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Dimensional assessment of anxiety disorders in parents and children for DSM-5†

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Abstract

The current shift in the DSM towards the inclusion of a dimensional component allows clinicians and researchers to demonstrate not only the presence or absence of psychopathology in an individual, but also the degree to which the disorder and its symptoms are manifested. This study evaluated the psychometric properties and utility of a set of brief dimensional scales that assess DSM-based core features of anxiety disorders, for children and their parents. The dimensional scales and the Screen for Child Anxiety Related Emotional Disorders (SCARED-71), a questionnaire to assess symptoms of all anxiety disorders, were administered to a community sample of children ($n = 382$), aged 8–13 years, and their mothers ($n = 285$) and fathers ($n = 255$). The dimensional scales assess six anxiety disorders: specific phobia, agoraphobia, panic disorder, social anxiety disorder, generalized anxiety disorder, and separation anxiety disorder. Children rated their own anxiety and parents their child's anxiety. The dimensional scales demonstrated high internal consistency ($\alpha > 0.78$, except for father reported child panic disorder, for reason of lack of variation), and moderate to high levels of convergent validity ($r_s = 0.29$–0.73). Children who exceeded the SCARED cutoffs scored higher on the dimensional scales than those who did not, providing preliminary support for the clinical sensitivity of the scales. Given their strong psychometric properties and utility for both child and parent report, addition of the dimensional scales to the DSM-5 might be an effective way to incorporate dimensional measurement into the categorical DSM-5 assessment of anxiety disorders in children. *Copyright © 2014 American Psychiatric Association. All rights reserved.*

Introduction

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) was published in May 2013. One of the major changes in the DSM-5 is the addition of a dimensional component to the traditional categorical approach of the previous DSM editions. The categorical system, in which a diagnosis has only two values (either the patient has or does not have a disorder) (Kraemer, 2007), has received considerable criticism (e.g. Hudziak *et al.*, 2007; Kraemer, 2007; Shear *et al.*, 2007). For example, categorical diagnoses fail to acknowledge differences in the extent to which children and adults manifest criterial symptoms (Hudziak *et al.*, 2007). Moreover, the

categorical system fails to reflect developmental, gender, and informant differences, including variation in precursors (genotype, age of onset, environmental exposures, and behavioral, emotional, and psychological characteristics), variation in concomitants (severity, specific symptomatology, response to treatment, and duration of episodes and remissions), and variation in consequences (disability, impairment, diminished quality of life, and shortened lifespan) (Kraemer, 2007). A second concern pertains to the high levels of comorbidity (Regier *et al.*, 2009), which the categorical approach artificially inflates (Shear *et al.*, 2007) because of lack of clear separation of the syndromes (Regier *et al.*, 2009). That is, comorbidity may represent underlying shared pathology.

By dimensionalizing (i.e. rating individual patients on a quantitative dimension with three or more ordered values) some aspects of diagnostic criteria, the abovementioned sources of variance can be in part accounted for in the DSM. Dimensional systems allow clinicians and researchers to evaluate not only the presence or absence of psychopathology, but also the degree to which an individual manifests a certain disorder (Hudziak *et al.*, 2007). Furthermore, it gives a better insight into the problem of categorical comorbidity. That is: in a dimensional approach, comorbidity can be represented as a specific pattern of elevation across multiple dimensions of disordered thought, affect, and behavior (Krueger *et al.*, 2005). Moreover, the addition of a severity score to each diagnosis allows the creation of patient-specific diagnostic profiles across disorders (Helzer *et al.*, 2006). Moreover, using a uniform quantitative score promotes consistency and improves comparability across studies, which is a benefit for both researchers and clinicians. Finally, quantification leads to an increase in statistical power without diminishing the utility of the categorical diagnoses. The inclusion of a dimensional scale to each of the traditional categorical diagnosis of the DSM is expected to enhance the validity and reliability of DSM diagnoses (Kraemer, 2007).

As LeBeau *et al.* (2012) aptly phrased it: "in few areas could the implementation of consistent dimensional measures be more useful than in the anxiety disorders, in which hundreds of validated scales are available to assess various domains of anxiety" (p. 259). Until today, no "golden standard" measure exists for each anxiety disorder. According to Shear *et al.* (2007), the most useful approach would be to add a cross-cutting anxiety assessment to the existing categorical system, in which symptoms common to multiple anxiety disorders are rated. Thus, the focus lies on underlying constructs that operate across different anxiety disorders, such as panic and worry, and pathological concern about threat. Avoidance, anxiety, and panic are common across the anxiety disorders. For this reason, the Anxiety Disorders Subgroup of the DSM-5 Anxiety, Obsessive Compulsive Spectrum, Post-traumatic, and Dissociative Work Group has developed a set of brief dimensional scales that are consistent in content and structure and assess core features of fear and anxiety that are shared across the anxiety disorders despite being manifested in different ways: the frequency of cognitive and physical symptoms related to the experience of fear and anxiety and the frequency of escape and avoidance behaviors. Because the sources of fear differ for each disorder, the scales were developed for five anxiety disorders separately: social anxiety disorder (SAD), specific phobia (SP), agoraphobia (AG), panic disorder (PD), and generalized anxiety disorder (GAD).

