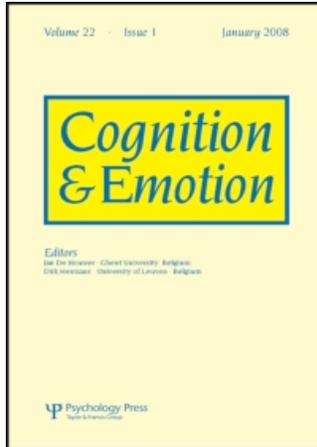


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Development and evaluation of a new paradigm for the assessment of anxiety-disorder-specific interpretation bias using picture stimuli

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An important factor in cognitive theories of anxiety disorders is the way in which information is processed. Findings support the existence of a biased information-processing style in anxious children. So far, cognitive biases in children with anxiety disorders are typically assessed as a general phenomenon. Thus, there is a lack of studies in children focusing on anxiety-disorder-specific interpretation bias. A new forced choice paradigm using anxiety-disorder-specific material was developed. Pictures illustrating separation and social situations were carefully generated and evaluated in a pre-study. In a school sample of 265 children the paradigm was investigated. The pictures were able to trigger emotional response and the paradigm demonstrated good internal consistency, and construct validity. Results clearly indicate evidence for content-specificity of the materials. Furthermore, preliminary results suggest a disorder-specific interpretation bias.

INTRODUCTION

Theoretical models of child anxiety disorders (e.g., Kendall, 1985) postulate cognitive factors as being central to the development and maintenance of anxiety. The interpretation bias is one of these factors, resulting in the favouring of emotionally negative interpretations of ambiguous information. Studies investigating children also support the hypothesis that anxious children or children at risk for anxiety disorders tend to favour threatening

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over non-threatening interpretations in ambiguous situations (e.g., Barrett, Rapee, Dadds, & Ryan, 1996; Bögels & Zigterman, 2000; Chorpita, Albano, & Barlow, 1996; Schneider, Unnewehr, Florin, & Margraf, 2002).

In the adult literature, interpretation bias is usually investigated in a disorder-specific manner. These studies suggest that interpretation biases are content specific (e.g., Foa, Franklin, Perry, & Herbert, 1996; Voncken, Bögels, & de Vries, 2003). However, in childhood-anxiety research, most studies investigated groups of mixed anxiety disorders without differentiating between specific subtypes (e.g., Barrett et al., 1996; Bögels & Zigterman, 2000; Chorpita et al., 1996). For a better understanding of the specific anxiety disorders and the development of even more effective treatments than those currently available (In-Albon & Schneider, 2007), a comprehensive understanding of disorder-specific cognitive distortions is needed.

Only very few studies have investigated content specificity among anxiety disorders in children and in most of them the content specificity was only a side focus (Bögels, Snieder & Kindt, 2003; Dalgleish et al., 2003; Muris et al., 2000). Results from Dalgleish et al. (2003) support the hypothesis of a difference between anxious (PTSD and GAD) and depressed participants but not between GAD and PTSD participants. Muris and colleagues (2000) exposed non-clinical children to stories reflecting social anxiety, separation anxiety, and generalised anxiety. Results provided no evidence for a specific interpretation bias for different types of anxiety. Bögels et al. (2003) found partial support for a situation-specific bias. Children high on symptoms of separation anxiety and social anxiety displayed a more frequent negative interpretation bias in situations relevant to their fear than children high on symptoms of GAD. However, children high on separation anxiety and social anxiety could not be differentiated from each other. Summarising these results, it remains unclear whether there are cognitive biases specific to the different types of anxiety disorders. However, there are several weaknesses of these studies that need to be mentioned. Most important, the material used was often not developed for investigating disorder-specific interpretation bias (e.g., Bögels et al., 2003; Dalgleish et al., 2003; Muris et al., 2000). Another problem is that only a few studies systematically investigated the psychometric properties of the questionnaires or other measures of interpretation bias utilised in their studies (e.g., Muris, Jacques, & Mayer, 2004; Schneider, In-Albon, Rose, & Ehrenreich, 2006). However, a sufficient reliability and validity of the used materials is an essential condition for a proper and solid investigation of disorder-specific interpretation bias. Thus, the unclear findings may also be a consequence of the weak reliability and validity of the used material.

