to 32) for the purpose of the study. Thus in testing Hypothesis 4.(c), a higher summary score represents more severe depression. Alternately, when examining the prevalence of individual depressive symptoms and their associations with suicidality for testing Hypothesis 4. (d), each depressive symptom was dichotomized to be clinically significant (threshold) or not (sub-threshold or no symptom).

Severity of current depressive episode

As covariate to test Hypothesis 1., the index of clinicians rated children's overall severity of their current or most recent episode of MDD was used. It was defined on a 5-point scale: 1 = mild, 2 = moderate, 3 = severe without psychotic features, 4 = severe with mood-congruent features and 5 = severe with mood-incongruent features. The observed values for this index ranged from 1 to 4 ($M = 2.28$, $SD = 0.71$).

Depressive illness history

ISCA-D served for the information on illness history included illness duration (onset and offset date of the episode/s), number of MDEs.

Psychiatric comorbid disorders

The following lifetime psychiatric comorbid disorders were included for statistical analysis: various anxiety disorders (regardless of its type and timing as covariate for testing Hypothesis 1), dysthymic disorder, attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder, conduct disorder, and substance abuse disorders.

Intake General Information Sheet (IGIS)

Demographic data were collected from the parents by a modified version of the Intake General Information Sheet developed for the study of childhood onset depression. It is a fully structured interview with pre-coded item response choices, covering among others demographic, family, developmental, physical health, and psychosocial history and characteristics, as well as information on lifetime psychiatric hospitalization, and lifetime use of TCAs or SSRIs. Years of maternal education served as a proxy for socioeconomic status.

Temperament

Temperament of children was assessed via the parent rated Emotionality, Activity, Shyness (EAS). Temperament Questionnaire, completed at the Time 1 assessment that measures four dimensions: *Emotionality*, *Activity*, *Sociability*, and *Shyness*. The EAS has 20 items, five corresponding to each of the four temperament dimensions. Each item is rated on a 5-point scale from “1: not characteristic or typical of your child,” to “5: very characteristic or typical of your child,” and the relevant items are summed to obtain the four temperament scores.

Emotion Regulation

The self-rated “Feelings and Me” Child version questionnaire served as an index of children’s self-regulatory responses to dysphoria and distress. This instrument, suitable for ages 7–17 years, lists a variety of adaptive and maladaptive responses (representing the behavioral, social–interpersonal, cognitive, and physical/somatic regulatory domains), which can be deployed when feeling sad or upset. We used the two major FAM-C subscale scores: *Adaptive ER* (32 items) and *Maladaptive ER* (22 items).

Statistical Analyses

Association of temperament and emotion regulation with different types of suicidal behavior

The association of temperament and emotion regulation with different type of suicidal behavior was tested with Kruskal–Wallis tests for continuous variables and chi-square tests for categorical variables. The Kruskal–Wallis test was used because of non-normal distributions for the continuous variables at one or more levels of suicidal behavior.

Testing our Hypothesis (1., 2. and 3.), we controlled for the effects of several covariates, including sex, age, socioeconomic status, the presence of anxiety disorder and in a post hoc analysis, for severity of depression. Statistical Analyses Software (SAS) version 8.2 was used to perform all analyses.

Clinical characteristics of depressed youths with different types of suicidal behavior

Overall prevalence rates of current suicidal behaviors were computed for recurrent thoughts of death, recurrent suicidal ideation, suicide plan, and suicide attempts.

Conditional prevalence rates were computed for current suicidal behaviors. Age-sex-specific prevalence rates were then computed for current suicidal behaviors.

For the comparison of clinical characteristics across nonsuicidal and various suicidal groups, we divided subjects into 5 groups on the basis of current suicidality: nonsuicidality, recurrent thoughts of death only, suicidal ideation without a specific plan or attempt, suicide plan without attempts, or suicide attempts. Chi-square tests were conducted to examine differences and similarities in depressive symptoms and comorbid disorders between nonsuicidal and suicidal children and adolescents and across various suicidal youths. Analysis of variance was performed to examine the differences in depression severity and illness duration among nonsuicidal and different suicidal children and adolescents.

