

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

Ph.D. Thesis

Zsuzsanna Tamás M.D.

Szeged

2017

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

Ph.D. Thesis

Zsuzsanna Tamás M.D.

University of Szeged

Doctoral School of Clinical Medicine-Clinical and Experimental
Neuroscience

Supervisors:

Ágnes Vetró M.D., PhD.

Krisztina Kapornai M.D. hab., PhD.

Szeged

2017

RELATED ARTICLES

I. Tamás, Z., Kovacs, M., Gentzler, A., Tepper, P., Gádoros, J., Kiss, E., Kapornai, K., Vetró, Á. (2007). The relations of temperament and emotion self-regulation with suicidal behaviors in a clinical sample of depressed children in Hungary. *Journal of Abnormal Child Psychology*, 35(4), 640-652. (IF:2,619)

II. Liu, X. C., Gentzler, A. L., Tepper, P., Kiss, E., Kothenczné, O. V., Tamás, Z., Vetró, Á., Kovacs, M. (2006). Clinical features of depressed children with various forms of suicidality. *Journal of Clinical Psychiatry*, 67(9), 1442-1450. (IF:5,533)

III. Vetró, Á., Tamás, Zs. (2015) : Depresszió, öngyilkosság, mentális betegségek serdülőkorban In : Kovács Á. (szerk.) : Kamaszkor-kamaszkór Szemelvények az adolescens medicina területéről (Válogatás a Házi Gyermekorvosok Egyesülete « Kávészünet -17 » című tudományos konferenciáján 2015. május 14-17. Hotel Azúr konferenciaközpont Siófok elhangzott előadásokból) 33-39.

RELATED ABSTRACTS

IV. Tamás Zs., Gádoros, J. The Features of Emotion Regulation in a Clinical Sample of Youth in Hungary. Pilot Study of „Feelings and me” Questionnaire. 15th Association of European Psychiatrist Congress, 2007, Madrid, Spain. Madrid: S260, (poster)

V. Tamás Zs., Gádoros, J. The features of emotion regulation in an inpatient sample of youth in Hungary. Pilot study of „Feelings and Me” Questionnaire. 13th International Congress of European Society for Child- and Adolescent Psychiatry, 2007, Florence, Italy. Florence (poster)

VI. Tamás, Zs., Kovács, M., Gentzler, A., Tepper, P., Gádoros, J., Kiss, E., Kapornai, K., Vetró, Á. A temperamentum és az érzelmi reguláció vonatkozásai depressziós fiatalok szuicid viselkedésében hazai klinikai mintán. Magyar Gyermekneurológiai, Idegsebészeti, Gyermek-és Ifjúságpszichiátriai Társaság XXXII. Kongresszusa, 2007, Eger, Magyarország. Budapest: p. 27. (presentation)

VII. Tamás, Zs., Gádoros J. Az érzelmi szabályozás jellegzetességei gyermekpszichiátriai populációban: Az „Érzések és Én” kérdőív pilot vizsgálata. Magyar

Pszichiátriai Társaság XIII. Vándorgyűlése, 2007. Miskolc. Budapest, 47-2007. (CD formátum) (presentation)

VIII. Tamás, Zs., Kovács, M., Gentzler, A., Tepper, P., Gádoros, J., Kiss, E., Kapornai, K., Vetró, Á. The association of temperament and emotion regulation of dysphoria with suicidal behavior in a clinical sample of depressed children in Hungary. 17th World Congress of the International Association for Child and Adolescent Psychiatry and allied Professions, 2006. Melbourne, Ausztrália. Melbourne: p. 139. (poster)

IX. Tamás, Zs., Kovacs, M., Gentzler, A., Tepper, P., Gádoros, J., Kiss, E., Kapornai, K., Vetró, Á.: The association of temperament and emotion regulation of dysphoria with suicidal behavior in a clinical sample of depressed children in Hungary. Magyar Gyermekneurológiai, Idegsebészeti, Gyermek- és Ifjúságpszichiátriai Társaság XXXI. Kongresszusa, 2006, Balatonfüred, Magyarország. Budapest: p. 146. (presentation)

X. Tamás, Zs., Gádoros J., Kiss E., Charles G.: Az érzelmi reguláció szerepe depressziós fiatalok szuicid viselkedésében. Magyar Gyermekneurológiai, Idegsebészeti, Gyermek- és Ifjúságpszichiátriai Társaság XXX. Kongresszusa, 2005, Debrecen, Magyarország. Budapest: p. 42. (presentation)

XI. Tamás, Zs., Gádoros, J., Kiss, E., Georges, C.: Temperamentum és emocionális reguláció depressziós fiatalok szuicid viselkedésében. Magyar Pszichiátriai Társaság XII. Jubileumi Vándorgyűlése, 2005, Budapest, Magyarország. Budapest, P. 134, és 248-2005 (CD formátum) (presentation)

Table of content

| | |
|--|-----------|
| Summary | 7 |
| Abbreviations | 9 |
| 1. Introduction | 10 |
| 1.1 Different forms of suicidal behavior in depression | 10 |
| 1.2 Clinical characteristics of depressed youngsters with different forms of suicidality | 11 |
| 1.2.1 Symptom profile | 11 |
| 1.2.2 Comorbidity | 11 |
| 1.2.3 Age- and sex | 12 |
| 1.3 Personality traits and emotion regulation as vulnerability factors of suicidal behavior in depressed youth | 12 |
| 1.3.1 Personality traits as contributors in different forms of suicidality | 12 |
| 1.4. Aims and hypotheses | 15 |
| 1.4.1. Association of temperament and emotion regulation with different type of suicidal behavior | 16 |
| 1.4.2. Clinical characteristics of depressed youths with different type of suicidal behavior | 16 |
| 2. Methods | 17 |
| 2.1 Participants | 17 |
| 2.2 Enrollment and assessment procedures | 17 |
| 2.2.1. Sample selection for testing the association of temperament and emotion regulation with different type of suicidal behavior | 19 |
| 2.2.2. Sample selection for testing clinical characteristics of depressed youths with different type of suicidal behavior | 19 |
| 2.3 Measurements | 19 |
| 2.3.1 Interview Schedule for Children and Adolescents - Diagnostic Version (ISCA-D) | 19 |
| 2.3.1.1. Suicidality rating | 20 |
| 2.3.1.2. Severity of current depressive symptoms | 22 |
| 2.3.1.3. Severity of current depressive episode | 22 |
| 2.3.1.4. Depressive illness history | 22 |
| 2.3.1.5. Psychiatric comorbid disorders | 22 |
| 2.3.2. Intake General Information Sheet (IGIS) | 23 |
| 2.3.3. Temperament | 23 |
| 2.3.4. Emotion Regulation | 24 |
| 2.4 Statistical Analyses | 25 |
| 2.4.1 Association of temperament and emotion regulation with different types of suicidal behavior | 25 |
| 2.4.2 Clinical characteristics of depressed youths with different types of suicidal behavior | 26 |
| 3. Results | 27 |
| 3.1 Association of temperament and emotion regulation with different types of suicidal behavior | 27 |
| 3.1.1 Association among temperament and emotion regulation | 29 |
| 3.1.2 Modelling the different types of suicidal behaviors | 29 |

| | |
|--|-----------|
| 3.2 Clinical characteristics of depressed youths with various suicidal behavior..... | 33 |
| 3.2.1 Suicidality | 33 |
| 3.2.2 Illness history and severity of depression | 36 |
| 3.2.3 Depressive symptom profile | 36 |
| 3.2.4 Psychiatric comorbidity | 38 |
| 3.2.5 Multivariate analysis | 38 |
| 4. Discussion | 39 |
| 4.1 Association of temperament and emotion regulation with different type of suicidal behavior | 39 |
| 4.2 Clinical characteristic of depressed youths with different forms of suicidality | 43 |
| 4.3 Limitations | 46 |
| 4.4 Respective findings and clinical implications | 47 |
| 5. Personal effort..... | 50 |
| 6. References..... | 51 |
| 7. Appendix | 62 |

Summary

Introduction: Although major depressive disorder (MDD) is associated with suicidal behaviors, some depressed individuals are not suicidal and others evidence different forms of suicidality. We examined various forms of suicidality specified in DSM-IV and their relations with temperament and emotion regulation (ER) and their clinical characteristics in two large samples of children and adolescents with MDD.

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. 2. (a) Negative *emotionality* and (b) *maladaptive ER* is increasingly likely as suicidal behavior becomes more severe. 3. *Adaptive ER* responses to dysphoria attenuate the impact of negative *emotionality* on severity of suicidal behavior. Furthermore, we aimed to examine other dimensions of temperament (*activity*, *shyness*, and *sociability*) in the context of exploratory analyses. 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: We analysed Hypothesis 1., 2. and 3. in a clinical sample of 407 children (ages 7-14 years) with MDD, and Hypothesis 4. in an enlarged clinical sample of 553 children with MDD (ages 7–14 years). Children's DSM-IV diagnoses were based on semi-structured interviews and best-estimate psychiatric consensus. Parents independently provided ratings of their children's temperament, and children separately completed an inventory of emotion regulation. **Results:** Using multivariate models, we failed to confirm the hypothesized relations of negative trait emotionality and suicidality, but confirmed that high maladaptive and low adaptive ER response tendencies increase the odds of suicidal behaviors, above and beyond the risk posed by depressive illness severity. Unplanned interaction terms between temperament dimensions (other than negative emotionality) and ER suggested that at some high-extremes of temperament, ER has no impact on suicidality but in their absence, adaptive ER lowers the risk of suicidality. Concerning the clinical characteristics, approximately 68% of the sample had recurrent thoughts of death, 48% had suicidal

ideation, 30% had suicide plan, and 12% had attempted suicide. Compared with nonsuicidal peers, suicidal children and adolescents were more severely depressed, had more depressive symptoms, and more likely had comorbid disorders. However, depressed children and adolescents with various forms of suicidality were very similar in clinical characteristics. Feelings of worthlessness, depressed mood, psychomotor agitation, and comorbid separation anxiety and conduct disorders were independent correlates of at least 1 form of suicidality. Only feelings of worthlessness was related to all 4 suicidal behaviors, after adjustment for other depressive symptoms, comorbid disorders, and demographics. **Conclusion:** Depressed non-suicidal and depressed suicidal children had comparable levels of negative *emotionality*. A depressed child 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. Youngsters who have attempted suicide have the least favorable distress-specific emotion regulatory profile as mirrored by their considerably higher *Maladaptive* and considerably lower *Adaptive ER* score. Clinical characteristics differ between nonsuicidal and suicidal children and adolescents but are very similar across various forms of suicidality. Feelings of worthlessness may play a central role in the development of suicidal behavior. Interventions toward the enlarging the repertoire of adaptive ER responses to dysphoria, and the decreasing the repertoire of maladaptive ER responses, and the enhancement of self-esteem and amelioration of underlying psychopathology may be crucial for the prevention of suicide attempts in depressed children and adolescents.

Abbreviations

ADHD: Attention Deficit Hyperactivity Disorder

BED: Best Estimate Diagnostician

CDI: Children Depression Inventory

CDI-S: Children Depression Inventory Short Version

CI: Confidence Interval

DSM: Diagnostical and Statistical Manual of Mental Disorders

DSM-IV: Diagnostical and Statistical Manual of Mental Disorders, Fourth Edition

EAS: Emotionality, Activity, Shyness Temperament Questionnaire

ER: Emotion Regulation

FAM-C: “Feelings and Me” Child Version

IGIS: Intake General Information Sheet

ISCA-D: Interview Schedule for Children and Adolescents – Diagnostic Version

MDD: Major Depressive Disorder

MDE: Major Depressive Episode

NIMH: National Institute of Mental Health

OR: Odds Ratio

SAS: Statistical Analysis Software

SD: Standard Deviation

SES: Socioeconomic Status

SPSS: Statistical Package for the Social Sciences

SSRI: Selective Serotonin Reuptake Inhibitor

TCA: Tricyclic Antidepressant

1. Introduction

Although childhood depression is associated with a high rate of episode recurrence, multiple coexisting psychiatric disorders, and substantial psychosocial impairment (Birmaher et al., 1996; Kovacs, 1996; Ryan, 2005), suicidality probably represents its most adverse and clinically serious feature because suicidal behaviors are often repetitive and increase risk for completed suicide (Bridge et al., 2006; Fombonne et al., 2001; Goldston et al., 1999; Gould et al., 2003; Pfeffer et al., 1991; Rao et al., 1993; Weissman et al., 1999).

Much of the past body of research on suicidal behavior in children and adolescents has focused on the association of depression and suicidal behavior. Across diverse samples, such as those clinically referred (Haavisto et al., 2003; Kovacs et al., 1993; Myers et al., 1991a; Pfeffer et al., 1986) as well as those in the community (Bridge et al., 2006), 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. For example, in clinical settings, between 72% and 85% of children and adolescents with major depression exhibit some form of suicidal behavior (Kovacs et al., 1993; Myers et al., 1991b; Yorbik et al. 2004).

1.1 Different forms of suicidal behavior in depression

It is not entirely surprising that depressive disorders and suicidal behaviors tend to go hand-in-hand, given that suicidality has long been considered one of the symptoms of major depressive or dysthymic disorder episodes (American Psychiatric Association, 1994; 2013; World Health Organization, 1994). It should be noted, however, that suicidal ideation and suicide attempts have been the most often studied forms of suicidality, although according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth and Fifth Edition* (DSM-IV, American Psychiatric Association, 1994; DSM-V, American Psychiatric Association 2013), suicidal behaviors also can manifest as recurrent thoughts of wanting to die or having made suicidal plans. Research has shown that 2 forms of suicidal behavior in clinical samples of depressed youths, namely, suicidal ideation and attempts, are very common. About 60% to 70% of depressed youths have been found to have suicidal ideation or thoughts, and 13% to 39% have attempted suicide (Kovacs et al., 1993; Mitchell et al., 1988; Ryan et al., 1987; Yorbik et al., 2004).

At the same time, however, partly because most research has focused on suicidal ideation or attempt, little information is available about the prevalence and clinical features of recurrent thoughts of death and suicide plan, which have been specified in the DSM-IV as part of diagnostic criteria for major depressive disorder (MDD) (American Psychiatric Association, 1994).

1.2 Clinical characteristics of depressed youngsters with different forms of suicidality

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, that can have important practical implications for early identification and clinical intervention (Robbins and Alessi, 1985).

1.2.1 Symptom profile

According to a study of symptom presentation (Barbe et al., 2005) (17), depressed children and adolescents who had a history of clinically significant suicidal ideation (at least with a plan) (N = 43) and nonsuicidal counterparts (N = 92) differed only in hopelessness and insomnia. Specifically, after controlling for demographics, suicidal youths were more likely to have hopelessness and insomnia than nonsuicidal youths (Barbe et al., 2005). Suicidal youths also were found to be more severely depressed than nonsuicidal youths, but average illness duration did not differ between suicidal and nonsuicidal youths (Barbe et al., 2005). However, in an earlier study, Kosky and colleagues (1986) did not find any significant differences in emotional and behavioral symptoms between suicidal and nonsuicidal depressed children and adolescents.

1.2.2 Comorbidity

Information about comorbid psychiatric disorders among suicidal depressed children and adolescents is equivocal. For example, in a comprehensive study of the clinical picture of childhood depression, Ryan et al. (1987) found that separation anxiety, phobias with avoidance, overanxious disorder, and conduct disorder were common comorbid disorders in depressed children and adolescents, but these disorders did not differ between suicidal and nonsuicidal youths. Barbe and colleagues (2005) found a lack of significant relationship between suicidality and lifetime comorbid disorders in depressed children and adolescents, including dysthymia, anxiety disorders, and

disruptive disorders. Similarly, Pfeffer et al. (1982) and Borst et al. (1991) found no association between conduct disorder and suicidal behavior in child and adolescent patients. In a longitudinal study, in contrast, Kovacs et al. (1993) reported that comorbid conduct/substance use disorders increased the risk of suicide attempts 3-fold. Goldston et al. (1998) found a higher prevalence of comorbid affective and substance abuse disorders among prior suicide attempters than nonsuicidal adolescent patients. Moreover, Wannan and Fombonne (1998) and Tuisku et al. (2012) noted that comorbid conduct disorder or substance abuse predicted suicidal behavior among psychiatric outpatient girls only.

1.2.3 Age- and sex

Epidemiologic data in the general population have compellingly shown that the rates of suicidal behaviors begin to increase during adolescence and are higher in adolescent girls than in boys (Bridge et al., 2006; Gould et al., 2003; Evans et al., 2005; Kwon et al., 2016). However, in clinical samples of depressed children and adolescents, age and sex effects on suicidal behavior have not been reported consistently. Several studies have reported a lack of sex differences in both suicidal ideation and suicide attempts (Mitchell et al., 1988; Ryan et al., 1987). Notably, Kovacs et al. (1993) followed an outpatient sample of children with affective disorders and found that sex differences of suicidal behavior became pronounced only when youths entered mid-adolescence. Age effects on suicide attempts but not suicidal ideation have been reported by Ryan and colleagues (1987). In a large-scale study of depressed children and adolescents aged 5.6 to 17.9 years (N = 916), Yorbik et al. (2004) reported that age and sex effects on suicidal ideation and attempts were similar to those reported in the general population studies (Gould et al., 2003; Evans et al., 2005).

1.3 Personality traits and emotion regulation as vulnerability factors of suicidal behavior in depressed youth

Suicidal behavior in children and adolescents has continued to receive considerable research attention, with particular interest in identifying clinically useful correlates as well as risk and vulnerability factors (for a review, see Bridge et al. 2006).

1.3.1 Personality traits as contributors in different forms of suicidality

To consider the role of depressive disorders in suicidal behaviors, researchers also have been examining the potential contribution of personal traits (Bridge et al., 2006).

Personal traits have attracted attention because they are generally stable characteristics, and developmentally are likely to antedate the onset of suicidal or related psychopathology (for a review, see Brezo et al., 2006).

1.3.1.1 Impulsivity, temperament, negative emotionality

Traits that have been associated with suicidal behavior in youngsters include impulsivity, impulsive aggression, trait anxiety, and trait anger (Brent et al., 2003; Brezo et al., 2006; Goldston et al., 1996; McKeown et al., 1998; Myers et al., 1991b; Ohring et al., 1996). Notably, in childhood, various traits such as impulsivity have been regarded as aspects of temperament, which has been defined as individual differences in arousability or physiological reactivity and overall self-regulation (for overviews, see Posner and Rothbart, 2000; Shiner, 1998). Differences in temperament appear very early in life and are believed to remain reasonably stable (for a review, see Rothbart et al., 2000). Although, as Rettew and McKee (2005) noted, investigators differ in how they define and measure temperament, there is agreement that this is a multidimensional construct and that negative emotionality is one of its key dimension. One of the best known models of childhood personality (Buss and Plomin, 1975, 1984) indeed specifies “emotionality” (the tendency to become easily and intensely negatively aroused) as one of four dimensions of temperament. Negative emotionality also has been regarded as a key component of neuroticism (Shiner, 1998).

In general, trait negative emotionality in childhood and adolescence has been shown to be associated with depression and related constructs, such as negative self-schema (Austin and Chorpita, 2004; Goodyer et al., 1993; Kelvin et al., 1996; Watson et al., 1988). But studies of temperament (including negative emotionality or neuroticism) and suicidal behaviors have involved almost exclusively adults (Bulik et al., 1999; Engström et al., 1996; Lolas et al., 1991; Lynch et al., 2004; Pendse et al., 1999) and older adolescents (Enns et al., 2003; Fergusson et al., 2000), were limited to some forms of suicidal behaviors, and used a variety of temperament scales. Although findings have been somewhat inconsistent, 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 potentially maladaptive traits such as dispositional shyness or behavioral inhibition (e.g., Kagan, 1994) contribute to the risk of suicidality.

1.3.1.2 Emotion regulation (ER)

Another trait variable that has been attracting interest for its role in mental health, in general, and in mood disorders, in particular, is the manner in which an individual self-regulates (modulates) negative emotion (for overviews, see Adrian et al., 2011; Davidson et al., 2002; Gross, 1998). 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 (Thompson, 1994). 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 (e.g., Calkins and Dedmon, 2000; Calkins et al., 1999; Cole et al., 2004; Grolnick et al., 1996; Thompson, 1994). Emotion self-regulation strategies have been categorized as adaptive or maladaptive (for review, see Aldao et al. 2010). Maladaptive emotion self-regulatory strategies or responses are likely to be ones that exacerbate (e.g., rumination) rather than lessen or ameliorate (e.g. physical exercise) the dysphoric mood. Indeed, dysfunctional or maladaptive emotion-regulation and depressive affect and disorders have been shown to be associated with one another in community (Garber et al., 1995; Larson et al., 1990; Nolen-Hoeksema and Morrow, 1993; Silk et al., 2003., 2006) and clinic samples of youths (Garber et al., 1991). However, little is known about the relations of emotion self-regulatory responses and risk of suicidal behaviors among depressed youths. Findings from rather small samples of young adults population (Rajappa et al., 2012.) and inpatient adolescents suggest that suicide attempters have more problems in controlling their dysphoric emotions than those with current suicidal ideation, although both groups have various self-regulatory difficulties (Zlotnick et al., 1997, 2003.).

Moreover, it has not yet been established if the four forms of DSM-specified suicidal behaviors (i.e., recurrent thoughts of wanting to die or wishing to be dead, specific thoughts of wanting to kill oneself or suicidal ideation, suicidal plans, and attempted suicide) are distinct categories or represent a continuum of clinical severity. On the one hand, attempted suicide is often associated with a history of suicidal ideation (thinking and/or talking about killing oneself) including plans and threats, suggesting at least some temporal relations between these behaviors (D'Eramo et al., 2004; Kovacs et al., 1993; Lewinsohn et al., 1994; Reinherz et al., 1995). On the other hand, the fact that most

youths who think about killing themselves do not attempt suicide (Kovacs et al., 1993; Myers et al., 1991b; Sanchez and Le, 2001), suggests that the behaviors are discontinuous.

In summary, there are suggestions in the literature that trait negative emotionality, as an aspect of temperament, is likely to be more pronounced in youngsters with depressive symptoms or disorders than it is in healthy controls, and that suicidal youths may also be characterized by problems in areas of emotion self-regulation. However, to our knowledge the temperament and emotion self-regulation have not 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 (American Psychiatric Association, 1994).

1.4. 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) (American Psychiatric Association, 1994), 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, as mentioned above, temperament and emotion self-regulation have not been assessed in the same sample of clinically depressed youngsters in the literature before. Therefore it is not known to what extent each alone or together contribute to suicidal behaviors. Additionally, none of the earlier studies of temperament and self-regulation in depression has examined the entire range of suicidal behaviors as specified by the DSM-IV (American Psychiatric Association, 1994). Therefore, 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.

1.4.1. 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.

1.4.2. 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

2. Methods

2.1 Participants

Samples included into the analyses comes from a study that evaluated the genetic liability and psychosocial risk factors in childhood-onset depression (funded by the National Institute of Mental Health Program Project grant #MH56193, HHSA, Washington DC, USA). The subjects were recruited from 23 clinical sites across Hungary between April 2000 and December 2003 (N=407) to analyze 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.

2.2 Enrollment and assessment procedures

Children were recruited through 23 child psychiatric facilities (7 of which had both inpatient and outpatient units) across Hungary, serving both urban and rural areas (Vetró et al., 2009). They provided services to at least 85% of the newly registered child psychiatry cases, giving us access to a significant portion of the referred population nationwide.

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 (required by the study's genetic component), and attained a predetermined cut-off score on one of various depressive symptom screens (e.g., the short version of the Children's Depressive Inventory of Kovacs, M. (2003), and selected items from the Child Behavior Checklist (Achenbach, 1991) designed for this project. Seeking to maximize sensitivity and specificity, these initial screens were based on a previous pilot study with a different clinical sample in Hungary. A clinician-rated symptom scale was used with those patients who had been under care for a while. Further, over the course of recruitment, we adjusted the screen cut-offs, and also screening measures used, so that we could minimize false positives.

Children meeting these criteria were scheduled for a 2-part evaluation, conducted on 2 separate occasions, about 6 weeks apart, by different clinicians. Written consent for participation was obtained signed by both parents and the child, in accordance with the legal requirements in Hungary and the University of Pittsburgh, Pittsburgh, PA, USA. All study procedures and consent forms were approved by the University of

Pittsburgh's Institutional Review Board and the Board of Ethics of Human Research of the Hungarian Council for Scientific Research in order to comply with both countries' ethical rules.

The first part of the evaluation entailed administration of the "Mood Disorder Module" of a diagnostic interview (see measurement section), as well as the Intake General Information Sheet (IGIS), a comprehensive demographic and anamnestic data form covering demographic, family, developmental, physical health, and psychosocial history and characteristics (Kapornai et al., 2007). Participants also completed self-rated scales (including the two on which we report in the present work). To set the proper framework and facilitate recall, evaluations started with a semistructured interview, designed to construct a "time line" for the patient from birth to the date of the assessment. The time-line anchors included major "public" events with the corresponding dates (e.g., Christmas, start of a school year) and personally relevant events (e.g., birth of a sibling, both positive and negative familial events, variables reflecting on adjustment). The time-line ("chronograph") served to identify the chronology of the child's symptoms and to date disorder onsets and offsets.

Children and adolescents who met DSM-IV criteria for a mood disorder at the first part were scheduled for the second part of assessment. The second part of the evaluation involved the full diagnostic interview and the completion of additional self-rated scales. (If DSM criteria of MDD were not met at the first assessment, the child was assigned an "at-risk" status and entered a follow-up arm of the study).

To increase diagnostic validity, results of both the first and second parts of the assessments and associated documentation (e.g., psychiatric records) were subjected to a consensus diagnostic procedure (Maziade et al., 1992). Pairs of senior child psychiatrists, trained as Best Estimate Diagnosticians (BEDs), separately reviewed all material, and then together derived consensus diagnoses. "Caseness" (proband status) as well as onset dates of disorders, was based on best-estimate consensus. As described in connection with previous work ([Kovacs et al., 1984a] and [Kovacs et al., 1984b]), operational rules were used to define disorder onset and recovery, and "midpoint" rules were used to date onsets and offsets, if more exact dating was not possible.

2.2.1. 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 (detailed below), 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) (*Table 1.*).

2.2.2. 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 (Ryan et al., 1987; Yorbik et al., 2004) (13, 14), 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) (*Table 1.*).

Table 1. Samples for hypothesis testing

| Sample selection | Current and/or past MDE (n) | Current MDE (n) | Boys (% of sample) | Mean age in years |
|------------------------------|------------------------------------|------------------------|---------------------------|--------------------------|
| Hypothesis 1., 2., 3. | 407 | - | 53,6 | 11,7 (SD=2,0) |
| Hypothesis 4. | 635 | 553 | 55,2 | 11,7 (SD=2,0) |

2.3 Measurements

2.3.1 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. It extends our earlier, symptom-based interview, which has been widely used and it has good inter-rater reliability (Sherrill & Kovacs, 2000). 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.

The interviews were administered by child psychiatrists or psychologists who completed 3 months of didactic and practical training in the semi-structured interview technique. They were required to reach an average of 85% symptom-agreement on 5 consecutive videotaped interviews against "gold standard" interview ratings provided by the trainers. Routine monitoring and follow-up training sessions served to minimize rater drift. All interviews were audiotaped. Interrater reliability on ISCA-D symptoms was satisfactory (using audiotapes of interviews for $n=46$ pairs of raters). For MDD symptoms, kappas ranged from 0.64 to 0.88, with 80% of the coefficients at or above 0.70. For Dysthymic Disorder symptoms (using DSM-IV criteria), kappas ranged from 0.38 to 0.93, with 80% at or above 0.70. For Generalized Anxiety Disorder symptoms (the most common DSM-IV anxiety diagnosis), kappas ranged from 0.53 to 1.00, with 62.5% at or above 0.70. Similar inter-rater reliability coefficients were obtained for other ISCA-D disorders as well (e.g., Kiss et al., 2007).

2.3.1.1. 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. According to a "skip rule," either of the first two items has to be endorsed in order to proceed to the last two, or else the latter are skipped.

At each assessment, after having recorded the rating for each symptom based on the parent interview and the child interview, the interviewer renders his/her clinician's overall rating for each symptom. 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. Also in our project, the interviewers had to follow operational rules in reaching their own "overall" rating for each symptom, namely: (a) each overall rating had to be within the ratings given by the parent and child separately

for that symptom (e.g., if the parent gave a “3” rating and the child gave a “1” rating to a symptom, the clinician’s overall rating had to be within those bounds), (b) whether the clinician’s final rating is exactly the same as the parent’s, or the child’s, or somewhere in between had to be based on the veracity of the informants on that given symptom (e.g., extent of detailed information; examples of functional impairment they provide; the overall credibility of the information in light of the child’s general context), and (c) having recorded the respondent’s answers, if the clinician did not feel that sufficient information was available to give an overall rating, he/she had to use the “missing information” data code for the overall rating for that given symptom.

Concerning the analyses of trait personality factors (temperament and emotion regulation, notably Hypothesis 1., 2. and 3. and its correlations with suicidal behavior, we categorized the sample of 407 youth (included into the program project until December 2003, see 2.2.1) by the type of suicidality based on the clinicians’ overall ratings: 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, as already noted before, 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 (see 2.2.2). 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 above described 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.

In the previously described inter-rater reliability project (see 2.3.1), we computed children’s suicidality classification also as described here. For these 46 cases, 39 of the children (84.8%) would be categorized into the same suicidality group based on

both interviewers' overall ratings ($\kappa = 0.79$; weighted $\kappa = 0.89$), and no set of interviewers' ratings resulted in children being more than 1 classification group apart.

2.3.1.2. 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).

2.3.1.3. 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 ($M = 2.28$, $SD = 0.71$).

2.3.1.4. 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.

2.3.1.5. 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.

These disorders have often been reported in the literature of adolescent suicidal behavior (Barbe et al., 2005; Pfeffer et al., 1982; Borst et al., 1991; Goldston et al., 1998).

2.3.2. 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 (Kapornai et al., 2007). 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.

2.3.3. Temperament

Temperament of children was assessed via the parent rated Emotionality, Activity, Shyness (EAS) Temperament Questionnaire (Buss and Plomin, 1984), completed at the Time 1 assessment, that measures four dimensions: *Emotionality* (the tendency to experience negative emotions such as irritability, anger), *Activity* (the preferred level of activity and speed of action), *Sociability* (the tendency to prefer the presence of others rather than being alone), and *Shyness* (the tendency to be inhibited and awkward in new social situations).

