

The Picture Anxiety Test (PAT): A new pictorial assessment of anxiety symptoms in young children

Kathrin Dubi, Silvia Schneider*

Department of Clinical Child and Adolescent Psychology, University of Basel, Missionsstrasse 60/62, 4055 Basel, Switzerland

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ABSTRACT

This study examines the psychometric properties of a newly developed pictorial anxiety assessment, the Picture Anxiety Test (PAT), designed for young children. A sample of 71 5–7-year-old children (clinically anxious and healthy controls) participated in an assessment comparing the PAT to other, established anxiety measures. Children's ratings were also compared to parent ratings of internalizing and externalizing problems. The PAT demonstrated favorable psychometric properties in this sample, including moderate to high internal consistency, high convergent validity with related constructs, and high discriminant validity between diagnostic groups and across pre- and post-treatment. Initial findings suggest that the PAT is a psychometrically sound instrument for assessing child anxiety and avoidance in young children and a valuable addition to existing diagnostic instruments for clinicians working with anxious children.

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1. Introduction

Anxiety disorders are among the most common emotional disorders of childhood and adolescence (Bernstein, Borchardt, & Perwien, 1996; Cartwright-Hatton, McNicol, & Doubleday, 2006). Although some anxieties and fears are developmentally appropriate (Muris, 2007), severe anxiety can be debilitating for some children, interfering with normal functioning, persisting over time, and continuing into adolescence and adulthood if left untreated (Costello, Mustillo, Erkanli, Keller, & Angold, 2003; Keller et al., 1992; Last, Perrin, Hersen, & Kazdin, 1996; Muris et al., 2003). Moreover, childhood anxiety disorders are associated with psychosocial and school problems, increased risk for other externalizing disorders, adult anxiety disorders, depression, and substance abuse (Brückl et al., 2007; Klein, 1994; Strauss, Lahey, Frick, Frame, & Hynd, 1988).

Although anxiety disorders have the earliest median age of onset of all mental disorders (Kessler et al., 2005; Kim-Cohen et al., 2003), and in spite of the known impact of childhood anxiety (Field, Cartwright-Hatton, Reynolds, & Creswell, 2008), research on anxiety in younger populations lags behind developments in the adult field. Despite an increasing emphasis on early detection, there are only few valid and reliable measurements to assess anxiety symptoms in preschool children. The most prominent and valid method of assessment in clinical child psychology is the

structured diagnostic interview (Ollendick & Hersen, 1993; Silverman, 1994). However, these interviews are typically conducted only with the parents if the child is less than 8 years. The format of "classical" structured interviews with "pure" questions and without any child-friendly material reduces compliance in the child and may adversely influence the validity of the child's answers. Another method for identifying emotional disturbances in childhood is through rating scales such as the commonly used Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978) and the Spence Children's Anxiety Scale (SCAS; Spence, 1998). Additionally, two new parent-report scales for measuring anxiety problems in 2–6 years old children have recently been developed. First results showed that both the Preschool Anxiety Scale (PAS; Spence, Rapee, McDonald, & Ingram, 2001) and the Children's Moods Fears and Worries Questionnaire (CMFWQ; Bayer, Sanson, & Hemphill, 2006) yielded moderate to good psychometric properties (Broeren & Muris, 2008).

Researchers generally agree that assessment of anxiety in children should be multi-informant (child, parent, and teacher) and multi-method (i.e., relying on more than one data gathering procedure) (Cartwright-Hatton et al., 2006; Ollendick & March, 2004; Silverman & Carmichael, 1999). The often modest parent-child agreement in clinical assessment (Achenbach & Edelbrock, 1989; Cartwright-Hatton et al., 2006) especially underscores the importance of gathering information from multiple informants. Specifically, parents generally tend to underreport and underestimate the number and severity of children's internalizing symptoms, especially anxiety (Cartwright-Hatton et al., 2006; Stallings & March, 1995). On the other hand, parents with anxiety

* Corresponding author. Tel.: +41 61 267 06 50; fax: +41 61 267 03 39.
E-mail address: silvia.schneider@unibas.ch (S. Schneider).

disorders themselves can tend to overreport anxiety symptoms in their children (Barbosa, Tannock, & Manassis, 2002; Comer & Kendall, 2004).

For effective assessment of the child perspective, child measurements should be age-appropriate and tailored to match young children's cognitive and verbal skills (King, Muris, & Ollendick, 2004; Ollendick, Davis, & Muris, 2004). Structured interviews such as the ADIS-C for DSM-IV (Albano & Silverman, 1996) can be difficult for children below the age of 8 years to follow. A few authors successfully overcame some of the inherent limitations associated with standard anxiety interviews and questionnaires for children by using pictures in their measurements (Ernst, Cookus, & Moravec, 2000; Ernst, Godfrey, Silva, Pouget, & Welkowitz, 1994; Muris et al., 2003; Valla, Bergeron, Bérubé, Gaudet, & St-Georges, 1994; Valla, Bergeron, & Smolla, 2000). According to these authors, pictures are well suited for the assessment of internalizing symptoms of young children, as the pictorial format focuses children's attention, stimulates their interest, and improves their participation (Ernst et al., 1994; Valla et al., 1994, 2000). In addition, as human faces are well suited to express emotions (Siegler, DeLoache, & Eisenberg, 2003), and research has shown that children aged 4 years and above are able to identify and discriminate between different emotions (Eisenberg Murphy, & Shepard, 1997), the use of pictures depicting children for assessing anxiety in boys and girls is effective and developmentally appropriate. An extensive literature review revealed three standardized self-report instruments that use the pictorial format for assessing anxiety in children below the age of 7 years: The Pictorial Instrument for Children and Adolescents (PICA-III-R) is a semi-structured interview with pictures covering five diagnostic categories for children and adolescents aged 6–16 years (Ernst et al., 1994). The Dominic questionnaire is a pictorial interview-based scale to assess mental disorders in children aged 6–11 years (Valla et al., 1994). Finally, the Koala Fear Questionnaire (KFQ) is a standardized self-report scale for assessing fears and fearfulness in children between 4 and 12 years (Muris et al., 2003). However, only the KFQ is designed for children below the age of 6 years, and both the Dominic questionnaire and the PICA-III-R are too lengthy to be conducted with children below the age of 6 years. In addition, pictures of these measurements are in black and white (KFQ), or information about this aspect is missing (PICA-III-R, Dominic). The characteristics of these instruments are shown in Table 1.

