

# Adolescent subthreshold-depression and anxiety: psychopathology, functional impairment and increased suicide risk

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**Background:** Subthreshold-depression and anxiety have been associated with significant impairments in adults. This study investigates the characteristics of adolescent subthreshold-depression and anxiety with a focus on suicidality, using both categorical and dimensional diagnostic models. **Methods:** Data were drawn from the *Saving and Empowering Young Lives in Europe (SEYLE)* study, comprising 12,395 adolescents from 11 countries. Based on self-report, including Beck Depression Inventory-II (BDI-II), Zung Self-Rating Anxiety Scale (SAS), Strengths and Difficulties Questionnaire (SDQ) and Paykel Suicide Scale (PSS) were administered to students. Based on BDI-II, adolescents were divided into three groups: nondepressed, subthreshold-depressed and depressed; based on the SAS, they were divided into nonanxiety, subthreshold-anxiety and anxiety groups. Analyses of Covariance were conducted on SDQ scores to explore psychopathology of the defined groups. Logistic regression analyses were conducted to explore the relationships between functional impairments, suicidality and subthreshold and full syndromes. **Results:** Thirty-two percent of the adolescents were subthreshold-anxious and 5.8% anxious, 29.2% subthreshold-depressed and 10.5% depressed, with high comorbidity. Mean scores of SDQ of subthreshold-depressed/anxious were significantly higher than the mean scores of the non-depressed/nonanxious groups and significantly lower than those of the depressed/anxious groups. Both subthreshold and threshold-anxiety and depression were related to functional impairment and suicidality. **Conclusions:** Subthreshold-depression and subthreshold-anxiety are associated with an increased burden of disease and suicide risk. These results highlight the importance of early identification of adolescent subthreshold-depression and anxiety to minimize suicide. Incorporating these subthreshold disorders into a diagnosis could provide a bridge between categorical and dimensional diagnostic models. **Keywords:** Categorical diagnostic model, dimensional diagnostic model, subthreshold-depression, subthreshold-anxiety, adolescent, suicide, SEYLE.

## Introduction

There is mounting criticism of the current classification systems (Diagnostic and Statistical Manual of Mental Disorders Text Revised (DSM-IV-TR) (American

Psychiatric Association, 2000) and International Classification of Mental and Behavioral Disorders (ICD-10) (World Health Organization, 1992), with increasing evidence for the advantages and disadvantages of both categorical and dimensional approaches (Lecrubier, 2008; Möller, 2008; Okasha, 2009). Individuals requiring psychiatric intervention may not receive a standard diagnosis based on the

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DSM-IV-TR or ICD-10 due to an insufficient number or duration of symptoms (Johnson, Weissman, & Klerman, 1992). Patients with substantial functional impairment who do not meet diagnostic criteria are regarded as having subthreshold disorders (Judd, Rapaport, Paulus, & Brown, 1994). Helmchen and Linden (2000) suggest that subthreshold diagnoses are not solely artefacts from potentially outdated definitions, but rather unique conditions demanding recognition. It has been suggested that implementing a hybrid of categorical and dimensional approaches in DSM-V would be useful, as both are important for clinical work and research (Okasha, 2009).

A large number of studies have focused on child and adolescent subthreshold-depression (Fergusson, Horwood, Ridder, & Beautrais, 2005; Foley, Goldston, Costello, & Angold, 2006; Keenan et al., 2008; Klein, Shankman, Lewinsohn, & Seeley, 2009; Lewinsohn, Solomon, Seeley, & Zeiss, 2000), showing that subthreshold-depression increases the risk of developing a major depressive episode (MDE) (Pine, Cohen, Cohen, & Brook, 1999; Shankman et al., 2009). Although the high comorbidity of anxiety [specifically generalized anxiety disorder (GAD)] and MDE are well described (Kessler, Chiu, Demler, Merikangas, & Walters, 2005; Unick, Snowden, & Hastings, 2009; Wittchen, Zhao, Kessler, & Eaton, 1994), there are still few studies on subthreshold-GAD among children/adolescents (Foley et al., 2006; Guberman & Manassis, 2011; Nauta et al., 2012).