A series of multinomial logistic regression analyses was performed to examine the associations of each form of suicidality with each depressive symptom or comorbid disorder, adjusting for the effects of age and sex. Stepwise multinomial logistic regression analyses were then conducted to examine the independent effects of depressive symptoms and comorbid disorders. Backward and forward stepwise regressions were explored to determine the best model for the prediction of each suicidal behavior. Odds ratios (ORs) and 95% confidence intervals (CIs) were used to present associations of each form of suicidality with depressive symptoms and comorbid disorders. All statistical tests were 2-tailed. SPSS 13.0 (SPSS Inc., Chicago, Ill.) was used for all statistical analyses.

Results

Association of temperament and emotion regulation with different types of suicidal behavior

In the clinical sample of 407 children with MDD, 67% had a history of suicidal behaviour. Recurrent thoughts of death, suicidal ideation, and suicidal plan had comparable rates of around 18–20% each, with suicidal attempt being the least common (12%).

We didn't find statistically significant differences in *Emotionality*, *Sociability*, or *Shyness* across the groups with different types of suicidal behaviors, but subjects with a

history of suicide attempt were rated by their mothers as displaying significantly the lowest levels of trait *Activity*: $df = 4$, Kruskal-Wallis = 10.24, $p < 0.05$.

As the type of suicidal behavior becomes more severe, *Maladaptive ER* response scores tend to increase (mean = 12.5, $sd = 7.55$; mean = 13.34, $SD = 8.02$; mean = 17.21, $SD = 7.71$, mean = 16.82, $SD = 8.64$; mean = 22, $SD = 8.09$ respectively; $df = 4$, Kruskal-Wallis = 50.76, $p < 0.001$) and *Adaptive ER* response scores tend to decrease (mean = 28.23, $SD = 10.29$; mean = 27.15, $SD = 12.02$, mean = 24.20, $SD = 11.54$, mean = 23.73, $SD = 10.85$, mean = 22.73, $SD = 11.46$ respectively; $df = 4$, Kruskal-Wallis = 16.33, $p < 0.01$). We found that non-suicidal children were younger than suicidal ones, the oldest children were the most likely to have attempted suicide ($df = 4$, Kruskal-Wallis = 26.85, $p < 0.001$). More girls than boys had suicidal ideation and suicidal attempts ($df = 4$, $X^2 = 21.47$, $p < 0.001$).

Altogether 143 children (35.1%) had the presence of any anxiety disorders (regardless of its type and timing), and its rates ranged from 13 to 22% across the various categories of suicidality, without significant effect on the severity of the suicidal behavior.

Association among temperament and emotion regulation

Three of the four temperament subscales were significantly inter-correlated: *Shyness* and *Sociability* $r = -0.50$ ($p < 0.001$); *Shyness* and *Activity* $r = -0.36$ ($p < 0.001$); and *Sociability* and *Activity* $r = 0.35$ ($p < 0.001$). *Emotionality* was not related to the other temperament dimensions ($ps > 0.31$).

We found a very modest correlation between *Adaptive* and *Maladaptive ER* scale scores ($r = 0.15$, $p = 0.002$). We found modest (although statistically significant) associations between *Maladaptive ER* and *Shyness* ($r = -0.12$, $p < 0.05$), and between *Adaptive ER* and *Shyness* ($r = -0.15$, $p < 0.05$), *Sociability* ($r = 0.16$, $p < 0.01$), and *Activity* ($r = 0.10$, $p < 0.05$).

Modelling the different types of suicidal behaviors

All EAS and ER scale scores were included in the polychotomous model as well as sex, age, comorbid anxiety and depression severity. Subjects at each level of suicidal behavior were individually compared to the non-suicidal group in the same model. A given odds ratio therefore indicates the risk of exhibiting a specific suicidal behavior in

comparison to the non-suicidal group for a given independent variable. The overall model was significant ($-2 \text{ Log Likelihood for intercept and covariates} = 995.80, p < 0.0001$).

Subjects with recurrent thoughts of death and non-suicidal subjects were indistinguishable on each of the independent variables. Suicide ideators and non-suicidal subjects were similar on all four EAS scales. Increased *Emotionality* (OR = 1.53, 95% CI = 1.04, 2.26, $p < 0.05$) and *Activity* (OR = 1.89, 95% CI = 1.22, 2.92, $p < 0.01$) distinguished those with suicidal plans from non-suicidal ones; whereas higher scores on *Shyness* differentiated attempters and non-suicidal cases (OR = 2.06, 95% CI = 1.18, 3.61, $p < 0.05$).