Given that fear and anxiety symptoms can develop at a very early age, a reliable and valid standardized instrument for assessing internalizing problems in children below the age of 8 years would be a valuable addition to the existing measurements of researchers and clinicians working in the field of childhood

anxiety. Based on the strength of pictorial anxiety instruments and for clinical and epidemiological purposes, we developed an anxiety test for children between 4 and 8 years, using a graphic approach. The Pictorial Anxiety Test (PAT) is based on core criteria of the DSM-IV-TR (American Psychiatric Association, 2000), and assesses the tendency toward anxiety and avoidance in specific situations using hypothetical vignettes. As it is difficult for children below the age of 11 to precisely report on the duration and onset of anxiety symptoms, these aspects are omitted from the PAT. Instead, the PAT assesses a wide range of anxieties and fears on a dimensional level, and is supplemental to the structured interview conducted with the parents of the children (e.g., ADIS-C/P for DSM-IV, Albano & Silverman, 1996).

The present study describes development and content of the PAT and examines its psychometric properties in a clinical sample and in a non-clinical control group. We first assessed internal consistency and test-retest reliability. We then predicted that the PAT would demonstrate construct validity by correlating more strongly with other self- and parent-report anxiety measures than with measures of externalizing difficulties. We further predicted that the PAT would show good discriminant validity in that it would be able to discriminate meaningfully between children with and without anxiety disorders and that there would be no differences between the children with different anxiety disorders. Finally, we predicted that the PAT would show utility in assessing the effects of a treatment for anxiety.

2. Method

2.1. Development and content of the PAT

For the first version of the PAT, an extended literature review on the contents of young children's fears and anxiety disorders was conducted and based on the available empirical data the most feared situations and objects for young children (Muris & Merckelbach, 2000; Muris, Merckelbach, Mayer, & Prins, 2000) were included. This version consists of 17 items: 11 pictures with specific phobia content (SpP), 2 pictures depicting social phobia situations (SP), 2 pictures containing generalized anxiety topics (GAD), and 2 pictures with separation anxiety situations (SAD). The first version of the PAT was tested in a community sample in schools and kindergartens. Results of this unpublished pilot study with 29 children showed good to very good internal consistency, convergent validity, comprehension, and acceptance (Groeben, Suppiger, & Schneider, 2005). In addition, professionals (21 psychologists) rated the quality of the PAT as "good" to "very good" (Binet, Suppiger, & Schneider, 2005).

Table 1
Characteristics of existing pictorial anxiety instruments.

	Dominic questionnaire (Valla et al., 1994)	PICA-III-R (Ernst et al., 1994)	KFQ (Muris et al., 2003)
Age range	6–11 years	6–16 years	4–12 years
Symptoms/diagnoses	ADHD, CD, MDD, OAD, ODD, SAD, SPh	ADHD, AGOR, AvD, CD, Ma, MDD, OAD, OCD, ODD, PD, SAD, SPh	Fears and fearfulness
Format	Structured	Semi-structured	Standardized
Size	99 pictures	137 pictures	31 pictures
Internal consistency (N; sample; age range)	$\alpha = .62-.88$ (N = 143; clinical and non-clinical sample; 6–11 years)	$\alpha = .54-.86$ (N = 51; clinical sample; 6–15 years)	$\alpha = .87-.89$ (N = 129; non-clinical sample; 4–6 years) $\alpha = .86-.89$ (N = 189; non-clinical sample; 8–11 years)
Test-retest reliability (N; sample; age range)	$\kappa > .40$; ICC = .59–.81 (N = 104; clinical and non-clinical sample; 6–11 years)	–	ICC = .92 (N = 129; non-clinical sample; 4–6 years) ICC = .84 (N = 189; non-clinical sample; 8–11 years)

Note: PICA-III-R = Pictorial Instrument for Children and Adolescents; KFQ = Koala Fear Questionnaire; ADHD = attention-deficit hyperactivity disorder; CD = conduct disorder; MDD = major depressive disorder; OAD = overanxious disorder; ODD = oppositional defiant disorder; SAD = separation anxiety disorder; SPh = simple phobia; AGOR = agoraphobia; AvD = avoidant disorder; Ma = mania; OCD = obsessive-compulsive disorder; PD = psychotic disorder, α = Cronbach's Alpha coefficient; κ = Kappa coefficient; ICC = intraclass correlation coefficient.

Each item of the PAT includes two color illustrations, depicting two different responses of a child in a potentially fearful situation (for examples, see Appendix A). In contrast to the existing pictorial measurements (Dominic, PICA-III-R, KFQ), which do not have separate pictures for boys and girls, participants who are tested with the PAT are shown illustrations depicting children of their gender (i.e., girls view illustrations of girls). The response format resembles that of the Harter scales (Harter, 1982; Harter & Pike, 1984). For each item, the two pictures are presented simultaneously: one depicts the critical symptom (e.g., child is afraid), while in the other picture the symptom is not shown (neutral). Again, this response format with two pictures per situation is different to the other pictorial instruments (Dominic, PICA-III-R, KFQ), which all have only one picture per situation. The participating child is questioned as to which child he or she resembles and indicates the degree of his or her feeling. The child's degree of fear and avoidance is assessed on a 4-point-scale ranging from "not at all" (0) to "very much" (3). The interviewer asks the child to provide separate ratings for anxiety and avoidance, but, similarly to structured interviews (e.g., ADIS-C/P for DSM-IV; Albano & Silverman, 1996), is allowed to adjust ratings based on clinical judgment. Analyses of the inter-rater reliability between two independent raters in a study with a community sample (Dubi & Schneider, submitted for publication) indicated excellent coding agreement with Cohen's Kappa ranging from $k = .83$ to $k = 1.0$.