Epidemiological data on child/adolescent subthreshold-depression vary, with 12-month prevalence ranging from 3% to 12%, and lifetime prevalence through late adolescence as high as 26% (Fergusson et al., 2005; Wittchen, Nelson, & Lachner, 1998). To our knowledge, no study has examined the prevalence of subthreshold-GAD among youth, whereas among adults, the 12-month prevalence was found to be 3.6–15.7% (Carter, Wittchen, Pfister, & Kessler, 2001; Rucci et al., 2003).

This variability in epidemiological data may be explained, in part, by different definitions and diagnostic methodologies. Some studies used standardized clinical interviews to screen for subthreshold-depression and subthreshold-GAD (Carter et al., 2001; Fergusson et al., 2005; Foley et al., 2006; Guberman & Manassis, 2011; Keenan et al., 2008; Rucci et al., 2003; Shankman et al., 2009), others used self-report (Lewinsohn et al., 2000) or both (Nauta et al., 2012).

Broad and narrow definitions of child/adolescent subthreshold-depression and subthreshold-GAD exist with respect to both the number and the duration of symptoms and additional criteria (e.g. presence of distress), but there is no accepted definitions of these conditions (Angst, Merikangas, & Preisig, 1997; Fergusson et al., 2005; Foley et al., 2006; Karsten, Nolen, Penninx, & Hartman, 2011; Keenan et al., 2008; Kertz & Woodruff-Borden,

2011; Klein et al., 2009; Rucci et al., 2003; Shankman et al., 2009).

Psychiatric disorders, especially MDE, are major risk factors for suicidal behaviour (Gould et al., 1998). Comorbidity, mainly anxiety disorders, increases the risk of suicidal behaviour among adolescents (Wunderlich, Bronisch, & Wittchen, 1998). Balázs, Bitter, Lecrubier, Ciszér, and Ostorharics (2000) found that almost two thirds of adult suicide attempters had MDE, half had GAD, one tenth had subthreshold-depressive episode and one fifth had subthreshold-GAD. Only a few adolescent studies have focused on subthreshold mental disorders, including subthreshold-depressive episodes and GAD, as a possible risk factor for suicide. Foley et al. (2006) examined subjects aged 9–16 years and found that suicidal youth without a full DSM-IV-TR; psychiatric disorder had significantly higher prevalence of subthreshold conditions than nonsuicidal youth without psychiatric disorders.

The aim of the present study of European adolescents was the examination of the prevalence of subthreshold-depression and subthreshold-anxiety and its relationships with psychopathology, functional impairment and suicidal behaviour.

## Method

### Participants

The sampling procedures of the *Saving and Empowering Young Lives in Europe* (SEYLE) study were previously described (Wasserman et al., 2010). SEYLE's sample of 12,395 adolescents (aged 14–16 years) is from 11 European countries: Austria, Estonia, France, Germany, Hungary, Ireland, Israel, Italy, Romania, Slovenia and Spain, with Sweden serving as the coordinating centre. Ethical approval was obtained from each site's local ethics committee. Local school authorities granted access to randomly selected school(s) and informed assent and consent were obtained, as required.

### Data collection

Students were administered a self-report questionnaire that included well-established measures and items developed for SEYLE (Wasserman et al., 2010).

Beck Depression Inventory-II (BDI-II) measured severity of depression by assessing specific symptoms experienced over the preceding 2 weeks (Beck, Steer, Ball, & Ranieri, 1996; Byrne, Stewart, & Lee, 2004). BDI-II item 'loss of interest in sex' was excluded from the SEYLE version because it was considered inappropriate in some cultural settings (Byrne et al., 2004).

Symptoms of current anxiety were assessed using Zung Self-Rating Anxiety Scale (SAS) (Zung, 1971), a 20-item self-report questionnaire. Zung referred to the scores as an 'Index score' ('normal range': ≤44; 'minimal to moderate anxiety': 45–59; 'marked to severe anxiety': 60–74; 'extreme anxiety': ≥75) (McDowell, 2006).

Psychopathology was evaluated using Strengths and Difficulties Questionnaire (SDQ), a brief instrument for

screening childhood behaviours, consisting of 25 items (Goodman, Meltzer, & Bailey, 1998). The extended version of the SDQ was used, which includes an impact supplement, a measure of functional impairment.