The present study had two aims: First, the development of a disorder-specific paradigm for the investigation of disorder-specific interpretation

bias in children with separation anxiety disorder (SAD) or social phobia. Second, to test the reliability and validity of the paradigm in school children.

METHOD

Pre-study: Development of the pictures

Since interpretation bias in children with SAD and social phobia will be studied, it was decided to establish a language-free method due to the typically young age of these children (Cartwright-Hatton, McNicol, & Doubleday, 2006). A forced choice paradigm using pictures as stimuli was developed with a set of pictures consisting of separation situations and social situations. In a pre-study, a set of 86 standardised and disorder-specific colour photographs representing two disorders, SAD and social phobia, were developed and empirically validated with school children. Social-situation pictures represent social interactions between children and separation-situation pictures represent arrival and departure situations between a mother and a child. Pictures consist of three different types of separation situations (departure, arrival, ambiguous departure/arrival) and social situations (popular, unpopular, ambiguous popular/unpopular). Girls and boys had separate sets of gender-specific pictures. Figure 1 presents an example of separation situation pictures. All pictures had a size of 600×450 pixels and were presented on a computer screen with a resolution of 1024×768 pixels.

For the validation of the pictures, 253 Swiss school children (134 girls and 119 boys, 6–14 years of age) were asked to indicate to what extent each

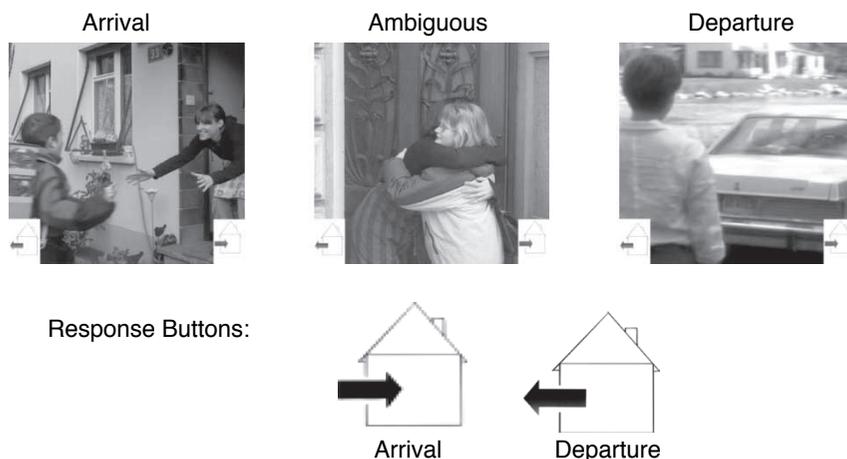


Figure 1. Separation-related pictures (arrival, departure, ambiguous) and response buttons.

picture displayed an arrival/departure situation (for the separation-anxiety-related pictures) or a popular/unpopular child (for the social-phobia-related pictures), using a 9-point Likert scale ranging from “*definite arrival*” to “*definite departure*”, or “*really popular*” to “*really unpopular*”, respectively. Depending on the children’s appraisal, each picture was assigned to one of the following stimulus categories: “definitive arrival”, “definitive departure” or “ambiguous departure or arrival”, and “definitive popular”, “definitive unpopular” or “ambiguous popular or unpopular”, respectively. On the basis of these appraisals, 6 non-ambiguous pictures, 8 ambiguous pictures, and 4 practice pictures of the separation situations and social situations were chosen for the forced choice paradigm.