Rather than DSM-IV-TR diagnosis classification, the PAT provides a measure of dimensional anxiety and avoidance within the 4 anxiety categories described above (SpP, SP, GAD, SAD). The PAT provides three main scores: (1) total anxiety score, (2) total avoidance score, and (3) composite score (total anxiety + total avoidance). However, comparable to structured interviews, the interviewer can use the mean score of each anxiety category to decide if one of the four assessed anxiety disorders may exist in the child. As it is not possible with the PAT to code DSM criteria as fulfilled or not, interviewers are instructed to rate DSM criteria as partially fulfilled if the symptom ratings are ≥ 2 . In these cases, more information on specific situations, impact, and duration needs to be obtained from children and/or parents. Because of the small item number in the categories SAD, GAD, and SP, and because not all DSM criteria are asked in the PAT no separate tests with respect to reliability of these DSM-diagnoses are reported in the current study.

Consequently, in line with research on the need for multi-informant clinical assessments (Achenbach & Edelbrock, 1989; Cartwright-Hatton et al., 2006; Ollendick & March, 2004; Silverman & Carmichael, 1999), the PAT serves as an additional source of information within the diagnostic process of young children.

2.2. Participants

Participants were children enrolled in a Swiss study of the behavioral, cognitive, and psychophysiological features and treatment of children with separation anxiety. This study involved three groups of children, including clinically referred children with separation anxiety, clinically referred children with mixed anxiety, and a non-clinical control group. All children were diagnosed using the Diagnostic Interview for Mental Disorders in Children and Adolescents (Kinder-DIPS; Schneider, Unnewehr, & Margraf, 2009), a structured interview in German based on DSM-IV-TR-criteria (American Psychiatric Association, 2000), similar to the ADIS-C/P for DSM-IV (Albano & Silverman, 1996).

The sample consisted of 71 children aged between 5.0 and 7.9 years ($M = 6.6$ years, $SD = 0.9$ years; 33 boys, 38 girls). According to the Kinder-DIPS, the sample was classified into the three diagnostic groups described above: Group I included 37 participants with a primary diagnosis of separation anxiety (separation

anxiety group); group II included 15 participants with a primary diagnosis of anxiety other than separation anxiety (mixed anxiety group); group III included 19 subjects with no mental disorder (non-clinical control group). Separation anxiety subjects ($n = 37$) all had a primary diagnosis of separation anxiety disorder. Sixteen children (43.2%) met criteria for at least one comorbid clinical disorder (specific phobia, generalized anxiety disorder, social phobia, major depression, oppositional defiant disorder, insomnia, attention-deficit hyperactivity disorder, enuresis, tic disorder). Subjects in the mixed anxiety group ($n = 15$) had the following primary anxiety diagnoses: social phobia ($n = 11$), specific phobia ($n = 3$), generalized anxiety disorder ($n = 1$). Five children (33.3%) of group II met criteria for at least one comorbid clinical disorder (oppositional defiant disorder, insomnia, enuresis, generalized anxiety disorder, nightmare disorder). Importantly, there were no comorbid diagnoses of separation anxiety disorder in this group. To obtain the non-clinical comparison group, non-disordered children and their families ($n = 19$) were recruited via announcements in newspapers and schools, via flyers, and from contacts of the researchers. Children in this group did not fulfill criteria for any mental disorder. Further inclusion criteria for all children from all three groups included age between 5 and 7 years and knowledge of the German language. Children were excluded if they had a comorbid pervasive developmental disorder, if they were taking psychotropic drugs, or if their knowledge of the German language was weak.

Eighty-three percent of the samples were Swiss, 16% were from other European countries, for one child the citizenship was not available. Most of the children (83%) were from two-parent-families. Parents were generally well-educated with 68% of families containing at least one parent having attained tertiary qualifications at a university or college. Table 2 shows demographics of the total sample and each diagnostic group. No significant differences were found across groups in terms of age, gender, or parental education.

2.3. Measures

2.3.1. Self-report measures

All children were interviewed with the PAT. As described, the PAT assesses anxiety and avoidance in 17 situations and provides three main scores (total anxiety score, total avoidance score, composite score).

In addition, children completed the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978; German version: Boehnke, Silbereisen, Reynolds, & Richmond, 1986), an instrument designed to assess the severity of chronic trait anxiety. The scale consists of 37 items (28 anxiety items and 9 items to check for socially desirable responding) to which the individual answers "Yes" or "No." The RCMAS is a widely used self-report questionnaire with good psychometric properties (Boehnke et al., 1986; Reynolds & Richmond, 1978), originally designed for children aged 6 years and above. However, as our sample

Table 2
Demographics of total sample and each diagnostic group.

Demographics	Total sample	Separation anxiety group	Mixed anxiety group	Non-clinical control group
N	71	37	15	19
% female	53.5	59.5	46.7	47.4
Mean age (SD)	6.6 (0.9)	6.5 (0.9)	6.5 (1.0)	6.7 (0.9)
% parents with tertiary qualification	67.6	64.9	60.0	78.9

Note: No significant differences were found in gender, age, or parental education across groups.

contained pre-literate children, questions were read aloud to all children. Ialongo, Edelsohn, Werhamer-Larsson, Crockett, and Kellam (1994) applied a similar format in their study with children aged 5 years and above and reported good internal consistencies. The internal consistency for the RCMAS in the current sample was $\alpha = .89$.

