The Psychometric Properties of the Icelandic Version of the Preschool Anxiety Scale-Revised

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Foreword and Acknowledgements

Anxiety disorders are common in childhood and adolescence and studies have shown that already around the preschool age, clinically significant anxiety can be identified. It is important to identify potential anxiety problems early and treat them before they start having disabling effects. To be able to do that, reliable and valid measures are needed. To our knowledge, two Icelandic psychometrically valid measures assess anxiety symptoms in preschool aged children, the Strengths and Difficulties Questionnaire (SDQ) and the Child Behavior Checklists (CBCL). Both measures assess broader constructs like combination of depression and anxiety, conduct problems and hyperactivity/inattention symptoms. To be able to identify anxiety symptoms in young children there is a need for a measure that examines the wide range of anxiety symptoms in preschool aged children. Hence, the Preschool Anxiety Scale-Revised (PAS-R) was translated to Icelandic. The aim of this study was to assess the psychometric properties of the scale. There were two samples, one was comprised of four to six-year-old children from Icelandic preschools. Another sample consisted of children who were showing first signs of anxiety problems and were contacted through a health clinic (The Centre for Child Development and Behavior). The PAS-R is a parent-based questionnaire so parents answer on behalf of their children.

The PAS-R could be a good addition to the selection of Icelandic anxiety measures for this age group. Identifying children who are showing first signs of anxiety problems and therefore at risk of developing anxiety disorders is essential and the PAS-R could be a helpful assessment tool for this purpose. Also, the PAS-R might be suitable for assessing effectiveness of therapy or early intervention programs since it is quite short and easy to administer.

This is a final thesis to fulfil the requirements of the MSc degree in clinical psychology at Reykjavík University and presented in the style of an article for submission to

a peer-reviewed journal. Work on the study was divided on to three semesters. Preparation began in January 2015 where authors met and planned the research work. Literature review was submitted to supervisors in May 2015. Also, in May 2015 a permission from the National Bioethics Committee of Iceland was granted. In November 2015 changes to the study were made and approval from the National Bioethics Committee of Iceland was attained again. Subsequently, permissions from preschool committees in three areas in Iceland were granted. Data collection took place in January to March 2016. Preschool directors were contacted and asked to send a survey to parents via Questionpro. Parents of children in the health clinic sample were asked to fill out the PAS-R before beginning a prevention/early intervention program. A draft for method chapter was submitted to supervisors in December 2015. Data analysis and writing of this thesis took place in February to May 2016.

This study was conducted in cooperation with The Centre for Child Development and Behavior in Iceland. I would like to thank my supervisor Þórunn Ævarsdóttir for helpful advices on writing about childhood anxiety and her participation in data collection. I would also like to thank my supervisor Þorlákur Karlsson for his advises on planning the study procedure, statistical analysis and writing this theses. Finally I would like to think the preschool directors and parents who took the time to participate in the study.

Abstract

The aim of this study was to assess the psychometric properties of the Icelandic version of the Preschool Anxiety Scale-Revised (PAS-R). The PAS-R is a parent-based questionnaire designed to assess anxiety symptoms in preschool aged children and consists of four subscales; general anxiety, social anxiety, separation anxiety and specific fears. Participants were four to six-year-old children from Icelandic preschools ($N = 255$) and children in a health clinic sample who are showing first signs of anxiety problems ($N = 29$). Participants from the preschool sample had significantly lower scores than Australian participants in the original study on the PAS-R. Exploratory factor analysis demonstrated a decent fit for a four-factor model. Not all items loaded on the proposed factors though. Confirmatory factor analysis showed a rather poor fit of the four-factor model for the data. Cronbach's alpha for the total PAS-R scale was high (.908) and acceptable for all subscales (GAD = .828, SOC = .853, SEP = .743, SPC = .725) indicating good internal consistency. The PAS-R was correlated to subscales on the Strength and Difficulties Questionnaire (SDQ) and results showed decent convergent and discriminative validity. Scores on the PAS-R in the preschool sample were compared to the health clinic sample. Results indicate that the PAS-R can differentiate between children in a community sample and children showing first signs of anxiety problems. Taken together, results suggest decent psychometric properties of the Icelandic version of the PAS-R in a sample of four to six-year-old children. Although, factor structure is rather unclear and needs to be further assessed.

Keywords: anxiety, children, preschool, questionnaires, exploratory factor analysis, confirmatory factor analysis, psychometric properties

The Psychometric Properties of the Icelandic Version of the Preschool Anxiety Scale-Revised

Anxiety disorders are common in childhood and adolescence (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003; Rapee, Schniering, & Hudson, 2009) with point prevalence ranging from 3% to 18% in large community studies (Essau & Gabbidon, 2013). Studies have shown that already around the preschool age, clinically significant anxiety can be identified and categorized into patterns similar to those seen in older children (Egger & Angold, 2006; Eley et al., 2003; Mian, Godoy, Briggs-Gowan, & Carter, 2012; Spence, Rapee, McDonald, & Ingram, 2001; Sterba, Egger, & Angold, 2007). Egger and Angold (2006) compared data from three studies and found that prevalence of anxiety disorders in preschool aged children was similar to children aged 5-17. Anxiety disorders that develop in childhood or adolescence increase risks of anxiety disorders later in life (Kim-Cohen et al., 2003; Orvaschel, Lewinsohn, & Seeley, 1995; Woodward & Fergusson, 2001) and predict a variety of other mental disorders such as depression and conduct disorder (Bittner et al., 2007; Costello et al., 2003). The financial burden of families with clinically anxious children is more than that of families from the general population. This cost can be attributed to several factors including parents' loss of productivity and children's school absenteeism (Bodden, Dirksen, & Bögels, 2008; Kessler, Foster, Saunders, & Stang, 1995). Psychiatric disorders tend to cause more functional impairment as children grow older, so the ability to detect psychiatric disorders early is important (Costello et al., 2003). Research on treatment for anxiety suggests that preschool aged children might benefit from cognitive behaviour therapy (Donovan & March, 2014; Hirshfeld-Becker & Biederman, 2002). Also, prevention programs aimed to teach parents skills to help their children who are showing first signs of anxiety problems might prevent anxiety disorders from developing and have beneficial effects later in childhood (Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2010). Showing