Forced choice paradigm

A fixation cross in the centre of a white screen was presented for 500 ms. The child was shown one picture at a time and was asked to press one of two response buttons (departure or arrival and popular or unpopular, respectively) as quickly and as accurately as possible to indicate whether the picture represented a departure/arrival situation or a popular/unpopular child. Response buttons for arrival displayed a house with an arrow leading into the house; departure was indicated with an arrow leading out of the house. The symbol for popular displayed a group of figures all standing together, unpopular was represented by figures standing together except for one standing alone (see Figure 1). The presented picture remained on the screen until the child made the response. There were 4 practice trials. The experiment was created and run using the E-Prime 1.1.3 software package (Psychology Software Tool, Inc., Pittsburgh, USA).

The child was asked to classify 8 ambiguous pictures and 6 non-ambiguous pictures for each of the two categories (departure or arrival; popular or unpopular). The pictures within each category were presented in a random order to each child. The dependent variable was the frequency of chosen category. To be prepared for the task, children learned in a practice trial the location of the response buttons, which were positioned next to each other on the keyboard and had to be pressed with the index finger of the preferred hand.

To evaluate the paradigm and its feasibility, the paradigm was used in a first step with school children. Children were presented non-ambiguous and ambiguous pictures depicting social- and separation-related situations and were asked to choose either a response defined as positive (arrival, popular) or defined as negative (departure, unpopular) as quickly as possible.

Picture-rating task

After the forced choice paradigm, each child rated the set of 28 pictures with regard to their category (e.g., arrival/departure; popular/unpopular) without time pressure, in the same manner used during the pre-study. This was to control whether the children assigned the non-ambiguous pictures to the correct category (dependent variable: “category rating”). After the paradigm, the valence and arousal associated with the viewing of each picture was measured using the Self-Assessment Manikin (SAM; Bradley & Lang, 1994). The unlabelled dimensions were represented pictorially on a 9-point scale. Figure 2 shows the SAM figure with pleasure and arousal on the top and bottom rows, respectively. Children were instructed to make a mark for each dimension, either on or between the figures (dependent variable: “valence rating”).

Measures

State anxiety. Since there is evidence that high levels of state anxiety at baseline are associated with increased threat perception and lower threat threshold (MacLeod, 1990; Muris, Rapee, Meesters, Schouten, & Geers, 2003), children’s level of state anxiety before and after the forced choice paradigm was assessed. The child was asked to indicate state anxiety on a 0- to 10-point Likert scale ranging from “*not anxious at all*” to “*very anxious*”.

Questionnaires. To get a clinical description of the sample, general anxiety and depression were assessed as well as disorder-specific separation anxiety and social anxiety. Anxiety sensitivity was assessed due to its association with separation as well as social anxiety (e.g., Schneider & Hensdiek, 2003). Due to time limitations, short versions of widely used anxiety and depression self-report questionnaires were empirically developed and evaluated in a German-speaking sample (Scalbert, In-Albon, &

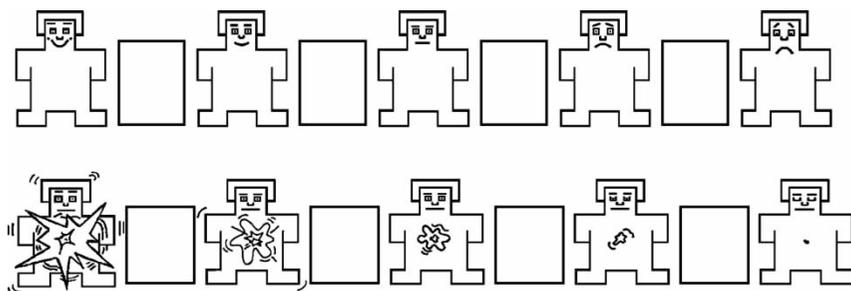


Figure 2. Self-Assessment Manikin (SAM; Bradley & Lang, 1994). Figures assessing pleasure (top) and arousal (bottom).

Schneider, 2006, unpublished master thesis) and used instead of complete questionnaires.