Furthermore, as a disorder-specific measure, the children completed the Separation Anxiety Inventory for Children (SAI-C; Schneider & In-Albon, in press). The questionnaire consists of 12 items assessing the level of avoidance of different separation situations on a 5-point-scale. Each item starts with "Because I am anxious, I'm avoiding... e.g., going to school, sleep in my own bed." The SAI-C has good reliabilities and construct validity (Schneider & In-Albon, in press). The internal consistency in the current sample was $\alpha = .84$.

2.3.2. Parent-report measures

Parents were interviewed about their child with the Diagnostic Interview for Mental Disorders in Children and Adolescents (Kinder-DIPS; Schneider et al., 2009), a structured interview in German based on DSM-IV-TR-criteria, similar to the ADIS-C/P for DSM-IV (Albano & Silverman, 1996). Studies with the Kinder-DIPS (Adornetto, In-Albon, & Schneider, 2008) have indicated that this instrument has a good validity and reliability for anxiety disorders ($\kappa = 0.85$) and other axis I disorders ($\kappa = 0.85-0.94$).

In addition, parents completed the parent version of the RCMAS (RCMAS-P; Pina, Silverman, Saavedra, & Weems, 2001; German version: Schneider, Adornetto, & Blatter, 2004). This version contains 37 items which assess the same areas as the child version RCMAS. In most cases both mothers and fathers were asked to fill out the questionnaires independently from each other. However, due to time and financial restrictions and since some single-parent-families participated, some parents did not provide separate information. In these cases mothers completed the questionnaires. There were separate ratings for both parents available for 49 children. Internal consistency for the RCMAS-P in the current sample was $\alpha = .89$ for mothers and $\alpha = .86$ for fathers.

Further, parents filled out the parent version of the Separation Anxiety Inventory (SAI-P; Schneider & In-Albon, in press). Similar to the child version, the SAI-P assesses the degree of the child's avoidance of a variety of separation situations. Internal consistency of the 12-items questionnaire is reported to be good (Schneider & In-Albon, in press) and was $\alpha = .86$ for mothers and $\alpha = .90$ for fathers.

Finally, parents completed the Child Behavior Checklist (CBCL; Achenbach, 1991; German version: Döpfner et al., 1993). The CBCL is one of the best-studied instruments for the evaluation of children's psychopathology and includes 118 items describing child behavior and emotional problems. Parents are asked to indicate whether each behavior is not true for their child (0), somewhat or sometimes true (1), or very true or often true (2) now or during the past six months. Several studies have supported the instrument's psychometric properties, showing good reliability and validity of both the English version (Achenbach, 1991; Cohen, Gotlieb, Kershner, & Wehrspann, 1985; Sandberg, Meyer-Bahlburg, & Yager, 1991) and the German version (Reinhard & Remschmidt, 1999; Schmeck et al., 2001). The internal consistencies in the current sample were $\alpha = .88$ (mothers) and $\alpha = .84$ (fathers) for the internalizing problems scale and $\alpha = .93$ (mothers) and $\alpha = .91$ (fathers) for the externalizing problems scale.

2.3.3. Clinicians' measure

The Global Assessment of Functioning (GAF; American Psychiatric Association, 2000) was applied to rate the children's

functioning considering psychological, social, and occupational functioning. Scores range from 0 to 100, with higher ratings indicating better functioning. The GAF has good psychometric properties (Hilsenroth et al., 2000; Jones, Thornicroft, Coffey, & Dunn, 1995).

2.4. Procedure

Children and their parents gave written consent to participate in the separation anxiety disorder research project, approved by the Ethics Committee of Basel, Switzerland, which informed them of the child's right to withdraw at any time. No child withdrew from participation. All children had either been referred to the Department of Clinical Child and Adolescent Psychology at the University of Basel for participation in the study on separation anxiety disorder or had contacted the department to participate in the healthy control group. The children were interviewed individually in a room at the Department of Clinical Child and Adolescent Psychology at the University of Basel. Each administration of the PAT and the questionnaires took between 30 and 60 min and was conducted by different interviewers. The interviewers were trained in conducting the test and supervised by the first author. Twenty-two children (13 girls, 9 boys, mean age = 6.5 years, $SD = 0.9$) from the separation anxiety group ($n = 37$) were in a waitlist group before treatment started and were therefore scheduled for a second administration of the PAT, 4–6 weeks following the first test. As the current study was part of an extensive study on the cognitive-behavioral treatment of children with separation anxiety, the PAT was administered to a subsample of 29 children again 4 weeks after the end of a 16-session combined child–parent therapy to test for the effect of the therapeutic intervention. Importantly, post-treatment assessments were conducted by a rater who was blind to the first assessment and the diagnosis of the child. Parents of all children were interviewed at the university using the Kinder-DIPS and completed the questionnaires at home. The Kinder-DIPS was conducted by different interviewers who were all trained in conducting the interview and supervised by the second author.

2.5. Data analysis

Psychometric analyses were conducted using the initial completion of the PAT. Internal consistency of the PAT was computed with Cronbach's α coefficient. Test–retest reliability across the first and second PAT assessments was evaluated by calculating Pearson product–moment correlations between the PAT scores across the two administrations in the waitlist group before treatment. Pearson product–moment correlations evaluated the relation between PAT scores and other measures of anxiety and externalizing behavior. One-way analyses of variance were used to investigate differences in PAT scores across diagnostic groups. All statistically significant analyses of variance were further examined using Tukey's Follow-up tests. Finally, to check for differences in PAT scores at pre- and post-treatment, repeated measures t -tests were calculated. Significance levels were set at $p \leq .05$. Due to the small sample size and the consequences connected to this problem (statistical power and Type II errors; Jaccard & Guilamo-Ramos, 2002), borderline significance levels between $p = .051$ and $p = .10$ are also reported. Cohen's classification of correlations (Cohen, 1988) was used to understand the magnitude of associations (large correlations: $r \geq .50$, moderate correlations: r between $.30$ and $.49$, small correlations: r between $.10$ and $.29$). Likewise, following Cohen (1988), effect sizes of $d \geq 0.8$ were classified as large effects.