first signs of anxiety problems refers to shy, withdrawn or inhibited children who might be at risk of developing anxiety disorders (Rapee, Lau, & Kennedy, 2010). For these reasons it is important to identify potential anxiety problems early and treat them before they start having disabling effects. To be able to do that, reliable and valid measures are needed to assess anxiety symptoms in young children.

To our knowledge, there are two Icelandic psychometrically valid measures which assess anxiety symptoms in preschool aged children, the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) and the Child Behavior Checklists (CBCL; Achenbach & Rescorla, 2000). Both measures assess broader constructs like the combination of depression and anxiety, conduct problems and hyperactivity/inattention symptoms. To be able to identify anxiety symptoms in young children a measure is needed that examines the wide range of anxiety symptoms in preschool aged children. Hence, the Preschool Anxiety Scale-Revised was translated into Icelandic (Aevarsdottir & Rikhardsdottir, 2012).

The Preschool Anxiety Scale (PAS) was developed in Australia (Spence et al., 2001) and later modified into the Preschool Anxiety Scale-Revised (PAS-R; Edwards, Rapee, Kennedy, & Spence, 2010). Spence et al. (2001) examined whether anxiety symptoms in preschool aged children reflected the anxiety subtypes consistent with the DSM-IV classification system. Five factors reflected dimensions of separation anxiety, general anxiety, social phobia, obsessive-compulsive disorder, and fear of physical injury. These factors are consistent with five factors of anxiety predicted by the DSM-IV (American Psychiatric Association, 1994). Items relating to Panic Disorder/Agoraphobia were discarded from pilot versions of the questionnaire because parents and expert clinicians found them irrelevant or rare in preschool children. Items relating to Posttraumatic Stress Disorder were not included as these are dependent upon the child experiencing trauma. Confirmatory factor analysis indicated that the five-factor model suggested by the explanatory factor analysis was the best

fit. The factors were highly correlated, indicating a higher order factor reflecting anxiety. The separation anxiety and general anxiety factors were highly correlated indicating little distinction between the two factors in this age group. The results indicated no clear gender difference suggesting that it is not seen until later in childhood. There was a clear age difference where three-year-old children showed higher levels of anxiety compared to four and five-year-olds (Spence et al., 2001).

In 2010, Edwards et al. did some modifications to the measure to better reflect common anxiety symptoms in preschool aged children. The Preschool Anxiety Scale-Revised (PAS-R) was developed by removing seven items from the PAS and adapting three items to give a clearer meaning. Moreover, nine items were added to broaden the symptom coverage. A confirmatory factor analysis was performed to assess the five-factor model demonstrated by Spence et al. (2001). Two items assessing obsessive-compulsive symptoms had poor psychometric properties and were therefore excluded from the PAS-R. The result was 28 items that measure anxiety symptoms in children aged two to five. The questions are answered by the children's parents on a five-point Likert scale. The authors tested the goodness of fit of a four-factor model, based on both mothers' and fathers' reports, which provided a good fit of the data. Results also showed clearer division between separation and generalized anxiety compared to the original version of the PAS (Edwards et al., 2010).

According to Edwards et al. (2010) the PAS-R has good psychometric properties. The measure was tested on parents of preschool children in Australia. Stability of the measure was assessed over a 12 month period. The data from the two measures were nearly identical demonstrating good test-retest reliability of the PAS-R. Also, this indicates stability in anxiety symptoms in preschool-aged children. The correlation between the PAS-R and the Emotional Symptoms Subscale of the SDQ was moderate to high, but low correlation was found with Hyperactivity-Inattention and Conduct Problem Subscales of the SDQ. This

indicates acceptable construct validity of the PAS-R. Results also showed high internal consistency for the total scale ($\alpha = .92$) and acceptable consistency for all subscales ($\alpha > .70$). The results showed no clear gender difference except for specific fears where girls scored higher according to their mothers (Edwards et al., 2010). This is in line with other studies which have failed to show gender difference in anxiety symptoms for this age group (Benga, Ţincaş, & Visu-Petra, 2010).

In addition to the Icelandic translation the PAS-R has been translated to Arabic, Dutch, Turkish, Norwegian and Chinese (Center for emotional health, n.d.). Articles about the psychometric properties of these versions have not been published to our knowledge. Psychometric properties of the Dutch and Romanian versions of the original PAS have been examined. In the Dutch study by Broeren and Muris (2008) internal consistency was moderate to high. The scores on the PAS correlated substantially with other anxiety measures indicating acceptable convergent validity. Factor analysis showed five factors consistent with results from the original study by Spence et al. (2001). Significant gender and age difference was found where girls had higher scores than boys and older children scored higher than younger children. In the Romanian study (Benga, Ţincaş, & Visu-Petra, 2010) internal consistency and construct validity were satisfactory and factor structure consistent with the original PAS version. Significant gender or age difference was not found.