Three studies have already examined the psychometric properties and clinical sensitivity of these scales. First, LeBeau *et al.* (2012) described the development of the scales and conducted a three-phase study to examine the validity and reliability of the scales. Phase One consisted of the administration of preliminary versions of the scales to 702 unselected undergraduates. This initial version demonstrated very high internal consistency for all scales, and both convergent and discriminant validity for the SAD, PD, and GAD scales. In Phase Two, the psychometric properties of a revised version of the scales were examined in an unselected sample of 57 undergraduates. The scales demonstrated adequate internal consistency, convergent validity, and test–retest reliability (except for SP). In Phase Three, the scales were administered to a clinical sample of 48 individuals with anxiety disorders. High internal consistency and clinical sensitivity were demonstrated. Second, Beesdo-Baum *et al.* (2012) largely replicated the promising findings of LeBeau *et al.* (2012) in a German clinical sample ($n = 102$). Scales showed high reliability, and both convergent and discriminant validity. Confirmatory factor analyses showed unidimensionality for all scales. Furthermore, the scales were able to differentiate between individuals with versus without a threshold anxiety diagnosis. Sensitivity and specificity were moderate to high, except for SP, for which the sensitivity was low. Third, Knappe *et al.* (2013) examined the sensitivity of the scales to clinical severity levels using the same clinical sample as Beesdo-Baum *et al.* (2012). Participants with either a subthreshold or threshold anxiety disorder scored higher on all five dimensional scales compared to participants without anxiety. Moreover, participants with a threshold anxiety disorder had higher

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scores on the dimensional scales compared to participants with a subthreshold anxiety disorder, except for SP. Disorder specific impairment ratings and global severity estimates were positively associated with higher scores on the dimensional scales. Overall, these three studies provide preliminary support for the utility of these dimensional scales in DSM-5 and for the screening of anxiety disorders, although further evaluation is clearly needed.

The present study again investigated the psychometric properties of the dimensional scales, but in contrast to the three previous studies that focused on adults, this study focused on anxiety assessment in children aged 8 to 13 years. As children may experience difficulty with communicating information about their internal states (McCathie and Spence, 1991), and with making meaningful ratings on Likert scales, as well as with understanding questionnaire items (Edelbrock and Costello, 1990), a multi-informant approach in the assessment of childhood anxiety is desired (Comer and Kendall, 2004). Therefore, in the present study, next to child self-reports, parents (both fathers and mothers) completed the dimensional scales about their children. In addition to the scales for five anxiety disorders (SAD, SP, AG, PD, and GAD) used in the studies of LeBeau *et al.* (2012), Beesdo-Baum *et al.* (2012), and Knappe *et al.* (2013), the present study also used a dimensional scale for separation anxiety disorder (SepAD).

Although questionnaires with good psychometric properties are already available for the screening of anxiety disorders in children, such as the Screen for Child Anxiety Related Emotional Disorders (SCARED; Bodden *et al.*, 2009), the dimensional scales proposed by the DSM-5 workgroup can benefit the clinical assessment of anxiety disorders in children for the following reasons. First, the dimensional scales are much more tied to the diagnostic criteria (e.g. fear, anxiety, avoidance), whereas the SCARED focuses on what particular stimuli and situations the person fears (e.g. fear of heights, being around strangers, being away from home). Second, agoraphobia cannot be measured with the current version of the SCARED, whereas the dimensional scales include a scale for agoraphobia.

The present study aimed to assess whether the dimensional scales can also be used as a self-report measure in 8- to 13-year-old children. The study examined the psychometric properties of the dimensional scales to measure anxiety disorders in a community sample of children and their fathers and mothers, including separation anxiety. Internal consistency, convergent validity, clinical sensitivity, and parent–child and father–mother agreement of the scales were assessed.

Methods

Participants

Eight primary schools were selected to participate in this study on the basis of already existing contacts with these schools and on their location in both rural and urban areas of the Netherlands. Children from 8 to 13 years and their biological parents were recruited by experimenters to participate in the present study and in a study on the influence of fathers' versus mothers' anxious or confident signals on child anxiety in ambiguous situations (Möller *et al.*, 2013). We invited 898 children to participate in the study and 394 children (44%) agreed. Subsequently, 12 children were excluded from the study because they were absent or due to missing data. Eventually, 382 children, 285 mothers (75%), and 255 fathers (67%) participated in the study. Characteristics of the participating children and parents are depicted in Table 1.

Assessments

Two questionnaires were used as a screening tool for anxiety.

Dimensional anxiety scales

The initial version of the dimensional anxiety scales was constructed by the Anxiety Disorder Subgroup of

Table 1. Participant characteristics

Child	*n* = 382
Boys (*n*, %)	183 (48%)
Age (*M*, SD)	11.00 (1.05)
Born in the Netherlands (*n*, %)	368 (96%)
Living with both parents (*n*, %)	315 (82%)
Father	*n* = 255 (67%)
Age (*M*, SD)	45.30 (5.55)
Born in the Netherlands (*n*, %)	227 (89%)
Working full-time (*n*, %)	210 (82%)
Number of children (*M*, SD)	2.66 (1.54)
Educational level (*M*, SD)[a]	5.91 (1.91)
Mother	*n* = 285 (75%)
Age (*M*, SD)	43.09 (4.56)
Born in the Netherlands (*n*, %)	255 (89%)
Working full-time (*n*, %)	31 (11%)
Number of children (*M*, SD)	2.59 (1.54)
Educational level (*M*, SD)[a]	5.60 (1.96)