3. Results

3.1. Internal consistency

Internal consistencies (Cronbach's α) were calculated for the composite PAT score (total anxiety + total avoidance) and the two subscales anxiety and avoidance. Cronbach's α was .87 for the composite score, .76 for the anxiety score, and .77 for the avoidance score, indicating adequate to good internal reliability. To check whether internal consistencies were different for the children with or without an anxiety disorder, Cronbach's α were calculated separately for group I and II and for group III. In the clinically anxious group ($n = 52$), Cronbach's α was .86 for the composite score, .73 for the anxiety score, and .74 for the avoidance score. Cronbach's α was slightly lower in the healthy control group ($n = 19$; $\alpha = .83$ for the composite score, $\alpha = .63$ for the anxiety score, and $\alpha = .71$ for the avoidance score).

3.2. Test-retest reliability

Correlations between PAT scores at time 1 and time 2 (interval: 4–6 weeks) were conducted to estimate test-retest reliability of the measure before treatment in the waitlist group ($n = 22$). Moderate to strong significant correlations were found for two of the three PAT scales: composite score, $r = .49$ ($p < .05$), anxiety score, $r = .63$ ($p < .01$). The correlation between the two avoidance scores was moderate, but not significant ($r = .30$). Repeated measures t -tests were conducted to examine changes over time. Significant decreases in scores were found for all three PAT scores: composite score ($t_{21} = 2.69$, $p < .05$), anxiety score ($t_{21} = 2.93$, $p < .01$), and avoidance score ($t_{21} = 2.30$, $p < .05$).

3.3. Convergent and discriminant validity

Table 3 presents correlations between the PAT scores and child-reported measures of trait anxiety (RCMAS) and separation anxiety (SAI-C). All correlations between the PAT and the two child-reported measures were moderate to strong (RCMAS $r = .41$ – $.47$; SAI-C $r = .47$ – $.50$).

In addition to the correlation of child-reported anxiety measures, Table 4 presents correlations between children's PAT scores and parent-reported measures of trait anxiety (RCMAS), separation anxiety (SAI-P), internalizing and externalizing problems (CBCL), and clinicians' ratings of functioning (GAF). The size of the correlations between child-reported anxiety and parents' ratings differed depending on the type of parental measurement. Highest associations were found between the PAT scores and the parental separation anxiety measure SAI-P (composite score $r = .43$ for mothers, $r = .49$ for fathers; anxiety score $r = .44$ for mothers, $r = .52$ for fathers; avoidance score $r = .39$ for mothers, $r = .44$ for fathers, all p 's $< .001$). In addition, the relationships between two

Table 3

Correlations between PAT scores and other measures of psychopathology (child-report).

	RCMAS	SAI-C
N	56	58
PAT scores		
Composite score	.45***	.50***
Anxiety score	.47***	.51***
Avoidance score	.41**	.47***

Note: PAT=Picture Anxiety Test; RCMAS=Revised Children's Manifest Anxiety Scale; SAI-C=Separation Anxiety Inventory for Children. Different sample sizes are due to incomplete data sets of some children.

** $p < .01$ (two-tailed).
*** $p < .001$ (two-tailed).

of the three PAT scores and the parental RCMAS were significant with moderate correlations (composite score $r = .28$ for mothers, $r = .29$ for fathers; anxiety score $r = .31$ for mothers, $r = .30$ for fathers, all p 's $< .01$). The correlations between the avoidance subscale of the PAT and the parental RCMAS were only borderline significant ($p = .056$ and $p = .066$). In addition, most relationships between the PAT scores and the parental internalizing problems subscale of the CBCL were significant (mothers: composite score $r = .29$, $p < .05$, anxiety score $r = .33$, $p < .01$; fathers: composite score $r = .29$, $p < .05$, avoidance score $r = .29$, $p < .05$). Again, the other two correlations were only marginally significant ($p = .078$ and $p = .064$). Further, the PAT correlated significantly with the clinicians' rating of general functioning, the GAF (composite score $r = -.44$, $p < .001$, anxiety score $r = -.44$, $p < .001$, avoidance score $r = -.39$, $p < .01$). As expected, the correlations between the PAT scales and the externalizing problems subscale of the CBCL were not significant (r between .14 and .22, ns).

Between-groups analyses were conducted to evaluate the relation between diagnostic group and PAT scores. First analyses showed that clinically anxious children (group I separation anxiety group and group II mixed anxiety group) differed significantly from the healthy controls (composite score $F = 12.48$, $p < .001$, anxiety score $F = 13.53$, $p < .001$, avoidance score $F = 9.59$, $p < .01$), with high effect sizes (Cohen's d between 0.93 and 1.12). Table 5 shows PAT mean values and the results of the comparisons between the two groups.

To further analyze differences between the three diagnostic groups (separation anxiety group, mixed anxiety group, non-clinical control group), between-groups analyses were conducted and the three groups were compared to each other. As shown in Table 6, PAT mean scores differed significantly across diagnostic groups (composite score $F = 6.45$, $p < .01$, anxiety score $F = 7.15$, $p < .001$, avoidance score $F = 4.85$, $p < .05$). Tukey's Follow-up tests indicated significantly higher scores on all three PAT scores for the separation anxiety group than for the healthy control group. Effect sizes (Cohen's d) for the differences between the two groups were

Table 4

Correlations between PAT scores and parental/clinician's measures of psychopathology.