The aim of this study was to assess the psychometric properties of the Icelandic version of the PAS-R. Means on the PAS-R in the Icelandic preschool sample were compared to means in the original study by Edwards et al (2010). Internal consistency of the total scales and subscales was assessed. Exploratory and confirmatory factor analysis were used to assess the factor structure of the scale and the aim was to test the four-factor model demonstrated by Edwards et al. Convergent and discriminative validity was evaluated by correlating scores on the PAS-R with subscales on the SDQ. Scores on the PAS-R in a community sample were

also compared to scores in a sample of children from a health clinic sample. This was done to assess if the PAS-R discriminates between children in community sample and children showing first signs of anxiety problems.

Method

Participants

Participants were children aged four to six years in Icelandic preschools ($N = 255$), 101 (40%) boys, 121 (47%) girls and 33 (13%) children where information about gender was missing. The sample consisted of 84 (33%) four-year-olds, 110 (43%) five-year-olds, 27 (11%) six-year-olds and 34 (13%) children where precise information about age was missing ($M = 4.74$ years, $SD = 0.66$). In 186 (73%) cases mothers answered on behalf of their children, in 34 (13%) cases fathers did so, in one case (< 1%) legal guardian and in 34 (13%) information about respondent was missing. The original study by Edwards et al. (2010) included three to five-year-old children but this study four to six-year-old. The reason for not including three-year-old children was few referrals to the health clinic in this age group and we wanted to have the samples comparable. The reason for including six-year-old children is that these children only recently turned six-years-old and were born in the same year as most of the five-year-old children in the sample.

Another sample of children aged four to six from a health clinic in Iceland ($N = 29$) consisted of 15 boys (52%) and 14 girls (48%) ($M = 4.86$ years, $SD = 0.79$). Of the 29 participants, 11 (38%) were four-year-olds, 11 (38%) five-year-olds and seven (24%) six-year-olds. In 20 (58%) cases mothers answered on behalf of their children, in four (14%) cases fathers did so and in five (17%) cases both parents answered. The children's parents attended a preventive/early intervention program for parents of children who were shy, withdrawn or behaviourally inhibited (The Cool Little Kids Program). Since this is a preventive/early intervention program, anxiety symptoms are not systematically assessed

before parents attend. Hence, the children did not have confirmed diagnosis of anxiety disorders.

Measures

The Preschool Anxiety Scale-Revised (PAS-R). The PAS-R is a parent-based questionnaire designed to assess anxiety symptoms in children aged two to five. The PAS-R consists of 28 items rated from 0 (*not at all true*) to 4 (*very often true*). Total score can range from 0 to 112 were higher score indicates more anxiety. Items are intended to assess DSM-defined symptoms of social anxiety (SOC; seven items), separation anxiety (SEP; five items), general anxiety (GAD; seven items) and specific fears (SPC; nine items). These four factors provided the best fit for the data in the original PAS-R study (Edwards et al., 2010). As mentioned earlier, the Australian version of the PAS-R has good psychometric properties. Internal consistency for the total scale is high (α = .92) and acceptable consistency for all subscales (GAD; α = .83, SOC; α = .89, SEP; α = .79, SPC; α = .72). The PAS-R was translated to Icelandic using a translation-back-translation technique by psychologists with experience in working with childhood anxiety, two psychology students, and a translator. The translation was piloted in two small samples and alterations made afterwards (Aevarsdottir & Rikhardsdottir, 2012).

The Strength and Difficulties Questionnaire (SDQ). The SDQ (parent version) consists of 25 items describing negative and positive traits of children rated on a three-point scale; not true, somewhat true or certainly true. These items assess symptoms on five subscales; emotional symptoms, hyperactivity-inattention, prosocial behaviour, peer problems and conduct problems. When total score is calculated, five items which assess positive traits are turned. Total scores range from 0 to 40 where higher score indicates higher likelihood of a psychiatric disorder. The psychometric properties of the Icelandic version of SDQ have been examined in a sample of five-year-old children. The results indicated that the

psychometric properties were not satisfactory for this age group. Internal consistency was unsatisfactory ($\alpha < .70$) on all subscales except hyperactivity-inattention scale ($\alpha = .74$) (Hrafnsdottir, 2006). Despite these results the SDQ was included in this study due to a lack of instruments assessing anxiety symptoms in Icelandic preschool children. Also because the SDQ was used to assess the construct validity of the PAS-R in the original study by Edwards et al. (2010) and therefore the results are comparable.

Procedure

This study was approved by the National Bioethics Committee of Iceland. Approval was also obtained from preschool committees from three areas of Iceland (Akureyri, Reykjanesbær, and Reykjavík). Preschools from these areas were randomly selected for participation and of the 23 who were selected, 15 preschool directors accepted participation. Data collection took place from January to March 2016. The preschool directors got an e-mail with information about the study and were asked to forward a link to the study (using *Questionpro*) to parents of children aged four to six who attended their preschool. They were later asked to send out e-mails to parents to remind them to participate in the study. The link contained information for parents about the study and their participation, background questions, the PAS-R and SDQ, which they answered electronically. Parents were informed that their answers would not be traceable back to them. Approximately 35% of parents accepted participation. To be included, parents were required to speak Icelandic.

Parents in the health clinic sample received an informed consent and filled out the PAS-R before beginning The Cool Little Kids Program.