[a]On a scale from zero (primary education) to eight (university).
Note: *M*, mean; SD, standard deviation.

the DSM-5 Anxiety, Obsessive-Compulsive Spectrum, Post-traumatic, and Dissociative Disorders Work Group and revised by LeBeau *et al.* (2012). The dimensional scales originally assess five anxiety disorders: PD, AG, SP, SAD, and GAD. In the present study, a dimensional scale for SepAD was also used. All scales share a common template that assesses the frequency of cognitive and physical symptoms and the frequency of escape and avoidance behaviors that are present among all anxiety disorders. Scales are adapted for each disorder through the use of different introductory statements and different reference points throughout the items. Each dimensional subscale consists of 10 items, in which the first five items assess the frequency of cognitive and physical symptoms related to the experience of fear and anxiety (e.g. "I have been anxious, worried, or nervous about … [object of fear per anxiety disorder, for example 'social situations' in SAD]", "I have felt a racing heart, sweaty, trouble breathing, faint, or shaky in …") and the second set of five items the frequency of escape and avoidance behaviors (e.g. "I have avoided, or did not approach or enter …", "I have distracted myself to avoid thinking about …"). All items are assessed in regard to the past month. The items are rated on a five-point Likert scale ranging from zero (never) to four (all of the time). A total scale score can be created by summing the scores on the 10 items (possible scores ranging from zero to 40). The "forward–backward" procedure was applied to translate the dimensional scales from English into Dutch. The scales were translated into Dutch by the first author and translated back into English by a native English speaker who was not familiar with the questionnaire. Moreover, for the child-report version language of the scales was adapted to ensure comprehensibility. These scales were first administered to seven children from 8 to 12 years, and slightly adapted according to their feedback. For example, the children did not understand the phrase "felt a racing heart", and we replaced this by "felt my heart beating fast". The child version of the dimensional scales is presented in Appendices A–F. In view of participant burden (children also participated in a different study for which they completed another set of questionnaires), each child completed only two of the six dimensional scales. The children were divided into three groups: one-third of the children ($n = 129$) filled in the scales on PD and SepAD, one-third ($n = 129$) on SP and AG, and one-third ($n = 124$) on SAD and GAD. Both mothers and fathers completed all six dimensional scales about their child. Examples of items for the parent version are: "my child has felt anxious, worried, or nervous about … [object of fear per anxiety disorder, for example 'social situations' in SAD]", or "my child has avoided, or did not approach or enter …".

SCARED-71

The SCARED, a screening tool for identifying anxiety disorders in youth aged 8–18 years, was developed by Birmaher *et al.* (1997) and over the years the screening tool has been revised and modified several times, eventually leading to the SCARED-71 (Bodden *et al.*, 2009). The SCARED-71 assesses a range of DSM-IV based anxiety symptoms that can be divided into symptoms of PD (13 items), GAD (nine items), SAD (nine items), SepAD (12 items), obsessive-compulsive disorder (nine items), post-traumatic stress disorder (four items), and SP (15 items). Items on obsessive-compulsive disorder and post-traumatic stress disorder were omitted because they were not of interest in the present study. Children indicated how frequently they experienced each of the remaining 58 anxiety symptoms using a three-point Likert scale with almost never = 0, sometimes = 1, and often = 2. The SCARED-71 is a reliable and valid questionnaire: the internal consistencies of the subscales are moderate to high (Cronbach's alpha ranging from 0.64 to 0.88) and anxious children score significantly higher on all subscales compared to control children, indicating good discriminant validity of the SCARED-71 (Bodden *et al.*, 2009). Parents completed the SCARED-Parent version (SCARED-P; Bodden *et al.*, 2009) about their child, capturing the same subscales as the SCARED-71. Again, items on obsessive-compulsive disorder and post-traumatic stress disorder were omitted. With respect to the reliability and validity of the SCARED-P, internal consistencies of the subscales are moderate to high (Cronbach's alpha ranging from 0.66 to 0.93), and parents of clinically anxious children report higher levels of anxiety symptoms on all subscales for their children compared to parents of control children (Bodden *et al.*, 2009).

Procedure

The study was approved by the ethical committee of the University of Amsterdam. Children and their parents signed informed consent before taking part in the study. Children completed a paper and pencil version of the questionnaires at school individually during a classroom session (approximately 45 minutes) under supervision of the first author or another experimenter. After completing the questionnaires, children received a small gift. Children were then handed the questionnaires for their parents, including a post-free

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return envelope. Parents completed the questionnaires at home (estimated duration of 60 minutes) and mailed them back to the university. Schools received a compensation of 100 euro per 60 participating children and parents received 10 euro.