Informant (N)	RCMAS-P		SAI-P		CBCL internalizing		CBCL externalizing		GAF
	Mothers (66)	Fathers (49)	Mothers (71)	Fathers (52)	Mothers (67)	Fathers (49)	Mothers (67)	Fathers (49)	
PAT scores									
Composite score	.28*	.29*	.43***	.49***	.29*	.29*	.21	.15	-.44***
Anxiety score	.31*	.30*	.44***	.52***	.33**	.27	.22	.15	-.44***
Avoidance score	.24	.27	.39***	.44***	.22	.29*	.18	.14	-.39***

Note: PAT = Picture Anxiety Test; RCMAS-P = Revised Children's Manifest Anxiety Scale – Parent Version; SAI-P = Separation Anxiety Inventory for Children – Parent Version; CBCL = Child Behavior Checklist; internalizing, = internalizing problems subscale of CBCL; externalizing, = externalizing problems subscale of CBCL; GAF = Global Assessment of Functioning. Different sample sizes are due to incomplete data sets of some parents.

* $p < .05$ (two-tailed).
** $p < .01$ (two-tailed).
*** $p < .001$ (two-tailed).

Table 5
Means (SD) and comparisons of PAT scores by two diagnostic groups.

PAT scores	Anxiety group ^a (n = 52)	Non-clinical control group ^b (n = 19)	Effect size <i>d</i>	<i>F</i> value
Composite score	0.71 (0.48)	0.31 (0.24)	a vs. b: 1.05	12.48 ^{***}
Anxiety score	0.71 (0.49)	0.27 (0.26)	a vs. b: 1.12	13.53 ^{***}
Avoidance score	0.72 (0.50)	0.34 (0.29)	a vs. b: 0.93	9.59 ^{**}

Note: PAT = Picture Anxiety Test; range of PAT = 0 (not at all) to 3 (very much).

^a Anxiety group.

^b Non-clinical control group.

^{**} $p < .01$.

^{***} $p < .001$.

high, with d between 0.99 and 1.20). As expected, the separation anxiety group and the mixed anxiety group did not differ significantly from each other on any of the three PAT scores. Although the mixed anxiety group had higher scores on all three PAT scores than the healthy control group, the differences were only significant at a borderline level (p 's between .07 and .10). However, effect sizes for the difference between the mixed anxiety group and the non-clinical control group were medium to large with $d = 0.86$ for the difference on the composite score, $d = 0.91$ on the anxiety score, and $d = 0.77$ on the avoidance score. In addition, to get a differentiated picture of the existing anxiety symptoms across the three diagnostic groups, the scores of the four anxiety categories of the PAT (SpP, SP, GAD, SAD) were analyzed separately (anxiety and avoidance score together). As shown in Table 6, both the separation anxiety group and the mixed anxiety group displayed higher scores in all four anxiety categories, with significant differences between the separation anxiety group and the non-clinical control group on the specific phobia scores and the separation anxiety scores. The differences between the mixed anxiety group and the non-clinical control group were not

significant. However, effect sizes for the differences between the separation anxiety group and the non-clinical control group on the one hand and between the mixed anxiety group and the non-clinical control group on the other hand were medium to large (d between 0.49 and 1.14; see Table 6).

Finally, repeated measures t -tests were conducted to analyze whether the PAT is able to show treatment effects after completion of a cognitive-behavioral therapy in a small subsample of children ($n = 29$). Significant decreases in scores were found from pre- to post-treatment for all three PAT scores: composite score ($t_{29} = 3.30$, $p < .01$), anxiety score ($t_{29} = 2.80$, $p < .01$), avoidance score ($t_{29} = 3.46$, $p < .01$). These results suggest that the PAT is sensitive for treatment effects, and support the discriminant validity of the new measurement. Effect sizes for the difference between pre- and post-treatment were medium, with $d = 0.57$ for the difference on the composite score, $d = 0.49$ on the anxiety score, and $d = 0.62$ on the avoidance score. As the therapy was specifically designed to treat separation anxiety disorder, additional t -tests were conducted to check whether the effects were higher for PAT scores of the SAD items only. Significant decreases in the SAD anxiety scores were found from pre- to post-treatment ($t_{29} = 2.82$, $p < .01$), and in the SAD avoidance scores ($t_{29} = 3.41$, $p < .01$). Again, effect sizes were medium, with $d = 0.56$ for the difference on the SAD anxiety score, and $d = 0.71$ for the SAD avoidance score.

4. Discussion

The current article describes development and psychometric properties of a new pictorial child-report measure of anxiety and avoidance in a small sample of clinically anxious and healthy control children aged 5–7 years. The PAT was developed to assess a wide range of anxiety symptoms in a way, which is appropriate even for very young children. The test differs from the majority of

Table 6
Means (SD) and pairwise comparisons of PAT scores by three diagnostic groups.

PAT scores	Separation anxiety ^a (n = 37)	Mixed anxiety ^b (n = 15)	Non-clinical control ^c (n = 19)	Effect size <i>d</i>	<i>F</i> value	Tukey's
Composite score	0.74 (0.47)	0.64 (0.49)	0.31 (0.24)	a vs. b: 0.10 a vs. c: 1.15 b vs. c: 0.86	6.45 ^{**}	a = b a > c ^{**} b = c
Anxiety score	0.74 (0.49)	0.62 (0.48)	0.27 (0.26)	a vs. b: 0.12 a vs. c: 1.20 b vs. c: 0.91	7.15 ^{**}	a = b a > c ^{***} b = c
Avoidance score	0.74 (0.49)	0.67 (0.53)	0.34 (0.29)	a vs. b: 0.07 a vs. c: 0.99 b vs. c: 0.77	4.85 [*]	a = b a > c ^{**} b = c
SpP score	0.66 (0.43)	0.53 (0.32)	0.32 (0.28)	a vs. b: 0.17 a vs. c: 0.94 b vs. c: 0.70	5.27 ^{**}	a = b a > c ^{**} b = c
SP score	0.72 (0.77)	0.90 (0.84)	0.36 (0.35)	a vs. b: -0.11 a vs. c: 0.60 b vs. c: 0.84	2.83	a = b a = c b = c
GAD score	0.55 (0.58)	0.52 (0.73)	0.24 (0.36)	a vs. b: 0.02 a vs. c: 0.64 b vs. c: 0.49	2.08	a = b a = c b = c
SAD score	1.01 (0.76)	0.62 (0.65)	0.32 (0.40)	a vs. b: 0.27 a vs. c: 1.14 b vs. c: 0.56	7.23 ^{***}	a = b a > c ^{***} b = c