In contrast, the association between emotion regulatory responses and suicidality was more straightforward. *Maladaptive ER* was consistently associated with specific suicidal behavior (except with recurrent thoughts of death), with the odds ratios increasing very slightly for suicide attempters (OR = 1.08, 95% CI = 1.03, 1.13, $p < 0.001$; OR = 1.08, 95% CI = 1.03, 1.13, $p < 0.01$; OR = 1.16, 95% CI = 1.09, 1.23, $p < 0.001$ respectively). Similarly, lower scores on the *Adaptive ER* subscale characterize ideators (OR = 0.96, 95% CI = 0.93, 0.99, $p < 0.01$), those with suicidal plan (OR = 0.94, 95% CI = 0.91, 0.98, $p < 0.001$), and attempters (OR = 0.93, 95% CI = 0.89, 0.97, $p < 0.01$), compared to non-suicidal youngsters.

In the model of suicide attempters (compared to non-suicidal children), we also found statistically significant interactions between *Adaptive ER* and *Shyness* (OR = 1.08, 95% CI = 1.03, 1.14, $p < 0.01$), as well as *Adaptive ER* and *Sociability* (OR = 1.08, 95% CI = 1.02, 1.15, $p < 0.01$). For children high on trait *Shyness*, the extent of *Adaptive ER* repertoire (i.e., High versus Low in the figure) does not substantially alter the odds of being a suicide attempter. In contrast, extent of *Adaptive ER* does make a difference for children with lower levels of trait *Shyness*; for them, adaptive ways of regulating dysphoria are associated with lower odds of being a suicide attempter.

The other interaction indicates that, at higher levels of trait *Sociability*, extent of *Adaptive ER* does not substantially impact on the odds of being an attempter. However, among children at lower levels of *Sociability*, having an extensive repertoire of *Adaptive ER* skills (i.e., High ER in the figure) signals decreased odds of being a suicide attempter.

The results also reveal that severity of the depressive episode is very significantly related to risk of suicidal behavior: this is most dramatic with regard to suicidal plans and suicide attempts: each unit change in depression severity increases the odds of being a suicide attempter about seven-fold. Importantly, however, given that our model has accounted for the effect of depression severity, the results indicate that the contribution of ER response tendencies to suicidality is independent of MDD severity.

Clinical characteristics of depressed youths with various suicidal behavior

Suicidality

67.5% of the sample of 553 currently depressed youth in their lifetime had recurrent thoughts of death, 47.6% had suicidal ideation, 29.8% had suicide plan, and 11.6% had attempted suicide. During the past month (current), 62.2% of the sample had recurrent thoughts of death, 43.9% had recurrent suicidal ideation, 26.9% had suicide plan, and 9.9% had attempted suicide. Among children and adolescents who had recurrent thoughts of death, 68.9% also evidenced suicidal ideation, 41.6% had suicide plan, and 15.4% had actually attempted suicide. Among suicidal ideators, 60.5% had suicide plan and 22.6% had actually attempted suicide. Moreover, 34.2% of patients with a suicide plan had actually attempted suicide.

For girls, all 4 suicidal behaviors tended to increase with age. The rates of suicidal ideation, plan, and attempts were markedly elevated at age 13 to 14 years. For boys, all 4 suicidal behaviors had no significant differences across age groups (all $p > 0.05$). Significant sex differences were observed only for depressed adolescents at age 13 to 14 years, with girls being more likely than boys to have suicidal ideation, and suicide attempts. Recurrent thoughts of death had no sex differences for all age groups.

Illness history and severity of depression

Suicidal and nonsuicidal children and adolescents had no significant differences in terms of mean illness duration, history of psychiatric hospitalization, recurrent episode of major depression, and history of SSRI and TCA use. Suicidal children and adolescents were more severely depressed than nonsuicidal peers after adjustment for age and sex. Across suicidal children and adolescents, no significant differences were found in terms of mean illness duration, recurrent episode of major depression, depression severity,

history of SSRI and TCA use. In the meanwhile, suicide attempters were significantly more likely than other suicidal peers to have a history of psychiatric hospitalization.

Depressive symptom profile and psychiatric comorbidity

Across various forms of suicidal children and adolescents, only depressed mood showed a significant difference, with the highest prevalence in attempters, followed by children and adolescents with suicidal ideation, recurrent thoughts of death, and suicide plan. Across various forms of suicidal groups, no significant differences were found for all comorbid disorders.