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. In our study, we obtained the following Cronbach’s alphas: *Emotionality* = 0.72; *Activity* = 0.65; *Sociability* = 0.52; and *Shyness* = 0.66, similar to results reported by others (e.g., 0.48–0.79 in Mathiesen and Tambs, 1999; and 0.78 on average in Boer and Westenberg, 1994). The reported intercorrelations among the four dimensions range from 0.02 to 0.61 and test–retest correlations range from 0.37 to 0.61 (Mathiesen and Tambs, 1999). The factor structure of the EAS does not vary substantially with age of the children (Boer and Westenberg, 1994; Mathiesen and Tambs, 1999). As reported by several investigators, the EAS has construct and predictive validity (Bradley and Lang, 1999; Shiner, 1998).

2.3.4. Emotion Regulation

The self-rated “Feelings and Me” Child version (FAM-C; Kovacs, 2000) 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. Items were derived from multiple sources (including pilot testing with children), were pre-tested with various samples of youngsters, and were each classified by seven clinical psychologists according to whether it represented an adaptive (or functional) versus a maladaptive (or dysfunctional) response, and the primary and secondary response domain being exemplified.

In the questionnaire, the stem “When I feel sad or upset, I: ...” is followed by a series of statements (e.g., “... throw, kick, or hit things”) that respondents rate on a scale ranging from “0 = not true of me” to “2 = many times true of me.” For the present analyses, we used the two major FAM-C subscale scores: *Adaptive ER* (32 items) and *Maladaptive ER* (22 items). In accordance with the logic underlying the scale construction, unpublished work on a large sample (unrelated to the present study) suggested that the adaptive–maladaptive dimension is the primary factor underlying the questionnaire. *Adaptive ER* mirrors responding to one’s own dysphoric emotion in ways which are likely to attenuate or modulate it (e.g., “I get my mom to give me a hug,” “I try to think of fun things”); *Maladaptive ER* mirrors responding which is likely to maintain and exacerbate the dysphoria (e.g., “I go away and hide,” “I throw and hit things”).

The FAM-C questionnaire has face validity and acceptable initial psychometric properties, as suggested by the following. In the present sample, Cronbach’s alpha is 0.89 for the *Adaptive ER* subscale and .87 for the *Maladaptive ER* subscale. Construct validity is partially supported by the correlation of 0.64 ($p < 0.0001$) between the *Maladaptive ER* score and the Children’s Depression Inventory (Kovacs, 2003). Concurrent validity is supported by the correlation of 0.71 between the *Maladaptive ER* subscale and a version of the Depressive Rumination scale (Nolen-Hoeksema and Morrow, 1993) modified for children. In the larger depressed clinical sample enrolled in the main study ($n = 649$) the mean *Maladaptive ER* score was significantly higher ($p < 0.0001$) than in an age-and-sex matched school-based sample in Hungary (15.20 versus 8.24, respectively). In two USA

based paediatric (normal control and at-risk for depression) samples, also involved in the overall Program Project, the correlation coefficients we obtained were similar to those noted above (in the Hungarian sample) with regard to *Maladaptive ER* and (a) self-rated depression ($r_s = 0.46$ and 0.52 , respectively) and (b) rumination ($r_s = 0.57$, and 0.49 , respectively). As also shown in the USA sample, the instrument has acceptable long-term stability: re-test with $n = 42$ youngsters (mean initial age = 8.5 years) after a 1-year (± 3 months) interval yielded an intraclass correlation coefficient of 0.44 ($p < 0.01$) for each of the two subscores.

2.4 Statistical Analyses

2.4.1 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, because in population samples, girls are generally more likely to exhibit suicidal behaviors than are boys (Bridge et al., 2006), although among clinically referred depressed youngsters, this association is equivocal (Haavisto et al., 2003; Kovacs et al., 1993; Myers et al., 1991a; Ryan et al., 1987). Analyses were controlled for chronological age because it is unequivocally related to suicidal behavior in clinical (Kovacs et al., 1993; Myers et al., 1991b; Ryan et al., 1987) and community samples (Bridge et al., 2006). We controlled for socioeconomic status (SES), because it has been directly related to suicidal behaviors in some samples of youth (Fergusson and Lynskey, 1995; Fergusson et al., 2000; Hawton et al., 1994) although not in others (Hawton et al., 2001). We also controlled for the presence of anxiety disorder because of some indications that this broad diagnostic category may play a role in risk of suicidal behaviors (Fergusson and Lynskey, 1995; Gould et al., 1998; Pilowsky et al., 1999; Reinherz et al., 1995). Finally, in a post hoc analysis, we included in the model an index of depression severity in light of prior findings that, both concurrently and prospectively, severity of depression (among depressed and mood disordered youngsters and adults) is associated with risk of suicidal behaviors (Barbe et al., 2005; Liu et al., 2006; Oquendo et

al., 2004). In other words, we intended to examine whether depression episode severity affected the relations between the independent and dependent variables.

Using a hierarchical method, polychotomous regression models were developed, adjusting for the above mentioned covariates. First the covariates of interest were entered into the model: age, sex, maternal education, and anxiety. Temperament scales were then entered as independent variables, followed by *Maladaptive* and *Adaptive* ER scores, and interaction terms between ER and temperament scale scores. Continuous variables were centered (i.e., a new variable was created by the original variable minus its mean) prior to computing interaction terms. Then the entire procedure was repeated in the post-hoc analysis with the addition of depression severity as a covariate. Although the results with regard to the hypotheses did not substantially change, we report the outcome of the model which included depression severity. The results were summarized as odds ratios (OR) and their 95% confidence intervals (CI). Statistical Analyses Software (SAS) version 8.2 was used to perform all analyses.

2.4.2 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. Following Kessler et al. (2005), conditional prevalence rates were computed for current suicidal behaviors (e.g., How many children had attempted suicide among suicidal ideators?). 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.

3. Results

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

In the clinical sample of 407 children with MDD, included into the program project until December 2003, 67% had a history of suicidal behavior (**Table 2**). 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%).

There were no statistically significant differences in *Emotionality*, *Sociability*, or *Shyness* across the groups of children with different types of suicidal behaviors (*Emotionality*: mean = 3.44, SD = 0.97; mean = 3.68, SD = 0.93; mean = 3.66, SD = 0.87; mean = 3.77, SD = 0.83; mean = 3.64, SD = 0.89 respectively, df = 4, Kruskal-Wallis = 6.98; *Sociability*: mean = 3.18, SD = 0.71; mean = 3.05, SD = 0.84; mean = 3.14, SD = 0.79; mean = 3.22, SD = 0.77; mean = 3.10, SD = 0.80 respectively, df = 4, Kruskal-Wallis = 2.48; *Shyness*: mean = 2.95, SD = 0.98; mean = 3.16, SD = 0.99; mean = 3.02, SD = 0.90; mean = 3.07, SD = 0.86; mean = 3.18, SD = 0.87 respectively, df = 4, Kruskal-Wallis = 3.33). The four groups of subjects significantly differed only on one temperament dimension: those with a history of suicide attempts were rated by their mothers as displaying the lowest levels of trait *Activity*: mean = 2.91, SD = 0.93; mean = 2.83, SD = 0.87; mean = 2.94, SD = 0.94; mean = 3.20, SD = 0.86; mean = 2.74, SD = 0.73 respectively, df = 4, Kruskal-Wallis = 10.24, $p < 0.05$.

The means for the ER scales were found to be generally in the predicted direction: that is, *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, $p < 0.01$) as the type of suicidal behavior becomes more severe. Additionally, we found that non-suicidal children were younger (mean = 11.15 years, SD = 2.15 years) than suicidal ones (mean = 11.56 years, SD = 1.83 years; mean = 12.06 years, SD = 1.99 years; mean = 11.88 years, SD = 1.75 years; mean = 12.79 years, SD = 1.79 years, respectively), that the oldest children were the most likely to have attempted suicide ($df = 4$, Kruskal-Wallis = 26.85, $p < 0.001$), and that more girls than boys had suicidal ideation and suicidal attempts ($df = 4$, $X^2 = 21.47$, $p < 0.001$) (although the sex ratio was reversed with regard to recurrent thoughts of death and suicide plans) (*Table 2*).

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.

Table 2. Selected characteristics of the sample of depressed children by type of suicidal behavior

| Variables | Total Ss | | Non-Suicidal Ss (N=134; 33%) | | Recurrent Thoughts of Death Ss (N=80; 20%) | | Suicide Ideation Ss (N=72; 18%) | | Suicide Plan Ss (N=72; 18%) | | Suicide Attempt Ss (N=49; 12%) | | Statistics (df=4) |
|--|----------|-------|---------------------------------|-------|---|-------|---------------------------------------|-------|--------------------------------|-------|--------------------------------------|-------|----------------------|
| | | | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Kruskal- Wallis |
| EAS Temperament scales ^a | | | | | | | | | | | | | |
| Emotionality | 3.61 | 0.92 | 3.44 | 0.97 | 3.68 | 0.93 | 3.66 | 0.87 | 3.77 | 0.83 | 3.64 | 0.89 | 6.98 |
| Activity | 2.93 | 0.89 | 2.91 | 0.93 | 2.83 | 0.87 | 2.94 | 0.94 | 3.20 | 0.86 | 2.74 | 0.73 | 10.24* |
| Sociability | 3.15 | 0.77 | 3.18 | 0.71 | 3.05 | 0.84 | 3.14 | 0.79 | 3.22 | 0.77 | 3.10 | 0.80 | 2.48 |
| Shyness | 3.05 | 0.93 | 2.95 | 0.98 | 3.16 | 0.99 | 3.02 | 0.90 | 3.07 | 0.86 | 3.18 | 0.87 | 3.33 |
| Emotion Self-Regulation scales ^b | | | | | | | | | | | | | |
| Maladaptive ER | 15.37 | 8.49 | 12.5 | 7.55 | 13.34 | 8.02 | 17.21 | 7.71 | 16.82 | 8.64 | 22 | 8.09 | 50.76*** |
| Adaptive ER | 25.84 | 11.26 | 28.23 | 10.29 | 27.15 | 12.02 | 24.20 | 11.54 | 23.73 | 10.85 | 22.73 | 11.46 | 16.33** |
| Age (years) | 11.72 | 2.00 | 11.15 | 2.15 | 11.56 | 1.83 | 12.06 | 1.99 | 11.88 | 1.75 | 12.79 | 1.79 | 26.85*** |
| Biological Mother's Education (yrs) | 11.45 | 2.82 | 11.07 | 2.30 | 11.65 | 3.06 | 11.5 | 2.84 | 11.76 | 3.11 | 11.6 | 3.22 | 2.68 |
| | N | % | N | % | N | % | N | % | N | % | N | % | X ² |
| Sex | | | | | | | | | | | | | |
| Female (% in each group) | 189 | 100 | 57 | 30.16 | 33 | 17.46 | 43 | 22.75 | 23 | 12.17 | 33 | 17.46 | 21.47*** |
| Male (% in each group) | 218 | 100 | 77 | 35.32 | 47 | 21.56 | 29 | 13.30 | 49 | 22.48 | 16 | 7.34 | |
| Anxiety Disorders | | | | | | | | | | | | | |
| Yes (% in each group) | 143 | 100 | 34 | 23.78 | 31 | 21.68 | 29 | 20.28 | 30 | 20.98 | 19 | 13.29 | 8.53 |
| No (% in each group) | 264 | 100 | 100 | 37.88 | 49 | 18.56 | 43 | 16.29 | 42 | 15.91 | 30 | 11.36 | |

^aPotential range: 0 – 5.

^bPotential range for Maladaptive ER: 0 – 44 (observed range: 0 – 42); potential range for Adaptive ER: 0 – 64 (observed range: 3 – 58).

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

3.1.1 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* $r = 0.35$ ($p < 0.001$). But *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 ($r = 0.15$, $p = 0.002$) and similarly 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* ($r = 0.10$, $p < 0.05$). We also examined whether any of the covariates (age, sex, maternal education level, and comorbid anxiety disorder) was related to temperament and ER. We found that age was moderately related both to *Adaptive* and *Maladaptive ER* scale scores ($r = -0.22$, 0.20 , respectively, $p < 0.0001$), and *Adaptive ER* scale score and maternal education level also were related ($r = -0.18$, $p < 0.0002$).

Sex differences were detected on two independent variables. Namely, parents rated sons significantly higher on the *Activity* subscale of the EAS than daughters ($t(401) = -3.55$, $p = 0.0004$), and girls reported higher rates of *Maladaptive ER* responses than did boys ($t(400) = 4.97$, $p < 0.0001$). Finally, children with comorbid anxiety disorder scored significantly higher on the *Emotionality* and *Shyness* scales than children without anxiety ($t(402) = -2.62$, $p = 0.0092$; $t(398) = -2.55$, $p = 0.0112$, respectively).

3.1.2 Modelling the different types of suicidal behaviors

In the polychotomous model, mother's education was not statistically significant (mean = 11.07 years, SD = 2.30 years; mean = 11.65 years, SD = 3.06 years; mean = 11.5 years, SD = 2.84 years; mean = 11.76 years, SD = 3.11 years; mean = 11.6 years, SD = 3.22 years respectively, $df = 4$, Kruskal-Wallis = 2.68); therefore it was not included in any later models. Interaction terms were dropped sequentially from the model based on their p -values, and only those with $p < 0.05$ were retained in the final model. All EAS and ER scale scores were included in the model as well as sex, age, and anxiety, regardless of their p -values. 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 (with depression severity included) was

significant (-2 Log Likelihood for intercept and covariates = 995.80, $p < 0.0001$) and is shown in **Table 3**.

As can be seen (**Table 3**), subjects with recurrent thoughts of death and non-suicidal subjects were indistinguishable on each of the independent variables. Additionally, the EAS Temperament scales had very inconsistent relationships to the remaining three categories of suicidality: 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 (**Table 3**). Thus, as can be seen in **Table 3**, higher *Maladaptive ER* scores differentiated each of the three suicidal groups from the non-suicidal group: 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.

Table 3. Models of temperament and emotion self-regulation for types of suicidality in depressed children: polychotomous regression results^{a, b}

| | Recurrent Thoughts of Death Vs. Non-suicidal Ss (N=80) | | Suicide Ideation Vs. Non-suicidal Ss (N=72) | | Suicide Plan Vs. Non-suicidal Ss (N=72) | | Suicide Attempt Vs. Non-suicidal Ss (N=49) | |
|--------------------------------|---|------------|--|------------|--|------------|---|-------------|
| | OR | 95%CI | OR | 95%CI | OR | 95%CI | OR | 95%CI |
| EAS Temperament scales | | | | | | | | |
| Emotionality | 1.34 | 0.97, 1.86 | 1.24 | 0.88, 1.76 | 1.53* | 1.04, 2.26 | 1.12 | 0.71, 1.78 |
| Activity | 1.12 | 0.76, 1.64 | 1.31 | 0.87, 1.98 | 1.89** | 1.22, 2.92 | 1.39 | 0.80, 2.42 |
| Sociability | 0.82 | 0.51, 1.32 | 0.94 | 0.57, 1.56 | 1.00 | 0.59, 1.70 | 1.34 | 0.71, 2.56 |
| Shyness | 1.15 | 0.78, 1.69 | 1.12 | 0.74, 1.70 | 1.33 | 0.84, 2.11 | 2.06* | 1.18, 3.61 |
| Emotion Self-Regulation scales | | | | | | | | |
| Maladaptive ER | 1.00 | 0.96, 1.04 | 1.08*** | 1.03, 1.13 | 1.08** | 1.03, 1.13 | 1.16*** | 1.09, 1.23 |
| Adaptive ER | 1.00 | 0.97, 1.03 | 0.96** | 0.93, 0.99 | 0.94*** | 0.91, 0.98 | 0.93** | 0.89, 0.97 |
| Interaction terms | | | | | | | | |
| Adaptive ER * Shyness | 0.98 | 0.95, 1.02 | 1.01 | 0.97, 1.06 | 1.00 | 0.96, 1.04 | 1.08** | 1.03, 1.14 |
| Maladapt ER * Sociability | 1.02 | 0.98, 1.07 | 1.00 | 0.96, 1.05 | 1.01 | 0.97, 1.06 | 1.08** | 1.02, 1.15 |
| Depression Severity | 2.01** | 1.25, 3.22 | 1.50 | 0.92, 2.45 | 3.91*** | 2.23, 6.85 | 7.16*** | 3.31, 15.52 |

Model fit statistics: -2 Log Likelihood: Intercept only: 1193.91, Intercept and covariates: 995.80.

Testing global null hypothesis: beta = 0, Wald test Chi-square = 130.87, DF=48, p<0.0001.

^aSex, age, and presence of comorbid anxiety disorder were controlled in the models.

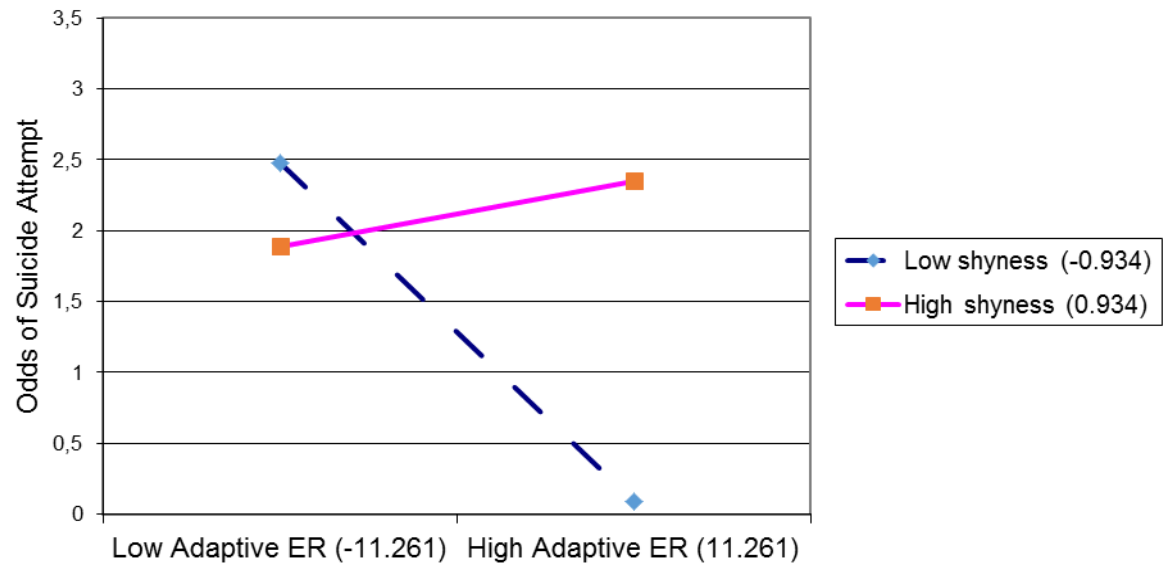
^bEmotion regulation and temperament variables were all centered.

*p < 0.05, **p < 0.01, ***p < 0.001.

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) in the model of suicide attempters (compared to non-suicidal children).

As illustrated in **Figure 1**, 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.

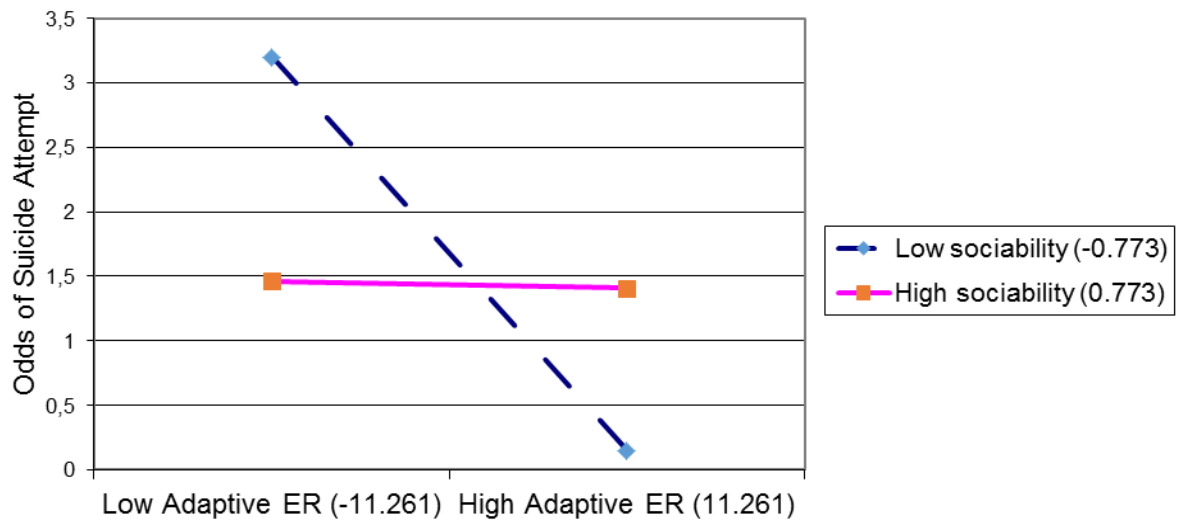
Figure 1. Interaction between *Shyness* and *Adaptive* Emotion Regulation for children with suicide attempts (using values of 1 SD above and below the mean).



The other interaction (see **Figure 2**) 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. For example, each unit change in depression severity increases the odds of being a suicide attempter about seven-fold (**Table 3**). Importantly, however, given that the model in **Table 3** 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.

Figure 2. Interaction between Sociability and Adaptive Emotion Regulation for children with suicide attempts (using values of 1 SD above and below the mean)



3.2 Clinical characteristics of depressed youths with various suicidal behavior

3.2.1 Suicidality

By the assessment date of December 2004, 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.

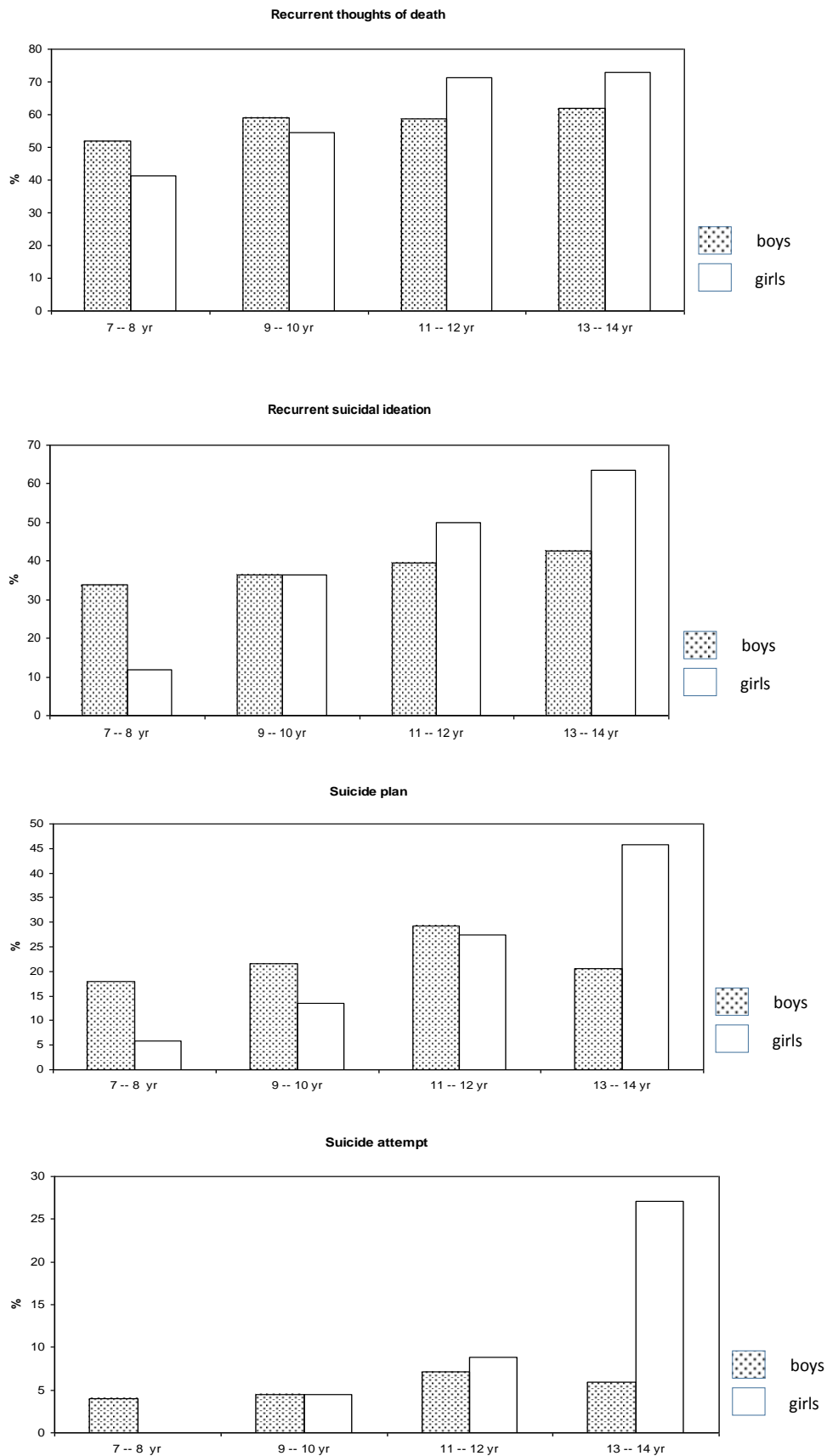
Age-specific rates of current suicidal behaviors are presented for both boys and girls in **Figure 3**.

For girls, all 4 suicidal behaviors tended to increase with age (thoughts of death, $\chi^2 = 10.54$, $df = 3$, $p = 0.014$; suicidal ideation, $\chi^2 = 21.02$, $df = 3$, $p < 0.001$; suicide plan, $\chi^2 = 22.42$, $df = 3$, $p < 0.001$; and suicide attempts, $\chi^2 = 21.12$, $df = 3$, $p < 0.001$). The rates of suicidal ideation, plan, and attempts were markedly elevated at age 13 to 14 years. For boys, however, 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 ($\chi^2 = 7.36$, $df = 1$, $p = 0.007$), suicide plan ($\chi^2 = 11.47$, $df = 1$, $p = 0.001$), and suicide attempts ($\chi^2 = 12.24$, $df = 1$, $p < 0.001$), supporting the Hypothesis 4 (b), with a trend of increasing difference respectively (as suicidal behavior becomes “more severe”). Recurrent thoughts of death had no sex differences for all age groups.

Maternal married status, level of education, and family financial status were not found to be significantly related to any of the 4 suicidal behaviors (all $p > 0.05$).

Figure 3. Suicidal behaviors in children and adolescents with Major Depressive Disorder by age and sex



3.2.2 Illness history and severity of depression

Table 4 presents illness history and current depressive severity of nonsuicidal and various suicidal children and adolescents.

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. However, as hypothesised, suicidal children and adolescents were more severely depressed than nonsuicidal peers (mean = 19.31, SD = 4.43 vs. mean = 17.81, SD = 5.38, $F = 3.17$, $p = 0.014$) 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 (all $p > 0.05$), and even if history of SSRI and TCA use tend to be more frequent as suicidal behavior becomes “more severe”, significant difference wasn’t found. In the meanwhile, suicide attempters were significantly more likely than other suicidal peers to have a history of psychiatric hospitalization ($\chi^2 = 19.95$, $df = 3$, $p < 0.001$).

Table 4. Illness history and depressive severity of nonsuicidal and different suicidal depressed children and adolescents

| Variable | Nonsuicidal (N = 202) | Suicidal | | | | | Statistic (F/χ^2) | |
|---|--------------------------|--------------------|-----------------------|----------------------|------------------|----------------------|-------------------------------|------------------------------|
| | | Total (N = 351) | Thoughts (N = 106) | Ideation (N = 92) | Plan (N = 98) | Attempts (N = 55) | Nonsuicidal vs Suicidal | Across Suicidal Groups |
| Illness duration, mean (SD), wk | 53.21 (63.71) | 62.67 (72.98) | 55.76 (62.92) | 68.47 (77.54) | 68.51 (84.71) | 55.65 (59.12) | 2.37 | 0.88 |
| History of psychiatric hospitalization, % | 23. | 29.3 | 21.7 | 31.5 | 22.4 | 52.7 | 2.40 | 19.95*** |
| Recurrent episode, % | 20. | 21.9 | 20.8 | 22.8 | 25.5 | 16.4 | 0.10 | 1.86 |
| History of SSRI use, % | 29. | 31.5 | 29.2 | 29.3 | 33.3 | 36.4 | 0.38 | 1.20 |
| History of TCA use, % | 23. | 21.7 | 22.6 | 18.5 | 25.8 | 18.2 | 0.21 | 1.96 |
| Current depressive severity (ISCA-D), mean (SD) ^a | 17.81 (5.38) | 19.31 (4.43) | 18.89 (4.10) | 19.41 (4.35) | 19.16 (4.85) | 20.24 (4.40) | 3.17* | 1.18 |

^aSummary score of ISCA-D depressive symptoms excluding suicidality items.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

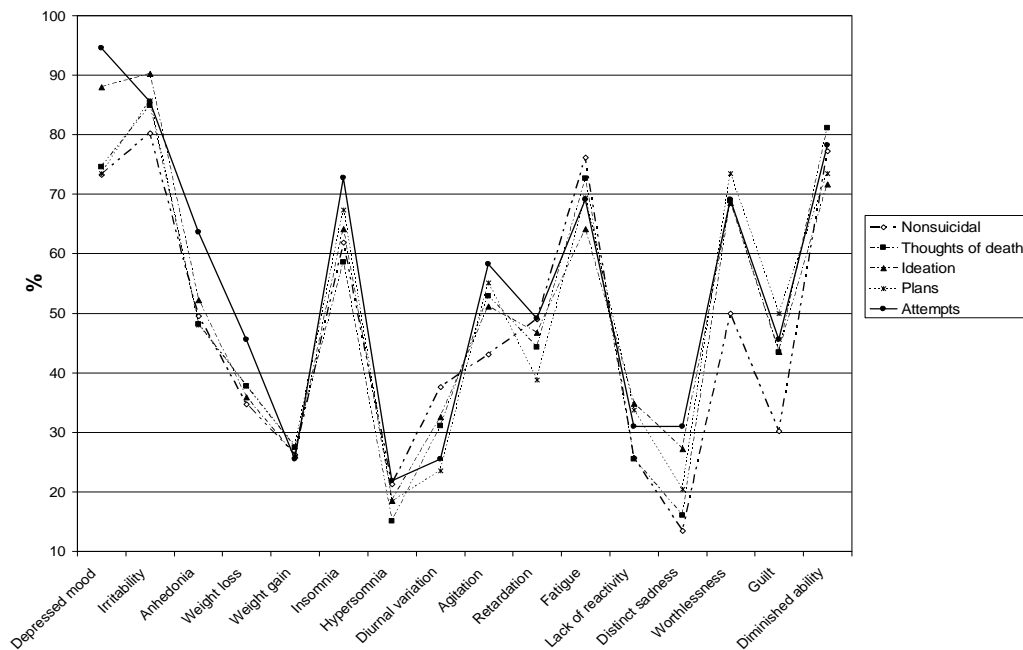
3.2.3 Depressive symptom profile

The rates of depressive symptoms in this sample of depressed children and adolescents ranged between 19% and 84%. Irritability was the most prevalent symptom (84.3%), followed by depressed mood (78.1%), diminished ability to concentrate (76.5%), fatigue (71.6%), insomnia (63.7%), feelings of worthlessness (62.7%), anhedonia (50.8%), and psychomotor agitation (49.9%). Distinct quality of depressed mood and hypersomnia were relatively less common, accounting for 19% of depressed children.