Results

Descriptive statistics

Data were not normally distributed, therefore non-parametric tests were used. See Table 2 for the means,

Table 2. Descriptive statistics for the child anxiety measures (dimensional scales and SCARED)

	N	Mean (SD)	Median	Range	Possible range
Child self-report					
Dimensional scales					
SAD	123	6.65 (5.93)	5	0–25	0–40
GAD	121	6.38 (6.08)	5	0–36	0–40
SP	124	9.20 (6.95)	9	0–32	0–40
AG	124	6.84 (6.04)	5	0–32	0–40
PD	127	4.38 (5.19)	3	0–29	0–40
SepAD	129	3.90 (4.78)	3	0–30	0–40
SCARED subscales					
SAD	368	5.15 (3.13)	5	0–18	0–18
GAD	374	4.52 (3.27)	4	0–18	0–18
SP	369	7.91 (5.07)	7	0–20	0–30
PD	370	3.77 (3.33)	3	0–21	0–26
SepAD	369	5.75 (3.65)	5	0–20	0–24
Father report about child					
Dimensional scales					
SAD	87	4.01 (4.91)	1	0–20	0–40
GAD	84	3.60 (4.84)	2	0–20	0–40
SP	76	5.83 (7.43)	2	0–24	0–40
AG	77	1.99 (5.29)	0	0–40	0–40
PD	90	0.61 (1.12)	0	0–6	0–40
SepAD	89	0.65 (1.80)	0	0–13	0–40
SCARED subscales					
SAD	251	3.45 (3.07)	3	0–16	0–18
GAD	249	2.99 (2.73)	2	0–15	0–18
SP	248	4.71 (4.17)	4	0–20	0–30
PD	250	1.20 (1.99)	1	0–15	0–26
SepAD	249	3.29 (2.99)	3	0–18	0–24
Mother report about child					
Dimensional scales					
SAD	91	4.99 (5.43)	3	0–21	0–40
GAD	93	4.33 (5.21)	3	0–25	0–40
SP	92	5.82 (7.69)	2	0–32	0–40
AG	94	2.98 (6.28)	0	0–40	0–40
PD	95	1.08 (2.31)	0	0–15	0–40
SepAD	97	1.48 (3.39)	0	0–18	0–40
SCARED subscales					
SAD	280	4.17 (3.74)	3	0–16	0–18
GAD	274	3.44 (3.37)	3	0–17	0–18
SP	278	5.50 (4.66)	5	0–25	0–30
PD	278	1.36 (1.88)	1	0–11	0–26
SepAD	270	3.88 (3.64)	3	0–20	0–24

standard deviations, and ranges of responses to the dimensional scales and SCARED.

Internal consistency

Cronbach's alpha coefficients of the dimensional scales were generally high for both child self-report and parents' reports, all $\alpha > 0.78$ (see Table 3), indicating a high level of homogeneity, with the exception of father-reported child PD which was low ($\alpha = 0.36$).

Validity

Spearman's correlations were calculated between each dimensional scale and each subscale of the SCARED to examine the validity of the dimensional scales. These

Table 3. Cronbach's alphas for the six dimensional scales for the child, father, and mother version (all reporting child anxiety)

	Child self-report		Father report about child		Mother report about child	
Dimensional scale	α	*n*	α	*n*	α	*n*
SAD	0.84	123	0.89	87	0.88	91
GAD	0.87	121	0.90	89	0.88	93
SP	0.84	124	0.93	76	0.95	92
AG	0.84	124	0.96	77	0.92	94
PD	0.86	127	0.36	90	0.82	95
SepAD	0.86	129	0.78	89	0.91	97

Table 4. Spearman's correlations between dimensional scales and SCARED within informant

Dimensional scales	SCARED SAD	SCARED GAD	SCARED SP	SCARED PD	SCARED SepAD
Child self-report (n = *123)*					
SAD	0.59 (ref)	0.58	0.47*	0.67	0.65
GAD	0.41*	0.55 (ref)	0.50	0.61	0.71
SP	0.39	0.42	0.42 (ref)	0.44	0.32
AG	0.39	0.43	0.46	0.49	0.31
PD	0.48	0.49	0.42	0.52 (ref)	0.46
SepAD	0.41	0.38	0.44	0.45	0.48 (ref)
Father report about child (n = *89)*					
SAD	0.39 (ref)	0.62	0.30	0.28	0.41
GAD	0.46**	0.67 (ref)	0.26***	0.28***	0.43**
SP	0.32	0.40	0.29 (ref)	0.23	0.37
AG	0.44	0.43	0.41	0.42	0.41
PD	0.24*	0.47	0.19*	0.42 (ref)	0.36
SepAD	0.28	0.42	0.34	0.33	0.43 (ref)
Mother report about child (n = *93)*					
SAD	0.67 (ref)	0.65	0.33***	0.54*	0.48**
GAD	0.57**	0.73 (ref)	0.27***	0.55**	0.53**
SP	0.22	0.25	0.36 (ref)	0.24	0.19
AG	0.37	0.37	0.41	0.36	0.33
PD	0.12*	0.42	0.27	0.33 (ref)	0.50
SepAD	0.37**	0.46	0.42*	0.46	0.59 (ref)

Note: ref = reference correlation for test of correlated coefficients. AG is not measured in the current version of the SCARED, therefore validity could not be calculated for AG. Reported *n* values represent the maximum number of participants, as *n* values slightly differed across scales due to some missing data.
*$p < 0.10$; **$p < 0.05$, ***$p < 0.01$.