Frequency of suicidal thoughts/ideations was assessed during the past 2 weeks using Paykel Suicide Scale (PSS) (Paykel, Myers, Lindenthal, & Tanner, 1974).

### Definitions

Adolescents were divided into three groups based on BDI-II score:  $\geq 20$  = depressed (Beck et al., 1996);  $< 20$  (BDI-II) and being positive ( $> 0$ ) on items assessing core symptoms of DSM-IV-TR MDE (sadness or loss of pleasure) = subthreshold-depression; all others = non-depressed.

Adolescents were also divided into three groups based on the SAS:  $\geq 60$  = anxious;  $45 \leq$  and  $< 60$  = subthreshold-anxious;  $< 45$  = nonanxious.

### Analyses

Data were analysed using IBM SPSS Statistic 20 software package (SPSS, Inc, 2011). Gender differences among nondepressed, subthreshold and depressed, as well as nonanxious, subthreshold and anxious groups were analysed using chi-squared tests. One-way ANOVAs were conducted to explore age differences. Means and standard deviations, as well as percentages of borderline and elevated SDQ total and impact scores are reported for the three groups of anxiety/depression, using the cut-off defined by Goodman et al. (1998). Due to cross-cultural variation in cut-off scores of the SDQ (Vostanis, 2006) continuous scores were used to explore levels of overall psychopathology. Bivariate relationships between measures of anxiety and depression, and SDQ total score were explored using Spearman correlations. Analyses of Covariance (ANCOVA) with Tukey post hoc test were conducted separately for girls and boys with age as covariate to detect differences among the three study groups. To differentiate the effects of anxiety and depression, each analysis was controlled for by depression/anxiety (for BDI-II total score when exploring the effect of subthreshold and full anxiety on functional impairments and for SAS total score when the effects of subthreshold and full depression were studied). Logistic regression analyses with dummy-coded SDQ impact score (0 'normal' and  $0 <$  'borderline/elevated scores') and PSS total score (0 or greater) as independents, were conducted to explore the relationships between functional impairments, as well as suicidality and subthreshold and full anxiety/depression. All analyses were adjusted for gender, age and continuous score of anxiety/depression. Due to sensitivity of Hosmer and Lemeshow goodness of fit test for very large sample sizes (Kramer & Zimmerman, 2007), the area under the Receiver operating characteristic (ROC) curve [area under the roc curve (AUC)] was reported. A  $p$ -value of .05 was considered statistically significant. Effect size measures are also reported for all analyses.

Multiple imputations (MI) were conducted using the IBM SPSS Statistics 20 (2011) to account for missing data. Five imputed datasets were created. Variables included in the model: age, country of origin, gender, all

SDQ items, PSS, SAS and BDI-II as target variables and predictors. Each completed dataset was analysed using standard methods for assessing differences among non-depressed/nonanxious, subthreshold-depressed/anxious and depressed/anxious groups. Pooled estimates were calculated using Rubin's Rules (Rubin, 1987).

## Results

### Subjects

Complete data were obtained for 11,109 (89.6%) of the 12,395 adolescents in SEYLE: 4,506 (40.7%) boys and 6,565 (59.3%) girls. Mean age: 14.80 years ( $SD = .84$ ).

Only 17,652 (1.8%) of the total 961,553 data items were missing. The proportion of the missing data was greatest on the sixth item of the SDQ ('I am usually on my own. I generally play alone or keep to myself.') (10.8%), whereas all other variables had less than 5% missing. Complete cases and incomplete cases differed significantly in age ( $t(12310) = -48.356$ ,  $p < .001$ , Cohen's  $d = 1.384$ ) and gender ( $\chi^2(1) = 755.363$ ,  $p < .001$ ,  $\phi = -.248$ ), indicating that adolescents with incomplete data tended to be older and male subject.

MI analyses used data of all 12,395 participants: 5,529 males and 6,799 females (67 missing gender cases). The mean age was 14.91 years ( $SD = .90$ ).

### Anxiety and depression

Among all 12,395 adolescents, 7,476 (60.3%) were identified as nondepressed, 3,618 (29.2%) subthreshold-depressed and 1,301 (10.5%) depressed.