Compared with nonsuicidal children and adolescents, suicidal peers were more likely to present depressed mood (80.9% vs. 73.3%, $\chi^2 = 4.38$, $df = 1$, $p = 0.036$), irritability (86.5% vs. 80.2%, $\chi^2 = 3.98$, $df = 1$, $p = 0.046$), psychomotor agitation (53.8% vs. 43.1%, $\chi^2 = 5.96$, $df = 1$, $p = 0.015$), distinct quality of depressed mood (22.5% vs. 13.4%, $\chi^2 = 6.91$, $df = 1$, $p = 0.009$), feelings of worthlessness (70.1% vs. 50.0%, $\chi^2 = 22.13$, $df = 1$, $p < 0.001$), and inappropriate guilt (45.6% vs. 30.2, $\chi^2 = 12.65$, $df = 1$, $p < 0.001$), but less likely to have diurnal variation of mood (28.5% vs. 37.6%, $\chi^2 = 4.93$, $df = 1$, $p = 0.026$). After correction for multiple comparisons (Benjamini and Hochberg, 1995), the following symptoms remained significant: feelings of worthlessness, inappropriate guilt, and distinct quality of depressed mood.

Across various forms of suicidal children and adolescents, only depressed mood showed a significant difference ($\chi^2 = 15.96$, $df = 3$, $p < 0.001$), with the highest prevalence in attempters (94.5%), followed by children and adolescents with suicidal ideation (88.0%), recurrent thoughts of death (74.5%), and suicide plan (73.5%) (**Figure 4**). After correction for multiple comparisons (Benjamini and Hochberg, 1995), depressed mood remained significant.

Figure 4 Depressive symptom profiles among nonsuicidal and suicidal children



3.2.4 Psychiatric comorbidity

Anxiety disorders were evidenced by 33.3% of the sample, with overanxious disorder being the most common anxiety disorder (11.0%), followed by generalized anxiety (9.6%) and separation anxiety disorder (8.5%). ADHD was the second most common comorbid disorder (17.7%), followed by dysthymic disorder (12.7%). The prevalence rates of oppositional defiant disorder and conduct disorder were 5.8% and 3.4%, respectively. Eating disorders were less prevalent in this sample (1.4%), and no patients had a history of alcohol/substance abuse disorders. Compared with nonsuicidal peers, suicidal children and adolescents were more likely to evidence anxiety disorders (38.2% vs. 24.9%, $\chi^2 = 10.18$, $df = 1$, $p = 0.001$) and conduct disorder (4.6% vs. 1.5%, $\chi^2 = 3.65$, $df = 1$, $p = 0.056$). However, across various forms of suicidal children and adolescents, no significant differences were found for all comorbid disorders (all $p > 0.05$).

3.2.5 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. As shown in Model 1 in *Table 5*, 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. As shown in Model 2 in *Table 5*, 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.

Table 5. Associations (odds ratio, 95% CI) of suicidality with depressive symptoms and comorbid disorders: multinomial logistic regression with nonsuicidal children and adolescents (N = 202) as reference

| Depressive Symptom and | Thoughts of Death (N = 106) | Suicidal Ideation (N = 92) | Suicide Plan (N = 98) | Suicide Attempts (N = 55) |
|------------------------------|--------------------------------|-------------------------------|--------------------------|------------------------------|
| Model 1^{a,b} | | | | |
| Depressed mood | 1.04 (0.61 to 1.79) | 2.45 (1.21 to 4.98)* | 0.90 (0.52 to 1.57) | 4.75 (1.40 to 16.16)* |
| Irritability | 1.44 (0.76 to 2.73) | 2.66 (1.22 to 5.84)* | 1.70 (0.86 to 3.35) | 2.09 (0.87 to 5.00) |
| Diurnal variation of mood | 0.76 (0.46 to 1.25) | 0.84 (0.50 to 1.42) | 0.53 (0.31 to 0.93)* | 0.64 (0.32 to 1.29) |
| Psychomotor agitation | 1.54 (0.95 to 2.49) | 1.60 (0.96 to 2.66) | 1.82 (1.10 to 3.01)* | 2.52 (1.32 to 4.79)** |
| Fatigue | 0.81 (0.47 to 1.39) | 0.49 (0.28 to 0.84)** | 0.63 (0.37 to 1.10) | 0.51 (0.25 to 1.02) |
| Distinct sadness | 1.23 (0.64 to 2.39) | 2.28 (1.22 to 4.23)** | 1.62 (0.85 to 3.08) | 2.50 (1.20 to 5.20)* |
| Feelings of worthlessness | 2.23 (1.36 to 3.66)** | 2.23 (1.32 to 3.77)** | 2.85 (1.67 to 4.85)*** | 2.37 (1.22 to 4.61)* |
| Inappropriate guilt | 1.77 (1.08 to 2.88)* | 1.77 (1.06 to 2.96)* | 2.27 (1.37 to 3.75)*** | 1.85 (0.98 to 3.50) |
| Comorbid separation anxiety | 0.77 (0.26 to 2.28) | 1.25 (0.45 to 3.50) | 3.44 (1.47 to 8.01)** | 4.72 (1.73 to 12.87)** |
| Comorbid conduct disorder | 3.53 (0.82 to 15.22) | 4.87 (1.12 to 21.20)* | 2.61 (0.51 to 13.48) | 8.58 (1.59 to 46.33)* |
| Model 2^{a,c} | | | | |
| Depressed mood | 0.93 (0.53 to 1.63) | 2.18 (1.06 to 4.50)* | 0.69 (0.39 to 1.25) | 3.66 (1.06 to 12.69)* |
| Psychomotor agitation | 1.51 (0.93 to 2.46) | 1.49 (0.89 to 2.51) | 1.70 (1.01 to 2.85)* | 2.18 (1.12 to 4.24)* |
| Feelings of worthlessness | 2.23 (1.34 to 3.68)** | 2.06 (1.21 to 3.52)** | 2.90 (1.68 to 5.01)*** | 2.11 (1.06 to 4.18)* |
| Comorbid separation anxiety | 0.78 (0.26 to 2.35) | 1.14 (0.40 to 3.25) | 3.50 (1.45 to 8.45)** | 4.01 (1.42 to 11.30)** |
| Comorbid conduct disorder | 3.76 (0.85 to 16.58) | 5.42 (1.20 to 24.54)* | 2.65 (0.49 to 14.40) | 9.27 (1.59 to 54.18)* |

^aAge and sex as covariates were forced to enter to model 1 and model 2.

^bModel 1: multinomial regression with each level of suicidality as dependent variable and 1 depressive symptom or comorbid disorder as independent variable, adjusting for age and sex. Those symptoms or comorbid disorders that were not significant are not presented.

^cModel 2: stepwise multinomial regression with each level of suicidality as dependent variable and all depressive symptoms and comorbid disorders in model 1 as independent variables, adjusting for age and sex.

*p < 0.05, **p < 0.01, ***p < 0.001.

4. Discussion

4.1 Association of temperament and emotion regulation with different type 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.

As an index of temperament, negative emotionality is typically evident early in life (Shiner, 1998) and by late childhood and thereafter, has been associated with the presence of depression (Goodyer et al., 1993; Kelvin et al., 1996; Watson et al., 1988). 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 (Thompson, 1994). By adolescence, difficulties in modulating or “downregulating” dysphoric mood have been associated with depression and suicidal behaviors (Garber et al., 1991; Zlotnick et al., 1997, 2003). 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.

Accordingly, we hypothesised, that the presence (Hypothesis 1.) and severity (Hypothesis 2.) of suicidal behavior among depressed youngsters would be associated with higher levels of trait negative emotionality, and more maladaptive (and fewer adaptive) emotion regulatory responses to dysphoria. We also hypothesized that adaptive ER responding would moderate the relations between high negative emotionality and suicidal behaviors (Hypothesis 3.).

While it has been proposed that, in infancy, temperament dispositions may be closely related to ER skill acquisition (e.g., Calkins, 1994), in our study we regard temperament and ER as separable constructs in the age groups under consideration. Indeed, studies of children have found that emotionality and regulation are only modestly related (e.g., Rydell et al., 2003), underscoring that these dimensions are not homologous. In testing our hypothesis, we controlled for the effects of variables (e.g., age and sex) that have been shown to be associated with suicidal behaviors. Then, an index of depression severity was added owing to its previously documented relations to suicidality.

Using data from a very large sample of depressed youngsters (N=407), 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 (see **Table 2**). And this trait variable only distinguished children with suicide plans from nonsuicidal depressed children, but at a modest level ($p < 0.05$), thereby rendering the finding tentative. However, negative emotionality (quantified by the EAS scale) has been associated with depression in children recruited from the community (Goodyer et al., 1993; Lengua et al., 1998). 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, with about 8% at the maximum value of 5.00 (whereas the *Shyness*, *Sociability*,

and *Activity* scores were more normally distributed). 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 (Thompson, 1994). 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.

The results also suggest that youngsters who have attempted suicide have the least favorable distress-specific emotion regulatory profile as mirrored by their considerably higher *Maladaptive ER* score than those of the other groups of children (see **Table 2**). Other researchers have specifically commented on the affect regulatory problems of adolescent suicide attempters and have suggested that overt suicidal acts may represent ways to reduce “intolerable emotional states” (Zlotnick et al., 1997). Although addressing primarily the context of borderline personality disorder, Marsha Linehan’s conceptual paradigm (1993) also highlights that suicidal behavior can be a direct response to intense negative affect and can serve to downregulate or dissipate it (for overviews, see Harned et al., 2006; McMain et al., 2001). Thus, in the presence of mood disorder, attempted

suicide may represent a behaviorally-focused maladaptive ER response which presumably can interrupt or modulate the dysphoric affect.

Importantly, the findings regarding ER and temperament did not notably change when we added severity of depression to the model (see **Table 3**). However, the results showed that the severity of the depressive episode rated by the clinician (as the index of the overall severity of the current or most recent episode on the 5-point scale) had been very significantly related to risk of suicidal behavior: most dramatically concerning to suicidal plans and suicide attempts. However, it's not surprising because a MDD episode is considered as more severe from clinical point of view when associated with any type of suicidal behavior, especially if the types of suicidal behavior are suicidal plans or attempt which represent the most severe forms of suicidality. 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) (Liu et al., 2006) and in another sample of 7- to 17-year-old depressed youngsters (Barbe et al., 2005). Also, among adults with mood disorder, self-rated depression severity predicted subsequent suicidal acts (Oquendo et al., 2004). It is not entirely clear how depression severity accounts for the increased risk of suicidality. Thus, future research on the relations of depression severity and suicidality should address mediators and moderators (including possibly ER). It can be suspected, however, that "severity indices" may either reflect the overall mood component of the disorder (extent of despondency and anhedonia), or possibly the multiplicity of symptoms that significantly impair daily functioning, either of which may become "too much" to bear. According to our results, a child's maladaptive dysphoria-related ER response repertoire poses a risk for suicidal behavior, which is above and beyond the contribution of depression severity. Please note that the ER scale-related odds ratios in **Table 3** refer to a change in the odds of the given outcome per unit change on the ER scale. Thus, for example, given a depressed child, whose *Maladaptive ER* score is eight points higher (~ 1 SD) than the score of another child, the higher scorer is about 3.3 times more likely (i.e., 1.168) to be an attempter than a non-suicidal depressed peer. This finding may have relevance to prevention efforts, because ER response styles appear to be moderately stable and may be assessed in children at risk for, but prior to a depressive episode.

Although we did not have hypotheses addressing temperament dimensions other than *Emotionality*, interaction terms were detected between *ER* and trait *Shyness* (**Figure**

I.) as well as trait *Sociability* (**Figure 2.**) in the statistical model for suicide attempters. Taken together, 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.

Several other findings are also of note. The overall portion of the depressed sample with some type of suicidal behavior is generally comparable to rates for depressed young patients in Finnish and USA samples (Haavisto et al., 2003; Myers et al., 1991b). The sex effect across suicidal behaviors in this Hungarian sample (for which we controlled in the analyses) echoes a first part of our study and a large body of research on the preponderance of girls among suicide ideators and attempters (Bridge et al., 2006). In future research, it would be interesting to examine whether sex moderates the relations of ER and suicidality. Finally, although rates of recurrent thoughts of death and suicide plans among clinically referred youngsters have not yet been established, our findings from this part of the study parallel reports from other studies indicating that a suicide attempt is the least frequent expression of suicidal behavior in our targeted age group (Haavisto et al., 2003; Kovacs et al., 1993; Myers et al., 1991b; Pfeffer et al., 1986, 1991).

4.2 Clinical characteristic of depressed youths with different forms of suicidality

The association between depressive disorders and suicidal behaviors is well documented (Haavisto et al., 2003; Kovacs et al., 1993; Myers et al., 1991a; Pfeffer et al., 1986, 1991), however, the fact remains that many depressed youngsters do not manifest suicidality, and that the rest display various types of suicidal symptoms.

We examined various forms of DSM-IV suicidality, notably the clinical characteristics of different suicidal depressed children and adolescents using data from a large clinical sample of children and adolescents with MDD aged 7 to 14 years (N = 553).

First, 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. The

rates of suicidal ideation and attempts in the current sample are in the low range of previous studies (Kovacs et al., 1993; Ryan et al., 1987; Yorbik et al., 2004). 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.

As we hypothesised, age and sex had significant interacting effects on all 4 suicidal behaviors. These results are consistent with the findings from a large study of 201 depressed children and 715 depressed adolescents (Yorbik et al., 2004), an early follow-up study of childhood depression (Kovacs et al., 1993), and most community studies (Bridge et al., 2006; Evans et al., 2005). Yorbik and colleagues (2004) found that, compared with depressed children, depressed adolescents had expressed more suicidal ideation, seriousness of suicidal acts, and medical lethality of suicidal acts. They also found that female depressed adolescents were more likely to have suicidal ideation and to attempt suicide than male adolescents (Yorbik et al., 2004). The same gender differences were found by Kwon et al. (2016). Kovacs et al. (1993) followed an outpatient sample of 134 depressed children for up to 12 years and found no significant sex differences in initial assessments of suicidal ideation and attempts at the mean age of 11 years. However, when youths entered mid-adolescence, girls were more likely to have suicidal ideation and attempts than boys (Kovacs et al., 1993). Although some small studies have yielded different results (Mitchell et al., 1988), taking the 3 relatively large studies together, it may be concluded that 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.

In accordance with our hypothesis (Hypothesis 4. (c), (d); **Figure 4.**), 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 (Barbe et al., 2005, 2004; Oquendo et al., 2004).

However, research has yielded mixed results on the associations between depressive symptom presentation and psychiatric comorbidity and suicidality (Ryan et al., 1987; Barbe et al., 2005; Pfeffer et al., 1982; Goldston et al., 1998; Wannan and Fombonne, 1998, Nruham et al., 2008., Zubrick et al., 2016). For example, Barbe et al. (2005) found that insomnia, but no comorbid disorders, were associated with suicidality. Robbins and Alessi (1985) found that suicidal behavior in adolescent psychiatric patients was associated with depressed mood, negative self-evaluation, anhedonia, insomnia, poor concentration, indecisiveness, lack of reactivity of mood, psychomotor disturbance, and alcohol and drug use. Wannan and Fombonne (1998) and Tuisku et al. (2012) reported that comorbid conduct disorder or substance abuse predicted suicidal behavior for psychiatric outpatient girls only. 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.

Findings from the present study 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 (**Figure 4.**). No significant differences were found across various suicidal children and adolescents in terms of illness duration, depressive severity, and psychiatric comorbidity. These findings are similar to those of Kosky et al. (1990), who did not find any difference in depressive symptoms between suicidal ideators and attempters in child and adolescent psychiatric outpatients. 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 (American Psychiatric Association, 1994; Kosky et al., 1990; Myers et al., 1991a).

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 (**Table 5.**). 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.

4.3 Limitations

The results of our study should be evaluated in light of several limitations.

First, although the sample sizes are large, the study subjects reported here were selected for a genetic study of depressed children and adolescents in Hungary. Subjects in the study must live with at least 1 biological parent and have at least 1 sibling aged 7 years or above. Additionally, even though this study included a diverse and nationally representative clinical sample of carefully diagnosed depressed children in Hungary, the sample is homogeneous in terms of ethnicity. All in all, while we expect that our findings would generalize to other populations of psychiatrically referred depressed youth, this will have to be explored in future studies, since at present, it is not known how cultural differences, which may exist between Hungarian and other samples, may affect the presentation and assessment of child psychiatric disorders. Future studies are therefore warranted to investigate the extent to which these findings can be generalized to other samples.

Second, the clinical interview with ISCA-D from which these data were gathered was not designed with the assessment of suicidality as a primary goal. As a result, no detailed histories were taken of the dates, lethality, and consequences when certain suicidal behavior occurred.

Third, limited differences in individual depressive symptoms across suicidal children and adolescents may be due to the fact that all subjects of the analysis on clinical characteristic of various form of suicidality were currently or lifetime in an episode of MDD at the time of the assessment. We do not know whether the similarities and differences observed in this clinically depressed sample can be generalized to non-clinical samples.

Fourthly, no causal relationships can be concluded based on the current cross-sectional study. Prospective, longitudinal studies are needed to investigate the continuum from suicidal thoughts through suicidal action and the pathway from feelings of worthlessness to suicidal behavior and to prove that aspects of temperament and maladaptive emotion regulation preceded and were causally related to suicidal behaviors. Although temperament and emotion self-regulatory styles are believed to emerge early in development and remain fairly stable (Calkins, 1994; Rothbart et al., 2000; Thompson, 1994), longitudinal research is needed to verify their prospective contribution to depressive psychopathology, including suicidal behaviors. Prospective studies are needed also to evaluate and confirm the finding that shows no difference between nonsuicidal and those with recurrent thoughts of death with regard to how they reportedly self-regulate distress. 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. This possibility should be investigated in future research

Moreover, the measures of temperament and ER may be viewed as constraining the findings. The EAS temperament scales showed somewhat low reliability and surprisingly low or nonsignificant associations with other measures (e.g., negative emotionality was uncorrelated with ER scales). Additionally, the FAM-C scale used to quantify emotion regulatory responding is a new instrument. Although its initial psychometric properties are promising, further research is needed to determine its validity and usefulness.

4.4 Respective findings and clinical implications

Our work represents the first report on the rates of recurrent thoughts of death and suicide plan in depressed children and adolescents. 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. These underline the importance of clinical evaluation of suicidal risk in depressed youth regardless of its presence and type(s) to prevent the future and/or even more severe appearance.

The findings indicate also that suicidal depressed children and adolescents are more severely depressed and are more likely to have certain depressive symptoms and comorbid disorders than nonsuicidal peers. Although clinical characteristics were very similar across various forms of suicidality, feelings of worthlessness may play a central role in the development of suicidality. Whether suicidal ideators act on their ideation may depend on a number of precipitants such as depressed mood, agitation, and anxiety and conduct disorders, in conjunction with feelings of worthlessness. These findings have also several important clinical implications for the intervention and prevention of suicidal behavior in depressed children and adolescents. First, given the interaction of age and sex on suicidality, depressed adolescent girls who are at high risk for suicidal behavior should be given close attention by clinicians and parents. Second, intervention toward the amelioration of underlying psychopathology should be the first step for prevention of suicide attempts. Third, depressed children and adolescents with feelings of worthlessness may represent a unique group of patients at high risk for various forms of suicidality. This group of patients may need more careful management than depressed patients without feelings of worthlessness. Psychological therapy, which can help depressed children and adolescents to reframe their misperception of self and enhance their self-esteem, may be crucial for clinical treatment of suicidality. Finally and notably, interventions should also address precipitating factors, such as depressed mood, agitation, comorbid anxiety and conduct disorders, and acute stressors for the effective treatment of suicidality and prevention of suicide attempts.

Concerning personality traits as correlates of different types of suicidal behavior, little is known to what extent each alone or together contribute to suicidality, as temperament and emotion self-regulation have not yet been assessed in the same sample of clinically depressed youngsters. Additionally, none of the earlier studies of temperament and self-regulation in depression has examined the entire range of suicidal behaviors as specified by the DSM-IV. Our results may fill a gap in this knowledge.

Based on our results, the 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. These findings should be taken into account during psychological treatment of suicidal behaviors (Neece et al., 2013).

Another finding 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 odds of attempted suicide. This finding may have relevance to prevention efforts, because ER response styles appear to be moderately stable and may be assessed in children at risk for, but prior to a depressive episode.

5. Personal effort

I participated directly in the patient recruitment and diagnostical assessment. I did continues site monitoring and family retaining. After performing literature search and background definition, the hypothesis were built up with my active impact. I took part in data cleaning and statistical method discussions and the interpretation of results with the potential clinical implication were finalized and written by me.

6. References

- Achenbach, T. M. (1991). Manual for the child behaviour checklist and 1991 child behaviour profile. Barlington, VT: University of Vermont, Department of Psychiatry
- Adrian, M., Zeman, J., & Veits, G. (2011). Methodological implications of the affect revolution: A 35-year review of emotion regulation assessment in children. *Journal of Experimental Child Psychology*, 110, 171-197.
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology. A meta-analytic review. *Clinical Psychology Review*, 30, 217-237.
- American Psychiatric Association (1994). Diagnostic and Statistical Manual of Mental Disorders (4th ed.). Washington, DC: Author.
- American Psychiatric Association (2013). Diagnostic and Statistical Manual of Mental Disorders (Fifth ed.). Arlington, VA: American Psychiatric Publishing.
- Austin, A. A., & Chorpita, B. F. (2004). Temperament, anxiety, and depression: Comparison across five ethnic groups of children. *Journal of Clinical Child and Adolescent Psychology*, 33, 216–226.
- Barbe, R. P., Bridge, J., Birmaher, B., et al. (2004). Suicidality and its relationship to treatment outcome in depressed adolescents. *Suicide and Life-Threatening Behavior*, 34, 44–55.
- Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: a practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society: Series B (Methodological)*, 57, 289–300.
- Birmaher, B., Ryan, N. D., Williamson, D. E., et al. (1996). Childhood and adolescent depression: a review of the past 10 years: part 1. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 1427–1439.
- Boer, F., & Westenberg, P. M. (1994). The factor structure of the Buss and Plomin EAS Temperament survey (Parental Ratings) in Dutch sample of elementary school children. *Journal of Personality Assessment*, 62, 537–551.
- Borst, S. R., Noam, G. G., & Bartok, J. A. (1991). Adolescent suicidality: a clinical developmental approach. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 796–803.
- Bradley, M. M., & Lang, P. J. (1999). Fearfulness and affective evaluations of pictures.

Motivation and Emotion, 23, 1–13.

- Brent, D. A., Oquendo, M., Birmaher, B., Greenhill, L., Kolko, D., Stanley, B., et al. (2003). Peripubertal suicide attempts in offspring of suicide attempters with siblings concordant for suicidal behavior. *The American Journal of Psychiatry*, 160, 1486–1493.
- Brezo, J., Paris, J., & Turecki, G. (2006). Personality traits as correlates of suicidal ideation, suicide attempts, and suicide completions: A systematic review. *Acta Psychiatrica Scandinavica*, 113, 180–206.
- Bridge, J. A., Goldstein, T. R., & Brent, D. A. (2006). Adolescent suicide and suicidal behavior. *Journal of Child Psychology and Psychiatry*, 47, 372–394.
- Bulik, C. M., Sullivan, P. F., & Joyce, P. R. (1999). Temperament, character and suicide attempts in anorexia nervosa, bulimia nervosa and major depression. *Acta Psychiatrica Scandinavica*, 100, 27–32.
- Buss, A. H., & Plomin, R. (1975). A temperament theory of personality development. New York: Wiley.
- Buss, A. H., & Plomin, R. (1984). Temperament: Early developing personality traits. Hillsdale, NJ: Lawrence Erlbaum.
- Calkins, S. D. (1994). Origins and outcomes of individual differences in emotion regulation. *Monographs of the Society for Research in Child Development*, 59, 2–3 (Serial No. 240), 53–72.
- Calkins, S. D., & Dedmon, S. E. (2000). Physiological and behavioral regulation in two year-old children with aggressive/destructive behavior problems. *Journal of Abnormal Child Psychology*, 28, 103–118.
- Calkins, S. D., Gill, K. I., Johnson, M. C., & Smith, C. L. (1999). Emotional reactivity and emotional regulation strategies as predictors of social behavior with peers during toddlerhood. *Social Development*, 8, 310–334.
- Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: methodological challenges and directions for child development research. *Child Development*, 75, 317–333.
- D'Eramo, K. S., Prinstein, M. J., Freeman, J., Grapentine, W. L., & Spirito, A. (2004). Psychiatric diagnoses and comorbidity in relation to suicidal behavior among psychiatrically hospitalized adolescents. *Child Psychiatry and Human Development*, 35, 21–35.

- Davidson, R. J., Pizzagalli, D., Nitschke, J. B., & Putnam, K. (2002). Depression: Perspectives from affective neuroscience. *Annual Review of Psychology*, 53, 545–574.
- Engström, G., Nyman, G. E., & Träskman-Bendz, L. (1996). The Marke–Nyman Temperament (MNT) scale in suicide attempters. *Acta Psychiatrica Scandinavica*, 94, 320–325.
- Enns, M. W., Cox, B. J., & Inayatulla, M. (2003). Personality predictors of outcome for adolescents hospitalized for suicidal ideation. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42, 720–727.
- Evans, E., Hawton, K., Rodham, K., et al. (2005). The prevalence of suicidal phenomena in adolescents: a systematic review of population-based studies. *Suicide and Life-Threatening Behavior*, 35, 239–250.
- Fergusson, D. M., & Lynskey, M. T. (1995). Childhood circumstances, adolescent adjustment, and suicide attempts in a New Zealand birth cohort. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34, 612–622.
- Fergusson, D. M., Woodward, L. J., & Horwood, L. J. (2000). Risk factors and life Processes associated with the onset of suicidal behaviour during adolescence and early adulthood. *Psychological Medicine*, 30, 23–39.
- Fombonne, E., Wostear, G., Cooper, V., et al. (2001). The Maudsley long-term follow-up of child and adolescent depression 2: suicidality, criminality and social dysfunction in adulthood. *The British Journal of Psychiatry*, 179, 218–223.
- Forbes, E. E., Miller, A., Cohn, J. F., Fox, N. A., & Kovacs, M. (2005). Affect-modulated startle in adults with childhood-onset depression: Relations to bipolar course and number of lifetime depressive episodes. *Psychiatry Research*, 134, 11–2
- Garber, J., Braafladt, N., & Weiss, B. (1995). Affect regulation in depressed and nondepressed children and young adolescents. *Development and Psychopathology*, 7, 93–115.
- Garber, J., Braafladt, N., & Zeman, J. (1991). The regulation of sad affect: An information processing perspective. In J. Garber & K. A. Dodge (Eds.). *The development of emotion regulation and dysregulation* (pp. 208–240). New York: Cambridge University Press.
- Goldston, D. B., Daniel, S., Reboussin, D. M., Kelley, A., Ievers, C., & Brunstetter, R.

- (1996). First-time suicide attempters, repeat attempters, and previous attempters on an adolescent inpatient psychiatry unit. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 631–639.
- Goldston, D. B., Daniel, S. S., Reboussin, B. A., et al. (1998). Psychiatric diagnoses of previous suicide attempters, first-time attempters, and repeat attempters on an adolescent inpatient psychiatry unit. *Journal of the American Academy of Child and Adolescent Psychiatry*, 37, 924–932.
- Goldston, D. B., Daniel, S. S., Reboussin, D. M., et al. (1999). Suicide attempts among formerly hospitalized adolescents: a prospective naturalistic study of risk during the first 5 years after discharge. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38, 660–671.
- Goodyer, I. M., Ashby, L., Altham, P. M., Vize, C., & Cooper, P. J. (1993). Temperament and major depression in 11 to 16 year olds. *Journal of Child Psychology and Psychiatry*, 34, 1409–1423.
- Gould, M. S., King, R., Greenwald, S., Fisher, P., Schwab-Stone, M., Kramer, R., et. al. (1998). Psychopathology associated with suicidal ideation and attempts among children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 37, 915–923.
- Gould, M. S., Greenberg, T., Velting, D. M., et al. (2003). Youth suicide risk and preventive interventions: a review of the past 10 years. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42, 386–405.
- Grolnick, W. S., Bridges, L. J., & Connell, J. P. (1996). Emotion regulation in two-year-olds: Strategies and emotional expression in four contexts. *Child Development*, 67, 928–941.
- Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Review of General Psychology*, 3, 271–299.
- Haavisto, A., Sourander, A., Ellilä, H., Välimäki, M., Santalahti, P., & Helenius, H. (2003). Suicidal ideation and suicide attempts among child and adolescent psychiatric inpatients in Finland. *Journal of Affective Disorders*, 76, 211–221.
- Harned, M. S., Banawan, S. F., & Lynch, T. R. (2006). Dialectical behavior therapy: An emotion-focused treatment for borderline personality disorder. *Journal of Contemporary Psychotherapy*, 36, 67–75.