Statistical Analysis

SPSS (22.0) was used to analyse the data. Missing values on the PAS-R and SDQ were less than 1.5% of total values (well below the 5% threshold) and were replaced with means from other participants on that particular item. Some participants chose only to answer

the PAS-R but not the SDQ. Internal consistency of the total PAS-R scale and subscales was examined using Cronbach's alpha. Exploratory factor analysis with direct oblimin rotation was performed to assess the factor structure of the PAS-R. A direct oblimin rotation was chosen allowing correlation between factors. To examine the construct validity of the scale, scores were correlated with Emotional Symptoms, Conduct Problems and Hyperactivity-Inattention Subscales on the SDQ. Results from the preschool sample were compared to the health clinic sample to assess how well the PAS-R differentiated between children in the community sample and children who are showing first signs of anxiety problems. T-tests between means from the Icelandic preschool sample and the Australian sample were conducted using Excel. This was done separately for mother's and father's reports so means would be comparable to the Australian results. Other analyses were conducted using mother's and father's reports together due to small number of father reports. Confirmatory factor analysis was performed using AMOS (24.0) to further explore the factor structure of the PAS-R. The goal was to test the four-factor model demonstrated by Edwards et al. (2010). To assess the model fit, the goodness of fit index (GFI), the adjusted goodness of fit index (AGFI), and the normed fit index (NFI) were used were values larger than .95 indicate good fit for the data (Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999). Also, standardized root mean square residual (SRMR) with value lower than .08 indicating good fit and root mean square error of approximation (RMSEA) with value lower than .06 were used (Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999).

Results

Means and Standard Deviations

Table 1 shows means and standard deviations for the total PAS-R scale and the four subscales in the Icelandic sample and the Australian sample from the original PAS-R study (Edwards et al., 2010).

Table 1

Means and Standard Deviations on the Total PAS-R Scale and Subscales in Icelandic and Australian Sample

	Total sample Ice. [a b] (N = 220)	Total sample Aus.[a c] (N = 764)	Girls Ice. [a b]	Girls Aus. [a c]	Boys Ice. [a b]	Boys Aus.[a c]
Total scale	25.1 (15.3)[d]	38.4 (19.0)[f]	23.5 (14.5)[h]	38.4 (18.8)[j]	26.9 (16.1)[l]	38.2 (19.2)[n]
	24.3 (11.2)[e]	37.5 (17.6)[g]	20.9 (10.7)[i]	37.4 (17.6)[k]	29.2 (10.4)[m]	37.7 (17.6)[p]
General anxiety	7.3 (5.2)	10.5 (5.6)	6.8 (5.0)	10.3 (5.7)	7.8 (5.3)	10.8 (5.6)
	6.8 (4.1)	10.1 (5.1)	5.9 (4.7)	10.0 (5.1)	8.0 (2.9)	10.1 (5.1)
Social anxiety	5.9 (5.0)	9.6 (6.6)	5.7 (4.5)	9.4 (6.7)	6.2 (5.5)	9.7 (6.5)
	7.1 (4.3)	9.7 (6.2)	6.2 (3.8)	9.7 (6.3)	8.3 (4.8)	9.7 (6.0)
Separation anxiety	3.0 (3.0)	5.9 (4.4)	2.7 (2.7)	5.6 (4.3)	3.3 (3.3)	6.2 (4.4)
	2.9 (2.4)	5.4 (3.8)	2.2 (2.2)	5.3 (3.7)	3.8 (2.5)	5.6 (3.9)
Specific fears	8.7 (5.5)	12.3 (6.3)	8.2 (5.2)	13.0 (6.3)	9.6 (5.8)	11.7 (6.3)
	7.6 (4.2)	12.3 (6.1)	6.7 (3.7)	12.4 (6.1)	9.0 (4.7)	12.2 (6.1)

[a] $p < .001$ (except for father's report on social anxiety in boys).
[b] 4-6 year old children, [c] 3-5 year old children.
[d] Mother report (n = 186), [e] father report (n = 34), [f] mother report (n = 764), [g] father report (n = 418), [h] mother report (n = 99), [i] father report (n = 20), [j] mother report (n = 384), [k] father report (n = 215), [l] mother report (n = 87), [m] father report (n = 14), [n] mother report (n = 380), [p] father report (n = 203).

All means were lower in the Icelandic sample compared to the Australian sample. The difference between scores in the Icelandic sample and Australian sample was statistically significant on the total PAS-R scale and all subscales except for father's reports on social anxiety in boys. Boys had higher scores than girls on the total scale and all subscales in the Icelandic sample, although statistical significant difference was not found. No statistical significance was found between age groups in the Icelandic sample.

Reliability

Cronbach's alpha for the total PAS-R scale was high (.908) and acceptable for all the subscales (GAD = .828, SOC = .853, SEP = .743, SPC = .725) indicating decent internal consistency.

Factor Analysis

Exploratory factor analysis. A principal component analysis with a direct oblimin rotation was conducted using the 28 items on PAS-R. KMO (Kaiser-Meyer-Olkin measure of sampling adequacy) and Bartlett's test of sphericity were conducted to test the adequacy of the sample and items. The KMO value of .884 was well above the .5 limit and significant Bartlett's test indicated that the sample was fit for factor analysis. Seven factors had eigenvalues over Kaiser's criterion of 1 and explained 62% of the variance. The scree plot shown in Figure 1 justified retaining four factors.