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correlations for conceptually similar and distinct measures were statistically compared with a Fisher *r*-to-*z* transformation. Spearman's correlations between the total score of each dimensional scale and the total score of each SCARED subscale can be found in Table 4. Moderate to high correlations appeared between each dimensional scale and its corresponding counterpart on the SCARED for all informants (all p values < 0.01), indicating some convergent validity. With respect to the intercorrelations of the dimensional scales with non-corresponding SCARED scales, discriminant validity was only demonstrated for GAD father and mother report about the child, but not for SAD, SP, PD and SepAD (for all informants, see Table 4). As AG is not measured in the current version of the SCARED, validity could not be calculated for AG.

Clinical sensitivity

Mann–Whitney *U* tests were conducted to examine whether participants who exceeded the cutoff on the SCARED scored significantly higher on the dimensional scales than those who scored below the cutoff. The following cutoff scores were used: ≥ 8 for all five SCARED-C scales, ≥ 7 for SCARED-P PD, SAD, and SP scales, and ≥8 for SCARED-P GAD and SepAD scales (Bodden *et al.*, 2009). Clinical sensitivity could not be calculated for AG as the SCARED does not measure AG. Results confirmed significantly higher scores among participants who exceeded the SCARED cutoff scores versus those who did not for all dimensional scales, except for father-reported child PD (see Table 5).

Table 5. Comparisons (Mann–Whitney U tests) of total scores on the dimensional scales between participants who did versus who did not exceed the clinical cutoff scores on the SCARED

	Above cutoff		Below cutoff		
Dimensional scales	Mean rank	*n*	Mean rank	*n*	*U*
Child self-report					
SAD	85.50	17	54.50	100	399.50**
GAD	94.54	25	50.81	94	311.50**
SP	73.61	54	48.69	65	1020.00**
AG	—	—	—	—	—
PD	103.04	13	55.94	108	155.50**
SepAD	84.69	26	55.92	97	671.00**
Father report about child					
SAD	62.43	14	39.82	72	239.00**
GAD	67.00	6	38.35	74	63.00**
SP	44.72	25	32.98	48	407.00*
AG	—	—	—	—	—
PD	85.00	1	44.55	88	4.00
SepAD	76.29	7	42.33	82	68.00**
Mother report about child					
SAD	69.02	24	36.95	66	227.50**
GAD	79.00	11	41.46	80	77.00**
SP	53.60	31	41.25	59	663.50*
AG	—	—	—	—	—
PD	90.83	3	45.01	89	0.50**
SepAD	74.13	12	42.98	81	160.50**

Note: as AG is not measured in the current version of the SCARED, clinical sensitivity of AG could not be calculated.
*$p < 0.05$, **$p < 0.01$.

Parent–child and father–mother agreement on child anxiety

Spearman's correlations between parent about child and child self-report are depicted in Table 6 for dimensional scales and SCARED scores. No significant correlations were found between child report and parent report on the dimensional scales, except for father-reported child PD and child self-reported PD. Next, we investigated whether parent–child agreement on the dimensional scales was comparable to parent–child agreement on the SCARED. Using Fisher *r*-to-*z* transformations, correlations between father about child/mother about child and child self-report on the dimensional scales and the SCARED were statistically compared. Father–child agreement on the dimensional scales did not differ from the SCARED, except for SP and SepAD (father–child agreement on the SCARED was higher than on the dimensional scales; $z = -3.39$, $p < 0.01$ and $z = -3.99$, $p < 0.01$ respectively). Also, mother–child agreement on the dimensional scales did not differ from the SCARED, except for SP (mother–child agreement on the SCARED was higher than on the dimensional scales; $z = -2.82$, $p < 0.01$).

With respect to father–mother agreement on child anxiety on the dimensional scales (see Table 7), significant correlations between father and mother report emerged for all scales, except for PD and SepAD. Correlations between father and mother report on the dimensional scales and the SCARED were statistically compared with a Fisher *r*-to-*z* transformation. Father–mother agreement on the dimensional scales did not differ from the SCARED, except for SepAD (father–mother agreement on the SCARED was higher than on the dimensional scales; $z = -3.50$, $p < 0.01$).

Table 6. Parent–child agreement (Spearman's correlations) on the concurrent dimensional scales and SCARED scales

	Father-report about child				Mother-report about child			
	Dimensional scale		SCARED		Dimensional scale		SCARED	
	r_s	*n*	r_s	*n*	r_s	*n*	r_s	*n*
Child self-report								
SAD	0.13	87	0.22**	241	0.18	91	0.28**	269
GAD	0.17	81	0.22**	242	0.10	90	0.29**	266
SP	−0.06	75	0.38**	238	0.04	90	0.37**	268
AG	−0.10	72	—	—	−0.10	89	—	—
PD	0.21*	89	0.05	240	−0.03	95	0.12	267
SepAD	−0.08	89	0.40**	242	0.20	97	0.33**	261

Note. Correlations between child report and parent report for the same disorder are displayed (e.g. the correlation between child self-reported SAD and father-reported child SAD on the dimensional scales is 0.13). AG is not measured in the current version of the SCARED; therefore parent–child agreement could not be calculated for AG.
*$p < 0.05$, **$p < 0.01$.