Analysis showed a significant age effect on group membership ( $F(2) = 28.321$ ,  $p < .001$ ). However, the effect size for this analysis ( $\eta^2 = .005$ ) was not found to exceed Cohen's (1988) convention for a small effect ( $\eta^2 = .01$ ).

Gender differences of small effect size were found among groups of nondepressed, subthreshold-depressed and depressed youth ( $\chi^2(2) = 254.956$ ,  $p < .001$ , Cramer's  $V = .143$ ). Girls more frequently were both subthreshold-depressed and depressed (Table 1) ( $p < .001$ ,  $\phi = .106$  and  $.143$  respectively).

Among all subjects, 7,708 (62.2%) were identified as nonanxious, 3,964 (32.0%) subthreshold-anxious and 723 (5.8%) anxious.

Among the three levels of anxiety, a significant effect of group membership was found for age ( $F(2) = 44.846$ ,  $p < .001$ ). Again, the effect size ( $\eta^2 = .007$ ) was not found to exceed Cohen's (1988) convention for a small effect.

Gender had a small effect on group membership across levels of anxiety ( $\chi^2(2) = 290.362$ ,  $p < .001$ , Cramer's  $V = .154$ ). Girls more frequently were both subthreshold-anxious and anxious (Table 1) ( $p < .001$ ,  $\phi = .115$  and  $.147$  respectively).

Results revealed a strong relationship between SAS and BDI-II scores ( $r = .503$  and  $.656$  for boys

**Table 1** Gender distribution among nondepressed/nonanxious, subthreshold-depressed/anxious and depressed/anxious groups

	Levels of anxiety		Levels of depression	
	Boys %	Girls %	Boys %	Girls %
No anxiety/depression	50.35	49.65	50.35	49.65
Subthreshold- anxiety/ depression	38.24	61.76	38.24	61.76
Full anxiety/depression	24.07	75.93	24.07	75.93

*N* = 12,395.

and girls respectively). When using a categorical approach, a strong association was also found between levels of anxiety and depression ( $\chi^2(4) = 3,807.565$ ,  $p < .001$ ,  $\gamma = .682$ ) (Table 2).

### Psychopathology

SDQ total score was found to be strongly related to both SAS ( $r = .513$ ,  $p < .001$  and  $.619$ ,  $p < .001$  for boys and girls respectively) and BDI-II scores ( $r = .542$ ,  $p < .001$  and  $.654$ ,  $p < .001$  for boys and girls respectively). After adjusting for the scores of depression/anxiety, associations between SDQ total score and SAS score ( $r = .287$ ,  $p = .004$  and  $.302$ ,  $p < .001$  for boys and girls respectively), as well as between SDQ and BDI-II score ( $r = .346$ ,  $p < .001$  and  $.396$ ,  $p < .001$  for boys and girls respectively) decreased, but remained significant, showing small to medium effect.

Descriptive statistics, as well as percentages of borderline and elevated scores of SDQ scales among groups of nondepressed/nonanxious, subthreshold-depressed/anxious and depressed/anxious are shown in Table 3.

Controlling for age and BDI-II score, mean SDQ problem score differed significantly across the non-anxious, subthreshold-anxious and anxious groups for both genders ( $F(2) = 136.154$ ,  $p < .001$ ,  $\eta^2 = .047$  for boys and  $F(2) = 213.552$ ,  $p < .001$ ,  $\eta^2 = .059$  for girls). All pair-wise post hoc comparisons were significant ( $p < .001$ ), indicating that mean scores of subthreshold-anxious adolescents were higher than the mean scores of the nonanxious group (Cohen's  $d = .920$  and  $.994$  for boys and girls respectively), but lower than the mean scores of the anxious group (Cohen's  $d = .839$  and  $1.102$  for boys and girls respectively).

**Table 2** Percents of levels of anxiety and depression

		Levels of Anxiety			Totals
		NonA %	SubA %	A %	
Levels of depression	NonD %	46.32	13.39	.60	60.31
	SubD %	14.75	12.98	1.46	29.19
	D %	1.11	5.61	3.77	10.50
Totals		62.18	31.98	5.83	100.00

$\chi^2(4) = 3,807.565$   $p < .001$ ;  $\gamma = .682$ .