- Hawton, K., Fagg, J., Simkin, S., & Mills, J. (1994). The epidemiology of attempted suicide in the Oxford area, England (1989–1992). *Crisis: The Journal of Crisis Intervention and Suicide Prevention*, 15, 123–135.
- Hawton, K., Harriss, L., Simkin, S., Bale, E., & Bond, A. (2001). Social class and suicidal behaviour: The associations between social class and the characteristics of deliberate self-harm patients and the treatment they are offered. *Social Psychiatry and Psychiatric Epidemiology*, 36, 437–443.
- Kagan, J. (1994). On the nature of emotion. In N. A. Fox (Ed.), *Emotion regulation: Behavioral and biological considerations. Monographs of the Society for Research in Child Development*, vol. 2–3, Serial no. 240 (pp. 7–24).
- Kapornai, K., Gentzler, A. L., Tepper, P. G., Kiss, E., Mayer, L., Tamás, Zs., et al. (2007). Early developmental characteristics and features of major depressive disorder among child psychiatric patients in Hungary. *Journal of Affective Disorders*, 100, 91–101.
- Kelvin, R. G., Goodyer, I. M., & Altham, P. M. E. (1996). Temperament and psychopathology amongst siblings of probands with depressive and anxiety disorders. *Journal of Child Psychology and Psychiatry*, 37, 543–550.
- Kessler, R. C., Berglund, P., Borges, G., et al. (2005). Trends in suicide ideation, plans, gestures, and attempts in the United States, 1990–1992 to 2001–2003. *The Journal of the American Medical Association*, 293, 2487–2495.
- Kiss, E., Gentzler, A. L., Kapornai, K., Tamás, Zs., Kovacs, M., Vetró, A., et al. (2007). Factors influencing mother–child reports of depressive symptoms and agreement among clinically referred depressed youngsters in Hungary. *Journal of Affective Disorders*, 100, 143–151.
- Kosky, R., Silburn, S., & Zubrick, S. (1986). Symptomatic depression and suicidal ideation: a comparative study with 628 children. *The Journal of Nervous and Mental Disease*, 174, 523–528.
- Kosky, R., Silburn, S., Zubrick, S. R. (1990). Are children and adolescents who have suicidal thoughts different from those who attempt suicide? *The Journal of Nervous and Mental Disease*, 178, 38–43.
- Kovacs, M. (1996). Presentation and course of major depressive disorder during childhood and later years of the lifespan. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 705–715.

- Kovacs, M. (2000). The “Feelings and Me” emotion regulatory strategy utilization questionnaires. Pittsburgh, PA: University of Pittsburgh School of Medicine.
- Kovacs, M. (2003). Children’s depression inventory: Technical manual update. Toronto, Multi-health Systems.
- Kovacs, M., Feinberg, T. L., Crouse-Novak, M. A., Paulauskas, S. L., & Finkelstein, R. (1984a). Depressive disorders in childhood. I. A longitudinal prospective study of characteristics and recovery. *Archives of General Psychiatry*, 41, 229–237.
- Kovacs, M., Feinberg, T. L., Crouse-Novak, M. A., Paulauskas, S. L., Pollock, M., & Finkelstein, R. (1984b). Depressive disorders in childhood. II. A longitudinal study of the risk for a subsequent major depression. *Archives of General Psychiatry*, 41, 653–659.
- Kovacs, M., Goldston, D., & Gatsonis, C. (1993). Suicidal behaviors and childhood-onset depressive disorders: A longitudinal investigation. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32, 8–20.
- Kwon, A., Song, J., Yook, K., Jon, D., Jung, M., Hong, N., & Hong, H. (2016). Predictors of Suicide Attempts in Clinically Depressed Korean Adolescents. *Clinical Psychopharmacology and Neuroscience*, 14, 383–387.
- Larson, R. W., Raffaelli, M., Richards, M. H., Ham, M., & Jewell, L. (1990). Ecology of depression in late childhood and early adolescence: A profile of daily states and activities. *Journal of Abnormal Psychology*, 99, 92–102.
- Lengua, L. J., West, S. G., & Sandler, I. N. (1998). Temperament as a predictor of symptomatology in children: Addressing contamination of measures. *Child Development*, 69, 164–181.
- Lewinsohn, P. M., Rohde, P., & Seeley, J. R. (1994). Psychosocial risk factors for future adolescent suicide attempts. *Journal of Consulting and Clinical Psychology*, 62, 297–305.
- Linehan M. (1993). Cognitive–behavioral treatment of borderline personality disorder. New York: Guilford Press.
- Liu, X., Gentzler, A. L., Tepper, P., Kiss, E., Kothencné, V., Tamás, Z., et al. (2006). Clinical features of depressed children and adolescents with various forms of suicidality. *Journal of Clinical Psychiatry*, 67, 1442–1450.
- Lolas, F., Gomez, A., & Suarez, L. (1991). EPQ-R and suicide attempt: The relevance of psychoticism. *Personality and Individual Differences*, 12, 899–902.

- Lynch, T. R., Cheavens, J. S., Morse, J. Q., & Rosenthal, M. Z. (2004). A model predicting suicidal ideation and hopelessness in depressed older adults: The impact of emotion inhibition and affect intensity. *Aging & Mental Health*, 8, 486–497.
- Mathiesen, K. S., & Tambs, K. (1999). The EAS Temperament Questionnaire—Factor structure, age trends, reliability, and stability in a Norwegian sample. *Journal of Child Psychology and Psychiatry*, 40, 431–439.
- Maziade, M., Roy, M. A., Fournier, J. P., Cliché, D., Mérette, C., Caron, C., et al. (1992). Reliability of best-estimate diagnosis in genetic linkage studies of major psychoses: Results from the Quebec pedigree studies. *The American Journal of Psychiatry*, 149, 1674–1686.
- McKeown, R. E., Garrison, C. Z., Cuffe, S. P., Waller, J. L., Jackson, K. L., & Addy, C. L. (1998). Incidence and predictors of suicidal behaviors in a longitudinal sample of young adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 37, 612–619.
- McMain, S., Korman, L. M., & Dimeff, L. (2001). Dialectical behavior therapy and the treatment of emotion dysregulation. *Psychotherapy in Practice*, 57, 183–196.
- Mitchell, J., McCauley, E., Burke, P. M., et al. (1988). Phenomenology of depression in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 27, 12–20.
- Myers, K., McCauley, E., Calderon, R., Mitchell, J., Burke, P., & Schloredt, K. (1991a). Risks for suicidality in major depressive disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 86–94. **(31 both)**
- Myers, K., McCauley, E., Calderon, R., & Treder, R. (1991b). The 3-year longitudinal course of suicidality and predictive factors for subsequent suicidality in youths with major depressive disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 804–810.
- Neece, C. L., Berk, M. S., & Combs-Ronto, L. A. (2013). Dialectical Behavior Therapy and suicidal behavior in adolescence: Linking developmental theory and practice. *Professional Psychology: Research and Practice*, 44, 257–265.
- Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion*, 7, 561–570.

- Nrugham, L., Larsson, B. & Sund, A. M. (2008). Specific depressive symptoms and disorders as associates and predictors of suicidal acts across adolescence. *Journal of Affective Disorders*, 111, 83–93.
- Ohring, R., Apter, A., Ratzoni, G., Weizman, R., Tyano, S., & Plutchik, R. (1996). State and trait anxiety in adolescent suicide attempters. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 154–157.
- Oquendo, M. A., Galfalvy, H., Russo, S., Ellis, S. P., Grunebaum, M. F., Burke, A., et al. (2004). Prospective study of clinical predictors of suicidal acts after a major depressive episode in patients with major depressive disorder or bipolar disorder. *American Journal of Psychiatry*, 161, 1433–1441.
- Pendse, B., Westrin, Å., & Engström, G. (1999). Temperament traits in seasonal affective disorder, suicide attempters with non- seasonal major depression and healthy controls. *Journal of Affective Disorders*, 54, 55–65.
- Pfeffer, C. R., Solomon, G., Plutchik, R., et al. (1982). Suicidal behavior in latency-age psychiatric inpatients: a replication and cross validation. *Journal of the American Academy of Child and Adolescent Psychiatry*, 21, 564–569.
- Pfeffer, C. R., Klerman, G. L., Hurt, S. W., et al. (1991). Suicidal behavior and hypothalamic-pituitary-adrenocortical axis indices in child psychiatric inpatients. *Biological Psychiatry*, 30, 609–616.
- Pfeffer, C. R., Klerman, G. L., Hurt, S. W., Lesser, M., Peskin, J. R., & Siefker, C. A. (1991). Suicidal children grow up: Demographic and clinical risk factors for adolescent suicide attempts. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 609–616.
- Pfeffer, C. R., Plutchik, R., Mizruchi, M. S., & Lipkins, R. (1986). Suicidal behavior in child psychiatric inpatients and outpatients and in nonpatients. *The American Journal of Psychiatry*, 143, 733–738.
- Pilowsky, D. J., Wu, L. T., & Anthony, J. C. (1999). Panic attacks and suicide attempts in mid-adolescence. *The American Journal of Psychiatry*, 156, 1545–1549.
- Posner, M. I., & Rothbart, M. K. (2000). Developing mechanisms of self-regulation. *Development and Psychopathology*, 12, 427–441.
- Rajappa, K., Gallagher, M., Miranda, R. (2012). Emotion dysregulation and vulnerability to suicidal ideation and attempts. *Cognitive Therapy and Research*, 36, 833-839.

- Rao, U., Weissman, M. M., Martin, J. A., et al. (1993). Childhood depression and risk of suicide: a preliminary report of a longitudinal study. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32, 21–27.
- Reinherz, H. Z., Giaconia, R. M., Silverman, A. B., Friedman, A., Pakiz, B., Frost, A. K., et al. (1995). Early psychosocial risks for adolescent suicidal ideation and attempts. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34, 599–611.
- Rettew, D. C., & McKee, L. (2005). Temperament and its role in developmental psychopathology. *Harvard Review of Psychiatry*, 13, 14–27.
- Robbins, D. R., & Alessi, N. E. (1985). Depressive symptoms and suicidal behavior in adolescents. *The American Journal of Psychiatry*, 142, 588–592.
- Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000). Temperament and personality: Origins and outcomes. *Journal of Personality and Social Psychology*, 78, 122–135.
- Ryan, N. D. (2005). Treatment of depression in children and adolescents. *Lancet*, 366, 933–940.
- Ryan, N. D., Puig-Antich, J., Ambrosini, P., Rabinovich, H., Robinson, D., Nelson, B., et al. (1987). The clinical picture of major depression in children and adolescents. *Archives of General Psychiatry*, 44, 854–861.
- Rydell, A., Berlin, L., & Bohlin, G. (2003). Emotionality, emotion regulation, and adaptation among 5- to 8-year-old children. *Emotion*, 3, 30–47.
- Sanchez, L. E., & Le, L. T. (2001). Suicide in mood disorders. *Depression and Anxiety*, 14, 177–182.
- Sherrill, J. T., & Kovacs, M. (2000). Interview schedule for children and adolescents (ISCA). *Journal of the American Academy of Child and Adolescent Psychiatry*, 39, 67–75.
- Shiner, R. L. (1998). How shall we speak of children's personalities in middle childhood? A preliminary taxonomy. *Psychological Bulletin*, 124, 308–332.
- Silk, J. S., Shaw, D. S., Skuban, E. M., Oland, A. A., & Kovacs, M. (2006). Emotion regulation strategies in offspring of childhood-onset depressed mothers. *Journal of Child Psychology and Psychiatry*, 47, 69–78.

- Silk, J. S., Steinberg, L., Morris, A. S. (2003). Adolescents' emotion regulation in daily life: Links to depressive symptoms and problem behaviour. *Child Development*, 74, 1869–1880.
- Tamás, Z., Kovacs, M., Gentzler, A., Tepper, P., Gádoros, J., Kiss, E., Kapornai, K., Vetró, Á. (2007). The relations of temperament and emotion self-regulation with suicidal behaviors in a clinical sample of depressed children in Hungary. *Journal of Abnormal Child Psychology*, 35(4), 640-652.
- Tuisku, V., Pelkonen, M., Kiviruusu, O., Karlsson, L., Marttunen, M. (2012). Alcohol use and psychiatric comorbid disorders predict deliberate self-harm behaviour and other suicidality among depressed adolescent outpatients in 1-year follow-up. *Nordic Journal of Psychiatry*, 66, 268-275.
- Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. In N. A. Fox (Ed.), *Emotion regulation: Behavioral and biological considerations. Monographs of the Society for Research in Child Development*, vol. 2–3, Serial no. 240 (pp. 25–52).
- Vetró, Á., Baji, I., Benák, I., Besnyő, M., Csorba, J., Daróczy, G., Dombovári, E., Kiss, E., Gádoros, J., Kaczvinszky, E., Kapornai, K., Mayer, L., Rimay, T., Skultéty, D., Szabó, K., Tamás, Zs., Székely, J., Kovács, M.. (2009) „Risk factors in childhood onset depression” research design, implementation, proceeding: history of 13 years: experience in grant preparation, writing organization in relation to an American NIMH Grant. *Psychiatria Hungarica*, 24, 6-14.
- Vetró, Á., Tamás, Zs. (2015) : Depresszió, öngyilkosság, mentális betegségek serdülőkorban In : Kovács Á. (szerk.) : Kamaszkor-kamaszkór Szemelvények az adolescens medicina területéről (Válogatás a Házi Gyermekorvosok Egyesülete « Kávészünet -17 » című tudományos konferenciáján 2015. május 14-17. Hotel Azúr konferenciaközpont Siófok elhangzott előadásokból) 33-39.
- Wannan, G., & Fombonne, E. (1998). Gender differences in rates and correlates of suicidal behavior amongst child psychiatric outpatients. *Journal of Adolescence*, 21, 371–381.
- Watson, D., Clark, L. A., & Carey, G. (1988). Positive and negative affectivity and their relation to anxiety and depressive disorders. *Journal of Abnormal Psychology*, 97, 346–353.

- Weissman, M. M., Wolk, S., Goldstein, R. B., et al. (1999). Depressed adolescents grown up. *The Journal of the American Medical Association*, 281, 1707–1713.
- World Health Organization. (1994). *International statistical classification of diseases and related health problems* (10th revision). Geneva: Author.
- Yorbik, O., Birmaher, B., Axelson, D., Williamson, D. E., & Ryan, N.D. (2004). Clinical characteristics of depressive symptoms in children and adolescents with major depressive disorder. *Journal of Clinical Psychiatry*, 65, 1654–1659.
- Zlotnick, C., Donaldson, D., Spirito, A., & Pearlstein, T. (1997). Affect regulation and suicide attempts in adolescent inpatients. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 793–798.
- Zlotnick, C., Wolfson, B. A., Johnson, B., & Spirito, A. (2003). Impaired self-regulation and suicidal behavior among adolescent and young adult psychiatric inpatients. *Archives of Suicide Research*, 7, 149–157.
- Zubrick, S., Hafekost, J., Johnson, S., Lawrence, D., Sam, S., Sawyer, M., Ainley, J., Buckingham, W. (2016). Suicidal behaviours: Prevalence estimates from the second Australian Child and Adolescent Survey of Mental Health and Wellbeing. *Australian and New Zealand Psychiatry*, 50, 899-910.

7. Appendix

- A. Acknowledgement
- B. Emotionality, Activity, Shyness Temperament Questionnaire
- C. “Feelings and Me” Child Version
- D. I. Related Article
- E. II. Related Article
- F. III. Related Article

Appendix A

Acknowledgement

First and foremost, I would like to express my thanks to my supervisors, dr. Ágnes Vetró and dr. Krisztina Kapornai for their continuous support and guidance throughout my PhD research and for their patience, motivation and assistance during the writing of these thesis.

I owe special thanks to Professor dr. Kovács Mária, for her guidance and support during the program project and publication work.

I would like to express my thanks to dr. Júlia Gádoros, dr. Enikő Kiss and dr. Ildikó Baji for their professional contribution and support during my work, to István Benák for his help in the data base handling, and to Charles George and Tepper Ping for their help and ideas in the statistical analyses and the interpretation of the results.

I am grateful for all the children and families participating in the program project, with all the employees working in the research sites.

Finally, I would like to thank the love, patience, motivation and spiritual support of my family.

Appendix B

EAS TEMPERAMENTUM KÉRDŐÍV GYERMEKEKNEK: SZÜLŐI ÉRTÉKELÉS^a

A vizsgált gyermek neve:

(vezetéknév és keresztnév)

Az adatokat szolgáltatja:

#

0 Édesanya

3 11

- 1 Nagyanya
- 2 Nevelőanya: _____
- 3 Édesapa
- 4 Nagyapa
- 5 Nevelőapa: _____
- 6 Saját maga
- 7 Más rokon:
- 8 Más (nem rokon): _____

Ki a vizsgált egyén?

- 0 Proband
- 1 Proband testvére
- 2 Proband más hozzátartozója

Megjegyzés: _____

ORVOS VAGY NŐVÉR TÖLTI KI !

Kérdőív száma: **103** #

Kutatóhely száma **33** 1

A proband TAJ-
száma (utolsó 6 jegy) **333-333** 2

Proband születési ideje: **33-33-33** 3

Év 19__ Hó Nap

A proband neme 1=fü; 2=lány **3** 4

Az interjú időpontja: **33-33-33** 5

Év 20__ Hó Nap

A vizsgált gyermek

TAJ-száma **333-333** 6

utolsó 6 jegy) vagy az

Születési ideje **33-33-33** 7

Év 19__ Hó Nap

Neme 1=fü; 2=lány **3** 8

Kutatási program kódja: **333** 9

A klinikus kódszáma **333** 10

UTASÍTÁS

Kedves szülő! Minden egyes kérdést GYERMEKÉRE vonatkozóan pontozzon 1-től (nem jellemző vagy tipikus az ön gyermekére) 5-ig (igazán jellemző vagy tipikus az ön gyermekére).

| | Nem jellemző vagy tipikus a gyermekre | | | | Igazán jellemző vagy tipikus a gyermekre | |
|--|---------------------------------------|---|---|---|--|-----------------|
| 1. Hajlamos arra, hogy szégyenlős legyen. | 1 | 2 | 3 | 4 | 5 | ☉ ₁₃ |
| 2. Könnyen sír. | 1 | 2 | 3 | 4 | 5 | ☉ ₁₄ |
| 3. Szeret másokkal együtt lenni. | 1 | 2 | 3 | 4 | 5 | ☉ ₁₅ |
| 4. Mindig tevékenykedik vagy csinál valamit. | 1 | 2 | 3 | 4 | 5 | ☉ ₁₆ |
| 5. Jobban szeret másokkal együtt mint egyedül játszani. | 1 | 2 | 3 | 4 | 5 | ☉ ₁₇ |
| 6. Hajlamos arra, hogy érzelmekkel reagáljon. | 1 | 2 | 3 | 4 | 5 | ☉ ₁₈ |
| 7. Általában lassú mozgású. | 1 | 2 | 3 | 4 | 5 | ☉ ₁₉ |
| 8. Könnyen szerez barátokat. | 1 | 2 | 3 | 4 | 5 | ☉ ₂₀ |
| 9. Rögtön rohangál és aktív amint reggel felébred. | 1 | 2 | 3 | 4 | 5 | ☉ ₂₁ |
| 10. Mások társaságát jobban kedveli bármi másnál. | 1 | 2 | 3 | 4 | 5 | ☉ ₂₂ |
| 11. Gyakran panaszkodik és sír. (érzelgősség) | 1 | 2 | 3 | 4 | 5 | ☉ ₂₃ |
| 12. Nagyon szociális. (fordított, szégyenlős) | 1 | 2 | 3 | 4 | 5 | ☉ ₂₄ |
| 13. Nagyon aktív. (aktivitás) | 1 | 2 | 3 | 4 | 5 | ☉ ₂₅ |
| 14. Hosszú időre van szüksége ahhoz, hogy felmelegedjen idegenekkel. | 1 | 2 | 3 | 4 | 5 | ☉ ₂₆ |
| 15. Könnyen feldúlt lesz. | 1 | 2 | 3 | 4 | 5 | ☉ ₂₇ |
| 16. Kissé magányos. | 1 | 2 | 3 | 4 | 5 | ☉ ₂₈ |
| 17. Jobban szereti a nyugodt, kevésbé aktív játékokat, mint az aktívabbakat. | 1 | 2 | 3 | 4 | 5 | ☉ ₂₉ |
| 18. Magányosnak érzi magát ha egyedül van. | 1 | 2 | 3 | 4 | 5 | ☉ ₃₀ |
| 19. Nagy érzelmekkel reagál amikor feldúlt. | 1 | 2 | 3 | 4 | 5 | ☉ ₃₁ |
| 20. Nagyon barátságos idegenekkel. | 1 | 2 | 3 | 4 | 5 | ☉ ₃₂ |

Appendix C

ÉRZÉSEK ÉS ÉN ^a

A vizsgált gyermek neve:

(vezetéknév és keresztnév)

Ki a vizsgált egyén?

- 0 Proband 3 11
- 1 Proband testvére
- 2 Proband más hozzátartozója

Megjegyzés: _____

ORVOS VAGY NŐVÉR TÖLTI KI!

Kérdőív száma: 106 #

Kutatóhely száma 33 1

333-333 2

Proband születési ideje: 33-33-33 3

Év 19__ Hó Nap

A proband neme 1=fiú; 2=lány 3 4

Az interjú időpontja: 33-33-33 5

Év 20__ Hó Nap

A vizsgált gyermek

333-333 6

Születési ideje 33-33-33 7

Év 19__ Hó Nap

Neme 1=fiú; 2=lány 3 8

Kutatási program kódja: 007 9

A klinikus kódszáma 10

UTASÍTÁS

Ez a kérdőív felsorol különböző dolgokat, amit a gyerekek akkor csinálnak, vagy gondolnak, amikor szomorúak, ingerlékenyek vagy feldúltak. Lesz néhány kérdés másfajta érzéssel kapcsolatban is.

Ez nem egy teszt. Nincs jó vagy rossz válasz.

Kérjük, egyenként olvasd el a mondatokat. Gondolkozz azon, hogy a mondat jellemző-e rád. A válaszdát egy "X"-szel jelezd abban a négyzetben, amelyik a legjobban leír téged. Az alábbiakban egy minta mondat következik, próbáld ki és írd be a válaszdát.

^aM. Kovacs, University of Pittsburgh; WPIC, 3811 O'Hara Street, Pittsburgh, PA 15213, USA 5/98

MINTA MONDAT

| | NEM JELLEMZŐ RÁM | NÉHA JELLEMZŐ RÁM | SOKSZOR JELLEMZŐ RÁM |
|--|------------------------|-------------------------|----------------------------|
| Amikor szomorú vagy feldúlt vagyok, akkor sírok. | ☹ (0) | ☹ (1) | ☹ (2) |

| | NEM JELLEMZŐ RÁM | NÉHA JELLEMZŐ RÁM | SOKSZOR JELLEMZŐ RÁM | # |
|--|------------------------|-------------------------|----------------------------|----|
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| csapkodok, rúgok vagy megütök dolgokat | ☹ | ☹ | ☹ | 12 |
| azon jár az eszem, hogy minden az én hibám | ☹ | ☹ | ☹ | 13 |
| nehéz jobb hangulatba kerülnöm | ☹ | ☹ | ☹ | 14 |
| azt színlelem, hogy boldog vagyok | ☹ | ☹ | ☹ | 15 |
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| arra gondolok, hogy minden rossz lesz mindig | ☹ | ☹ | ☹ | 16 |
| arra gondolok, hogy milyen nyomorultan érzem magam | ☹ | ☹ | ☹ | 17 |
| lefekszem aludni | ☹ | ☹ | ☹ | 18 |
| arra gondolok, hogy milyen rossz ember vagyok | ☹ | ☹ | ☹ | 19 |
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK | | | | |
| el tudom gyorsan üzni ezt az érzést | ☹ | ☹ | ☹ | 20 |
| eszem és eszem | ☹ | ☹ | ☹ | 21 |
| veszekszem a barátaimmal | ☹ | ☹ | ☹ | 22 |
| gyógyszert szedek, drogozom, vagy alkoholt iszom | ☹ | ☹ | ☹ | 23 |

| | NEM JELLEMZŐ RÁM | NÉHA JELLEMZŐ RÁM | SOKSZOR JELLEMZŐ RÁM | # |
|--|------------------------|-------------------------|----------------------------|----|
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| tanárral vagy más felnőttel próbálok beszélni | ☹ | ☹ | ☹ | 24 |
| vakarom a bőrömet, húzom a hajam vagy rágom a körmöm | ☹ | ☹ | ☹ | 25 |
| álmodozom a jó dolgokról, amiket szeretnék | ☹ | ☹ | ☹ | 26 |
| finomakat eszem, például cukorkát, fagyaltot vagy csokoládét | ☹ | ☹ | ☹ | 27 |
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| szomorú zenét hallgatok | ☹ | ☹ | ☹ | 28 |
| írok arról, hogy milyen szomorú vagyok | ☹ | ☹ | ☹ | 29 |
| arra gondolok, hogy hamarosan jobban fogom érezni magam | ☹ | ☹ | ☹ | 30 |
| megpróbálok elfeledkezni arról, hogy hogyan is érzem magam | ☹ | ☹ | ☹ | 31 |
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| elmegyek, hogy egyedül legyek | ☹ | ☹ | ☹ | 32 |
| valami jó dologra gondolok | ☹ | ☹ | ☹ | 33 |
| elfoglalom magam iskolai vagy más munkával | ☹ | ☹ | ☹ | 34 |
| kellemes zenét hallgatok | ☹ | ☹ | ☹ | 35 |

| | NEM JELLEMZŐ RÁM | NÉHA JELLEMZŐ RÁM | SOKSZOR JELLEMZŐ RÁM | # |
|--|------------------------|-------------------------|----------------------------|----|
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| kimegyek futni vagy sétálni | Ə | Ə | Ə | 36 |
| TV-t nézek vagy számítógépezek | Ə | Ə | Ə | 37 |
| megpróbálok telefonon beszélni vagy találkozni egy barátommal/barátnómmal | Ə | Ə | Ə | 38 |
| az anyámmal vagy apámmal beszélek arról, hogyan érzem magam | Ə | Ə | Ə | 39 |
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| a családommal beszélek erről (szülőket most ne számítsd bele) | Ə | Ə | Ə | 40 |
| találok valamit, amivel játszhatok | Ə | Ə | Ə | 41 |
| egy csomó szomorú dologra gondolok | Ə | Ə | Ə | 42 |
| elfoglalom magam, például, labdázok, biciklizek, úszom, futok vagy görkorizok | Ə | Ə | Ə | 43 |
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| Lefekszem, és csak pocsékul érzem magam | Ə | Ə | Ə | 44 |
| kiabálok és üvöltözök a családtagjaimmal | Ə | Ə | Ə | 45 |
| megpróbálok elérni, hogy valaki megöleljen | Ə | Ə | Ə | 46 |
| kellemes érzésre próbálok gondolni | Ə | Ə | Ə | 47 |

| | NEM JELLEMZŐ RÁM | NÉHA JELLEMZŐ RÁM | SOKSZOR JELLEMZŐ RÁM | |
|--|------------------------|-------------------------|----------------------------|----|
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| megpróbálok énekelni vagy táncolni | Э | Э | Э | 48 |
| elöttem álló feladatokra, dolgokra gondolok | Э | Э | Э | 49 |
| törődök az állataimmal, vagy számomra fontos dolgokkal vagy gondozom a növényeimet | Э | Э | Э | 50 |
| megfürdök vagy zuhanyozom | Э | Э | Э | 51 |
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| összekuporodom vagy hintáztatom magam | Э | Э | Э | 52 |
| megpróbálok közel ülni valakihez vagy fogni a kezét | Э | Э | Э | 53 |
| elbújok az emberek elől | Э | Э | Э | 54 |
| dobolok a lábammal, beverem a fejem, ütöm magam | Э | Э | Э | 55 |
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| azon gondolkodom, hogy mit is kellene csinálom, hogy jobban érezzem magam | Э | Э | Э | 56 |
| azon gondolkodom, hogy miért vagyok szomorú | Э | Э | Э | 57 |
| újságot, vagy könyveket olvasok | Э | Э | Э | 58 |
| segíteni próbálok az anyámnak/apámnak/testvéremnek | Э | Э | Э | 59 |

| | NEM JELLEMZŐ RÁM | NÉHA JELLEMZŐ RÁM | SOKSZOR JELLEMZŐ RÁM | # |
|---|------------------------|-------------------------|----------------------------|----|
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| gondolkodom arról a csomó alkalomról, amikor ilyen pocsekul érzem magam | Ə | Ə | Ə | 60 |
| megpróbálom ellazítani magam | Ə | Ə | Ə | 61 |
| azokra az emberekre gondolok, akik bántottak engem | Ə | Ə | Ə | 62 |
| valamit csinállok, aminél a kezemet használhatom, például, építek/javítok/kötök/rajzolok/festek | Ə | Ə | Ə | 63 |
| AMIKOR <u>SZOMORÚ</u> VAGY <u>FELDÚLT</u> VAGYOK: | | | | |
| kitakarítok a szobámban | Ə | Ə | Ə | 64 |
| nem engedem, hogy bárki hozzám érjen | Ə | Ə | Ə | 65 |
| Istenre gondolok vagy imádkozok | Ə | Ə | Ə | 66 |
| hibáztatom magam, amiért rossz vagyok | Ə | Ə | Ə | 67 |
| AMIKOR <u>MÉRGES</u> VAGY <u>DÜHÖS</u> VAGYOK: | | | | |
| összetörök vagy rugdalok dolgokat | Ə | Ə | Ə | 68 |
| veszekedek a családommal vagy a barátaimmal/ barátnőimmal | Ə | Ə | Ə | 69 |
| megvadulok, vagy nem tudom kontrollálni magam | Ə | Ə | Ə | 70 |
| arra gondolok, hogy valakit meg fogok sérteni | Ə | Ə | Ə | 71 |

| | NEM JELLEMZŐ RÁM | NÉHA JELLEMZŐ RÁM | SOKSZOR JELLEMZŐ RÁM | # |
|--|------------------------|-------------------------|----------------------------|----|
| AMIKOR <u>FÉLEK</u> VAGY <u>IDEGES</u> VAGYOK: | | | | |
| megpróbálok mély lélegzeteket venni, vagy lassan lélegzeni | Ə | Ə | Ə | 72 |
| azt akarom, hogy az anyám vagy apám megöleljen | Ə | Ə | Ə | 73 |
| körbe-körbe futok | Ə | Ə | Ə | 74 |
| arra gondolok, hogy bátor leszek | Ə | Ə | Ə | 75 |
| AMIKOR <u>BOLDOG</u> VAGYOK: | | | | |
| játszom vagy szórakozom a barátaimmal/ barátnőimmal | Ə | Ə | Ə | 76 |
| arra gondolok, hogy mennyire jól érzem magam | Ə | Ə | Ə | 77 |
| csinálok valamit, például, futok, úszok, labdázok, görkorizok | Ə | Ə | Ə | 78 |
| iskolai vagy más munkával elfoglalom magam | Ə | Ə | Ə | 79 |

Köszönjük, hogy válaszoltál

Appendix D

I. Related article

The Relations of Temperament and Emotion Self-regulation with Suicidal Behaviors in a Clinical Sample of Depressed Children in Hungary

Zsuzsanna Tamás · Maria Kovacs · Amy L. Gentzler ·
Ping Tepper · Júlia Gáboros · Enikő Kiss ·
Krisztina Kapornai · Ágnes Vetró

Received: 17 July 2006 / Accepted: 16 February 2007
© Springer Science + Business Media, LLC 2007

Abstract Although major depressive disorder (MDD) is associated with suicidal behaviors, some depressed individuals are not suicidal and others evidence various forms of suicidality. We thus investigated whether aspects of temperament and self-regulation of dysphoria represent risk factors for DSM-IV suicidality (recurrent thoughts of death, recurrent suicidal ideation, suicidal plan, and suicide attempt) in depressed youths. Using a sample of children with MDD ($N=407$; ages 7–14 years), recruited from clinical sites across Hungary, we tested the hypotheses that: (a) suicidality is related to higher levels of trait negative emotionality as well as more maladaptive and fewer adaptive regulatory responses

to dysphoria and (b) as the severity of suicidal behavior increases, levels of trait negative emotionality and dysfunctional emotion regulation also increase. We also explored if other aspects of temperament relate to suicidality. Children's DSM-IV diagnoses were based on semi-structured interviews and best-estimate psychiatric consensus. Parents independently provided ratings of their children's temperament, and children separately completed an inventory of emotion regulation (ER). Using multivariate models, we failed to confirm the hypothesized relations of negative trait emotionality and suicidality, but confirmed that high maladaptive and low adaptive ER response tendencies increase the odds of suicidal behaviors, above and beyond the risk posed by depressive illness severity. Unplanned interaction terms between temperament dimensions (other than negative emotionality) and ER suggested that at some high-extremes of temperament, ER has no impact on suicidality but in their absence, adaptive ER lowers the risk of suicidality. The practical implications of the findings are discussed.