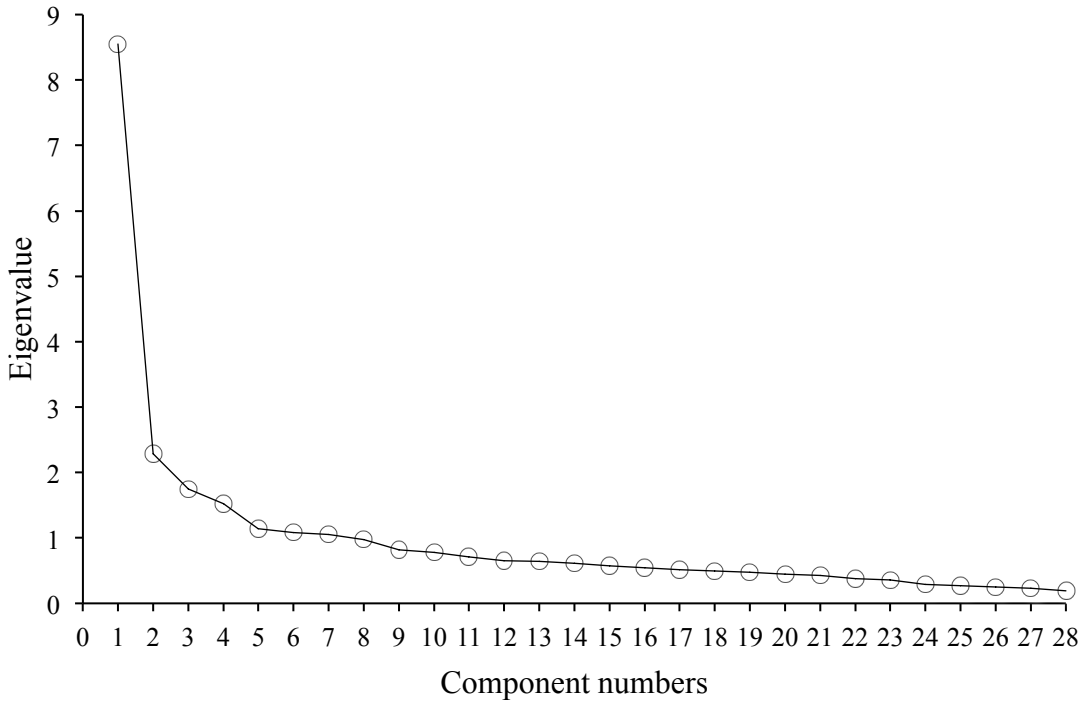

Figure 1. Scree plot showing the eigenvalue of each component.

Since the original PAS-R research by Edwards et al. (2010) demonstrated a four-factor model another factor analysis was conducted by extracting four factors. They explained 50.3% of the variance after rotation. The first factor explained 30.5% of the variance, the second factor 8.2%, the third factor 6.2% and the fourth factor 5.4%. Factor loadings after rotation, communalities (h^2) and Cronbach's alpha are shown in Table 2.

Table 2

Factor Loadings of Items on PAS-R with Direct Oblimin Rotation, Communalities and Cronbach's alpa

	Factor 1 General anxiety	**Factor 2** Social anxiety	**Factor 3** Specific fears	**Factor 4** Separation anxiety	**h^2**
Worries about doing the right thing	**.785**				.600
Gets upset if s/he makes a mistake	**.779**				.582
Asks for reassurance when it doesn't seem necessary	**.605**			.207	.522
Has difficulty stopping him/herself from worrying	**.564**			.245	.500
Has nightmares	**.478**	.312	.309		.459
Seems nervous in new or unusual situations	.317	**-.530**		.274	.666
Gets upset if something unexpected happens	.272			**.525**	.531
Acts shy and quiet around new people		**-.712**	.220		.680
Is afraid of meeting or talking to unfamiliar people		**-.708**	.235		.666
Is afraid to go up to a group of children to join their activities	.272	**-.550**		.213	.588
Is afraid of talking in front of the class (preschool group) e.g., show & tell	.444	**-.471**			.545
Is scared to ask an adult for help (e.g., a preschool or school teacher)		**-.463**		.400	.518
Worries that he/she will do something to look stupid in front of other people	**.759**				.590
Worries that he/she will do something embarrassing in front of other people	**.774**				.624
Is frightened of dogs			**.761**		.512
Is wary of large animals			**.682**		.442
Is afraid of insects and/or spiders			**.679**	.279	.505
Is afraid of the dark	.244		**.460**		.414
Is scared of heights (high places)			**.422**	.288	.330
Is afraid of doctors and/or dentists			**.375**		.259
Is scared of thunderstorms		.228	**.371**	.269	.340
Is afraid of loud noises			.334	**.413**	.391
Is nervous of going swimming		.220			.221
Becomes distressed if separated from parents				**.772**	.633
Becomes distressed about your leaving him/her at preschool or with a babysitter				**.768**	.583
Would be upset at sleeping away from home				**.712**	.515
Worries that something bad will happen to his/her parents	.239	.316	.202	**.415**	.485
Worries that something bad might happen to him/her (e.g., getting lost or kidnapped), so he/she won't be able to see you again	.268	.250	.237	**.311**	.409
Cronbach's Alpha	.828	.853	.725	.743	

Factor loadings in a sample of 255 cases are considered significant if they exceed .326 (Gudmundsson & Kristjansson, 2005). Of the 28 items on the PAS-R scale, 22 loaded significantly on the correct factor predicted by Edwards et al. (2010). Two items intended to measure general anxiety, "seems nervous in new or unusual situations" and "gets upset if something unexpected happens" did load somewhat on the general anxiety factor but loaded

more strongly on other factors. Two items intended to measure social anxiety, “worries that he/she will do something to look stupid in front of other people” and “worries that he/she will do something embarrassing in front of other people”, loaded strongly on the general anxiety factor. One item intended to measure specific fears, “is afraid of loud noises”, did load on the specific fears factor but loaded a little bit more strongly on the separation anxiety factor. Another item intended to measure specific fears, “is nervous of going swimming”, did not load significantly on any factor and had a communality under .3. Means on this items were also low. The item “is afraid of doctors and/or dentists” also had low communality. Removing these two items did not have much effect on the factor structure.