*N* = 12,395. NonA, nonanxious group; SubA, subthreshold-anxious group; A, anxious group; NonD, nondepressed group; SubD, subthreshold-depressed group; D, depressed group.

Analysis resulted in a significant effect of group membership across levels of depression on SDQ total score for both genders ( $F(2) = 190.553$ ,  $p < .001$ ,  $\eta^2 = .064$  for boys and  $F(2) = 292.788$ ,  $p < .001$ ,  $\eta^2 = .079$  for girls). Nondepressed adolescents had significantly lower scores than subthreshold-depressed adolescents ( $p < .001$ , Cohen's  $d = .632$  and  $.776$  for boys and girls respectively), whereas subthreshold-depressed adolescents had significantly lower scores than depressed adolescents ( $p < .001$ , Cohen's  $d = 1.126$  and  $1.171$  for boys and girls respectively).

### Functional impairment

Logistic regression analysis revealed a significant effect of age (OR = 1.219; 95% CI = 1.171–1.269) on dummy-coded SDQ impact score as dependent (0 = no impairment; 1 = borderline/elevated scores), indicating that for each year of increase in age increases the probability of having functional impairments with 21.9%. Gender also had a significant effect (OR = .726; 95% CI = .675–.780), indicating that boys were predicted to have functional impairment with lower probability than girls.

Adjusting for the effect of age, gender and BDI-II score, the odds for a subthreshold-anxious adolescent having functional impairment was 1.795 (95% CI = 1.638–1.967) times greater than the odds for a nonanxious adolescent. Similarly, anxious adolescents were predicted to have functional impairment with a 2.519 (95% CI = 1.982–3.201) times greater probability than their nonanxious counterparts ( $\chi^2(5) = 2845.482$ ,  $p < .001$ , Nagelkerke- $R^2 = .276$ , AUC = .773, 95% CI = .776–.780).

In the second logistic regression model, when the effect of age, gender and SAS score were controlled, there were significant main effects of being subthreshold-depressed (OR = 1.960; 95% CI = 1.795–2.140) and depressed (OR = 4.102; 95% CI = 3.455–4.871) on having functional impairment ( $\chi^2(5) = 2589.091$ ,  $p < .001$ , Nagelkerke- $R^2 = .254$ , AUC = .756, 95% CI = .749–.764).

### Suicidality

Descriptive statistics of PSS and percentages of positive responders, by item, in nonanxious/nondepressed, subthreshold-anxious/depressed and anxious/depressed groups are reported in Table 4.

A significant effect of age (OR = 1.174, 95% CI = 1.126–1.225) was found when using dummy-coded PSS total score (0 or greater) as dependent in the logistic regression model, indicating that for each year increase on age increases the probability of suicidality with 17.4%. Gender had also a significant effect on the dependent variable (OR = .546, 95% CI = .506–.590), indicating that boys were predicted to have suicidal thoughts/ideations with lower probability than girls.

Adjusting for the effect of age, gender and BDI-II score, the odds for a subthreshold-anxious adolescent for having suicidal thoughts/ideations were 1.788 (95% CI = 1.622–1.971) times greater than the odds for a nonanxious adolescent. Similarly, anxious adolescents were predicted to have suicidal thoughts/ideations with a 2.756 (95% CI = 2.159–3.518) times greater probability than their nonanxious counterparts ( $\chi^2(5) = 3739.359$ ,

**Table 3** Mean scores, standard deviations, as well as percentages of borderline and elevated scores of SDQ scales among groups of nondepressed/nonanxious, subthreshold-depressed/anxious and depressed/anxious.