Keywords Temperament · Emotion regulation · Suicidal behaviors · Major depressive disorder · Children

Suicidal behavior in children and adolescents has continued to receive considerable research attention, with particular interest in identifying clinically useful correlates as well as risk and vulnerability factors (for a review, see Bridge et al. 2006). Much of the past body of research has focused on the association of depression and suicidal behavior. Across diverse samples, such as those clinically referred (Haavisto et al. 2003; Kovacs et al. 1993; Myers et al. 1991a; Pfeffer et al. 1986) as well as those in the community (Bridge et al. 2006), findings have consistently shown that depressed children have high rates of suicidal behavior and that suicidal

Z. Tamás · J. Gáboros
Vadaskert Hospital,
Budapest, Hungary

M. Kovacs
University of Pittsburgh School of Medicine and Western
Psychiatric Institute and Clinic,
Pittsburgh, PA, USA

A. L. Gentzler · P. Tepper
University of Pittsburgh Medical Center,
Pittsburgh, PA, USA

E. Kiss · K. Kapornai · Á. Vetró
Department of Child and Adolescent Psychiatry,
University of Szeged,
Szeged, Hungary

Z. Tamás (✉)
Vadaskert Kórház,
Hűvösvölgyi út 116,
Budapest 1021, Hungary
e-mail: zsuzsa.tamas@chello.hu

children are likely to have depressive or mood disorders. For example, in clinical settings, between 72 and 85% of children and adolescents with major depression exhibit some form of suicidal behavior (Kovacs et al. 1993; Myers et al. 1991b; Yorbik et al. 2004). It should be noted, however, that suicidal ideation and suicide attempts have been the most often studied forms of suicidality, although according to the DSM (American Psychiatric Association 1994), suicidal behaviors also can manifest as recurrent thoughts of wanting to die or having made suicidal plans.

It is not entirely surprising that depressive disorders and suicidal behaviors tend to go hand-in-hand, given that suicidality has long been considered one of the criterion symptoms of major depressive or dysthymic disorder episodes (American Psychiatric Association 1994; World Health Organization 1994). At the same time, however, partly because most research has focused on suicidal ideation or attempt, it has not yet been established if the four forms of DSM-specified suicidal behaviors (i.e., recurrent thoughts of wanting to die or wishing to be dead, specific thoughts of wanting to kill oneself or suicidal ideation, suicidal plans, and attempted suicide) are distinct categories or represent a continuum of clinical severity. On the one hand, attempted suicide is often associated with a history of suicidal ideation (thinking and/or talking about killing oneself) including plans and threats, suggesting at least some temporal relations between these behaviors (D'Eramo et al. 2004; Kovacs et al. 1993; Lewinsohn et al. 1994; Reinherz et al. 1995). On the other hand, the fact that most youths who think about killing themselves do not attempt suicide (Kovacs et al. 1993; Myers et al. 1991b; Sanchez and Le 2001), suggests that the behaviors are discontinuous.

In addition to considering the role of depressive disorders in suicidal behaviors, researchers also have been examining the potential contribution of personal traits (Bridge et al. 2006). Personal traits have attracted attention because they are generally stable characteristics, and *developmentally are likely to antedate* the onset of suicidal or related psychopathology (for a review, see Brezo et al. 2006). Traits that have been associated with suicidal behavior in youngsters include impulsivity, impulsive aggression, trait anxiety, and trait anger (Brent et al. 2003; Brezo et al. 2006; Goldston et al. 1996; McKeown et al. 1998; Myers et al. 1991b; Ohring et al. 1996). Notably, in childhood, various traits such as impulsivity have been regarded as aspects of temperament, which has been defined as individual differences in arousability or physiological reactivity and overall self-regulation (for overviews, see Posner and Rothbart 2000; Shiner 1998). Differences in temperament appear very early in life and are believed to remain reasonably stable (for a review, see Rothbart et al. 2000). Although, as Rettew and McKee (2005) noted, investigators differ in how they define and measure temperament, there is agreement that

this is a multidimensional construct and that negative emotionality is one of its key dimension. One of the best-known models of childhood personality (Buss and Plomin 1975, 1984) indeed specifies "emotionality" (the tendency to become easily and intensely negatively aroused) as one of four dimensions of temperament. Negative emotionality also has been regarded as a key component of neuroticism (Shiner 1998).

In general, trait negative emotionality in childhood and adolescence has been shown to be associated with depression and related constructs, such as negative self-schema (Austin and Chorpita 2004; Goodyer et al. 1993; Kelvin et al. 1996; Watson et al. 1988). But studies of temperament (including negative emotionality or neuroticism) and suicidal behaviors have involved almost exclusively adults (Bulik et al. 1999; Engström et al. 1996; Lolas et al. 1991; Lynch et al. 2004; Pendse et al. 1999) and older adolescents (Enns et al. 2003; Fergusson et al. 2000), were limited to some forms of suicidal behaviors, and used a variety of temperament scales. Although findings have been somewhat inconsistent, 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 potentially maladaptive traits such as dispositional shyness or behavioral inhibition (e.g., Kagan 1994) contribute to the risk of suicidality.

Another trait variable that has been attracting interest for its role in mental health, in general, and in mood disorders, in particular, is the manner in which an individual self-regulates (modulates) negative emotion (for overviews, see Davidson et al. 2002; Gross 1998). Emotion regulation (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 (Thompson 1994). 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 (e.g., Calkins and Dedmon 2000; Calkins et al. 1999; Cole et al. 2004; Grolnick et al. 1996; Thompson 1994). Maladaptive emotion self-regulatory strategies or responses are likely to be ones that exacerbate (e.g., rumination) rather than lessen or ameliorate (e.g. physical exercise) the dysphoric mood. Indeed, dysfunctional or maladaptive emotion-regulation and depressive affect and disorders have been shown to be associated with one another in community (Garber et al. 1995; Larson et al. 1990; Nolen-Hoeksema and Morrow 1993; Silk et al. 2003) and clinic samples of youths (Garber et al. 1991). However, little is known about the relations of emotion self-regulatory responses and risk of suicidal behaviors among depressed youths. Findings from rather small samples of inpatient adolescents suggest that suicide attempters have more problems in controlling their dys-

phoric emotions than those with current suicidal ideation, although both groups have various self-regulatory difficulties (Zlotnick et al. 1997, 2003).

In summary, there are suggestions in the literature that trait negative emotionality, as an aspect of temperament, is likely to be more pronounced in youngsters with depressive symptoms or disorders than it is in controls, and that suicidal youths may also be characterized by problems in areas of emotion self-regulation. However, temperament and emotion self-regulation have not 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 (American Psychiatric Association 1994).

In the present study, we therefore addressed this problem area by testing several hypotheses in our sample of carefully diagnosed, psychiatrically referred depressed youngsters. We hypothesized that the presence of any form of suicidal behavior (compared to its absence) will be associated with: (a) higher level of trait negative emotionality, (b) more extensive deployment of maladaptive ER responses to dysphoria, and (c) less extensive use of adaptive ER responses to dysphoria, and that negative emotionality and maladaptive ER will be increasingly likely as suicidal behavior becomes more severe. We also hypothesized that adaptive ER responses to dysphoria would attenuate the impact of negative emotionality on severity of suicidal behavior. Although our hypotheses about temperament focus on negative emotionality, we examine other dimensions of temperament (activity, shyness, and sociability) in the context of exploratory analyses (both main effects and possible interactions with ER), because there is scant information on how they may be related to ER or suicidality.

In testing our hypotheses, we controlled for the effects of several covariates, including sex, because in population samples, girls are generally more likely to exhibit suicidal behaviors than are boys (Bridge et al. 2006), although among clinically referred depressed youngsters, this association is equivocal (Haavisto et al. 2003; Kovacs et al. 1993; Myers et al. 1991a; Ryan et al. 1987). We controlled for chronological age because it is unequivocally related to suicidal behavior in clinical (Kovacs et al. 1993; Myers et al. 1991b; Ryan et al. 1987) and community samples (Bridge et al. 2006). The importance of considering sex and age as covariates is underscored by our study of the clinical correlates of suicidality in the larger sample (Liu et al. 2006). We controlled for socio-economic status (SES), because it has been directly related to suicidal behaviors in some samples of youth (Fergusson and Lynskey 1995; Fergusson et al. 2000; Hawton et al. 1994) although not in others (Hawton et al. 2001). We also controlled for the

presence of anxiety disorder because of some indications that this broad diagnostic category may play a role in risk of suicidal behaviors (Fergusson and Lynskey 1995; Gould et al. 1998; Pilowsky et al. 1999; Reinherz et al. 1995). Finally, in a post hoc analysis, we included in our model an index of depression severity in light of prior findings that, both concurrently and prospectively, severity of depression (among depressed and mood disordered youngsters and adults) is associated with risk of suicidal behaviors (Barbe et al. 2005; Liu et al. 2006; Oquendo et al. 2004). In other words, we wanted to examine whether depression severity affected the relations between our independent and dependent variables.¹

Materials and Method

Participants

The subjects for the present article are 407 children (189 girls), aged 11.7 years on average ($SD=2.0$ years, range of 7.3–14.9 years), who were enrolled and evaluated in a study of genetic and psychosocial risk factors in childhood onset depression by December 31, 2003, had biological mothers as parental informants, and met diagnostic criteria for MDD (detailed below). Ethnic composition was 95.1% Caucasian, 0.3% African, 1.9% multiracial, and 2.7% identifying themselves as Roma or other minorities, representative of the population of Hungary. Years of education of the mothers ranged from 3 to 21 years ($M=11.4$ years, $SD=2.8$ years). The overall sample has been the focus of various articles addressing facets of subjects' depressive illness (Kapornai et al. 2007; Kiss et al. 2007), including clinical correlates of suicidality (Liu et al. 2006); sample size have varied across these articles as a function of data base cut-off dates which were used. Further, this study represents part of a larger Program Project of research examining risk factors for and correlates of juvenile-onset depression (e.g., Forbes et al. 2005; Perez-Edgar et al. 2006; Silk et al. 2006).

Enrollment and Assessment Procedures

Children were recruited through 23 child psychiatric facilities (seven of which had both inpatient and outpatient units) across Hungary, serving both urban and rural areas. Based on information available on most sites for the year 2004, we estimate that they provided services to at least 80% of the newly registered child psychiatry cases, giving us access to a significant portion of the referred population

¹ We thank the anonymous reviewers for their suggestions in this regard.

nationwide. Children presenting at each research site were scheduled for a research assessment if they met the following criteria: 7.0–14.9 years old, not mentally retarded, no evidence of major systemic medical disorder, had available at least one biologic parent and a 7- to 17.9-year-old sibling (required by the study's genetic component but not included in this article), and attained a predetermined cut-off score on one of various depressive symptom screens designed for this project. Children meeting these initial criteria were scheduled for a 2-part evaluation, conducted on two separate occasions, about 6 weeks apart, by different clinicians (all with advanced degrees in psychology or psychiatry). Written consent for participation was signed by both parents and the child, in accordance with the legal requirements in Hungary and the IRB of the University of Pittsburgh, Pittsburgh, PA, USA.

The first part of the evaluation entailed administration of the "Mood Disorder Module" of a diagnostic interview (described below), as well as the Intake General Information Sheet (IGIS), a comprehensive demographic and psychosocial history data form. Participants also completed self-rated scales, including the two on which we report in the present article. At each evaluation, parents were interviewed first about their children, and then children were interviewed separately about themselves. To provide a framework and facilitate recall, evaluations started with a semi-structured interview in order to construct a time line ("chronograph") for the patient from birth to the date of the assessment (identifying key events as markers); this served to identify the chronology of the child's symptoms and to date disorder onsets and offsets.

The second part of the evaluation involved the full diagnostic interview and the completion of additional self-rated scales, but was administered only if the child had met DSM criteria for mood disorder at the first evaluation. (If DSM criteria were not met, the child was assigned an "at-risk" status and entered a follow-up arm of the study). For our diagnostic interview, we used the Interview Schedule for Children and Adolescents-Diagnostic Version (ISCA-D), which is an extension of the Interview Schedule for Children and Adolescents (ISCA) (Sherrill and Kovacs 2000). The ISCA-D covers the relevant Axis-I DSM-IV as well as some DSM-III disorders and yields symptom ratings and diagnoses for "current" as well as "lifetime" episodes. For any given episode, the ratings reflect the patient's status at its worst point. The interview was administered by the same interviewer separately to a parent about the child, and then to the child about him/herself.

To increase diagnostic validity, results of the two assessments and associated documentation (e.g., psychiatric records) were subjected to a consensus diagnostic procedure (Maziade et al. 1992). Pairs of senior child psychiatrists, trained as Best Estimate Diagnosticians (BEDs), separately

reviewed all material, and then together derived consensus diagnoses. "Caseness," as well as onset dates of disorders, was based on best-estimate consensus. As described in connection with previous work (Kovacs et al. 1984a, b), operational rules were used to define disorder onset and recovery, and associated dates.

The interviews were administered by child psychiatrists and psychologists who completed 3 months of didactic and practical training in the semi-structured interview technique. They were required to reach an average of 85% symptom-agreement on five consecutive videotaped interviews against "gold standard" ratings provided by the trainers. Routine monitoring and follow-up training sessions served to minimize rater drift. All interviews were audiotaped. Interrater reliability on ISCA-D symptoms was satisfactory (using audiotapes of interviews for $n=46$ pairs of raters). For MDD symptoms, kappas ranged from 0.64 to 0.88, with 80% of the coefficients at or above 0.70. For DD symptoms (using DSM-IV criteria), kappas ranged from 0.38 to 0.93, with 80% at or above 0.70. For Generalized Anxiety Disorder symptoms (the most common DSM-IV anxiety diagnosis), kappas ranged from 0.53 to 1.00, with 63% at or above 0.70. Similar inter-rater reliability coefficients were obtained for other disorders as well.

Dependent Variables

Type of Suicidal Behavior The ISCA-D's depressive disorders section contains four items on suicidal behavior (as per DSM criteria) in the following order: recurrent thoughts of death (repeatedly thinking about one's own death and dying; thoughts of wanting to die or wanting to be dead), recurrent suicidal ideation (specific thoughts of wanting to kill oneself), suicidal plan (having formulated a plan and a method to kill oneself), and 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. According to a "skip rule," either of the first two items has to be endorsed in order to proceed to the last two, or else the latter are skipped.

At each assessment, after having recorded the rating for each symptom based on the parent interview and the child interview, the interviewer renders his/her clinician's overall rating for each symptom. 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. Also in our project, the interviewers had to follow operational rules in reaching their own "overall" rating for each symptom, namely: (a) each overall rating had to be within the ratings given by the parent and child separately for that

symptom (e.g., if the parent gave a “3” rating and the child gave a “1” rating to a symptom, the clinician’s overall rating had to be within those bounds), (b) whether the clinician’s final rating is exactly the same as the parent’s, or the child’s, or somewhere in between had to be based on the veracity of the informants on that given symptom (e.g., extent of detailed information; examples of functional impairment they provide; the overall credibility of the information in light of the child’s general context), and (c) having recorded the respondent’s answers, if the clinician did not feel that sufficient information was available to give an overall rating, he/she had to use the “missing information” data code for the overall rating for that given symptom.

Based on the clinicians’ overall ratings, we assigned each subject an overall “suicidal behavior” classification using the current *and/or* past episode of MDD and assuming a hierarchy of severity. In the present sample, 76.9% were in their first episodes of MDD; thus, for the majority of the sample, the suicidality classification was based on and reflected behavior within the current, first episode. Each subject was assigned to only one group, namely, those with a history of suicidal attempt, or suicidal plan, or suicide ideation, or recurrent thoughts of death, or no 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.

For the subset of the cases ($n=46$) from the larger study who had participated in an inter-rater reliability project, wherein two clinicians independently rated the same interviews, we computed children’s suicidality classification as described above. For these 46 cases, 39 of the children (84.8%) would be categorized into the same suicidality group based on both interviewers’ overall ratings ($\kappa=0.79$; weighted $\kappa=0.89$), and no set of interviewers’ ratings resulted in children being more than 1 classification group apart.

Independent Variables

Temperament Temperament of children was assessed via the parent rated EAS Temperament Questionnaire (Buss and Plomin 1984), completed at the Time 1 assessment, that measures four dimensions: *Emotionality* (the tendency to experience negative emotions such as irritability, anger), *Activity* (the preferred level of activity and speed of action), *Sociability* (the tendency to prefer the presence of others rather than being alone), and *Shyness* (the tendency to be inhibited and awkward in new social situations).

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. In our study, we obtained the following Cronbach’s alphas: emotionality=0.72; activity=0.65; sociability=0.52; and shyness=0.66, similar to results reported by others (e.g., 0.48–0.79 in Mathiesen and Tambs 1999; and 0.78 on average in Boer and Westenberg 1994). The reported intercorrelations among the four dimensions range from 0.02 to 0.61 and test–retest correlations range from 0.37 to 0.61 (Mathiesen and Tambs 1999). The factor structure of the EAS does not vary substantially with age of the children (Boer and Westenberg 1994; Mathiesen and Tambs 1999). As reported by several investigators, the EAS has construct and predictive validity (Bradley and Lang 1999; Shiner 1998).

Emotion Regulation The self-rated “Feelings and Me” Child version (FAM-C; Kovacs 2000) questionnaire served as an index of children’s self-regulatory responses to dysphoria and distress. This new 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. Items were derived from multiple sources (including pilot testing with children), were pre-tested with various samples of youngsters, and were each classified by seven clinical psychologists according to whether it represented an adaptive (or functional) versus a maladaptive (or dysfunctional) response, and the primary and secondary response domain being exemplified.

In the questionnaire, the stem “When I feel sad or upset, I: ...” is followed by a series of statements (e.g., “... throw, kick, or hit things”) that respondents rate on a scale ranging from “0 = not true of me” to “2 = many times true of me.” For the present analyses, we used the two major FAM subscale scores: *Adaptive ER* (32 items) and *Maladaptive ER* (22 items). In accordance with the logic underlying the scale construction, unpublished work on a large sample (unrelated to the present article) suggested that the adaptive–maladaptive dimension is the primary factor underlying the questionnaire. *Adaptive ER* mirrors responding to one’s own dysphoric emotion in ways which are likely to attenuate or modulate it (e.g., “I get my mom to give me a hug,” “I try to think of fun things”); *Maladaptive ER* mirrors responding which is likely to maintain and exacerbate the dysphoria (e.g., “I go away and hide,” “I throw and hit things”).

The FAM-C questionnaire has face validity and acceptable initial psychometric properties, as suggested by the following. In the present sample, Cronbach’s alpha is 0.89 for the *Adaptive ER* subscale and .87 for the *Maladaptive ER* subscale. Construct validity is partially supported by the

correlation of 0.64 ($p < 0.0001$) between the *Maladaptive ER* score and the Children's Depression Inventory (Kovacs 2003). Concurrent validity is supported by the correlation of 0.71 between the *Maladaptive ER* subscale and a version of the Depressive Rumination scale (Nolen-Hoeksema and Morrow 1993) modified for children. In the larger depressed clinical sample enrolled in the main study ($n = 649$) the mean *Maladaptive ER* score was significantly higher ($p < 0.0001$) than in an age-and-sex matched school-based sample in Hungary (15.20 versus 8.24, respectively). In two USA based pediatric (normal control and at-risk for depression) samples, also involved in the overall Program Project, the correlation coefficients we obtained were similar to those noted above (in the Hungarian sample) with regard to *Maladaptive ER* and (a) self-rated depression ($r_s = 0.46$ and 0.52 , respectively) and (b) rumination ($r_s = 0.57$, and $.49$, respectively). As also shown in the USA sample, the instrument has acceptable long-term stability: re-test with $n = 42$ youngsters (mean initial age = 8.5 years) after a 1-year (± 3 months) interval yielded an intraclass correlation coefficient of 0.44 ($p < 0.01$) for each of the two subscores.

Covariates

Anxiety Disorders The presence of any anxiety disorder (regardless of its type and timing) was used as a covariate. Altogether 143 children (35.1%) had anxiety disorders, with all the relevant DSM-IV anxiety diagnoses having been represented.

MDD Severity Clinicians rated children's overall severity of their current or most recent episode of MDD 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 ($M = 2.28$, $SD = 0.71$).

Child's sex, child's age, and maternal educational level were also controlled, as noted in the Introduction.

Statistical Analyses

The association of independent variables and covariates with 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.

Using a hierarchical method, polychotomous regression models were developed to investigate the association between temperament and emotion regulation and type of suicidal behavior, adjusting for covariates. First we entered into the model the covariates of interest: age, sex, maternal

education, and anxiety. Temperament scales were then entered as independent variables, followed by *Maladaptive* and *Adaptive ER* scores, and interaction terms between ER and temperament scale scores. Continuous variables were centered (i.e., a new variable was created by the original variable minus its mean) prior to computing interaction terms. We then repeated the entire procedure with the addition of depression severity as a covariate.¹ Although our results with regard to our hypotheses did not substantially change, we report the outcome of the model which included depression severity. We summarize the results as odds ratios (OR) and their 95% confidence intervals (CI). Statistical Analyses Software (SAS) version 8.2 was used to perform all analyses.

Results

In this clinical sample of children with MDD, 67% had a history of suicidal behavior (Table 1). 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%).

There were no statistically significant differences in *Emotionality*, *Sociability*, or *Shyness* across the groups of children with different types of suicidal behaviors. The four groups of subjects significantly differed only on one temperament dimension: those with a history of suicide attempts were rated by their mothers as displaying the lowest levels of trait *Activity*.

The means for the ER scales were found to be generally in the predicted direction: that is, *Maladaptive ER* response scores tend to increase and *Adaptive ER* response scores tend to decrease as the type of suicidal behavior becomes more severe. Additionally, we found that non-suicidal children were younger than suicidal ones, that the oldest children were the most likely to have attempted suicide, and that more girls than boys had suicidal ideation and suicidal attempts (although the sex ratio was reversed with regard to recurrent thoughts of death and suicide plans) (Table 1). Rates of anxiety disorders, which ranged from 13 to 22% across the various categories of suicidality, were not significantly different.

Association among Independent Variables

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* $r = 0.35$ ($p < 0.001$). But *Emotionality* was not related to the other temperament dimensions ($p_s > 0.31$). We found a very modest correlation between *Adaptive* and *Maladaptive ER* scale scores ($r = 0.15$, $p = 0.002$) and similarly modest (although statistically signifi-

Table 1 Selected characteristics of the sample of depressed children by type of suicidal behavior

| Variables | Total Ss | | Non-suicidal Ss (<i>N</i> =134; 33%) | | Recurrent thoughts of death Ss (<i>N</i> =80; 20%) | | Suicide Ideation Ss (<i>N</i> =72; 18%) | | Suicide plan Ss (<i>N</i> =72; 18%) | | Suicide attempt Ss (<i>N</i> =49; 12%) | | Statistics (df=4) |
|---|----------|-------|---------------------------------------|-------|---|-------|--|-------|--------------------------------------|-------|---|-------|-------------------|
| | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Kruskal–Wallis |
| EAS temperament scales ^a | | | | | | | | | | | | | |
| Emotionality | 3.61 | 0.92 | 3.44 | 0.97 | 3.68 | 0.93 | 3.66 | 0.87 | 3.77 | 0.83 | 3.64 | 0.89 | 6.98 |
| Activity | 2.93 | 0.89 | 2.91 | 0.93 | 2.83 | 0.87 | 2.94 | 0.94 | 3.20 | 0.86 | 2.74 | 0.73 | 10.24* |
| Sociability | 3.15 | 0.77 | 3.18 | 0.71 | 3.05 | 0.84 | 3.14 | 0.79 | 3.22 | 0.77 | 3.10 | 0.80 | 2.48 |
| Shyness | 3.05 | 0.93 | 2.95 | 0.98 | 3.16 | 0.99 | 3.02 | 0.90 | 3.07 | 0.86 | 3.18 | 0.87 | 3.33 |
| Emotion self-regulation scales ^b | | | | | | | | | | | | | |
| Maladaptive ER | 15.37 | 8.49 | 12.5 | 7.55 | 13.34 | 8.02 | 17.21 | 7.71 | 16.82 | 8.64 | 22 | 8.09 | 50.76*** |
| Adaptive ER | 25.84 | 11.26 | 28.23 | 10.29 | 27.15 | 12.02 | 24.20 | 11.54 | 23.73 | 10.85 | 22.73 | 11.46 | 16.33** |
| Age (years) | 11.72 | 2.00 | 11.15 | 2.15 | 11.56 | 1.83 | 12.06 | 1.99 | 11.88 | 1.75 | 12.79 | 1.79 | 26.85*** |
| Biological mother's education (yrs) | 11.45 | 2.82 | 11.07 | 2.30 | 11.65 | 3.06 | 11.5 | 2.84 | 11.76 | 3.11 | 11.6 | 3.22 | 2.68 |
| | <i>N</i> | % | <i>N</i> | % | <i>N</i> | % | <i>N</i> | % | <i>N</i> | % | <i>N</i> | % | X ² |
| Sex | | | | | | | | | | | | | 21.47*** |
| Female (% in each group) | 189 | 100 | 57 | 30.16 | 33 | 17.46 | 43 | 22.75 | 23 | 12.17 | 33 | 17.46 | 8.53 |
| Male (% in each group) | 218 | 100 | 77 | 35.32 | 47 | 21.56 | 29 | 13.30 | 49 | 22.48 | 16 | 7.34 | |
| Anxiety disorders | | | | | | | | | | | | | |
| Yes (% in each group) | 143 | 100 | 34 | 23.78 | 31 | 21.68 | 29 | 20.28 | 30 | 20.98 | 19 | 13.29 | 8.53 |
| No (% in each group) | 264 | 100 | 100 | 37.88 | 49 | 18.56 | 43 | 16.29 | 42 | 15.91 | 30 | 11.36 | |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.^a Potential range: 0–5.^b Potential range for Maladaptive ER: 0–44 (observed range: 0–42); potential range for Adaptive ER: 0–64 (observed range: 3–58).

cant) 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* ($r = 0.10$, $p < 0.05$). We also examined whether any of the covariates (age, sex, maternal education level, comorbid anxiety disorder) was related to temperament and ER. We found that age was moderately related both to *Adaptive ER* and *Maladaptive ER* scale scores ($r = -0.22$, 0.20 , respectively, $p < 0.0001$), and *Adaptive ER* scale score and maternal education level also were related ($r = -0.18$, $p < 0.0002$).

Sex differences were detected on two independent variables. Namely, parents rated sons significantly higher on the *Activity* subscale of the EAS than daughters ($t(401) = -3.55$, $p = 0.0004$), and girls reported higher rates of *Maladaptive ER* responses than did boys ($t(400) = 4.97$, $p < 0.0001$). Finally, children with comorbid anxiety disorder scored significantly higher on the *Emotionality* and *Shyness* scales than children without anxiety ($t(402) = -2.62$, $p = 0.0092$; $t(398) = -2.55$, $p = 0.0112$, respectively).

Modeling the Various Types of Suicidal Behaviors

In the polychotomous model, mother's education was not statistically significant; therefore it was not included in any later models. Interaction terms were dropped sequentially

from the model based on their p -values, and only those with $p < 0.05$ were retained in the final model. All EAS and ER scale scores were included in the model as well as sex, age, and anxiety, regardless of their p -values. 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 (with depression severity included) was significant ($-2 \text{ Log Likelihood for intercept and covariates} = 995.80$, $p < 0.0001$) and is shown in Table 2.