Confirmatory factor analysis. The four-factor model (GAD, SOC, SEP, and SPC) proposed by Edwards et al. (2010) was tested allowing correlations between factors. The model provided a poor fit for the data ($\chi^2 = 808.043$, df = 337, $p < .001$, GFI = .808, AGFI = .769, NFI = .735, SRMR = .072, RMSEA = .074). Loadings on factors ranged from .37 to .74. Three items had loadings below .40, “is nervous of going swimming”, “is frightened of dogs”, and “is wary of large animals”. These items all belong to the specific fears factor.

A single factor model was also tested to see if the items were better understood by a single anxiety factor. This model did not provide better fit for the data ($\chi^2 = 1242.579$, df = 359, $p < .000$, GFI = .700, AGFI = .652, NFI = .593, SRMR = .087, RMSEA = .100).

Construct Validity

Table 3 shows the correlation between scores on the PAS-R and subscales on the SDQ.

Table 3

Correlations between Scores on the PAS-R Scales and Subscales on the SDQ

	SDQ subscales (N = 222)		
PAS-R scales (N = 255)	ES	CP	HI
Total	.686**	.151*	.023
GAD	.673**	.270**	.098
SOC	.553**	.078	-.093
SPC	.487**	.011	.050
SEP	.487**	.150	.013

* $p < .05$
** $p < .01$
Note: ES = Emotional Symptoms Subscale, CP = Conduct Problems Subscale, HI = Hyperactivity-Inattention Subscale

Correlation between all PAS-R scales and the Emotional Symptoms Subscale on the SDQ was moderate to strong indicating decent convergent validity. Weak correlation was found between the PAS-R and Conduct Problems and Hyperactivity-Inattention Subscales on the SDQ indicating decent discriminant validity. These results demonstrate good construct validity of the PAS-R.

Table 4 shows means and standard deviations from the preschool sample compared to the clinical sample.

Table 4

Means and Standard Deviations in Preschool and Clinical Sample

	PAS-R subscales				
	Total	GAD	SOC	SEP	SPC
Preschool sample (N = 255)	25.2 (15.0)*	7.3 (5.1)*	6.2 (5.0)*	3.0 (3.0)*	8.7 (5.4)*
Clinical sample (N = 29)	56.5 (20.1)*	16.5 (5.6)*	15.9 (5.4)*	9.7 (5.7)*	15.6 (8.8)*

* $p < .001$

Participants in the clinical sample had higher scores on all scales compared to the preschool sample. The difference was statistically significant on the total scale and on all subscales. This indicates that the PAS-R differentiates between children in community sample and children showing first signs of anxiety problems.

Discussion

The aim of this study was to assess the psychometric properties of the Icelandic version of the PAS-R in a preschool sample. Means in the Icelandic sample were significantly lower compared to the sample in the original PAS-R study (Edwards et al, 2010). The PAS-R had good internal consistency and decent convergent and discriminant validity but the factor structure was rather unclear. The PAS-R seems to differentiate between participants in the preschool sample and participants in the health clinic sample who are showing first signs of anxiety problems.

As mentioned above, means on the total scale and subscales was lower in the Icelandic sample than in the Australian sample. The difference was statistically significant on all scales except fathers' reports of social anxiety in boys. The reason for this lack of significance is most likely small sample size, as only 14 fathers responded on behalf of their sons in the Icelandic sample. The reason for the difference between the Icelandic and Australian sample is not clear. A possible explanation is that the two samples vary, the Icelandic sample consists entirely of children recruited from preschools but the Australian sample was recruited via preschools, health care services and magazines. It is possible that parents from health care services and those who respond to magazine ads are more likely to have anxious children. The samples also have different age groups, the Australian sample contains three to five-year-olds whereas the Icelandic sample consists of four to six-year-old children, which could explain the group differences. However, no age difference was found in this study. Edwards et al. (2010) did not report any data on age difference so we do not

know if three-year-old children had different scores than four to six-year-old children. Another reason might be that Icelandic parents evaluate their children's anxiety symptoms more modestly or that Icelandic preschool children are less anxious than those in Australia.

No statistically significant gender difference was found which is consistent with findings in the original PAS-R study by Edwards et al. (2010) and the Romanian study on the PAS (Benga et al., 2010) who concluded that gender difference does not show until later in childhood. No statistically significant difference was found between age groups. Results from other studies have varied when it comes to comparing anxiety levels of different age groups in preschool children. The Romanian study on the PAS found no significant age difference (Benga et al., 2010) but Spence et al. (2001) found a difference between age groups. Acceptable internal consistency was found on all the PAS-R scales which is in line with the original study by Edwards et al. (2010).