Note: PAT = Picture Anxiety Test; SpP = specific phobia items; SP = social phobia items; GAD = generalized anxiety items; SAD = separation anxiety items; range of PAT = 0 (not at all) to 3 (very much).

^a Separation anxiety group.

^b Mixed anxiety group.

^c Non-clinical control group.

^{*} $p < .05$.

^{**} $p < .01$.

^{***} $p < .001$.

child-report anxiety measures in terms of its pictorial approach. Findings suggest that anxiety and avoidance in young children can be reliably and validly assessed using the PAT.

The PAT scores had adequate to good internal consistencies for the composite scale as well as the two subscales (anxiety and avoidance). Thus, in terms of internal consistencies, the PAT compares favorably with reliabilities obtained in similar picture-based measurements such as the Dominic (Valla et al., 1994), PICA-III-R (Ernst et al., 1994), and KFQ (Muris et al., 2003), with equal or higher Cronbach's α compared to the other assessment tools.

Test–retest reliability with a small subsample of children in the SAD group revealed an acceptable level of test–retest reliability in children's composite scores, anxiety scores, and avoidance scores on the PAT over a 4–6 weeks period. The test–retest data showed a significant tendency for these waitlist children to report lower scores after the 4–6 weeks interval. Improvement in the untreated group is broadly consistent with previous research (e.g., Smith et al., 2007; Stein et al., 2003), and may be due to spontaneous recovery over time and/or to the therapeutic effect of retesting. All children who were retested were from the SAD group and were all highly impaired by their anxiety at the first assessment. It is possible that the mere contact with the clinicians and the waiting condition could have led to decreasing anxiety symptoms at the second administration of the PAT. To control for treatment expectation effects it has to be tested if the observed decrease in anxiety is also found in children with an anxiety disorder who are not waiting for treatment or in children without an anxiety disorder. Indeed, test–retest correlations of the PAT scores of 40 children from a community sample in another study (Dubi & Schneider, submitted for publication) were higher across time 1 and time 2 (4–6 weeks interval) compared to the scores of the children in the current study, with strong associations between $r = .65$ and $r = .71$.

The convergent validity of the PAT scores was supported by moderate correlations between the PAT scores and a widely used measure of childhood anxiety, namely the RCMAS. In addition, the PAT correlated significantly on a moderate to high level with a separation anxiety specific questionnaire, the SAI-C. In addition to the moderate to high relationships between the PAT and child-report anxiety measures, most parental measures of child anxiety were also significantly correlated with the PAT scores. However, all correlations were lower compared to the correlations with other child-reported anxiety measures and differed depending on the type of parental measurement instrument. The externalizing problems subscale of the CBCL did not correlate significantly with the PAT scores, supporting the discriminant validity of the PAT as an indicator of internalizing rather than externalizing symptoms. To sum up, there was substantial support for the convergent validity of the PAT with the majority of associations between child-reported and parental-reported child anxiety reaching significance. However, most relationships between parent and child-ratings were moderate to low. Nevertheless, the low agreement between child and parent ratings of childhood anxiety has been found in other studies (Achenbach, McConaughy, & Howell, 1987; Birmaher et al., 1997; Cartwright-Hatton et al., 2006; Grills & Ollendick, 2003; Muris et al., 2003; Silverman, 1994; Spence, 1998). Even in studies where the same measures of child anxiety have been used, correlations between parents and children have been relatively low. For example, Birmaher et al. (1997) found a moderate association of $r = .30$ between parent and child report on the total score of the SCARED. Grills and Ollendick (2003) reported low levels of agreement on the ADIS-P/C between parents and children for the presence of an anxiety disorder with k -values between .24 and .37. Thus, it is not surprising that associations between child and parent report are even lower when several instruments employing different questions and response formats

are used, as in the comparison between the PAT and the parent questionnaires. However, our research question was to test the validity of the PAT by using reliable and valid measurements as external criteria. In a next step it would be interesting and reasonable to assess both parents and children about the child's anxiety with the PAT and to analyze associations between parental and child PAT scores. In addition, given the relatively small sample size, it is hard to disentangle whether the low correlations between child and parent report are a real effect, or rather result from the power issues related to that (Jaccard & Guilamo-Ramos, 2002).

Further support for the construct validity of the PAT scores was obtained through significant correlations between all PAT scores and the clinicians' rating of general functioning (GAF), indicating that the PAT could differentiate between high and low impacted children. Again, these correlations compare favorably with relationships obtained in other child-based anxiety measurements (Masia-Warner et al., 2003).