As can be seen (Table 2), subjects with recurrent thoughts of death and non-suicidal subjects were indistinguishable on each of the independent variables. Additionally, the EAS Temperament scales had very inconsistent relationships to the remaining three categories of suicidality: suicide ideators and nonsuicidal subjects were similar on all four EAS scales; increased *Emotionality* ($OR = 1.53$, $p < 0.05$) and *Activity* ($OR = 1.89$, $p < 0.01$) distinguished those with suicidal plans from non-suicidal ones; whereas higher scores on *Shyness* differentiated attempters and non-suicidal cases ($OR = 2.06$, $p < 0.05$).

In contrast, the association between emotion regulatory responses and suicidality was more straightforward.

Table 2 Models of temperament and emotion self-regulation for types of suicidality in depressed children: polychotomous regression results^{a, b}

| | Recurrent thoughts of death vs. non-suicidal Ss (N=80) | | Suicide ideation vs. non- suicidal Ss (N=72) | | Suicide plan vs. non- suicidal Ss (N=72) | | Suicide attempt vs. non- suicidal Ss (N=49) | |
|---------------------------------------|---|------------|---|------------|---|------------|--|-------------|
| | OR | 95%CI | OR | 95%CI | OR | 95%CI | OR | 95%CI |
| EAS temperament scales | | | | | | | | |
| Emotionality | 1.34 | 0.97, 1.86 | 1.24 | 0.88, 1.76 | 1.53* | 1.04, 2.26 | 1.12 | 0.71, 1.78 |
| Activity | 1.12 | 0.76, 1.64 | 1.31 | 0.87, 1.98 | 1.89** | 1.22, 2.92 | 1.39 | 0.80, 2.42 |
| Sociability | 0.82 | 0.51, 1.32 | 0.94 | 0.57, 1.56 | 1.00 | 0.59, 1.70 | 1.34 | 0.71, 2.56 |
| Shyness | 1.15 | 0.78, 1.69 | 1.12 | 0.74, 1.70 | 1.33 | 0.84, 2.11 | 2.06* | 1.18, 3.61 |
| Emotion self-regulation scales | | | | | | | | |
| Maladaptive ER | 1.00 | 0.96, 1.04 | 1.08*** | 1.03, 1.13 | 1.08** | 1.03, 1.13 | 1.16*** | 1.09, 1.23 |
| Adaptive ER | 1.00 | 0.97, 1.03 | 0.96** | 0.93, 0.99 | 0.94*** | 0.91, 0.98 | 0.93** | 0.89, 0.97 |
| Interaction terms | | | | | | | | |
| Adaptive ER * shyness | 0.98 | 0.95, 1.02 | 1.01 | 0.97, 1.06 | 1.00 | 0.96, 1.04 | 1.08** | 1.03, 1.14 |
| Adaptive ER * sociability | 1.02 | 0.98, 1.07 | 1.00 | 0.96, 1.05 | 1.01 | 0.97, 1.06 | 1.08** | 1.02, 1.15 |
| Depression severity | 2.01** | 1.25, 3.22 | 1.50 | 0.92, 2.45 | 3.91*** | 2.23, 6.85 | 7.16*** | 3.31, 15.52 |

Model fit statistics: -2 Log likelihood, Intercept only: 1193.91, Intercept and covariates: 995.80.

Testing global null hypothesis: beta=0, Wald test Chi-square=130.87, DF=48, $p<0.0001$.

^a Sex, age, and presence of comorbid anxiety disorder were controlled in the models.

^b Emotion regulation and temperament variables were all centered.

* $p<0.05$, ** $p<0.01$, *** $p<0.001$.

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 (Table 2). Thus, as can be seen in Table 2, higher *Maladaptive ER* scores differentiated each of the three suicidal groups from the non-suicidal group. Similarly, lower scores on the *Adaptive ER* subscale characterize ideators (OR=0.96, $p<0.01$), those with suicidal plan (OR=0.94, $p<0.001$), and attempters (OR=0.93, $p<0.01$), compared to non-suicidal youngsters.

We also found statistically significant interactions between *Adaptive ER* and *Shyness* (OR=1.08, $p<0.01$), as well as *Adaptive ER* and *Sociability* (OR=1.08, $p<0.01$) in the model of suicide attempters (compared to non-suicidal children). As illustrated in Fig. 1, 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 (see Fig. 2) 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. For example, each unit change in depression severity increases the odds of being a suicide attempter about seven-fold (Table 2). Importantly, however, given that the model in Table 2 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.

Discussion

Although the association between depressive disorders and suicidal behaviors is well documented (Haavisto et al. 2003; Kovacs et al. 1993; Myers et al. 1991a; Pfeffer et al. 1986, 1991), the fact remains that many depressed youngsters do not manifest suicidality, and that the rest display

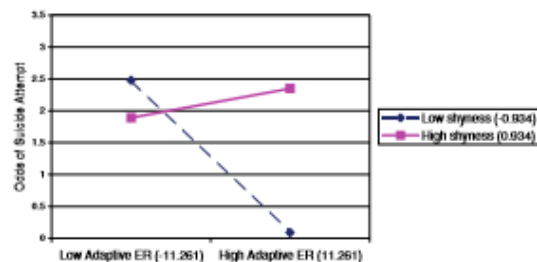
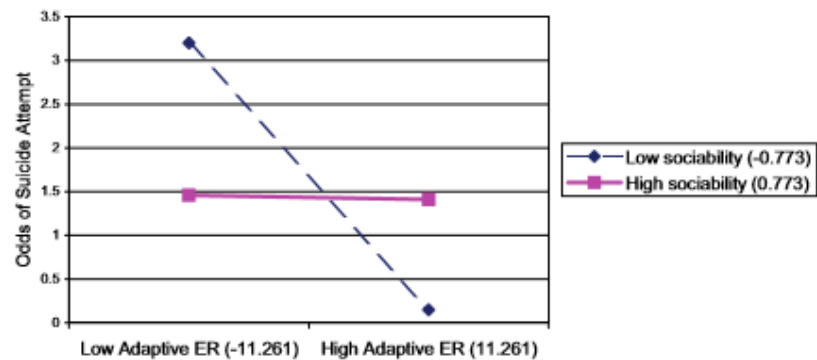


Fig. 1 Interaction between shyness and adaptive emotion regulation for children with suicide attempts (using values of 1 SD above and below the mean)

Fig. 2 Interaction between sociability and adaptive emotion regulation for children with suicide attempts (using values of 1 SD above and below the mean)



various types of suicidal symptoms. In the present study, we were primarily interested in investigating 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.

As an index of temperament, negative emotionality is typically evident early in life (Shiner 1998) and by late childhood and thereafter, has been associated with the presence of depression (Goodyer et al. 1993; Kelvin et al. 1996; Watson et al. 1988). 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 (Thompson 1994). By adolescence, difficulties in modulating or “downregulating” dysphoric mood have been associated with depression and suicidal behaviors (Garber et al. 1991; Zlotnick et al. 1997, 2003). 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.

Accordingly, we posited that, among depressed youngsters, the presence and severity of suicidal behavior would be associated with higher levels of trait negative emotionality, and more maladaptive (and fewer adaptive) emotion regulatory responses to dysphoria. We also hypothesized that adaptive ER responding would moderate the relations between high negative emotionality and suicidal behaviors. While it has been proposed that, in infancy, temperament dispositions may be closely related to ER skill acquisition (e.g., Calkins 1994), our hypotheses suggest that we regard temperament and ER as separable constructs in the age groups under consideration. Indeed, studies of children have found that emotionality and regulation are only modestly

related (e.g., Rydell et al. 2003), underscoring that these dimensions are not homologous. In testing our hypotheses, we controlled for the effects of variables (e.g., age and sex) that have been shown to be associated with suicidal behaviors. Then, we also added an index of depression severity owing to its previously documented relations to suicidality.

Using data from a very large sample of depressed youngsters, we failed to confirm our hypothesis that high level of trait negative emotionality is associated with suicidal behaviors. In fact, our depressed non-suicidal and depressed suicidal children had comparable levels of negative emotionality (see Table 1). And this trait variable only distinguished children with suicide plans from nonsuicidal depressed children, but at a modest level ($p < 0.05$), thereby rendering the finding tentative. Negative emotionality (quantified by the EAS scale) has been associated with depression in children recruited from the community (Goodyer et al. 1993; Lengua et al. 1998). Our failure to find strong and consistent main effects for negative emotionality may be due to the fact that the corresponding scores were negatively skewed in our sample, with about 8% at the maximum value of 5.00 (whereas the *Shyness*, *Sociability*, and *Activity* scores were more normally distributed). Thus, a ceiling effect could have decreased the likelihood of obtaining the predicted results for *Negative Emotionality*.

However, we confirmed our hypotheses about the relations of dysphoria-focused emotion self-regulation and suicidality, 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. This possibility should be investigated in future research.

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 also suggest that youngsters who have attempted suicide have the least favorable distress-specific emotion regulatory profile as mirrored by their considerably higher *Maladaptive ER* score than those of the other groups of children (see Table 1). Other researchers have specifically commented on the affect regulatory problems of adolescent suicide attempters and have suggested that overt suicidal acts may represent ways to reduce “intolerable emotional states” (Zlotnick et al. 1997). Although addressing primarily the context of borderline personality disorder, Marsha Linehan’s conceptual paradigm also highlights that suicidal behavior can be a direct response to intense negative affect and can serve to downregulate or dissipate it (for overviews, see Harned et al. 2006; McMain et al. 2001). Thus, in the presence of mood disorder, attempted suicide may represent a behaviorally-focused ER response which presumably can interrupt or modulate the dysphoric affect.

Importantly, our findings regarding ER and temperament did not notably change when we added severity of depression to the model. Depression severity, indexed as a sum of clinical symptom ratings, has been found to be related to suicidality in the larger sample of our study (Liu et al. 2006) and in another sample of 7- to 17-year-old depressed youngsters (Barbe et al. 2005). And among adults with mood disorder, self-rated depression severity also predicted subsequent suicidal acts (Oquendo et al. 2004). It is not entirely clear how depression severity accounts for the increased risk of suicidality. Thus, future research on the relations of depression severity and suicidality should address mediators and moderators (including possibly ER). We suspect, however, that “severity indices” may either reflect the overall mood component of the disorder (extent of despondency and anhedonia), or possibly the multiplicity of symptoms that significantly impair daily functioning, either of which may become “too much” to bear. According to our findings, a child’s maladaptive dysphoria-related ER response repertoire poses a risk for suicidal behavior, which is above and beyond the contribution of depression severity.

Please note that the ER scale-related odds ratios in Table 2 refer to a change in the odds of the given outcome per unit change on the ER scale. Thus, for example, given a depressed child, whose *Maladaptive ER* score is eight points higher (~1 SD) than the score of another child, the higher scorer is about 3.3 times more likely (i.e., 1.16^8) to be an attempter than a non-suicidal depressed peer. This finding may have relevance to prevention efforts, because ER response styles appear to be moderately stable and may be assessed in children at risk for, but prior to a depressive episode.

Although we did not have hypotheses addressing temperament dimensions other than *Emotionality*, we detected interaction terms between *ER* and trait *Shyness* as well as trait *Sociability* in the statistical model for suicide attempters. Taken together, 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 odds of attempted suicide.

Several other findings are also of note. The overall portion of our depressed sample with some type of suicidal behavior is generally comparable to rates for depressed young patients in Finnish and USA samples (Haavisto et al. 2003; Myers et al. 1991b). The sex effect across suicidal behaviors in this Hungarian sample (for which we controlled in our analyses) echoes a large body of research on the preponderance of girls among suicide ideators and attempters (Bridge et al. 2006). In future research, it would be interesting to examine whether sex moderates the relations of ER and suicidality. Finally, although rates of recurrent thoughts of death and suicide plans among clinically referred youngsters have not yet been established, our findings parallel reports from other studies indicating that a suicide attempt is the least frequent expression of suicidal behavior in our targeted age group (Haavisto et al. 2003; Kovacs et al. 1993; Myers et al. 1991b; Pfeffer et al. 1986, 1991).

The results of our study should be evaluated in light of several limitations. First, we used a cross-sectional design and therefore cannot prove that aspects of temperament and maladaptive emotion regulation preceded and were causally related to suicidal behaviors. Although temperament and emotion self-regulatory styles are believed to emerge early in development and remain fairly stable (Calkins 1994; Rothbart et al. 2000; Thompson 1994), longitudinal research is needed to verify their prospective contribution to depressive psychopathology, including suicidal behaviors. Second, our measures of temperament and ER may be viewed as constraining our findings. The EAS temperament scales showed somewhat low reliability and surprisingly low or nonsignificant associations with other measures (e.g., negative emotionality was

uncorrelated with ER scales). Additionally, the FAM scale used to quantify emotion regulatory responding is a new instrument. Although its initial psychometric properties are promising, further research is needed to determine its validity and usefulness. Finally, even though our study included a diverse and nationally representative clinical sample of carefully diagnosed depressed children in Hungary, the sample is homogeneous in terms of ethnicity. All in all, while we expect that our findings would generalize to other populations of psychiatrically referred depressed youth, this will have to be explored in future studies.

Acknowledgements Members of the International Consortium for Childhood-Onset Mood Disorders include: Ildikó Baji M.D., István Benák, Emília Kaczvinsky M.D., Krisztina Kapornai M.D., Viola Kothencné Osváth M.S., László Mayer M.D., Szeged University Medical Faculty, Department of Child and Adolescent Psychiatry, Szeged. Márta Besnyő M.D., Julia Gáboros M.D., Ph.D., Vadaskert Hospital, Budapest. Judit Székely M.D. Semmelweis University I. Pediatric Department, Budapest. Edit Dombóvári M.D., Heim Pál Hospital for Sick Children Outpatient Unit of Child Psychiatry, Budapest. Special thanks are due to the following participating physicians across various research sites in Hungary: Zsuzsa Bánk M.D., Katalin Bense M.D., Katalin Benkő M.D., Ferenc Dicső M.D., Emőke Endreffy Ph.D., Edina Farkas M.D., Gyöngyi Farkas M.D., Zsuzsanna Fekete M.D., Márta Fohn M.D., Magdolna Gácsér M.D., Eszter Gyenge M.D., Éva Gyulai M.D., Mária Gyurcsó M.D., Rózsa Hasuly M.D., Ágnes Horváth M.D., Enikő Juhász M.D., Mária Károlyfalvi M.D., Dénes Kövendy M.D., Mária Mojzes M.D., Ilona Mőgor M.D., Róza Oláh M.D., Mária Palaczk M.D., Mária Révhelyi M.D., Ilona Riegler M.D., Zsuzsanna Sörfőző, M.D., Péter Steiner M.D., Zsuzsa Takács M.D. and Mariann Vados M.D. and to Charles J. George, MS, for his statistical comments on an earlier version of this manuscript.

This work was supported by Program Project Grant #MH056193 from the National Institute of Mental Health, HHS, Washington, D.C.

Disclosure The Children's Depression Inventory and the Feelings and Me Scales are published by MultiHealth Systems, Inc., from which Dr. Kovacs receives royalties.

References

- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Austin, A. A., & Chorpita, B. F. (2004). Temperament, anxiety, and depression: Comparison across five ethnic groups of children. *Journal of Clinical Child and Adolescent Psychology*, 33, 216–226.
- Barbe, R. P., Williamson, D. E., Bridge, J. A., Birmaher, B., Dahl, R. E., Axelson, D. A., et al. (2005). Clinical differences between suicidal and nonsuicidal depressed children and adolescents. *Journal of Clinical Psychiatry*, 66, 492–498.
- Boer, F., & Westenberg, P. M. (1994). The factor structure of the Buss and Plomin EAS temperament survey (Parental Ratings) in Dutch sample of elementary school children. *Journal of Personality Assessment*, 62, 537–551.
- Bradley, M. M., & Lang, P. J. (1999). Fearfulness and affective evaluations of pictures. *Motivation and Emotion*, 23, 1–13.
- Brent, D. A., Oquendo, M., Birmaher, B., Greenhill, L., Kolko, D., Stanley, B., et al. (2003). Peripubertal suicide attempts in offspring of suicide attempters with siblings concordant for suicidal behavior. *The American Journal of Psychiatry*, 160, 1486–1493.
- Brezo, J., Paris, J., & Turecki, G. (2006). Personality traits as correlates of suicidal ideation, suicide attempts, and suicide completions: A systematic review. *Acta Psychiatrica Scandinavica*, 113, 180–206.
- Bridge, J. A., Goldstein, T. R., & Brent, D. A. (2006). Adolescent suicide and suicidal behavior. *Journal of Child Psychology and Psychiatry*, 47, 372–394.
- Bulik, C. M., Sullivan, P. F., & Joyce, P. R. (1999). Temperament, character and suicide attempts in anorexia nervosa, bulimia nervosa and major depression. *Acta Psychiatrica Scandinavica*, 100, 27–32.
- Buss, A. H., & Plomin, R. (1975). *A temperament theory of personality development*. New York: Wiley.
- Buss, A. H., & Plomin, R. (1984). *Temperament: Early developing personality traits*. Hillsdale, NJ: Lawrence Erlbaum.
- Calkins, S. D. (1994). Origins and outcomes of individual differences in emotion regulation. *Monographs of the Society for Research in Child Development*, 59, 2–3 (Serial No. 240), 53–72.
- Calkins, S. D., & Dedmon, S. E. (2000). Physiological and behavioral regulation in two-year-old children with aggressive/destructive behavior problems. *Journal of Abnormal Child Psychology*, 28, 103–118.
- Calkins, S. D., Gill, K. I., Johnson, M. C., & Smith, C. L. (1999). Emotional reactivity and emotional regulation strategies as predictors of social behavior with peers during toddlerhood. *Social Development*, 8, 310–334.
- Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: methodological challenges and directions for child development research. *Child Development*, 75, 317–333.
- D'Eramo, K. S., Prinstein, M. J., Freeman, J., Grapentine, W. L., & Spirito, A. (2004). Psychiatric diagnoses and comorbidity in relation to suicidal behavior among psychiatrically hospitalized adolescents. *Child Psychiatry and Human Development*, 35, 21–35.
- Davidson, R. J., Pizzagalli, D., Nitschke, J. B., & Putnam, K. (2002). Depression: Perspectives from affective neuroscience. *Annual Review of Psychology*, 53, 545–574.
- Engström, G., Nyman, G. E., & Träskman-Bendz, L. (1996). The Marke-Nyman Temperament (MNT) scale in suicide attempters. *Acta Psychiatrica Scandinavica*, 94, 320–325.
- Enns, M. W., Cox, B. J., & Inayatulla, M. (2003). Personality predictors of outcome for adolescents hospitalized for suicidal ideation. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42, 720–727.
- Fergusson, D. M., & Lynskey, M. T. (1995). Childhood circumstances, adolescent adjustment, and suicide attempts in a New Zealand birth cohort. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34, 612–622.
- Fergusson, D. M., Woodward, L. J., & Horwood, L. J. (2000). Risk factors and life processes associated with the onset of suicidal behaviour during adolescence and early adulthood. *Psychological Medicine*, 30, 23–39.
- Forbes, E. E., Miller, A., Cohn, J. F., Fox, N. A., & Kovacs, M. (2005). Affect-modulated startle in adults with childhood-onset depression: Relations to bipolar course and number of lifetime depressive episodes. *Psychiatry Research*, 134, 11–25.
- Garber, J., Braafladt, N., & Weiss, B. (1995). Affect regulation in depressed and nondepressed children and young adolescents. *Development and Psychopathology*, 7, 93–115.
- Garber, J., Braafladt, N., & Zeman, J. (1991). The regulation of sad affect: An information-processing perspective. In J. Garber & K. A. Dodge (Eds.), *The development of emotion regulation and dysregulation* (pp. 208–240). New York: Cambridge University Press.
- Goldston, D. B., Daniel, S., Reboussin, D. M., Kelley, A., Ievers, C., & Brunstetter, R. (1996). First-time suicide attempters, repeat attempters, and previous attempters on an adolescent inpatient

- psychiatry unit. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 631–639.
- Goodyer, I. M., Ashby, L., Altham, P. M., Vize, C., & Cooper, P. J. (1993). Temperament and major depression in 11 to 16 year olds. *Journal of Child Psychology and Psychiatry*, 34, 1409–1423.
- Gould, M. S., King, R., Greenwald, S., Fisher, P., Schwab-Stone, M., Kramer, R., et al. (1998). Psychopathology associated with suicidal ideation and attempts among children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 37, 915–923.
- Grolnick, W. S., Bridges, L. J., & Connell, J. P. (1996). Emotion regulation in two-year-olds: Strategies and emotional expression in four contexts. *Child Development*, 67, 928–941.
- Gross, J. J. (1998). The emerging field of emotion regulation: An integrative review. *Journal of General Psychology*, 3, 271–299.
- Haavisto, A., Sourander, A., Ellilä, H., Välimäki, M., Santalahti, P., & Helenius, H. (2003). Suicidal ideation and suicide attempts among child and adolescent psychiatric inpatients in Finland. *Journal of Affective Disorders*, 76, 211–221.
- Harned, M. S., Banawan, S. F., & Lynch, T. R. (2006). Dialectical behavior therapy: An emotion-focused treatment for borderline personality disorder. *Journal of Contemporary Psychotherapy*, 36, 67–75.
- Hawton, K., Fagg, J., Simkin, S., & Mills, J. (1994). The epidemiology of attempted suicide in the Oxford area, England (1989–1992). *Crisis: The Journal of Crisis Intervention and Suicide Prevention*, 15, 123–135.
- Hawton, K., Harriss, L., Simkin, S., Balc, E., & Bond, A. (2001). Social class and suicidal behaviour: The associations between social class and the characteristics of deliberate self-harm patients and the treatment they are offered. *Social Psychiatry and Psychiatric Epidemiology*, 36, 437–443.
- Kagan, J. (1994). On the nature of emotion. In N. A. Fox (Ed.), *Emotion regulation: Behavioral and biological considerations. Monographs of the Society for Research in Child Development*, vol. 2–3, Serial no. 240 (pp. 7–24).
- Kapornai, K., Gentzler, A. L., Tepper, P. G., Kiss, E., Mayer, L., Tamás, Zs., et al. (2007). Early developmental characteristics and features of major depressive disorder among child psychiatric patients in Hungary. *Journal of Affective Disorders*, in press.
- Kelvin, R. G., Goodyer, I. M., & Altham, P. M. E. (1996). Temperament and psychopathology amongst siblings of probands with depressive and anxiety disorders. *Journal of Child Psychology and Psychiatry*, 37, 543–550.
- Kiss, E., Gentzler, A. L., Kapornai, K., Tamás, Zs., Kovacs, M., & Vetró, A., et al. (2007). Factors influencing mother–child reports of depressive symptoms and agreement among clinically referred depressed youngsters in Hungary. *Journal of Affective Disorders*, in press.
- Kovacs, M. (2000). *The “Feelings and Me” emotion regulatory strategy utilization questionnaire*. Pittsburgh, PA: University of Pittsburgh School of Medicine.
- Kovacs, M. (2003). *Children’s depression inventory: Technical manual update*. Toronto, Multi-health Systems.
- Kovacs, M., Feinberg, T. L., Crouse-Novak, M. A., Paulauskas, S. L., & Finkelstein, R. (1984a). Depressive disorders in childhood. I. A longitudinal prospective study of characteristics and recovery. *Archives of General Psychiatry*, 41, 229–237.
- Kovacs, M., Feinberg, T. L., Crouse-Novak, M. A., Paulauskas, S. L., Pollock, M., & Finkelstein, R. (1984b). Depressive disorders in childhood. II. A longitudinal study of the risk for a subsequent major depression. *Archives of General Psychiatry*, 41, 653–659.
- Kovacs, M., Goldston, D., & Gatsonis, C. (1993). Suicidal behaviors and childhood-onset depressive disorders: A longitudinal investigation. *Journal of the American Academy of Child and Adolescent Psychiatry*, 32, 8–20.
- Larson, R. W., Raffaelli, M., Richards, M. H., Ham, M., & Jewell, L. (1990). Ecology of depression in late childhood and early adolescence: A profile of daily states and activities. *Journal of Abnormal Psychology*, 99, 92–102.
- Lengua, L. J., West, S. G., & Sandler, I. N. (1998). Temperament as a predictor of symptomatology in children: Addressing contamination of measures. *Child Development*, 69, 164–181.
- Lewinsohn, P. M., Rohde, P., & Seeley, J. R. (1994). Psychosocial risk factors for future adolescent suicide attempts. *Journal of Consulting and Clinical Psychology*, 62, 297–305.
- Liu, X., Gentzler, A. L., Tepper, P., Kiss, E., Kothencné, V., Tamás, Z., et al. (2006). Clinical features of depressed children and adolescents with various forms of suicidality. *Journal of Clinical Psychiatry*, 67, 1442–1450.
- Lolas, F., Gomez, A., & Suarez, L. (1991). EPQ-R and suicide attempt: The relevance of psychoticism. *Personality and Individual Differences*, 12, 899–902.
- Lynch, T. R., Cheavens, J. S., Morse, J. Q., & Rosenthal, M. Z. (2004). A model predicting suicidal ideation and hopelessness in depressed older adults: The impact of emotion inhibition and affect intensity. *Aging & Mental Health*, 8, 486–497.
- Mathiesen, K. S., & Tambs, K. (1999). The EAS Temperament Questionnaire—Factor structure, age trends, reliability, and stability in a Norwegian sample. *Journal of Child Psychology and Psychiatry*, 40, 431–439.
- Maziade, M., Roy, M. A., Fournier, J. P., Cliché, D., Mérette, C., Caron, C., et al. (1992). Reliability of best-estimate diagnosis in genetic linkage studies of major psychoses: Results from the Quebec pedigree studies. *The American Journal of Psychiatry*, 149, 1674–1686.
- McKeown, R. E., Garrison, C. Z., Cuffe, S. P., Waller, J. L., Jackson, K. L., & Addy, C. L. (1998). Incidence and predictors of suicidal behaviors in a longitudinal sample of young adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 37, 612–619.
- McMain, S., Korman, L. M., & Dimeff, L. (2001). Dialectical behavior therapy and the treatment of emotion dysregulation. *Psychotherapy in Practice*, 57, 183–196.
- Myers, K., McCauley, E., Calderon, R., Mitchell, J., Burke, P., & Schloedt, K. (1991a). Risks for suicidality in major depressive disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 86–94.
- Myers, K., McCauley, E., Calderon, R., & Treder, R. (1991b). The 3-year longitudinal course of suicidality and predictive factors for subsequent suicidality in youths with major depressive disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 804–810.
- Nolen-Hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion*, 7, 561–570.
- Ohring, R., Apter, A., Ratzoni, G., Weizman, R., Tyano, S., & Plutchik, R. (1996). State and trait anxiety in adolescent suicide attempters. *Journal of the American Academy of Child and Adolescent Psychiatry*, 35, 154–157.
- Oquendo, M. A., Galfalvy, H., Russo, S., Ellis, S. P., Grunebaum, M. F., Burke, A., et al. (2004). Prospective study of clinical predictors of suicidal acts after a major depressive episode in patients with major depressive disorder or bipolar disorder. *American Journal of Psychiatry*, 161, 1433–1441.
- Pendse, B., Westrin, Å., & Engström, G. (1999). Temperament traits in seasonal affective disorder, suicide attempters with non-seasonal major depression and healthy controls. *Journal of Affective Disorders*, 54, 55–65.
- Perez-Edgar, K., Fox, N. A., Cohn, J. F., & Kovacs, M. (2006). Behavioral and electrophysiological markers of selective attention

- in children of parents with a history of depression. *Biological Psychiatry*, 60, 1131–1138.
- Pfeffer, C. R., Klerman, G. L., Hurt, S. W., Lesser, M., Peskin, J. R., & Siefker, C. A. (1991). Suicidal children grow up: Demographic and clinical risk factors for adolescent suicide attempts. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 609–616.
- Pfeffer, C. R., Plutchik, R., Mizruchi, M. S., & Lipkins, R. (1986). Suicidal behavior in child psychiatric inpatients and outpatients and in nonpatients. *The American Journal of Psychiatry*, 143, 733–738.
- Pilowsky, D. J., Wu, L. T., & Anthony, J. C. (1999). Panic attacks and suicide attempts in mid-adolescence. *The American Journal of Psychiatry*, 156, 1545–1549.
- Posner, M. I., & Rothbart, M. K. (2000). Developing mechanisms of self-regulation. *Development and Psychopathology*, 12, 427–441.
- Reinherz, H. Z., Giaconia, R. M., Silverman, A. B., Friedman, A., Pakiz, B., Frost, A. K., et al. (1995). Early psychosocial risks for adolescent suicidal ideation and attempts. *Journal of the American Academy of Child and Adolescent Psychiatry*, 34, 599–611.
- Rettew, D. C., & McKee, L. (2005). Temperament and its role in developmental psychopathology. *Harvard Review of Psychiatry*, 13, 14–27.
- Rothbart, M. K., Ahadi, S. A., & Evans, D. E. (2000). Temperament and personality: Origins and outcomes. *Journal of Personality and Social Psychology*, 78, 122–135.
- Ryan, N. D., Puig-Antich, J., Ambrosini, P., Rabinovich, H., Robinson, D., Nelson, B., et al. (1987). The clinical picture of major depression in children and adolescents. *Archives of General Psychiatry*, 44, 854–861.
- Rydell, A., Berlin, L., & Bohlin, G. (2003). Emotionality, emotion regulation, and adaptation among 5- to 8-year-old children. *Emotion*, 3, 30–47.
- Sanchez, L. E., & Le, L. T. (2001). Suicide in mood disorders. *Depression and Anxiety*, 14, 177–182.
- Sherrill, J. T., & Kovacs, M. (2000). Interview schedule for children and adolescents (ISCA). *Journal of the American Academy of Child and Adolescent Psychiatry*, 39, 67–75.
- Shiner, R. L. (1998). How shall we speak of children's personalities in middle childhood? A preliminary taxonomy. *Psychological Bulletin*, 124, 308–332.
- Silk, J. S., Shaw, D. S., Skuban, E. M., Oland, A. A., & Kovacs, M. (2006). Emotion regulation strategies in offspring of childhood-onset depressed mothers. *Journal of Child Psychology and Psychiatry*, 47, 69–78.
- Silk, J. S., Steinberg, L., & Morris, A. S. (2003). Adolescents' emotion regulation in daily life: Links to depressive symptoms and problem behavior. *Child Development*, 74, 1869–1880.
- Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. In N. A. Fox (Ed.), *Emotion regulation: Behavioral and biological considerations. Monographs of the Society for Research in Child Development*, vol. 2–3, Serial no. 240 (pp. 25–52).
- Watson, D., Clark, L. A., & Carey, G. (1988). Positive and negative affectivity and their relation to anxiety and depressive disorders. *Journal of Abnormal Psychology*, 97, 346–353.
- World Health Organization. (1994). *International statistical classification of diseases and related health problems* (10th revision). Geneva: Author.
- Yorbik, O., Birmaher, B., Axelson, D., Williamson, D. E., & Ryan, N. D. (2004). Clinical characteristics of depressive symptoms in children and adolescents with major depressive disorder. *Journal of Clinical Psychiatry*, 65, 1654–1659.
- Zlotnick, C., Donaldson, D., Spirito, A., & Pearlstein, T. (1997). Affect regulation and suicide attempts in adolescent inpatients. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 793–798.
- Zlotnick, C., Wolford, B. A., Johnson, B., & Spirito, A. (2003). Impaired self-regulation and suicidal behavior among adolescent and young adult psychiatric inpatients. *Archives of Suicide Research*, 7, 149–157.