SDQ	Total sample	Levels of anxiety			Levels of depression		
		NonA	SubA	A	NonD	SubD	D
<b>Problem scale</b>							
Borderline %	11.7	5.1	20.6	33.3	5.5	16.6	33.4
Elevated %	5.7	1.5	8.6	34.9	1.5	5.5	30.0
<i>M (SD)</i>	10.74 (5.10)	8.89 (4.22)	13.07 (1.80)	17.77 (4.76)	8.97 (4.30)	12.45 (4.46)	17.07 (4.57)
<b>Impact scale</b>							
Borderline %	4.2	4.8	3.0	1.1	5.1	3.6	1.4
Elevated %	37.2	23.9	55.3	83.6	23.7	49.1	82.0
Median (Interquartile Range)	0 (0–3)	0 (0–1)	2 (0–5)	6 (3–10)	0 (0–1)	1 (0–4)	6 (3–10)

*N* = 12,395. SDQ, Strength and Difficulties Questionnaire; NonA, nonanxious group; SubA, subthreshold-anxious group; A, anxious group; NonD, nondepressed group; SubD, subthreshold-depressed group; D, depressed group.

**Table 4** Descriptive statistics of PSS and per cent of positive responders by item in nondepressed/nonanxious, subthreshold-depressed/anxious and depressed/anxious groups

	Total sample	Levels of anxiety			Levels of depression		
		NonA	SubA	A	NonD	SubD	D
PSS Median (Interquartile Range)	0 (0–1)	0 (0–0)	1 (0–3)	4 (1–10)	0 (0–0)	0 (0–2)	4 (2–9)
Life not worth living during past 2 weeks %	27.00	14.78	41.95	75.29	12.46	38.93	77.35
Wish that were dead during past 2 weeks %	18.52	8.21	30.00	65.61	6.99	25.08	66.52
Thought of taking own life during past 2 weeks %	16.79	7.86	26.74	57.50	6.74	21.76	60.70

*N* = 12,395. PSS, Paykel Suicide Scale; NonA, nonanxious group; SubA, subthreshold-anxious group; A, anxious group; NonD, nondepressed group; SubD, subthreshold-depressed group; D, depressed group.

$p < .001$ , Nagelkerke- $R^2 = .361$ , AUC = .812, 95% CI = .805–.819).

When assessing the effect of levels of depression on suicidality, we found significant main effects of being subthreshold-depressed (OR = 3.065; 95% CI = 2.792–3.364) and depressed (OR = 9.210; 95% CI = 7.700–11.016) when the effect of age, gender and SAS scores were controlled for ( $\chi^2(5) = 3492.978$ ,  $p < .001$ , Nagelkerke- $R^2 = .340$ , AUC = .800, 95% CI = .793–.807).

## Discussion

Similar to the study of Angst et al. (1997) on a community sample of individuals ages 19–20, in the current study approximately half of the adolescents met the criteria for threshold and/or subthreshold-depression and/or anxiety. Although our focus was on subthreshold-depression and subthreshold-anxiety, it is noteworthy that based on screening tools an exceptionally high proportion of this sample was categorized as depressed (10.5%) and anxious (5.8%). Similar to prior findings, our results show a high prevalence of subthreshold-depression and anxiety among adolescents throughout Europe (Fergusson et al., 2005; Wittchen et al., 1998). According to our data, almost one third of adolescents had current subthreshold-depression and one third had current subthreshold-anxiety. Importantly, even these less severe cases were associated with elevated levels of psychopathology, and

increased risk for functional impairment and suicidality.

No difference in the prevalence of depression among preadolescent boys and girls has been described (Anderson, Williams, McGee, & Silva, 1987; Kashani et al., 1983). After ages 11–13 and throughout adulthood, this trend changes and female subjects are approximately twice as likely as male subjects to be depressed and the same prevalence estimate is true for anxiety disorders (Angold, Costello, & Worthman, 1998; Mackinaw-Koons & Vasey, 2000). In the current study, we observed similar gender distributions in the depressed and anxiety groups and in the subthreshold-depressed and subthreshold-anxiety groups as well.

In this large international sample, we found a strong correlation between depression according to BDI-II and anxiety according to SAS. While high comorbidity of both threshold and subthreshold-depression and anxiety was expected (Kessler et al., 2005; Unick et al., 2009; Wittchen et al., 1994), it is still surprising that only one tenth of all adolescents with threshold-depression or threshold-anxiety had 'pure forms' of the disorders. The presence of comorbid (even subthreshold) MDE and anxiety is associated with more severe psychopathology, greater impairment, increased suicidality and worse outcome than in noncomorbid conditions (Altamura, Montresor, Salvadori, & Mundo, 2004; Foley et al.,

2006; Guberman & Manassis, 2011). Our results highlight the importance of assessing comorbidity of depression and anxiety in adolescents. In contrast to the high comorbidity of threshold psychopathology, the percentage of pure forms of subthreshold-depression and subthreshold-anxiety were found to be much higher (up to 40–50).