Exploratory factor analysis showed that 22 of the 28 items loaded on the proposed factors. There was a sizable overlap between the general and social anxiety factors which was not seen in other studies on the PAS and PAS-R. This could indicate that there is no clear distinction between the two constructs in this sample. Two items intended to measure general anxiety, "seems nervous in new or unusual situations" and "gets upset if something unexpected happens" did load somewhat on the general anxiety factor but loaded more strongly on other factors. Despite this it would be justifiable to consider these items a measure of general anxiety. The two items, "worries that he/she will do something to look stupid in front of other people" and "worries that he/she will do something embarrassing in front of other people", intended to measure social anxiety correlated strongly with the general anxiety factor but had very low correlation with other factors and could therefore be considered a measure of general anxiety. The reason for this might be that in a principal component analysis with a direct oblimin rotation, the first factor explains most of the

variance and therefore these two items might have ended up on this factor. The confirmatory factor analysis showed that these two items fit adequately on the proposed social anxiety factor. Two items, “is nervous of going swimming” and “is afraid of doctors and/or dentists”, had low communalities and low factor loadings in the exploratory factor analysis. These items also showed rather poor fit in the confirmatory factor analysis which confirms that it would be justifiable to remove them from the measure or change them to provide a better meaning. The reason for poor psychometric properties of the “is nervous of going swimming” item could be that Icelandic children are accustomed to go to swimming pools from a young age and going to swimming pools is a large part of Icelandic culture. Also, means on this item were low which indicates that Icelandic parents do not find it relevant. The reason for poor psychometric properties of the item “is afraid of doctors and/or dentists” is less clear since nothing in Icelandic culture seems to account for it.

The confirmatory factor analysis suggested that the four-factor model proposed by Edwards et al. (2010) did not fit the data adequately. The χ^2 was statistically significant and other model fit measures were not acceptable indicating poor model fit. The reason for this is unknown. A small sample size could affect the model fit, but the RMSEA tends to reject true models in samples with few participants (Hu & Bentler, 1999). All items, except three items on the specific fears factor, had acceptable factor loadings, which provides some support for the four-factor model. Taken together, results from exploratory and confirmatory factor analysis suggest that items on the Icelandic version of the PAS-R do not reflect the four categories of anxiety in a clear way.

The relatively strong correlation of the PAS-R to the Emotional Symptoms Subscale on the SDQ indicates decent convergent validity. Low correlation with the Conduct Problems and Hyperactivity-Inattention Subscales indicates acceptable discriminant validity. This evidence of good construct validity is in line with the study by Edwards et al. (2010). These

results need to be interpreted with caution since the psychometric properties of the Icelandic version of the SDQ are poor in this age group (Hrafnsdottir, 2006). Means in the clinical sample were significantly higher compared to the preschool sample. This suggests that the PAS-R differentiates between children in a community sample and children who are showing first signs of anxiety problems. However, this needs to be interpreted with caution since the children in the clinical sample do not have confirmed diagnoses of anxiety disorder and is therefore, strictly speaking not a true clinical sample.

There are several limitations to this study. Firstly, the 35% response rate is relatively low and the small sample size does probably not represent the preschool population in Iceland. Similar response rates were found in the Dutch study by Broeren and Muris (2008). One reason for the low response rate could be the electronic format of the study. Parents got an e-mail from the preschool director where participation was requested and it is quite easy to ignore such a requests. Response rate might have been higher if the questionnaires had been on paper and sent home with the children. Also, the preschool directors were asked to send reminders to parents about the study but not everybody did that. Another limitation is that in most studies on the PAS-R and SDQ participants answer on paper and not electronically and little is known about the consistency between answers on the two versions.

In conclusion, the Icelandic version of the PAS-R seems to have decent psychometric properties in a sample of four to six-year-old children. Results from factor analysis suggest that items on the Icelandic version of the PAS-R do not reflect the four categories of anxiety in a clear way. The measure needs to be tested in with a larger sample that is more representative of the population of preschool children in Iceland. If positive results will be attained it might be justifiable to use the PAS-R in research and clinical work. The PAS-R should only be considered as an instrument to assess potential anxiety problems but further clinical assessment needs to take place when a diagnosis of anxiety disorders are considered.

The measure could be a good addition to the selection of Icelandic anxiety measures for this age group. It is important to identify children who are showing first signs of anxiety problems and therefore at risk of developing anxiety disorders. The PAS-R could be a helpful assessment tool for this purpose. Also, the PAS-R might be suitable for assessing effectiveness of therapy or early intervention programs since it is quite short and easy to administer.

References

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: American Psychiatric Association.

Achenbach, T. M., & Rescorla, L. A. (2000). *Manual for the ASEBA Preschool Forms and Profiles*. Retrieved April 21, 2016 from http://www.aseba.org/ordering/ASEBA%20Reliability%20%26%20Validity-Pre-school%20.pdf

Aevarsdottir, T., & Rikhardsdottir, K. (2012). *A pilot study of the efficacy of a prevention/early intervention program for preschool aged children at risk of developing anxiety disorders* (Unpublished master's thesis). Aarhus University, Denmark.

Benga, O., Ţincaş, I., & Visu-Petra, L. (2010). Investigating the structure of anxiety symptoms among Romanian preschoolers using the Spence Preschool Anxiety Scales. *Cognitie, Creier, Comportament/Cognition, Brain, Behavior*, *14*(2), 159-182.