Multivariate analysis

Multinomial logistic regressions were first conducted to examine the associations between individual depressive symptoms and comorbid disorders and each form of suicidal behavior with the nonsuicidal peers as the reference group, when age and sex were statistically controlled. 6 depressive symptoms (depressed mood, irritability, agitation, distinct sadness, feelings of worthlessness, inappropriate guilt) and comorbid separation anxiety and conduct disorders were associated with elevated risk for 1 or more forms of suicidality. Fatigue and diurnal variation of mood were negatively associated with suicidal ideation and suicide plan, respectively.

Stepwise multinomial logistic regression analysis was then conducted to examine which depressive symptoms or comorbid disorders that were significant in model 1 were independently associated with which form of suicidal behavior after controlling for each other and age and sex. Depressed mood, psychomotor agitation, feelings of worthlessness, comorbid separation anxiety, and conduct disorder were significantly and independently associated with increased risk for at least 1 form of suicidality. Specifically, recurrent thoughts of death were significantly predicted by feelings of worthlessness only (OR = 2.23). Suicidal ideation was associated with depressed mood (OR = 2.18), feelings of worthlessness (OR = 2.06), and comorbid conduct disorder (OR = 5.42). Suicide plan was associated with feelings of worthlessness (OR = 2.90), psychomotor agitation (OR = 1.70), and comorbid separation anxiety (OR = 3.50). Suicide attempts were significantly associated with conduct disorder (OR = 9.27), separation anxiety (OR = 4.01), depressed mood (OR = 3.66), psychomotor agitation (OR = 2.18), and feelings of worthlessness (OR = 2.11) in order of ORs.

Discussion

Association of temperament and emotion regulation with different type of suicidal behavior

As an index of temperament, negative emotionality is typically evident early in life and by late childhood and thereafter, has been associated with the presence of depression. Having a predominantly negative affective temperament may plausibly contribute to the risk of suicidality in depression in several ways, including by worsening the extent of dysphoria or anhedonia, exacerbating the overall severity of the disorder, or compromising cognitive appraisal.

The ways in which youngsters respond to (or regulate) their own dysphoric mood also are presumed to have their origins in early childhood, during which time individual differences in emotion self-regulation already are evident. By adolescence, difficulties in modulating or “downregulating” dysphoric mood have been associated with depression and suicidal behaviors. The ability to adaptively self-modulate dysphoria (e.g., to decrease its intensity or duration) may alter the risk of suicidal behaviors in depression by impacting on the mood component of the disorder.

In our study we controlled for the effects of age and sex that have been shown to be associated with suicidal behaviors, and an index of depression severity was added owing to its previously documented relations to suicidality. We failed to confirm the hypothesis that high level of trait negative emotionality is associated with suicidal behaviors. In fact, depressed non-suicidal and depressed suicidal children had comparable levels of negative emotionality. The failure to find strong and consistent main effects for negative emotionality in our sample may be due to the fact that the corresponding scores were negatively skewed in the sample. Thus, a ceiling effect could have decreased the likelihood of obtaining the predicted results for negative emotionality.

At the same time we confirmed the hypothesis about the relations of dysphoria-focused emotion self-regulation and suicidality, however with some interesting exceptions. First, we found that, with regard to how they reportedly self-regulate distress, nonsuicidal children and those with recurrent thoughts of death cannot be distinguished from one another. Because these two groups of depressed children also were very similar on the four dimensions of temperament, it is possible that recurrent

thoughts of death are less closely related to suicidal behavior than hitherto thought, and may be also considered as the symptom of psychological development. This possibility should be investigated in future research, in the comparison with normal control group.

Second, we found that depressed children with the remaining three types of suicidal behaviors consistently differ from non-suicidal peers by virtue of higher scores on the maladaptive and lower scores on the adaptive *ER* scales. In other words, a depressed child who is characterized by many maladaptive regulatory responses to dysphoria is likely to be a child with definite suicidal behaviors (ideation, plans, or attempts). Conversely, a more extensive repertoire of adaptive regulatory responses to dysphoria signals a decreased likelihood of specific suicidal behavior. Notably, these two aspects of emotion regulation represent relatively independent dimensions. Thus, from a clinical perspective, these findings could suggest that the risk of specific suicidal behavior in depressed children may be lowered in two ways: by enlarging their repertoire of adaptive ER responses to dysphoria, and by decreasing their repertoire of maladaptive ER responses.