In addition, evidence was found for the PAT's ability to discriminate individuals with and without an anxiety disorder. Composite scores, anxiety scores, and avoidance scores of the PAT were significantly higher among children with an anxiety disorder than among the healthy controls, with high effect sizes. Moreover, detailed analyses showed that all PAT scores were significantly higher among children with separation anxiety disorder than among the non-anxious children. Effect sizes for the difference between the two groups were high, supporting the discriminant validity of the PAT. Further, children in the separation anxiety group and in the mixed anxiety group did not differ significantly from each other. However, the PAT could not significantly differentiate between children with other anxiety disorders and healthy controls. Although the mixed anxiety group reported higher PAT scores than the healthy control group, the differences were only significant on a borderline level. One explanation for the marginal significances might be the small sample size. Given the fact that the effect sizes for the differences between the mixed anxiety group and the healthy control group were medium, it is very likely that these differences would reach significance when using a bigger sample. However, given that the anxious children involved in the present paper were specially selected for a research project related to separation anxiety disorder, it would be valuable in the future to investigate the psychometric properties of the PAT with a more diverse sample of clinically anxious children.

Further evidence for the discriminant validity of the PAT comes from the finding that the PAT is able to show treatment effects after a cognitive-behavioral treatment. Specifically, children in a subsample showed significant decreases of anxiety and avoidance after a combined child–parent intervention of 16 sessions, with medium effect sizes.

Although our study revealed several interesting findings, some limitations should be noted. First, as just mentioned, sample size was small; especially the mixed anxiety group and the healthy control group were both very small and considerably smaller than the separation anxiety group. In fact, given the small sample size and the consequences connected to this problem (statistical power and Type II errors; Jaccard & Guilamo-Ramos, 2002), our results are very promising. Second, generalizability of the findings is not certain. Children were recruited via different sources and were largely of a well-educated Swiss background.

In the light of the favorable psychometric properties of the PAT, the next step is to evaluate it in a bigger sample of clinically anxious children. Psychometric properties of the PAT in a community sample have been studied with promising results and are described elsewhere (Dubi & Schneider, submitted for publication). Future research should also test the practical utility of

the PAT—especially because psychometrically sound self-report anxiety measurements for this young age group are rare. Indeed, we had a panel of professionals evaluating the quality and utility of the PAT—with very favorable results in terms of suitability for young children and the need for sound, age-appropriate measurements (Dubi & Schneider, submitted for publication). Additionally, future studies could compare the PAT with other picture-based anxiety measurements. Furthermore, given the findings that the PAT scores decreased after a disorder-specific treatment, the PAT could be used as a repeated measure to assess clinical progress in the treatment of anxiety disorders.

To sum up, our results suggest that the PAT can be reliably and validly used for assessing anxiety and avoidance in young children, and should be supplemental to the structured interview conducted with the parents of the children. As mentioned, child-reported anxiety measures are important as they capture relevant

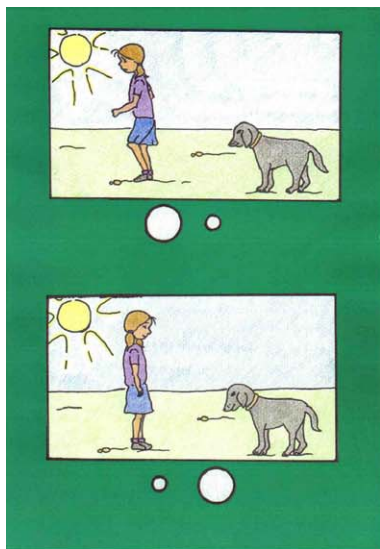
information from the child’s point of view (Cartwright-Hatton et al., 2006; Muris et al., 2003). The pictorial approach of the PAT is an effective and age-appropriate way for children aged 5–7 years to communicate, and therefore contributes to the improvement of existing techniques for assessing young children’s internalizing symptoms.

Acknowledgment

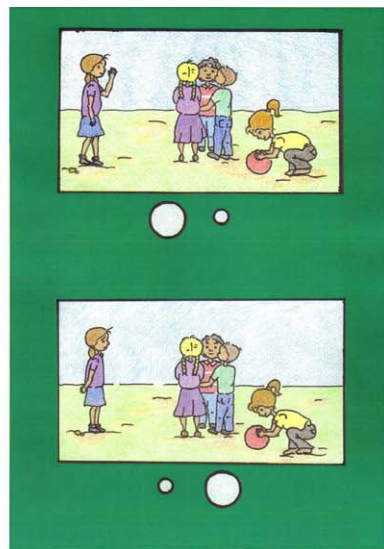
This study was funded by the Swiss National Science Foundation (SNF) (project nos. PP001-68701; 105311-116517/1).

Appendix A. Appendix

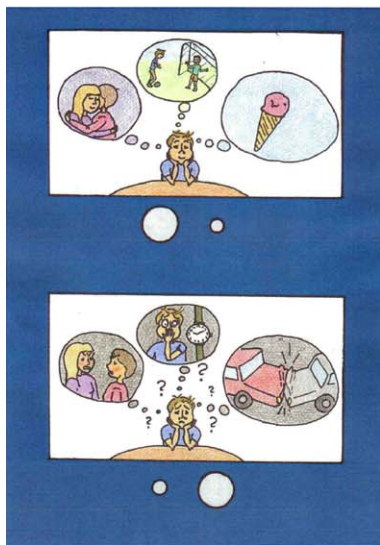
Item examples of the PAT.



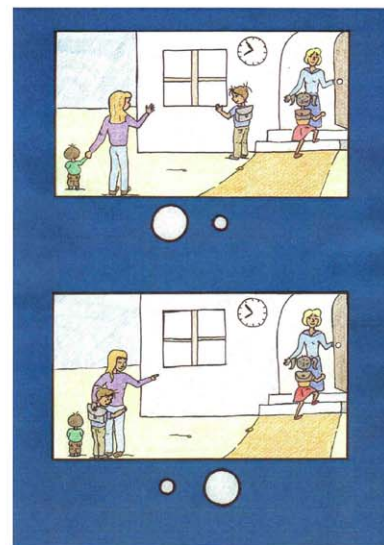
Girl scared of dogs



Girl scared of playing with and chatting to other children



Boy worrying



Boy scared of separating from mother

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