Table 7. Father–mother agreement on child anxiety (Spearman's correlations) on the dimensional scales and SCARED

	Mother report about child			
	Dimensional scales		SCARED	
	r_s	*n*	r_s	*n*
Father report about child				
SAD	0.53*	84	0.60*	244
GAD	0.57*	83	0.54*	240
SP	0.64*	72	0.57*	239
AG	0.37*	75	—	—
PD	0.18	87	0.39*	241
SepAD	0.18	88	0.55*	234

Note: Correlations between father report and mother report for the same disorder are displayed (e.g. the correlation between father-reported child SAD and mother-reported child SAD on the dimensional scales is 0.53). AG is not measured in the current version of the SCARED; therefore father–mother agreement could not be calculated for AG.
*$p < 0.01$.

Discussion

The present study provides preliminary evidence for good psychometric properties of a set of dimensional scales for anxiety disorders in a population of unselected children as reported by themselves and their parents. Internal consistency of the dimensional scales was generally high, and children who exceeded the SCARED cutoffs scored higher on the dimensional scales than those who did not, indicating that the dimensional scales show some clinical sensitivity. In general, parent–child agreement and father–mother agreement on child anxiety of the dimensional scales did not differ from the SCARED.

This was the first study including the dimensional scale on SepAD. The studies of LeBeau *et al.* (2012), Beesdo-Baum *et al.* (2012), and Knappe *et al.* (2013) only assessed SP, AG, PD, SAD, and GAD. Our study showed that the SepAD dimensional scale was equally internally consistent, convergent, and clinically sensitive as the other dimensional scales.

Internal consistency of the dimensional scales proved to be good, except for father-reported child PD ($\alpha = 0.36$). This may be due to low variance in PD scores: almost all fathers reported that their children did not experience any PD symptoms. The dimensional scales were able to differentiate between individuals who did or did not exceed the SCARED cutoffs. Only the mean PD score (father-report on child anxiety) of children who scored above the SCARED PD cutoff did not differ from the mean score of children who scored below the cutoff, most likely because only one child scored above the cutoff.

With respect to convergent validity of the dimensional scales, significant correlations emerged between each dimensional scale and the corresponding SCARED scale for both child self-report and mother/father report about the child. Discriminant validity (i.e. a lack of convergence between each dimensional scale and non-corresponding SCARED scales) was only demonstrated for GAD father

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and mother report about the child, but not for SAD, SP, PD, and SepAD (for all informants). An explanation for this finding is that the SCARED and the dimensional scales are conceptually too similar to assess discriminant validity. Formal tests of discriminant validity could not be performed, as no measures assessing theoretically distinct domains, such as depression, were included in this study.

Parent–child agreement on the dimensional scales generally did not differ from parent–child agreement on the SCARED. On both scales, parent–child agreement was low. This is in line with other studies, indicating that parent and child reports are usually discrepant (e.g. Benjamin *et al.*, 2011; Comer and Kendall, 2004). For example, Benjamin *et al.* (2011), using the Anxiety Disorders Interview Schedule child and parent versions, showed that children reported fewer worries and physiological symptoms than their parents about them and that children's self-reports were less predictive of child anxiety disorder than parent reports. It is therefore recommended to administer the dimensional scales to both children and parents. Although informants may differ in their view on the child's anxiety, it should not be assumed that one view is better than another (Grills and Ollendick, 2003). As Ollendick and Hersen (1993) point out, incorporating these different viewpoints may be more likely to result in a complete diagnostic picture of the child.

Regarding father–mother agreement on child anxiety using the dimensional scales, father and mother report were significantly correlated for the SAD, GAD, SP, and AG scales, but not for PD and SepAD. Compared to mothers, fathers reported almost no PD and SepAD symptoms in their children, complicating measuring agreement about level of symptoms (see also Table 2). In general, fathers reported less anxiety across scales compared to mothers, which is consistent with other studies showing that fathers report less anxiety in their children than mothers (e.g. Bögels and van Melick, 2004). Generally, father–mother agreement on the dimensional scales did not differ from the SCARED.

Correlations between parent and child report, and correlations between father and mother report on the subscales PD and SepAD were better for the SCARED than for the dimensional scales. Therefore, the SCARED is preferred as an instrument to screen for children with high levels of anxiety in community populations, as the present study's population was. However, the dimensional scales are a valuable addition to the currently available measures used to assess anxiety disorders in clinical populations. Professionals may use the scales to get an impression of the type of anxiety disorder a child may suffer from, the level of anxiety within each of the disorder types, and the typical characteristics (cognitive, avoidance, somatic, etc.). The child may complete the scale under guidance of a professional, and the professional may want to talk with the family about discrepancies between the different informants (child and parents). Lack of correspondence between informants is not an insurmountable problem for clinical purposes, as it will give the professional valuable information.

The results of this study should be interpreted with the following limitations taken into account. First, children only filled in two dimensional scales due to possible participant burden. As a consequence, the number of children filling in each scale was smaller than the number of children filling in the SCARED. Second, the study sample was quite homogeneous, with mostly married parents and their children, possibly limiting the generalizability of the present findings. Moreover, because most parents and children were Caucasian, cultural sensitivity, a major issue in the development of DSM-5 (American Psychiatric Association, 2010), could not be examined. Third, the characteristics of the non-responders are unknown and it is possible that highly anxious parents and children did not participate in the study. Fourth, this study was conducted in a community sample of parents and children. Therefore, it remains unclear if the results can be generalized to clinical groups of children and parents with anxiety disorders. Future studies should evaluate the psychometric properties and clinical utility of the dimensional scales in a population of clinically anxious children and their parents, as well as in children from other age groups and from different cultural and socio-economic backgrounds. Fifth, and maybe most importantly, although we adapted the language of the original dimensional scales to ensure comprehensibility of the scales by 8- to 13-year-olds and piloted the comprehensibility, some children indicated afterwards that the five-point Likert scales and the language of the questionnaire were difficult. Future research should assess the comprehensibility of the scales and the need for guidance of an adult.