Our results showed also that the severity of the depressive episode had been very significantly related to risk of suicidal behavior: most dramatically concerning to suicidal plans and suicide attempts. Depression severity, indexed as a sum of clinical symptom ratings, has also been found to be related to suicidality in the second part of the study on the larger sample (N=553).

Interaction terms were detected between *ER* and trait *Shyness* as well as trait *Sociability* in the statistical model for suicide attempters. These findings may suggest that when some temperament traits become extreme, emotion regulatory competence (or its lack therein) has little impact on the odds of suicide attempt, but in the absence of extreme traits, *Adaptive ER* skills appear to serve as protective factors and lower the risk for attempted suicide.

The overall portion of the depressed sample with some type of suicidal behavior is generally comparable to rates for depressed young patients in other samples, and as reported from other studies also, suicide attempt is the least frequent expression of suicidal behavior in this targeted age group. The sex effect across suicidal behaviors in our sample echoes the second part of our study and a large body of research on the preponderance of girls among suicide ideators and attempters

Clinical characteristic of depressed youths with different forms of suicidality

We found that approximately 68% of depressed children and adolescents in their lifetime had recurrent thoughts of death, 48% had suicidal ideation, 30% had suicide plan, and 12% had actually attempted suicide. This is the first report on the rates of recurrent thoughts of death and suicide plan in depressed children and adolescents. We also found that close to 15% of depressed children and adolescents who had recurrent thoughts of death, 23% of suicidal ideators, and 34% of suicide planners had actually attempted suicide. These findings suggest that depressed children and adolescents are at high risk for various forms of suicidality and that suicidal thoughts and suicide plan are associated with elevated risk for suicide attempts.

Age and sex had significant interacting effects on all 4 suicidal behaviors: suicidality in depressed children and adolescents increases with age and that sex differences become significant in middle adolescence (about age 13–14 years), with female adolescents being more likely to take suicidal actions (ideation, plan) than male adolescents.

In accordance with our hypothesis, suicidal children and adolescents compared with nonsuicidal peers, were more severely depressed, were more likely to have certain depressive symptoms (depressed mood, irritability, psychomotor agitation, distinct sadness, feelings of worthlessness, and inappropriate guilt), and were more likely to have comorbid anxiety and conduct disorders. The association between depressive severity and suicidality has already been reported in patients with MDD, however, research has yielded mixed results on the associations between depressive symptom presentation and psychiatric comorbidity and suicidality. Taken together, these findings suggest that clinical symptom presentation and psychiatric comorbidity differ between suicidal and nonsuicidal depressed children and adolescents. Suicidal depressed children and adolescents may represent a group of more severely depressed patients with more depressive symptoms and comorbid disorders.

Our findings indicate that clinical characteristics appear to be very similar across depressed children and adolescents with various forms of suicidal behavior. With regard to depressive symptoms presentation, we found that only depressed mood of 16 ISCA-D depressive symptoms differed significantly across 4 groups of suicidal children and adolescents, with suicide attempters having more depressed mood. No significant

differences were found across various suicidal children and adolescents in terms of illness duration, depressive severity, and psychiatric comorbidity. These suggest that various forms of suicidality represent a feature of depression rather than characterize subgroups of depressed children and adolescents at risk and thus have the same diagnostic implication for depression.

We found that 3 depressive symptoms (i.e., depressed mood, psychomotor agitation, and feelings of worthlessness) and comorbid anxiety and conduct disorders were independent and significant correlates of at least 1 form of suicidal behaviour. Close examination of the results revealed that recurrent thoughts of death were independently related to feelings of worthlessness only, suicidal ideation and plan were related to 2 symptoms and 1 comorbid disorder, and suicide attempts were related to all 3 symptoms and both comorbid disorders. Feelings of worthlessness were the only symptom that was independently related to all 4 forms of suicidal behavior after controlling for other symptoms, comorbid disorders, and demographics. These findings suggest that feelings of worthlessness may play a central role in the increasing suicidality from nonsuicidality through recurrent thoughts of death or suicidal ideation to suicide attempts. The progression of suicidal thoughts to suicidal acts depends on accumulating precipitants in the presence of feelings of worthlessness, such as depressed mood, psychomotor agitation, and comorbid anxiety and conduct disorders. Prospective studies are warranted to examine the central role of feelings of worthlessness and various psychosocial and clinical precipitants for suicidal risk in depressed children and adolescents.

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