Appendix E

II. Related article

Clinical Features of Depressed Children and Adolescents With Various Forms of Suicidality

Xianchen Liu, M.D., Ph.D.; Amy L. Gentzler, Ph.D.; Ping Tepper, Ph.D.;
Enikő Kiss, M.D.; Viola Osváth Kothencné, M.S.; Zsuzsanna Tamás, M.D.;
Ágnes Vetró, M.D., Ph.D.; and Maria Kovacs, Ph.D.

Objective: To examine various forms of suicidality specified in DSM-IV and their clinical characteristics in a large sample of children and adolescents with major depressive disorder (MDD).

Method: Subjects included 553 children and adolescents (aged 7.0–14.9 years) recruited between April 2000 and December 2004 from 23 mental health facilities in Hungary. Subjects received standardized clinical evaluations and best-estimate consensus DSM-IV diagnoses of MDD. All subjects were in a current episode of MDD at their assessment date.

Results: Approximately 68% of the sample had recurrent thoughts of death, 48% had suicidal ideation, 30% had suicide plan, and 12% had attempted suicide. Compared with nonsuicidal peers, suicidal children and adolescents were more severely depressed, had more depressive symptoms, and more likely had comorbid disorders. However, depressed children and adolescents with various forms of suicidality were very similar in clinical characteristics. Feelings of worthlessness, depressed mood, psychomotor agitation, and comorbid separation anxiety and conduct disorders were independent correlates of at least 1 form of suicidality. Only feelings of worthlessness was related to all 4 suicidal behaviors, after adjustment for other depressive symptoms, comorbid disorders, and demographics.

Conclusion: Clinical characteristics differ between nonsuicidal and suicidal children and adolescents but are very similar across various forms of suicidality. Feelings of worthlessness may play a central role in the development of suicidal behavior. Interventions toward the enhancement of self-esteem and amelioration of underlying psychopathology may be crucial for the prevention of suicide attempts in depressed children and adolescents.

(*J Clin Psychiatry* 2006;67:1442–1450)

Received March 22, 2006; accepted May 9, 2006. From the Department of Psychiatry, University of Pittsburgh School of Medicine and Western Psychiatric Institute and Clinic, Pittsburgh, Pa. (Drs. Liu and Kovacs); the University of Pittsburgh Medical Center, Pittsburgh, Pa. (Drs. Gentzler and Tepper); the Department of Child and Adolescent Psychiatry, University of Szeged, Szeged, Hungary (Drs. Kiss and Vetró and Ms. Kothencné); and Vadaskert Hospital, Budapest, Hungary (Dr. Tamás).

Supported by the National Institute of Mental Health Program Project grant #MH 56193.

The authors report no other financial or other affiliations relevant to the subject of this article.

The authors thank all participating physicians across various research sites in Hungary and Charles J. George, M.S. (University of Pittsburgh Medical Center, Pittsburgh, Pa.) for his statistical comments on an earlier version of this manuscript.

Corresponding author and reprints: Xianchen Liu, M.D., Ph.D., Western Psychiatric Institute and Clinic, 134 Webster Hall, 3811 O'Hara St., Pittsburgh, PA 15213 (e-mail: xcliu@pitt.edu).

Although childhood depression is associated with a high rate of episode recurrence, multiple coexisting psychiatric disorders, and substantial psychosocial impairment,^{1–3} suicidality probably represents its most adverse and clinically serious feature because suicidal behaviors are often repetitive and increase risk for eventual suicide.^{4–10} Research has shown that 2 forms of suicidal behavior in clinical samples of depressed youths, namely, suicidal ideation and attempts, are very common. About 60% to 70% of depressed youths have been found to have suicidal ideation or thoughts, and 13% to 39% have attempted suicide.^{11–14} However, little information is available about the prevalence and clinical features of recurrent thoughts of death and suicide plan, which have been specified in the DSM-IV as part of diagnostic criteria for major depressive disorder (MDD).¹⁵

Do suicidal depressed children and adolescents differ from their nonsuicidal peers on clinical parameters, such as depressive symptom profile, severity of depression, illness duration, or comorbid disorders? Do depressed children and adolescents with various forms of suicidality manifest different clinical characteristics? Answers to such questions have important practical implications for early identification and clinical intervention.¹⁶ However, relevant data are few in the literature. According to 1 recent study of symptom presentation,¹⁷ depressed children and adolescents who had a history of clinically significant suicidal ideation (at least with a plan) (N = 43) and nonsuicidal counterparts (N = 92) differed only in hopeless-

ness and insomnia. Suicidal youths were more likely to have hopelessness and insomnia than nonsuicidal youths, after controlling for demographics.¹⁷ Suicidal youths also were found to be more severely depressed than nonsuicidal youths, but average illness duration did not differ between suicidal and nonsuicidal youths.¹⁷ However, in an earlier study, Kosky and colleagues¹⁸ did not find any significant differences in emotional and behavioral symptoms between suicidal and nonsuicidal depressed children and adolescents.

Information about comorbid psychiatric disorders among suicidal depressed children and adolescents is equivocal. For example, in a comprehensive study of the clinical picture of childhood depression, Ryan et al.¹³ found that separation anxiety, phobias with avoidance, overanxious disorder, and conduct disorder were common comorbid disorders in depressed children and adolescents, but these disorders did not differ between suicidal and nonsuicidal youths. Barbe and colleagues¹⁷ found a lack of significant relationship between suicidality and lifetime comorbid disorders in depressed children and adolescents, including dysthymia, anxiety disorders, and disruptive disorders. Similarly, Pfeffer et al.¹⁹ and Borst et al.²⁰ found no association between conduct disorder and suicidal behavior in child and adolescent patients. In a longitudinal study, in contrast, Kovacs et al.¹¹ reported that comorbid conduct/substance use disorders increased the risk of suicide attempts 3-fold. Goldston et al.²¹ found a higher prevalence of comorbid affective and substance abuse disorders among prior suicide attempters than nonsuicidal adolescent patients. Moreover, Wannan and Fombonne²² noted that comorbid conduct disorder or substance abuse predicted suicidal behavior among psychiatric outpatient girls only.

Finally, epidemiologic data in the general population have compellingly shown that the rates of suicidal behaviors begin to increase during adolescence and are higher in adolescent girls than in boys.^{4,7,23} However, in clinical samples of depressed children and adolescents, age and sex effects on suicidal behavior have not been reported consistently. Several studies have reported a lack of sex differences in both suicidal ideation and suicide attempts.^{12,13} Notably, Kovacs et al.¹¹ followed an outpatient sample of children with affective disorders and found that sex differences of suicidal behavior became pronounced only when youths entered mid-adolescence. Age effects on suicide attempts but not suicidal ideation have been reported by Ryan and colleagues.¹³ In 1 recent large-scale study of depressed children and adolescents aged 5.6 to 17.9 years (N = 916), Yorbik et al.¹⁴ reported that age and sex effects on suicidal ideation and attempts were similar to those reported in the general population studies.^{7,23}

In the present article, we examined various forms of suicidality specified in DSM-IV (i.e., recurrent thoughts

of death, recurrent suicidal ideation, suicide plan, and suicide attempts) and their clinical characteristics in a large clinical sample of children and adolescents with MDD (N = 553). Specifically, our first purpose was to examine the similarities and differences between nonsuicidal and suicidal children and adolescents, in terms of illness history, severity of depression, depressive symptom profiles, and comorbid psychiatric disorders. Our second purpose was to examine whether clinical parameters differed across children and adolescents with various forms of suicidality. Our third purpose was to examine which depressive symptoms or comorbid disorders were independently associated with which form of suicidal behavior. Finally, we aimed to examine age and sex effects on various forms of suicidal behavior.

METHOD

Subjects

Data presented here are from an ongoing investigation of the roles of genetic liability and emotion regulatory factors in the risk of childhood-onset depression in 23 mental health facilities in Hungary. The 23 clinical sites, including all of the 7 dedicated child psychiatry inpatient units in Hungary, are estimated to cover about 80% of all referred child psychiatric patients in the nation in 2004. Children and adolescents referred to participating psychiatric facilities were considered as potential subjects if they met the following eligibility criteria: DSM-IV criteria for MDD, aged 7.0 to 14.9 years, at least 1 biological parent available, having a sibling aged 7 years or older, not mentally retarded, and free of major systemic medical disorders. We obtained signed consent from the parent(s) and assent from the child before initial evaluation as required by the institutional review boards at the University of Pittsburgh and in Hungary.

Between April 2000 and December 2004, 864 children and adolescents aged 7.0 to 14.9 years were sequentially evaluated, going through at least the first part of the assessment procedure (described below). Of those, 635 youth met criteria for childhood-onset depression, and 553 were in a current episode of MDD at their assessment date. We restricted this sample to subjects in a current episode of MDD so that our results are more comparable to those reported in prior studies.^{13,14} Our sample therefore included 553 currently depressed children and adolescents; 55.2% were boys, mean (SD) age was 11.7 (2.0) years (range, 7.3–14.9), and 94.1% were white. Most of the subjects (78.5%) were in their first major depressive episode (MDE); the mean age at first onset of MDE was 10.6 years (SD = 2.3), the mean illness duration was 59.2 weeks (SD = 69.8, median = 30.0 weeks), and 19.2% had the illness more than 2 years. A total of 150 patients (27.1%) had a history of psychiatric hospitalization; 22.3% and 30.6% had taken tricyclic antidepressants

FOCUS ON CHILDHOOD AND ADOLESCENT MENTAL HEALTH

(TCAs) and selective serotonin reuptake inhibitors (SSRIs), respectively. With respect to family demographics, 62.0% of the biological parents were married, 20.7% of mothers received education of 12 years or above, and about 31.4% of parents rated their family financial status worse or much worse than that of other families in general.

Psychiatric Evaluation and Diagnosis

Subjects were evaluated by a semistructured interview, the Interview Schedule for Children and Adolescents-Diagnostic Version (ISCA-D), an extension and modification of the Interview Schedule for Children and Adolescents.²⁴ The measure includes most DSM-IV Axis I diagnoses as well as some DSM-III disorders and yields ratings for "current" as well as "lifetime" diagnoses. For each item of the ISCA-D, the clinician first interviews the parent about the child's symptoms, then interviews the child, and finally achieves an overall rating for each symptom based on information from both child and parent. Ratings were obtained both for current symptoms (1 month before the interview) and past symptoms (prior to the last month or, alternatively, prior to the current episode).

The assessment procedure was completed in 2 parts approximately 6 weeks apart. At the first part, the "mood disorder module" of the ISCA-D, which includes the MDD symptomatology, was administered to the parent and child. Also, the Intake General Information Sheet was given to the parent, which is a comprehensive demographic and anamnestic data form, covering demographic, family, developmental, physical health, and psychosocial history and characteristics. Children and adolescents who met DSM-IV criteria for a mood disorder at the first part were scheduled for the second part of assessment. The second part included the full diagnostic interview of ISCA-D. Results of the 2 parts of assessment and associated documentation were subjected to final consensus diagnostic procedure using pairs of senior child psychiatrists trained as best-estimate diagnosticians.²⁵ Diagnoses of MDD and comorbid disorders, as well as onset ages of disorders, were based on best-estimate consensus.

Psychiatric evaluations were conducted by child psychiatrists and psychologists, who had to complete 3 months of training in the semistructured interview technique and reach an average of 85% symptom agreement with "gold standard" ratings (provided by experienced trainers) on 5 consecutive videotaped interviews. Routine follow-up training sessions were held to minimize rater drift. All interviews were audiotaped. Interrater reliability on current depressive symptoms was estimated on a sample of 46 cases using pairs of clinical raters. For all depressive symptoms that count toward a diagnosis of current MDE, kappa coefficients ranged from 0.64 to 0.88, with 80% at or above 0.70. Similar interrater reliability estimates were obtained for other DSM-IV disorders.

Study Variables

Suicidality. The ISCA-D mood disorder module includes the 4 DSM-IV forms of suicidality (recurrent thoughts of death, recurrent suicidal ideation, suicide plan, and suicide attempts), and each is rated for the past month (current) as well as for the time prior to past month or the onset of the current episode (past). *Thoughts of death* was defined as thinking of not wanting to live (e.g., "I wish I were dead" or "I'd be better off dead"), *suicidal ideation* was defined as thinking about killing self, a *suicide plan* was defined as having a specific plan for killing self, and a *suicide attempt* was defined as having attempted and intent to end one's life. Each form of suicidality was rated as "yes" or "no."

Depressive symptoms and severity. 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 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). 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 for the purpose of the study. A higher summary score represents more severe depression. Alternately, when examining the prevalence of individual depressive symptoms and their associations with suicidality, each depressive symptom was dichotomized to be clinically significant (threshold) or not (subthreshold or no symptom).

Psychiatric comorbid disorders. The following lifetime psychiatric comorbid disorders were included for statistical analysis: various anxiety disorders, dysthymic disorder, attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder, conduct disorder, and substance abuse disorders. These disorders have often been reported in the literature of adolescent suicidal behavior.^{17,19-21}

Other variables. Illness history included illness duration, number of MDEs, lifetime psychiatric hospitalization, and lifetime use of TCAs or SSRIs. Demographic variables included age, sex, maternal married status and education, and family financial status.

Statistical Analyses

Overall prevalence rates of current and lifetime suicidal behaviors were computed for recurrent thoughts of death, recurrent suicidal ideation, suicide plan, and suicide attempts. Following Kessler et al.,²⁶ conditional prevalence rates were computed for current suicidal behaviors (e.g., How many children had attempted suicide

among suicidal ideators?). 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.

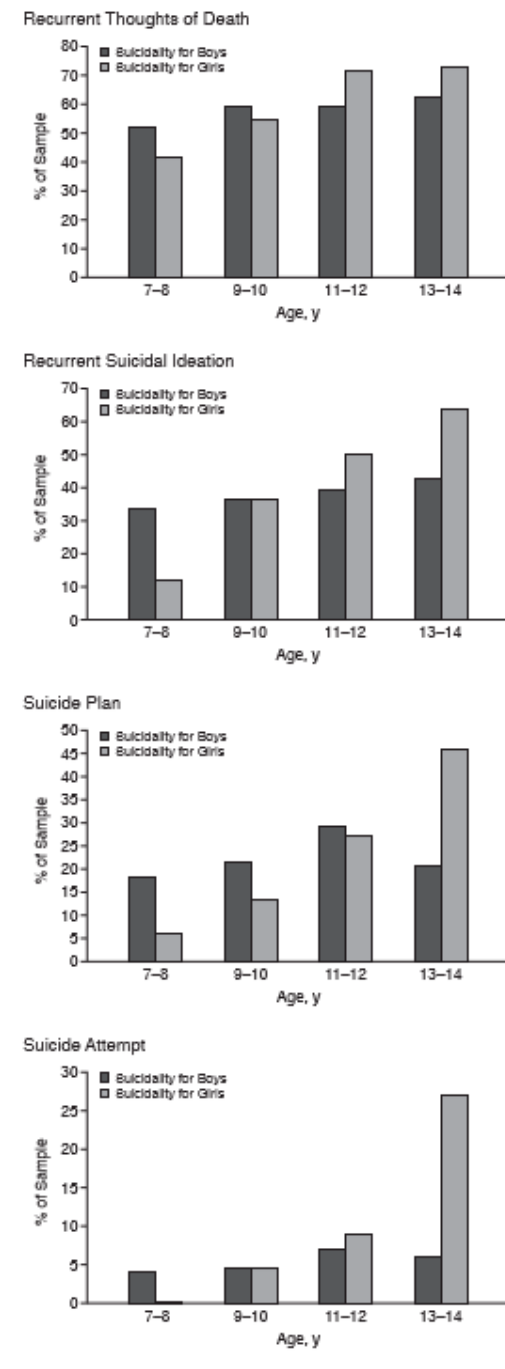
RESULTS

Suicidality

By the assessment date, 67.5% of the sample 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.

Age-specific rates of current suicidal behaviors are presented for both boys and girls in Figure 1. For girls, all 4 suicidal behaviors tended to increase with age (thoughts of death, $\chi^2 = 10.54$, $df = 3$, $p = .014$; suicidal ideation, $\chi^2 = 21.02$, $df = 3$, $p < .001$; suicide plan, $\chi^2 = 22.42$, $df = 3$, $p < .001$; and suicide attempts, $\chi^2 = 21.12$, $df = 3$, $p < .001$). The rates of suicidal ideation, plan, and attempts were markedly elevated at age 13 to 14 years. For boys, however, all 4 suicidal behaviors had no significant

Figure 1. Suicidal Behaviors in Children and Adolescents With Major Depressive Disorder by Age and Sex



FOCUS ON CHILDHOOD AND ADOLESCENT MENTAL HEALTH

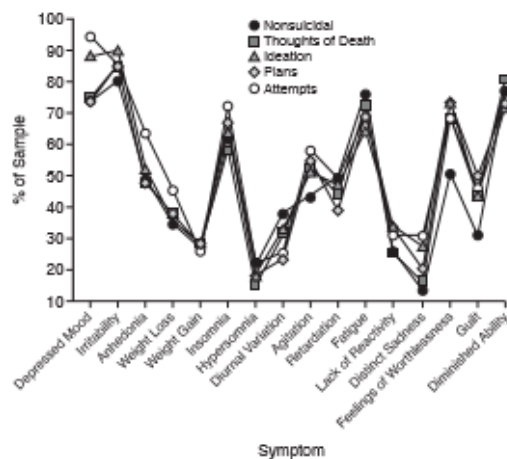
Table 1. Illness History and Depressive Severity of Nonsuicidal and Different Suicidal Depressed Children and Adolescents

| Variable | Nonsuicidal (N = 202) | Total (N = 351) | Thoughts (N = 106) | Suicidal | | | Statistic (F/χ^2) | |
|---|--------------------------|--------------------|-----------------------|----------------------|------------------|----------------------|-------------------------------|------------------------------|
| | | | | Ideation (N = 92) | Plan (N = 98) | Attempts (N = 55) | Nonsuicidal vs Suicidal | Across Suicidal Groups |
| Illness duration, mean (SD), wk | 53.21 (63.71) | 62.67 (72.98) | 55.76 (62.92) | 68.47 (77.54) | 68.51 (84.71) | 55.65 (59.12) | 2.37 | 0.88 |
| History of psychiatric hospitalization, % | 23.3 | 29.3 | 21.7 | 31.5 | 22.4 | 52.7 | 2.40 | 19.95* |
| Recurrent episode, % | 20.8 | 21.9 | 20.8 | 22.8 | 25.5 | 16.4 | 0.10 | 1.86 |
| History of SSRI use, % | 29.0 | 31.5 | 29.2 | 29.3 | 33.3 | 36.4 | 0.38 | 1.20 |
| History of TCA use, % | 23.4 | 21.7 | 22.6 | 18.5 | 25.8 | 18.2 | 0.21 | 1.96 |
| Current depressive severity (ISCA-D), mean (SD) ^b | 17.81 (5.38) | 19.31 (4.43) | 18.89 (4.10) | 19.41 (4.35) | 19.16 (4.85) | 20.24 (4.40) | 3.17 ^c | 1.18 |

^a $p < .001$.^bSummary score of ISCA-D depressive symptoms excluding suicidality items.^c $p < .05$.

Abbreviations: ISCA-D = Interview Schedule for Children and Adolescents-Diagnostic Version, SSRI = selective serotonin reuptake inhibitor, TCA = tricyclic antidepressant.

Figure 2. Depressive Symptom Profiles Among Nonsuicidal and Suicidal Children and Adolescents



differences across age groups (all $p > .05$). 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 ($\chi^2 = 7.36$, $df = 1$, $p = .007$), suicide plan ($\chi^2 = 11.47$, $df = 1$, $p = .001$), and suicide attempts ($\chi^2 = 12.24$, $df = 1$, $p < .001$). Recurrent thoughts of death had no sex differences for all age groups.

Maternal married status, level of education, and family financial status were not found to be significantly related to any of the 4 suicidal behaviors (all $p > .05$).

Illness History and Severity of Depression

Table 1 presents illness history and current depressive severity of nonsuicidal and various suicidal children and adolescents. 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. However, suicidal children and adolescents were more severely depressed than nonsuicidal peers (mean \pm SD = 19.31 ± 4.43 vs. 17.81 ± 5.38 , $F = 3.17$, $p = .014$) 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, and history of SSRI and TCA use (all $p > .05$), but suicide attempters were more likely than other suicidal peers to have a history of psychiatric hospitalization ($\chi^2 = 19.95$, $df = 3$, $p < .001$).

Depressive Symptom Profiles

The rates of depressive symptoms in this sample of depressed children and adolescents ranged between 19% and 84%. Irritability was the most prevalent symptom (84.3%), followed by depressed mood (78.1%), diminished ability to concentrate (76.5%), fatigue (71.6%), insomnia (63.7%), feelings of worthlessness (62.7%), anhedonia (50.8%), and psychomotor agitation (49.9%). Distinct quality of depressed mood and hypersomnia were relatively less common, accounting for 19% of depressed children.

Figure 2 presents depressive symptom profiles of nonsuicidal and different suicidal children and adolescents. Compared with nonsuicidal children and adolescents, suicidal peers were more likely to present depressed mood (80.9% vs. 73.3%, $\chi^2 = 4.38$, $df = 1$, $p = .036$), irritability (86.5% vs. 80.2%, $\chi^2 = 3.98$, $df = 1$, $p = .046$), psychomotor agitation (53.8% vs. 43.1%, $\chi^2 = 5.96$, $df = 1$, $p = .015$), distinct quality of depressed mood (22.5% vs. 13.4%, $\chi^2 = 6.91$, $df = 1$, $p = .009$), feelings of worthlessness (70.1% vs. 50.0%, $\chi^2 = 22.13$, $df = 1$, $p < .001$), and inappropriate guilt (45.6% vs. 30.2%, $\chi^2 = 12.65$, $df = 1$, $p < .001$), but less likely to have diurnal variation of mood (28.5% vs. 37.6%, $\chi^2 = 4.93$, $df = 1$, $p = .026$). After cor-

Table 2. Associations (odds ratio, 95% CI) of Suicidality With Depressive Symptoms and Comorbid Disorders: Multinomial Logistic Regression With Nonsuicidal Children and Adolescents (N = 202) as Reference

| Depressive Symptom and Comorbid Disorder | Thoughts of Death (N = 106) | Suicidal Ideation (N = 92) | Suicide Plan (N = 98) | Suicide Attempts (N = 55) |
|--|-----------------------------|----------------------------|------------------------|---------------------------|
| Model 1^{a,b} | | | | |
| Depressed mood | 1.04 (0.61 to 1.79) | 2.45 (1.21 to 4.98)* | 0.90 (0.52 to 1.57) | 4.75 (1.40 to 16.16)* |
| Irritability | 1.44 (0.76 to 2.73) | 2.66 (1.22 to 5.84)* | 1.70 (0.86 to 3.35) | 2.09 (0.87 to 5.00) |
| Diurnal variation of mood | 0.76 (0.46 to 1.25) | 0.84 (0.50 to 1.42) | 0.53 (0.31 to 0.93)* | 0.64 (0.32 to 1.29) |
| Psychomotor agitation | 1.54 (0.95 to 2.49) | 1.60 (0.96 to 2.66) | 1.82 (1.10 to 3.01)* | 2.52 (1.32 to 4.79)** |
| Fatigue | 0.81 (0.47 to 1.39) | 0.49 (0.28 to 0.84)** | 0.63 (0.37 to 1.10) | 0.51 (0.25 to 1.02) |
| Distinct sadness | 1.23 (0.64 to 2.39) | 2.28 (1.22 to 4.23)** | 1.62 (0.85 to 3.08) | 2.50 (1.20 to 5.20)* |
| Feelings of worthlessness | 2.23 (1.36 to 3.66)** | 2.23 (1.32 to 3.77)** | 2.85 (1.67 to 4.85)*** | 2.37 (1.22 to 4.61)* |
| Inappropriate guilt | 1.77 (1.08 to 2.88)* | 1.77 (1.06 to 2.96)* | 2.27 (1.37 to 3.75)*** | 1.85 (0.98 to 3.50) |
| Comorbid separation anxiety | 0.77 (0.26 to 2.28) | 1.25 (0.45 to 3.50) | 3.44 (1.47 to 8.01)** | 4.72 (1.73 to 12.87)** |
| Comorbid conduct disorder | 3.53 (0.82 to 15.22) | 4.87 (1.12 to 21.20)* | 2.61 (0.51 to 13.48) | 8.58 (1.59 to 46.33)* |
| Model 2^{a,c} | | | | |
| Depressed mood | 0.93 (0.53 to 1.63) | 2.18 (1.06 to 4.50)* | 0.69 (0.39 to 1.25) | 3.66 (1.06 to 12.69)* |
| Psychomotor agitation | 1.51 (0.93 to 2.46) | 1.49 (0.89 to 2.51) | 1.70 (1.01 to 2.85)* | 2.18 (1.12 to 4.24)* |
| Feelings of worthlessness | 2.23 (1.34 to 3.68)** | 2.06 (1.21 to 3.52)** | 2.90 (1.68 to 5.01)*** | 2.11 (1.06 to 4.18)* |
| Comorbid separation anxiety | 0.78 (0.26 to 2.35) | 1.14 (0.40 to 3.25) | 3.50 (1.45 to 8.45)** | 4.01 (1.42 to 11.30)** |
| Comorbid conduct disorder | 3.76 (0.85 to 16.58) | 5.42 (1.20 to 24.54)* | 2.65 (0.49 to 14.40) | 9.27 (1.59 to 54.18)* |

^aAge and sex as covariates were forced to enter to model 1 and model 2.

^bModel 1: multinomial regression with each level of suicidality as dependent variable and 1 depressive symptom or comorbid disorder as independent variable, adjusting for age and sex. Those symptoms or comorbid disorders that were not significant are not presented.

^cModel 2: stepwise multinomial regression with each level of suicidality as dependent variable and all depressive symptoms and comorbid disorders in model 1 as independent variables, adjusting for age and sex.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

rection for multiple comparisons,²⁷ the following symptoms remained significant: feelings of worthlessness, inappropriate guilt, and distinct quality of depressed mood.

Across various forms of suicidal children and adolescents, only depressed mood showed a significant difference ($\chi^2 = 15.96$, $df = 3$, $p < .001$), with the highest prevalence in attempters (94.5%), followed by children and adolescents with suicidal ideation (88.0%), recurrent thoughts of death (74.5%), and suicide plan (73.5%). After correction for multiple comparisons,²⁷ depressed mood remained significant.

Psychiatric Comorbidity

Anxiety disorders were evidenced by 33.3% of the sample, with overanxious disorder being the most common anxiety disorder (11.0%), followed by generalized anxiety (9.6%) and separation anxiety disorder (8.5%). ADHD was the second most common comorbid disorder (17.7%), followed by dysthymic disorder (12.7%). The prevalence rates of oppositional defiant disorder and conduct disorder were 5.8% and 3.4%, respectively. Eating disorders were less prevalent in this sample (1.4%), and no patients had a history of alcohol/substance abuse disorders. Compared with nonsuicidal peers, suicidal children and adolescents were more likely to evidence anxiety disorders (38.2% vs. 24.9%, $\chi^2 = 10.18$, $df = 1$, $p = .001$) and conduct disorder (4.6% vs. 1.5%, $\chi^2 = 3.65$, $df = 1$, $p = .056$). However, across various forms of suicidal children and adolescents, no significant differences were found for all comorbid disorders (all $p > .05$).

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. As shown in model 1 in Table 2, 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. As shown in model 2 in Table 2, 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

FOCUS ON CHILDHOOD AND ADOLESCENT MENTAL HEALTH

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

Using data from a large clinical sample of children and adolescents with MDD aged 7 to 14 years (N = 553), we examined various forms of DSM-IV suicidality and clinical characteristics of different suicidal depressed children and adolescents. Our major findings are summarized and discussed as follows.

First, 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. The rates of suicidal ideation and attempts in the current sample are in the low range of previous studies.^{11,13,14} 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.

Second, compared with nonsuicidal peers, we found that suicidal children and adolescents 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 been reported in patients with MDD.^{17,28,29} However, research has yielded mixed results on the associations between depressive symptom presentation and psychiatric comorbidity and suicidality.^{13,17,19,21,22} For example, Barbe et al.¹⁷ found that 2 DSM depressive symptoms (hopelessness and insomnia), but no comorbid disorders, were associated with suicidality. Robbins and Alessi¹⁶ found that suicidal behavior in adolescent psychiatric patients was associated with depressed mood, negative self-evaluation, anhedonia, insomnia, poor concentration, indecisiveness, lack of reactivity of mood, psychomotor disturbance, and alcohol and drug use. Wannan and Fombonne²² reported that comorbid conduct disorder or substance abuse predicted suicidal behavior for psychiatric outpatient girls only. 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.

Third, 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. Our findings are similar to those of Kosky et al.,³⁰ who did not find any difference in depressive symptoms between suicidal ideators and attempters in child and adolescent psychiatric outpatients. These findings suggest that various forms of suicidality represent 1 feature of depression rather than characterize subgroups of depressed children and adolescents at risk and thus have the same diagnostic implication for depression.^{15,30,31}

Fourth, 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 behavior. Close examination of our 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. The co-occurrence of certain acute stressors and adverse events of antidepressants may also act as precipitants or triggers and thereby increase risk for suicidal behavior.^{3,4,32,33} 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.