Bittner, A., Egger, H. L., Erkanli, A., Costello, E. J., Foley, D. L., & Angold, A. (2007). What do childhood anxiety disorders predict? *Journal of Child Psychology and Psychiatry, 48*(12), 1174–1183. doi: 10.1111/j.1469-7610.2007.01812.x

Bodden, D. H. M., Dirksen, C. D., & Bögels, S. (2008). Societal burden of clinically anxious youth referred to treatment: A cost-of-illness study. *Journal of Abnormal Child Psychology, 36*, 487–497. doi: 10.1007/s10802-007-9194-4

Broeren, S., & Muris, P. (2008). Psychometric evaluation of two new parent-rating scales for measuring anxiety symptoms in young Dutch children. *Journal of Anxiety Disorders*, *22*(6), 949-958. doi: 10.1016/j.janxdis.2007.09.008

Center for Emotional Health. (n.d.). *Child & adolescent questionnaires*. Retrieved March 27, 2016 from http://www.centreforemotionalhealth.com.au/pages/questionaire-child-and-adolescent-survey.aspx

Costello, E. J., Mustillo, S., Erkanli, A., Keeler, G., & Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry*, *60*(8), 837-844. doi: 10.1001/archpsyc.60.8.837

Donovan, C. L., & March, S. (2014). Online CBT for preschool anxiety disorders: A randomised control trial. *Behaviour Research and Therapy*, *58*, 24-35. doi: 10.1016/j.brat.2014.05.001

Edwards, S. L., Rapee, R. M., Kennedy, S. J., & Spence, S. H. (2010). The assessment of anxiety symptoms in preschool-aged children: The revised Preschool Anxiety Scale. *Journal of Clinical Child & Adolescent Psychology*, *39*(3), 400-409. doi: 10.1080/15374411003691701

Egger, H. L., & Angold, A. (2006). Common emotional and behavioral disorders in preschool children: Presentation, nosology, and epidemiology. *Journal of Child Psychology and Psychiatry*, *47*(3-4), 313-337. doi: 10.1111/j.1469-7610.2006.01618.x

Eley, T. C., Bolton, D., O'Connor, T. G., Perrin, S., Smith, P., & Plomin, R. (2003). A twin study of anxiety‐related behaviours in pre‐school children. *Journal of Child Psychology and Psychiatry*, *44*(7), 945-960. doi: 10.1111/1469-7610.00179

Essau, C. A. & Gabbidon, J. (2013). Epidemiology, comorbidity and mental health service utilization. In C. A. Essau & T. H. Ollendick (Eds.), *The Wiley-Blackwell handbook of the treatment of childhood and adolescent anxiety* (pp. 23-42). Chichester, UK: John Wiley & Sons, Ltd.

Goodman, R. (1997). The Strengths and Difficulties Questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, *38*(5), 581-586. doi: DOI: 10.1111/j.1469-7610.1997.tb01545.x

Gudmundsson, E., & Kristjansson, A. (2005). *Gagnavinnsla í SPSS*. Háskólaútgáfan.

Hirshfeld-Becker, D. R., & Biederman, J. (2002). Rationale and principles for early intervention with young children at risk for anxiety disorders. *Clinical Child and Family Psychology Review, 5*(3), 161-172.

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *Electronic Journal of Business Research Methods*, *6*(1), 53-60.

Hrafnsdottir, A. H. (2006). Athugun á próffræðilegum eiginleikum Spurninga um styrk og vanda í hópi 5 ára barna á Íslandi. *Sálfræðiritið*, *10-11*, 71-82.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1-55. doi: 10.1080/10705519909540118

Kessler, R. C., Foster, C. L., Saunders, W. B., & Stang, P. E. (1995). Social consequences of psychiatric disorders, I: Educational attainment. *American Journal of Psychiatry*, *152*(7), 1026-1032.

Kim-Cohen, J., Caspi, A., Moffitt, T. E., Harrington, H., Milne, B. J., & Poulton, R. (2003). Prior juvenile diagnoses in adults with mental disorder: Developmental follow-back of a prospective-longitudinal cohort. *Archives of General Psychiatry*, *60*(7), 709-717. doi: 10.1001/archpsyc.60.7.709

Mian, N. D., Godoy, L., Briggs-Gowan, M. J., & Carter, A. S. (2012). Patterns of anxiety symptoms in toddlers and preschool-age children: Evidence of early differentiation. *Journal of Anxiety Disorders*, *26*(1), 102-110. doi: 10.1016/j.janxdis.2011.09.006

Orvaschel, H., Lewinsohn, P. M., & Seeley, J. R. (1995). Continuity of psychopathology in a community sample of adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, *34*(11), 1525-1535. doi: 10.1097/00004583-199511000-00020

Rapee, R. M., Kennedy, S. J., Ingram, M., Edwards, S. L., & Sweeney, L. (2010). Altering the trajectory of anxiety in at-risk young children. *American Journal of Psychiatry*. doi: 10.1176/appi.ajp.2010.09111619

Rapee, R. M., Lau, E. X., & Kennedy, S. J. (2010). The Cool little Kids Anxiety Prevention Program-Therapist manual. Center for emotional health, Macquire University, Sidney.

Rapee, R. M., Schniering, C. A., & Hudson, J. L. (2009). Anxiety disorders during childhood and adolescence: Origins and treatment. *Annual Review of Clinical Psychology*, *5*, 311-341. doi: 10.1146/annurev.clinpsy.032408.153628

Spence, S. H., Rapee, R., McDonald, C., & Ingram, M. (2001). The structure of anxiety symptoms among preschoolers. *Behaviour Research and Therapy*, *39*(11), 1293-1316. doi: 10.1016/S0005-7967(00)00098-X

Sterba, S., Egger, H. L., & Angold, A. (2007). Diagnostic specificity and nonspecificity in the dimensions of preschool psychopathology. *Journal of Child Psychology and Psychiatry*, *48*(10), 1005-1013. doi: 10.1111/j.1469-7610.2007.01770.x

Woodward, L. J., & Fergusson, D. M. (2001). Life course outcomes of young people with anxiety disorders in adolescence. *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*(9), 1086-1093. doi: 0.1097/00004583-200109000-00018