The *Childhood Anxiety Sensitivity Index* (CASI; Silverman, Fleisig, Rabian, & Peterson, 1991; German translation by Schneider & Hensdiek, 1994) was administered in order to assess anxiety sensitivity. The CASI used in this study is a 10-item questionnaire assessing fear of anxiety symptoms in children on a 3-point Likert scale ranging from 1 “never” to 3 “often”. Internal consistency of the German short version was .72.

The *Revised Children's Manifest Anxiety Scale* (RCMAS; Reynolds & Richmond, 1978; Boehnke, Silbereisen, Reynolds, & Richmond, 1986) is a self-report measure to assess manifest anxiety. The RCMAS used in this study was a short version of 6 items in which the sum of the individual “yes” or “no” responses was calculated to yield a total anxiety score. The test-retest reliability of the RCMAS short version was 0.74 (Boehnke et al., 1986) and Cronbach's alpha for the German short version was .67. The *Children's Depression Inventory* (CDI; Kovacs, 1981; German Version DIKJ, Stiensmeier-Pelster, Schürmann, & Duda, 2000) is a self-report measure of depression for children and adolescents. The CDI used in this study included 10 items related to the cognitive, affective, and behavioural signs of depression. Each item had a range of three choices. Children were instructed to choose the choice that best characterised them over the past 2 weeks. The German short version of the CDI had an internal consistency of .76.

To assess separation anxiety 5 items were chosen from the separation subscale of the *Spence Children's Anxiety Scale* (SCAS; Spence, 1998; German version Essau, Muris, & Ederer, 2002). Each item is rated on a 4-point scale in terms of its frequency from 1 “never” to 4 “always”. Internal consistency of the SCAS subscale was .66. Social anxiety was assessed with 5 items of the *Social Anxiety Scale for Children* (SASC; La Greca, Dandes, Wick, Shaw, & Stone, 1988; German version Melfsen & Florin, 1997). The SASC is designed to assess anxiety in children in relation to social interactions. Remaining consistent with the scale used in the SCAS, children were asked to respond to various statements using a 4-point scale from 1 “not at all true” to 4 “always true”. Internal consistency of the SASC subscale was .59.

Pilot study

The paradigm was tested with 5 children (3 girls and 2 boys) with a mean age of 6.6 years ($SD = 0.55$, range 5–7 years). After the paradigm children were asked whether the task was easy or difficult, if they had fun or found it boring, and if the instructions and button-symbols were clear. Results confirmed feasibility and comprehensibility of the paradigm in these children.

Participants

A total of 265 children were recruited from different schools in Basel, Switzerland, and Nijmegen, The Netherlands. There was a minor, but significant age difference between the Basel and Nijmegen sample, $t(263) = 4.58$, $p < .01$. Gender and age distributions in the two groups and the combined sample are shown in Table 1.

Procedure

Children and their parents gave written consent to participate in this study, which informed them of the child's right to withdraw at any time. No child withdrew his or her participation. Children were tested individually or in pairs in a quiet room with the assistance of a graduate student. Before and after the paradigm, state anxiety was assessed. After the experiment, the children were asked to complete the picture rating task and the questionnaires. Duration of the paradigm was about 30 minutes.

RESULTS

Descriptives

An alpha level of .05 was used for all statistical tests. Table 2 presents the means and standard deviations on the RCMAS, CDI, CASI, SOC and SAD items as well as the internal consistency of each questionnaire of the current sample. As can be seen from Table 2, children in the present study displayed low means and little variation on all scales of anxiety and depression (SD s between 1.49 and 3.65). As expected, girls had higher anxiety and depression scores than boys. There was a significant age effect on the separation anxiety items, in that younger children reported higher levels of separation anxiety than older children, $F(1, 6) = 2.39$, $p = .03$. State anxiety assessed before the paradigm was low ($M = 0.97$, $SD = 1.79$; Range 1–10) and decreased further during the paradigm ($M = 0.78$).