Finally, we found that age and sex had significant interacting effects on all 4 suicidal behaviors, consistent with a recent, large study of 201 depressed children and 715 depressed adolescents,¹⁴ an early follow-up study of childhood depression,¹¹ and most community studies.^{4,23} For example, Yorbik and colleagues¹⁴ found that, com-

pared with depressed children, depressed adolescents had expressed more suicidal ideation, seriousness of suicidal acts, and medical lethality of suicidal acts. They also found that female depressed adolescents were more likely to have suicidal ideation and to attempt suicide than male adolescents.¹⁴ Kovacs et al.¹¹ followed an outpatient sample of 134 depressed children for up to 12 years and found no significant sex differences in initial assessments of suicidal ideation and attempts at the mean age of 11 years. However, when youths entered mid-adolescence, girls were more likely to have suicidal ideation and attempts than boys.¹¹ Although some small studies have yielded different results,¹² taking the 3 relatively large studies together, it may be concluded that 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.

In interpreting the results of these analyses, however, 3 important limitations need to be born in mind. First, although the sample size is large, the study subjects reported here were selected for a genetic study of depressed children and adolescents in Hungary. Subjects in the study must live with at least 1 biological parent and have at least 1 sibling aged 7 years or above. At present, it is not known how cultural differences, which may exist between Hungarian and American samples, may affect the presentation and assessment of child psychiatric disorders. Future studies are therefore warranted to investigate the extent to which these findings can be generalized to other samples. Second, the clinical interview with ISCA-D from which these data were gathered was not designed with the assessment of suicidality as a primary goal. As a result, no detailed histories were taken of the dates, lethality, and consequences when certain suicidal behavior occurred. Third, limited differences in individual depressive symptoms across suicidal children and adolescents may be due to the fact that all subjects were currently in an episode of MDD at the time of the assessment. We do not know whether the similarities and differences observed in this clinically depressed sample can be generalized to non-clinical samples. Finally, no causal relationships can be concluded based on the current cross-sectional study. Prospective, longitudinal studies are needed to investigate the continuum from suicidal thoughts through suicidal action and the pathway from feelings of worthlessness to suicidal behavior.

In summary, our findings indicate that suicidal depressed children and adolescents are more severely depressed and are more likely to have certain depressive symptoms and comorbid disorders than nonsuicidal peers. Clinical characteristics were very similar across various forms of suicidality. Feelings of worthlessness may play a central role in the development of suicidality. Whether suicidal ideators act on their ideation may depend on

a number of precipitants such as depressed mood, agitation, and anxiety and conduct disorders, in conjunction with feelings of worthlessness. These findings have several important clinical implications for the intervention and prevention of suicidal behavior in depressed children and adolescents.

First, given the interaction of age and sex on suicidality, depressed adolescent girls who are at high risk for suicidal behavior should be given close attention by clinicians and parents. Second, intervention toward the amelioration of underlying psychopathology should be the first step for prevention of suicide attempts. Third, depressed children and adolescents with feelings of worthlessness may represent a unique group of patients at high risk for various forms of suicidality. This group of patients may need more careful management than depressed patients without feelings of worthlessness. Psychological therapy, which can help depressed children and adolescents to reframe their misperception of self and enhance their self-esteem, may be crucial for clinical treatment of suicidality. Finally, interventions should also address precipitating factors, such as depressed mood, agitation, comorbid anxiety and conduct disorders, and acute stressors for the effective treatment of suicidality and prevention of suicide attempts.

REFERENCES

1. Birmaher B, Ryan ND, Williamson DE, et al. Childhood and adolescent depression: a review of the past 10 years: part 1. *J Am Acad Child Adolesc Psychiatry* 1996;35:1427–1439
2. Kovacs M. Presentation and course of major depressive disorder during childhood and later years of the lifespan. *J Am Acad Child Adolesc Psychiatry* 1996;35:705–715
3. Ryan ND. Treatment of depression in children and adolescents. *Lancet* 2005;366:933–940
4. Bridge JA, Goldstein TR, Brent DA. Adolescent suicide and suicidal behavior. *J Child Psychol Psychiatry* 2006;47:372–394
5. Fombonne E, Wostear G, Cooper V, et al. The Maudsley long-term follow-up of child and adolescent depression 2: suicidality, criminality and social dysfunction in adulthood. *Br J Psychiatry* 2001;179:218–223
6. Goldston DB, Daniel SS, Reboussin DM, et al. Suicide attempts among formerly hospitalized adolescents: a prospective naturalistic study of risk during the first 5 years after discharge. *J Am Acad Child Adolesc Psychiatry* 1999;38:660–671
7. Gould MS, Greenberg T, Velting DM, et al. Youth suicide risk and preventive interventions: a review of the past 10 years. *J Am Acad Child Adolesc Psychiatry* 2003;42:386–405
8. Pfeffer CR, Klerman GL, Hurt SW, et al. Suicidal behavior and hypothalamic-pituitary-adrenocortical axis indices in child psychiatric inpatients. *Biol Psychiatry* 1991;30:609–616
9. Rao U, Weissman MM, Martin JA, et al. Childhood depression and risk of suicide: a preliminary report of a longitudinal study. *J Am Acad Child Adolesc Psychiatry* 1993;32:21–27
10. Weissman MM, Wolk S, Goldstein RB, et al. Depressed adolescents grown up. *JAMA* 1999;281:1707–1713
11. Kovacs M, Goldston D, Gatsonis C. Suicidal behaviors and childhood-onset depressive disorders: a longitudinal investigation. *J Am Acad Child Adolesc Psychiatry* 1993;32:8–20
12. Mitchell J, McCauley E, Burke PM, et al. Phenomenology of depression in children and adolescents. *J Am Acad Child Adolesc Psychiatry* 1988; 27:12–20
13. Ryan ND, Puig-Antich J, Ambrosini P, et al. The clinical picture of major depression in children and adolescents. *Arch Gen Psychiatry* 1987; 44:854–861

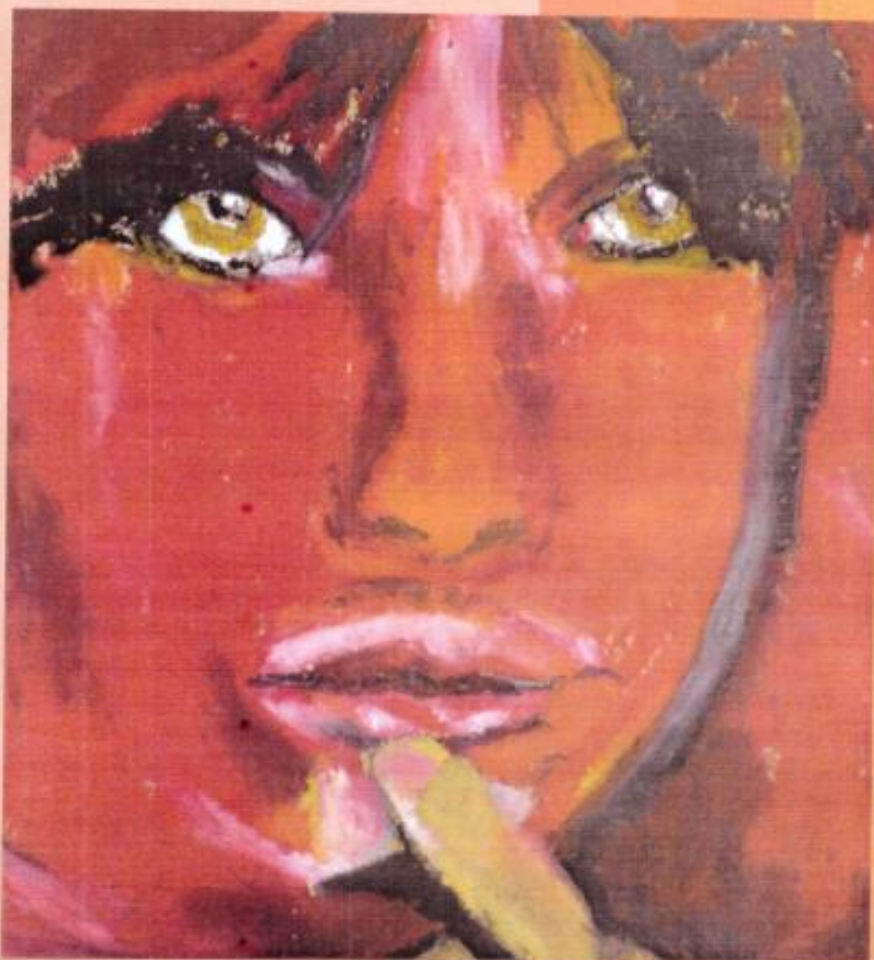
FOCUS ON CHILDHOOD AND ADOLESCENT MENTAL HEALTH

14. Yorhik O, Birmaher B, Axelson D, et al. Clinical characteristics of depressive symptoms in children and adolescents with major depressive disorder. *J Clin Psychiatry* 2004;65:1654–1659
15. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. Fourth Edition. Washington, DC: American Psychiatric Association; 1994
16. Robbins DR, Alessi NE. Depressive symptoms and suicidal behavior in adolescents. *Am J Psychiatry* 1985;142:588–592
17. Barbe RP, Williamson DE, Bridge JA, et al. Clinical differences between suicidal and nonsuicidal depressed children and adolescents. *J Clin Psychiatry* 2005;66:492–498
18. Kosky R, Silburn S, Zubrick S. Symptomatic depression and suicidal ideation: a comparative study with 628 children. *J Nerv Ment Dis* 1986; 174:523–528
19. Pfeffer CR, Solomon G, Plutchik R, et al. Suicidal behavior in latency-age psychiatric inpatients: a replication and cross validation. *J Am Acad Child Adolesc Psychiatry* 1982;21:564–569
20. Borst SR, Noam GG, Bartok JA. Adolescent suicidality: a clinical-developmental approach. *J Am Acad Child Adolesc Psychiatry* 1991; 30:796–803
21. Goldston DB, Daniel SS, Reboussin BA, et al. Psychiatric diagnoses of previous suicide attempters, first-time attempters, and repeat attempters on an adolescent inpatient psychiatry unit. *J Am Acad Child Adolesc Psychiatry* 1998;37:924–932
22. Wannan G, Fombonne E. Gender differences in rates and correlates of suicidal behavior amongst child psychiatric outpatients. *J Adolesc* 1998; 21:371–381
23. Evans E, Hawton K, Rodham K, et al. The prevalence of suicidal phenomena in adolescents: a systematic review of population-based studies. *Suicide Life Threat Behav* 2005;35:239–250
24. Sherrill JT, Kovacs M. Interview Schedule for Children and Adolescents (ISCA). *J Am Acad Child Adolesc Psychiatry* 2000;39:67–75
25. Maziade M, Roy MA, Fournier JP, et al. Reliability of best-estimate diagnosis in genetic linkage studies of major psychoses: results from the Quebec pedigree studies. *Am J Psychiatry* 1992;149:1674–1686
26. Kessler RC, Berglund P, Borges G, et al. Trends in suicide ideation, plans, gestures, and attempts in the United States, 1990–1992 to 2001–2003. *JAMA* 2005;293:2487–2495
27. Benjamini Y, Hochberg Y. Controlling the false discovery rate: a practical and powerful approach to multiple testing. *J Royal Stat Society Series B (Methodological)* 1995;57:289–300
28. Barbe RP, Bridge J, Birmaher B, et al. Suicidality and its relationship to treatment outcome in depressed adolescents. *Suicide Life Threat Behav* 2004;34:44–55
29. Oquendo MA, Galfalvy H, Russo S, et al. Prospective study of clinical predictors of suicidal acts after a major depressive episode in patients with major depressive disorder or bipolar disorder. *Am J Psychiatry* 2004;161:1433–1441
30. Kosky R, Silburn S, Zubrick SR. Are children and adolescents who have suicidal thoughts different from those who attempt suicide? *J Nerv Ment Dis* 1990;178:38–43
31. Myers K, McCauley E, Calderon R, et al. Risks for suicidality in major depressive disorder. *J Am Acad Child Adolesc Psychiatry* 1991;30:86–94
32. US Food and Drug Administration. Medication Guide About Using Antidepressants in Children and Teenagers. Available at: http://www.fda.gov/Cder/drug/antidepressants/MG_template.pdf. Accessed March 8, 2006
33. March J, Silva S, Petrycki S, et al. Fluoxetine, cognitive-behavioral therapy, and their combination for adolescents with depression: Treatment for Adolescents With Depression Study (TADS) randomized controlled trial. *JAMA* 2004;292:807–820

Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Childhood and Adolescent Mental Health section. Please contact Melissa P. DelBelio, M.D., at delbelmp@email.uc.edu.

Appendix F

III. Related article



Kamaszkor – kamasz kór

Szemelvények az adolescens medicina területéről

Válogatás a Házi Gyermekorvosok Egyesülete „Kávészünet-17” című tudományos konferenciáján
(2015. május 14-17. Hotel Azúr konferenciaközpont Siófok) elhangzott előadásokból

szerkesztette: Dr. Kovács Ákos

Depresszió, öngyilkosság, mentális betegségek a serdülőkorban

DR. VETRÓ ÁGNES, DR. TAMÁS ZSUZSANNA

A gyakorló orvos számára a depresszió kifejezés a hangulat és viselkedés megváltozásával – az enyhe reaktív szomorúságtól a kifejezett diszfóriáig – és halállal kapcsolatos gondolatokkal szövődik össze. Az ENSZ Fenntartható Fejlődés Bizottsága közzétette a 2015-ös World Happiness Reportot, a világ boldogság-indexét. Magyarország a 158 vizsgált ország közül a 104. helyre került ezen a felmérésen.

Mivel a szomorúság, boldogtalanság a normális emberi természet velejárói (a vizsgálatok alapján évente a lakosság 40%-a boldogtalannak tartja magát) a különbség a hangulatváltozások és az affektív zavar (azaz a depressziós betegség) között nem mindig teljesen tiszta. A diagnózis felállítása különösen serdülők között nagyon nehéz, mert esetükben gyakoriak a hangulatváltások és az ezzel kapcsolatos ingerlékeny magatartászavar. Különösen megnehezíti a diagnózist, ha a depresszió más alapbetegséghez – pszichiátriai vagy más belgyógyászati kórképhez – társul. Serdülőkorban ugyanis elég gyakori, hogy a depresszió más pszichiátriai betegséget – szorongásos kórképek, drog-függőség, étkezési vagy személyiségzavar – kísér.

Mivel mindenki ismeri a szomorúság érzését, és az élet stresszeire ez természetes válasz, a családtagok vagy a barátok gyakran lebecsülik a depressziós tüneteket, nem ismerik fel akkor sem, ha betegség szintet elért. Az apátiás vagy nyugtalan serdülőt a szülők gyakran kissé unszimpatikus színben tüntetik fel, lustának vagy manipulatívnek tartják. Maguk a bajban lévő serdülők is félreismerik saját problémájukat, saját kellemetlen érzéseikért családjukat vagy tanáraikat okolják. Ennek az eredménye gyakran erőharc lesz, ahol nem veszik észre az alap

Depresszió, öngyilkosság, mentális betegségek a serdülőkorban | Dr. Vetrő Ágnes, Dr. Tamás Zsuzsanna

problémát, a serdülő hangulatzavarát. Pedig a serdülőkori depresszió betegség nem ritka, gyakorisága 3-5 % között van a populációban.

Bár a depressziós érzések és gondolatok hozzátartoznak az érzelmi fejlődéshez, a depressziós gondolatok súlyossága és intenzitása fontos eleme a lelki egészség megítélésének. Megfigyelhető, hogy az öngyilkosságot elkövető serdülők hosszú időn át meditáltak a kísérletet megelőzően élet és halál között. A serdülőkori öngyilkosságok hátterében a leggyakrabban depressziót lehetett kimutatni.

A depresszió tünetei

Érzelmi tünetek

A depresszió klinikai manifesztációjában a serdülő szomorúnak érzi magát, a „padlón van”. Mivel rosszkedv minden életkorban gyakran előfordul, a klinikai diagnózishoz az is szükséges, hogy ez a rossz érzés erősségében, kiterjedésében, tartamában, mélységében súlyosabb legyen, mint a szokásos hangulatingadozások. Ezen az intenzív szinten az élmény gyakran fájdalmas és sokkoló.

Generalizált szorongás az esetek több mint 60%-ánál fordul elő. Bűnösségérzés, szégyenérzet, düh vagy ingerlékenység szintén gyakran társulnak a depresszióhoz. Azok a depressziós serdülők, akik agresszív érzéseket ritkán fejeznek ki, gyakrabban fordulnak önmaguk ellen.

Viselkedésbeli tünetek

A depresszív serdülők számos viselkedésbeli eltérést mutatnak, mely depressziós állapotukkal van összefüggésben. Nyugtalanág, agitáció, az arckifejezés megváltozása, máskor az aktivitási szint csökkenése, a beszédbeli válaszok látenciaidejének a megnyúlása, váratlan sírás gyakran társulnak hozzá. Gyermekeknél szomatikus panaszok is gyakran jelentkeznek, míg a serdülő gyakran negativisztikus, vagy antiszociális irányultságot vesz.

Valószínű a diagnózis gyermekeknél és serdülőknél, ha a) a szokásos viselkedés megváltozott, b) hosszabb időn át fennáll, c) a napi tevékenységet megzavarja d) a szülők, tanárok, kortárok szokásos beavatkozásaira nem reagál.

Attitűdváltás

Az önértékelési zavar, az önbizalom csökkenése elsődleges tünet depresszióban. Inadekvátnak, értéktelennek, „rosszul sikerültnek” érzik magukat, és azt képzelik, hogy más is annak látja őket. Az önbizalom csökkenésével a tehetetlenség, reménytelenség érzése is megjelenik, és gyakran állandósul. Ha ezek az érzések nagyon

Dr. Vetrő Ágnes, Dr. Tamás Zsuzsanna | Depresszió, öngyilkosság, mentális betegségek a serdülőkorban

erősek, fennáll az öngyilkosság veszélye is. A depressziós epizódban egy év alatt 1 %-ban követnek el szuicidiumot, s tekintettel arra, hogy az esetek 15 %-ában a depresszió rendszeresen visszatér az élet folyamán, a klinikusnak gondosan fel kell tárnia az öngyilkossági gondolatokat az agresszív impulzusokkal együtt. Különösen fontos ez serdülőkorban, ahol az öngyilkosság a második vezető halálok.

Kognitív díszfunkció

A depressziós serdülők úgy tűnik mindig gondolataikba mélyednek, feszültek. Nehezen koncentrálnak a környezet által fontosnak tartott dolgokra, pl. tanulni- valóra. Emiatt gyakran romlik az iskolai teljesítményük. Gondolkodásuk beszűkült, a világot, jövőjüket gyakran negatív színben látják. Ez ördögi körként önsors rontó tendenciákhoz, motiváció csökkenéshez vezet.

Élettani és testi változások

Az étkezési szokások megváltoznak, alvászavar lép fel. Ez általában súlycsökkenésben, (máskor hízásban) hajnali ébredésben (vagy különösen serdülő lányoknál több alvásban) nyilvánul meg. Az aktivitási szint is változik, gyakori a fáradtság, letargia. Máskor a céltalan aktivitásfokozódás (nyugtalanosság) a jellemzőbb. Szokásos kedvteléseiknek nem örülnek, szociális aktivitásuk beszűkül. Ezt gyakran kimerüléses állapotnak, idegességnek tartják. Szintén gyakran panaszkodnak hányingerről, szomatikus panaszokról, egyéb specifikus fájdalomokról.

Diagnózisa a DSM-V kritériumok szerint

A következő tünetek közül legalább 1+4 együttesen 2 héten át fennáll és funkcionális (szociális és kognitív területen) romlás észlelhető.

- Depressziós, diszfóriás hangulat (gyermekkorban irritabilitás is lehet) vagy kifejezett
 - Örömtelenség, örömeire való képesség elvesztése
- és a következő tünetek közül legalább négy:
- Megváltozott étvágy, vagy testsúlyváltozás (↑ vagy ↓)
 - Alvászavar (↑ vagy ↓)
 - Psychomotoros agitatio vagy retardatio
 - Fáradtság, energiavesztés
 - Feleslegesség érzése vagy erős büntudat
 - Koncentrációképesség csökkenése vagy határozatlanság
 - Visszatérő gondolatok a halálról, öngyilkossági gondolatok, kísérlet

Depresszió, öngyilkosság, mentális betegségek a serdülőkorban | Dr. Vetrő Ágnes, Dr. Tamás Zsuzsanna

Nem schizofrenia, organikus (testi betegség, gyógyszer) ok, organikus mentális betegség, vagy komplikációmentes gyász okozta.

A tünetek 2 héten át csaknem mindennap megfigyelhetők

Pszichoterápiás kezelés

Mivel már egyetlen depressziós epizód is súlyos hatással lehet a gyermeki személyiség fejlődésére, hatékony és életkor specifikus beavatkozásra van szükség. Igazi hatással a depresszió kezelésére a behaviour, kognitív-behaviour és a támogató pszichoterápiák vannak.

A kognitív és behaviour terápiák lényege az, hogy a személy azért válik depresszióssá, mert nem kap elég megerősítést, dicséretet a környezetétől, s így nem fejlődnek ki megfelelő szociális készségei. Úgy érzi, hogy környezetének ki van szolgáltatva, reménytelen számára, hogy befolyásolja a saját életét. Szociális készség tréninggel, új problémamegoldó stratégiák kifejlesztésével, kellemes tevékenységek beépítésével javítani lehet a beteg állapotát. A Jacobson-féle progresszív izomrelaxáción alapuló tréning szintén segíthet a gyógyulásban. A kognitív tréningek segíthetnek a beteg önértékelésének a javításában, pozitív életperspektívák kidolgozásában, a maladaptív kognitív sémák és negatív kogníciók megváltoztatásában. Ilyen strukturált tréning program a PASCET program, ami megtanulható hazánkban is.

A szupportív terápia – mely a pszichodinamikus terápián alapul – segíti a beteget abban, hogy belső erőit mozgósítsa, s megbirkózási stratégiáival jobban tudjon gazdálkodni.

Gyógyszeres kezelés

A gyermekpszichofarmakológia más területeihez hasonlóan fontos, hogy a kezeléshez alkalmazott szer hatékony és biztonságos legyen.

Szelektív szerotonin visszavétel gátlók (SSRI)

Ha a pszichoterápia nem elég hatékony, vagy a depresszió súlyos, gyógyszeres kezeléssel egészítjük ki. A depressziós serdülők 70-90 %-a reagál pozitívan az SSRI szerekre. Egyformán hatékonynak tűnnek, és mellékhatásaik is hasonlóak. Különbség az eliminálási időben van közöttük.

Dr. Vetrő Ágnes, Dr. Tamás Zsuzsanna | Depresszió, öngyilkosság, mentális betegségek a serdülőkorban

Adagolás: A mellékhatások elkerülése miatt alacsony dózissal kezdünk. Hatásuk kifejtéséhez 4-6 hétre van szükség.

| Generikus név | Felezési idő | Kezdő adag (mg/nap) | Maximális adag (mg/nap) |
|---------------|--------------|---------------------|-------------------------|
| Fluoxetine | 2-3 nap | 5-10 | 10-60 |
| Sertaline | 2-4 nap | 25-50 | 50-200 |
| Paroxetine | 1 nap | 10-20 | 10-60 |
| Fluvoxamine | 1 nap | 25-50 | 50-300 |

Gyógyszerelhagyás: Az elhagyás fokozatos legyen, mert a depresszió tünetei visszatérhetnek. Általában 6 hét alatt hagyjuk abba a kezelést.

Mellékhatások: Az SSRI szerek mellékhatásai hasonlóak egymáshoz, dózisfüggők, és az alkalmazás idejével fokozatosan csökkennek. Izgatottság, étvágy-csökkenés, súlycsökkenés, fejfájás, tremor, álmatlanság ill. hypersomnia (főleg paroxetine és fluvoxamine) élénk álmok, apátia jelentkezhetnek. Egyes adatok szerint növelik az öngyilkossági gondolatok gyakoriságát placebohoz viszonyítva, de az öngyilkossági kísérletek száma nem emelkedik.

Gyógyszerelhagyás: Az elhagyás fokozatos legyen, mert a depresszió tünetei visszatérhetnek. Általában 6 hét alatt hagyjuk abba a kezelést.

Öngyilkosság a gyermek és serdülőkorban

Az öngyilkosság világszerte a serdülőkorúak halálozásának vezető okai között van. Hazánkban is a halálozási statisztikában a balesetek és a malignus kórképekkel vetekszik az első-harmadik helyért.

D. Shaffer és mtsai kimutatták, hogy befejezett öngyilkosságok esetében szülői információk szerint az elkövetők 59 %-ának volt pszichiátriai diagnózisa, 46 %-uk tünetei több mint 3 éve fennálltak, és 46%-uknak volt kapcsolata mentálhigiénés szakemberrel. A vizsgálat szerint a megelőző kísérlet és a hangulatzavar mindkét nemnél a befejezett öngyilkosság fő rizikótényezőjének számított. Az alkohol vagy drog használat csak fiúknál számított rizikó tényezőnek. Lányoknál a hangulatzavar gyakoribb volt, mint fiúk esetében. A pszichiátriai diagnózisok – különösen a kóros szerhasználat – gyakorisága az életkor növekedésével emelkedett.

Ha a befejezett öngyilkosságok pszichoszociális és családi rizikó tényezőit vizsgálják (M.S. Gould és mtsai) megállapítható, hogy az iskolai nehézségek, a családi öngyilkossági minta, a szegényes verbális kommunikáció a családtagok

között és a stresszteli életesemények számíthatnak jelentős súllyal a cselekmény elkövetésében.

Az öngyilkossági viselkedés felmérésére a Columbia-Öngyilkosság Súlyossági Skálát ill. a Columbia Klasszifikációs Algoritmust használjuk (K. Posner és mtsai 2007, 2011), mely segítségével az esetek jelentős részében elkülöníthető a saját élet kioltására irányuló önsértő késztetés és cselekedet a meghalás szándéka nélküli önsértésektől. Az öngyilkossági kísérlet esetében ugyanis az önsértés mellett a meghalási szándék is kifejezett. Ez utóbbi meglete előrevetítheti újabb jövőbeli kísérletek valószínűségét.

Az öngyilkossági kísérletek gyakoriságát vizsgálva E. Evans és mtsai összefoglaló közleményükben megállapították, hogy populációs vizsgálatokban a serdülők 9,7 %-a számolt be élete valamelyik időszakában öngyilkossági kísérletről, és 29,9 %-uk gondolt már öngyilkosságra. A lányok esetében ezek gyakrabban jelentkeztek mint fiúknál.

Nem szuicid ön-sérülés és szándékos önsértés szakirodalmát tanulmányozva J. J. Muehlenkamp és mtsai arra a következtetésre jutottak, hogy ezek gyakorisága erősen függ attól, hogy milyen módszerrel vizsgálták őket. Ha csak egy önkitaltós kérdőívet alkalmaztak, ahol egy-egy kérdés vonatkozott ezekre a cselekedetekre, akkor a nem szuicid önsértés vonatkozásában 12,5 % os élettartam prevalenciát kaptak, míg ha olyan viselkedési kérdőívet alkalmaztak, ahol különböző ilyen cselekedeteket felsoroltak, akkor az élettartam gyakoriság 23,6 %-ra nőtt. Ugyanez vonatkozott a szándékos önsértésre is, ahol az élettartam prevalencia 12,2-ről 31,4-re emelkedett.

M.K. Nock és mtsai 6483 13-18 év közötti serdülő és szülőjük közvetlen interjúja alapján megállapították, hogy az öngyilkossági gondolatok, tervek és kísérletek élettartam prevalenciája 12,1%, 4,0% és 4,1 % volt. Az érintett serdülők nagyobb részénél a DSM-IV szerint valamilyen pszichiátriai betegséget is meg lehetett állapítani.

Mindezek alapján elmondható, hogy gyermek-serdülőkori depresszió komoly egészségügyi probléma, és megelőzése, korai stádiumban történő kezelése a korcsoport öngyilkossági statisztikáját is jelentősen javíthatná.

Javasolt irodalom

D. Shaffer; M. S. Gould; P. Fisher; P. Trautman; D. Moreau; M. Kleinman; M. Flory.: Psychiatric Diagnosis in Child and Adolescent Suicide Arch Gen Psychiatry. 1996;53(4):339-348.

Dr. Vetró Ágnes, Dr. Tamás Zsuzsanna | Depresszió, öngyilkosság, mentális betegségek a serdülőkorban

- K. Posner, M. A. Oquendo, M. Gould, B. Stanley, M. Davies: Columbia Classification Algorithm of Suicide Assessment (C-CASA): Classification of Suicidal Events in the FDA's Pediatric Suicidal Risk Analysis of Antidepressants. *Am J Psychiatry* 2007; 164:1035–1043)
- K. Posner, G. K. Brown, B. Stanley, D. A. Brent, K. V. Yershova, M. A. Oquendo, G. W. Currier, G. A. Melvin, L. Greenhill, S. Shen, J. J. Mann.: The Columbia–Suicide Severity Rating Scale : Initial Validity and Internal Consistency Findings From Three Multisite Studies With Adolescents and Adults *Am J Psychiatry* 2011 ; 168 :1266 –1277
- M. S. Gould; P. Fisher; M. Parides; M. Flory; D. Shaffer: Psychosocial Risk Factors of Child and Adolescent Completed Suicide *Arch Gen Psychiatry*. 1996;53(12):1155-1162
- E. Evans; K. Hawton; K. Rodham; J. Deeks: The Prevalence of Suicidal Phenomena in Adolescents: A Systematic Review of Population-Based Studies *Suicide and Life-Threatening Behavior* Volume 35, Issue 3, pages 239–250, June 2005
- J. J. Muehlenkamp, L. Claes, L. Havertape, P. L. Plener: International prevalence of adolescent nonsuicidal self-injury and deliberate self-harm *Child and Adolescent Psychiatry and Mental Health* 2012, 6:10
- M. K. Nock; J. G. Green; I. Hwang; K. A. McLaughlin; N. A. Sampson; A. M. Zaslavsky; R. C. Kessler: Prevalence, Correlates, and Treatment of Lifetime Suicidal Behavior Among Adolescents Results From the National Comorbidity Survey Replication Adolescent Supplement *JAMA Psychiatry*. 2013;70(3):300-310.
- World Happiness Report: <http://worldhappiness.report/>