Several other directions for further research can be formulated. First, it is important to assess test–retest reliability of the scales. LeBeau *et al.* (2012) already demonstrated strong test–retest reliability of all dimensional scales, with the exception of SP, in a sample of college students. As anxiety disorders tend to naturally wax and wane over time, especially in young age groups (Beesdo *et al.*, 2009), it remains unclear whether the test–retest reliability in children will be as stable as in adults. Second, formal discriminant validity should be assessed using scales that assess domains theoretically distinct from anxiety, such as depression. Third, it is important to validate the dimensional scales relative to

clinician-rated measures, such as the Anxiety Disorders Interview Schedule (DiNardo *et al.*, 1994). In this way, the clinical sensitivity can be studied better. Fourth, a next step would be to examine the latent factor structure of the dimensional scales to assess whether the items cluster together in disorder subscales as intended, as was already done for the adult version of the dimensional scales (Beesdo-Baum *et al.*, 2012). Moreover, the degree to which the scales behave dimensionally should be examined, for example by a taxometric analysis. Finally, as the dimensional scales are similar in structure and content across anxiety disorders, the overlap across anxiety disorders can be studied more extensively.

In summary, the findings of the present study show that the dimensional scale measure is a valid and reliable tool for the assessment of anxiety in a community sample. The current findings demonstrate that the dimensional scales possess good internal consistency, clinical sensitivity and convergent validity in children. The studies of Beesdo-Baum *et al.* (2012), LeBeau *et al.* (2012), and Knappe *et al.* (2013) already showed good psychometric properties for the dimensional scales when used with adults, and the results of our study provide preliminary support for the use of these scales with children, although more research is needed. The dimensional scales may offer advantages over the currently available measures used to assess anxiety disorders, especially regarding the rating of symptoms common to multiple anxiety disorders.

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Declaration of interest statement

The authors have no competing interests.

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Appendix A. Social Anxiety Disorder Dimensional Scale

The following questions ask about thoughts, feelings, and behaviors that you may have had about *social situations*. Examples of social situations are: giving a speech in class, asking or answering questions in class, going to a party, starting a conversation, speaking to children you do not know, giving and receiving compliments, saying no, and eating and writing while others are watching.

Please rate how often the following statements are true for you:

During the *past month*,

		Never	Almost never	Some-times	Often	Always
1	I suddenly felt panicky, fearful or frightened in social situations	0	1	2	3	4
2	I felt anxious, worried, or nervous about social situations	0	1	2	3	4
3	I had thoughts of being rejected, I was ashamed, shy, I thought I was made fun of, or that I had upset others	0	1	2	3	4
4	I felt my heart beating fast, felt sweaty, had trouble breathing, passed out, or felt shaky in social situations	0	1	2	3	4
5	I felt tense muscles, was unable to sit still, or had trouble relaxing in social situations	0	1	2	3	4
6	I stayed away from social situations	0	1	2	3	4
7	I left social situations early or I did not participate much (for example, said little, or did not make eye contact with other people)	0	1	2	3	4
8	I spent a lot of time thinking about what to say or do in social situations	0	1	2	3	4
9	I did other things to stop thinking about social situations	0	1	2	3	4
10	I needed help to deal with social situations (for example, medicines, lucky charms, other people)	0	1	2	3	4

Appendix B. Specific Phobia Dimensional Scale

The following questions ask about thoughts, feelings, and behaviors that you may have had about different situations. Please first circle the item below that makes you most anxious. Choose only one item.

a. Driving, flying, tunnels, bridges, or closed spaces
b. Animals or insects
c. Heights, storms, or water
d. Blood, needles, or injections
e. Choking or throwing up

Now, please rate how often the following statements are true for you for the situation you have circled.

During the *past month*,

		Never	Almost never	Some-times	Often	Always
1	I suddenly felt panicky, fearful or frightened in these situations	0	1	2	3	4
2	I felt anxious, worried, or nervous about these situations	0	1	2	3	4
3	I thought that I would get injured, that I would suddenly become very anxious, or that other bad things would happen in these situations	0	1	2	3	4
4	I felt my heart beating fast, felt sweaty, had trouble breathing, passed out, or felt shaky in these situations	0	1	2	3	4
5	I felt tense muscles, was unable to sit still, or had trouble relaxing in these situations	0	1	2	3	4
6	I stayed away from these situations	0	1	2	3	4
7	I left these situations (early)	0	1	2	3	4
8	I spent a lot of time getting ready for, or putting off, these situations	0	1	2	3	4
9	I did other things to stop thinking about these situations	0	1	2	3	4
10	I needed help to deal with these situations (for example, medicines, lucky charms, other people)	0	1	2	3	4

Appendix C. Agoraphobia Dimensional Scale

The following questions ask about thoughts, feelings, and behaviors that you may have had about the following situations: large groups of people, public places, traveling by public transport (for example, buses, planes, trains), traveling alone or being away from home.