Based on both dimensional and categorical diagnostic models, our data revealed a strong association between the SDQ total score and SAS/BDI scores. According to the SDQ Impact scale, after adjusting for age, gender and SAS scores, being subthreshold-depressed increased the probability of having functional impairment, the odds for having functional impairment for depressed was four times more than being nondepressed. Similarly, adjusting for the effects of age, gender and BDI-II score, adolescents with both subthreshold-anxiety and threshold-anxiety showed greater probability of having functional impairment than nonanxious adolescents. The elevated level of psychopathology and the increased risk of functional impairment suggest that adolescents with subthreshold-depression and with subthreshold-anxiety already have clinically meaningful symptoms, requiring professional intervention.

Gender here had a significant effect on suicide behaviour, similar to earlier findings (Wunderlich, Bronisch, Wittchen, & Carter, 2001). According to the PSS total score, subthreshold conditions increased the probability of having suicidal thoughts/ideations, and the odds for having suicidal thoughts/ideations in a full syndrome condition were even greater in both anxiety and depression. Namely, after adjusting for age, gender and BDI-II scores, the odds for a subthreshold-anxious adolescent to have suicidal thoughts/ideations were approximately two times greater than the odds for a nonanxious adolescent, and being anxious increased the probability of having suicidal thoughts/ideations almost two and a half times. We found the same pattern in the case of depression: adjusting for age, gender and SAS score, adolescents with subthreshold-depression showed three times greater probability of having suicidal thoughts/ideations than nonanxious adolescents, whereas being threshold-depressed increased the probability of having suicidal thoughts/ideations nine times more than being nondepressed. These data indicate that both subthreshold and threshold forms of depression increase the risk of having suicidal thoughts/ideations, even more than subthreshold and threshold-anxiety. From a clinical standpoint, early recognition and intervention of subthreshold-depression and subthreshold-anxiety may prevent full-onset depression/anxiety and significantly reduce the related suicide risk.

This study's results contribute to the current discussions about categorical and dimensional systems. We used a dimensional diagnostic model of depression and anxiety and introduced a third con-

dition, subthreshold-depression/subthreshold-anxiety, based on classical categorical approaches. Our findings, that the level of risk for increased burden and suicide among adolescents with subthreshold-depression/anxiety is between the risk for those nondepressed/nonanxious and depressed/anxious, supports the suggestion of previous studies that show that subthreshold and full DSM-IV-TR depression/anxiety could be on the same continuum (Fergusson et al., 2005; Klein et al., 2009; Lewinsohn et al., 2000; Shankman et al., 2009). Based on our data, inputting subthreshold-depression and subthreshold-anxiety into the diagnostic systems could provide an important bridge between traditional categorical diagnostic approaches and dimensional models.

Limitations of these findings include their being cross-sectional. Longitudinal studies are needed to understand the potential negative sequel of subthreshold-depression and anxiety. As this study took place in eleven European countries, cross-cultural differences must also be taken into account. Finally, our data are based on self-report, which can be biased.

In conclusion, our study supports the dimensional rather than the categorical nature of adolescent subthreshold and full syndrome depression and anxiety. It highlights the importance of early detection especially, as it may be associated with suicidal behaviour. Recognition and appropriate intervention for adolescent subthreshold conditions may significantly save lives of young people.

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### Key points

- This study investigates the characteristics of adolescent subthreshold-depression and subthreshold-anxiety in a large European sample, with a focus on suicidality.
- According to our data, both subthreshold-depression and subthreshold-anxiety are very prevalent, and associated with an increased burden of disease and suicidal risk.
- Our study highlights the importance of early detection of subthreshold-depression and subthreshold-anxiety to reduce psychopathology and distress in adolescents, especially as it may be associated with suicidal behaviour.
- The current study supports the continuum, that is the dimensional rather than categorical nature of adolescent subthreshold and full syndrome depression and anxiety.

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