Please rate how often the following statements are true for you:

During the *past month*,

		Never	Almost never	Some-times	Often	Always
1	I suddenly felt panicky, fearful or frightened in these situations	0	1	2	3	4
2	I felt anxious, worried, or nervous about these situations	0	1	2	3	4
3	I had thoughts about panic attacks, unpleasant feelings in my body, getting lost, or to suddenly become very anxious in these situations	0	1	2	3	4
4	I felt my heart beating fast, felt sweaty, had trouble breathing, passed out, or felt shaky in these situations	0	1	2	3	4
5	I felt tense muscles, was unable to sit still, or had trouble relaxing in these situations	0	1	2	3	4
6	I stayed away from these situations	0	1	2	3	4
7	I left these situations (early) or remained close to the exit	0	1	2	3	4
8	I spent a lot of time getting ready for, or putting off, these situations	0	1	2	3	4
9	I did other things to stop thinking about these situations	0	1	2	3	4
10	I needed help to deal with these situations (for example, medicines, lucky charms, other people)	0	1	2	3	4

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Appendix D. Panic Disorder Dimensional Scale

The following questions ask about thoughts, feelings, and behaviors about panic attacks. A panic attack is when you suddenly get very anxious (without a reason). Then you can feel your heart beating fast, have trouble breathing, feel dizzy, sweat a lot, and be fearful of losing control or dying.

Please rate how often the following statements are true for you:

During the *past month*,

		Never	Almost never	Some-times	Often	Always
1	I suddenly felt panicky, fearful or frightened (a panic attack)	0	1	2	3	4
2	I felt anxious, worried, or nervous about having more panic attacks	0	1	2	3	4
3	I had thoughts of losing control, dying, going crazy, or other bad things happening because of panic attacks	0	1	2	3	4
4	I felt my heart beating fast, felt sweaty, had trouble breathing, passed out, or felt shaky	0	1	2	3	4
5	I felt tense muscles, was unable to sit still, or had trouble relaxing or sleeping	0	1	2	3	4
6	I stayed away from situations in which I might have a panic attack	0	1	2	3	4
7	I left situations early or I did not participate much because of panic attacks	0	1	2	3	4
8	I spent a lot of time getting ready for, or putting off, situations in which I might have a panic attack	0	1	2	3	4
9	I did other things to stop thinking about these situations	0	1	2	3	4
10	I needed help to deal with panic attacks (for example, medicines, lucky charms, other people)	0	1	2	3	4

Appendix E. Generalized Anxiety Disorder Dimensional Scale

The following questions ask about thoughts, feelings, and behaviors that have often to do with worrying about family, health, money, or school.

Please rate how often the following statements are true for you:

During the *past month*,

		Never	Almost never	Some-times	Often	Always
1	I suddenly felt panicky, fearful or frightened	0	1	2	3	4
2	I felt anxious, worried, or nervous	0	1	2	3	4
3	I thought that bad things would happen, such as to my family, my health, or that accidents would happen	0	1	2	3	4
4	I felt my heart beating fast, felt sweaty, had trouble breathing, passed out, or felt shaky	0	1	2	3	4
5	I felt tense muscles, was unable to sit still, or had trouble relaxing or sleeping	0	1	2	3	4
6	I stayed away from situations that I worried about	0	1	2	3	4
7	I left situations early or I did not participate much because I worried so much	0	1	2	3	4

Appendix E. Continued

During the *past month*,

		Never	Almost never	Some-times	Often	Always
8	I spent a lot of time making decisions, getting ready for, or putting off situations, because I worried so much	0	1	2	3	4
9	I needed others to calm me down because I worried so much	0	1	2	3	4
10	I needed help to deal with anxiety (for example, medicines, lucky charms, other people)	0	1	2	3	4

Appendix F. Separation Anxiety Disorder Dimensional Scale

The following questions ask about thoughts, feelings, and behaviors that you may have had about being away from home or from people who are important to you.

Please rate how often the following statements are true for you:

During the *past month*,

		Never	Almost never	Some-times	Often	Always
1	I suddenly felt panicky, fearful or frightened when being away from home or my family	0	1	2	3	4
2	I felt anxious, worried, or nervous about being away from home or my family	0	1	2	3	4
3	I thought that bad things would happen to people that are important to me (for example, accidents) or that something bad would happen to me when being away from them (for example, getting lost)	0	1	2	3	4
4	I felt my heart beating fast, felt sweaty, had trouble breathing, passed out, or felt shaky when being away from home or my family	0	1	2	3	4
5	I felt tense muscles, was unable to sit still, or had trouble relaxing when being away from home or my family	0	1	2	3	4
6	I stayed away from places where I would be away from home or my family	0	1	2	3	4
7	I left places early to go home when being away from home or my family	0	1	2	3	4
8	I spent a lot of time getting ready for how to deal with being away from home or my family	0	1	2	3	4
9	I did other things to stop thinking about being away from home or my family	0	1	2	3	4
10	I needed help to deal with being away from home or my family (for example, medicines, lucky charms, other people)	0	1	2	3	4

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