TABLE 1
Gender and age distributions of the Basel, Nijmegen and the combined samples

| | <i>Basel</i> | <i>Nijmegen</i> | <i>Combined sample</i> |
|----------------------------|-------------------|-------------------|------------------------|
| <i>N</i> | 103 | 162 | 265 |
| Gender | 52 girls, 51 boys | 78 girls, 84 boys | 130 girls, 135 boys |
| Age <i>M</i> (<i>SD</i>) | 10.3 (1.98) | 9.3 (1.57) | 9.69 (1.8) |
| | Range 7–13 years | Range 7–12 years | Range 7–13 years |

TABLE 2
Cronbach's α of questionnaires, means (standard deviations), and range of anxiety and depression measures of the total sample and for both sexes

| | Cronbach's α | Total M (SD) | Range (min./max.) | Girls M (SD) | Boys M (SD) |
|-------|---------------------|--------------------|-------------------|--------------------|-------------------|
| RCMAS | .46 | 10.06 (1.49) | 6–12 (6/12) | 9.85 (1.66) | 10.24 (1.27) |
| CASI | .74 | 15.77 (3.65) | 8–27 (10/30) | 16.20 (3.76) | 15.27 (3.39) |
| SAD | .50 | 8.85 (2.51) | 5–17 (5/20) | 9.23 (2.52) | 8.47 (2.46) |
| SOC | .54 | 9.96 (2.83) | 5–20 (5/20) | 10.47 (3.08) | 9.45 (2.48) |
| CDI | .66 | 14.29 (2.91) | 9–23 (0/30) | 14.54 (2.92) | 14.07 (2.89) |

In a first step, we tested whether the sample from Basel and Nijmegen were comparable and could be treated as one sample. The dependent variables of these six analyses were: the chosen category for each picture type (social and separation pictures), ratings of the pictures, and valence ratings. Each of these analyses involved picture type as within-subject factor, sample site and gender as between-subject factors, and age as a covariate. Age was used as a covariate since there was a significant age difference between the Basel and the Nijmegen sample. The critical question was whether there was an interaction between sample site and picture type. This was neither the case for choices regarding social pictures ($p = .14$) nor separation pictures ($p = .18$). Concerning the picture ratings, there was a significant interaction for social pictures ($p = .01$), but not for separation pictures ($p = .11$), reflecting slightly more insecure ratings of the non-ambiguous social pictures in the Nijmegen sample. Concerning the valence ratings, there was no significant interaction for the social pictures ($p = .26$), but an interaction was found for separation pictures ($p < .01$), in that the Nijmegen sample rated the valence of the separation pictures as more unpleasant, however the means tended in the same direction ($M = 4.35$ vs. $M = 3.44$). In summary, both groups showed similar effects of the picture types and could therefore be treated as one sample.

Test of stimulus material. Before running main analyses (reliability, validity, disorder specificity), we tested whether children in the present study assigned the pictures to the same categories as the children of the pre-study.

Picture ratings. The children's ratings of the pictures' contents, their valence ratings, and the arousal associated with viewing the pictures, indicated that the children categorised the pictures in the hypothesised manner. Ratings of non-ambiguous pictures ranged from 1.33 (arrival) and 2.02 (popular) to 7.91 (departure) and 7.81 (unpopular). Ambiguous pictures ranged in between with a mean of 5.13 for ambiguous separation

and 4.51 for ambiguous social pictures. Valence and arousal ratings indicate that the pictures elicited an emotional response. However, the unpleasantness of the departure/unpopular (negative) pictures was only mildly threatening ($M_s = 5.43$ and 6.25 ; $1 = \textit{very pleasant}$, $9 = \textit{very unpleasant}$).

Forced choices. Similarly, under time pressure, children categorised the non-ambiguous pictures in the expected manner; 93.06% chose arrival when an arrival situation was displayed and 83.59% chose departure when viewing a departure picture (popular = 83.19%, unpopular = 85.61%). For the ambiguous separation pictures, children chose 53.84% arrival and for the ambiguous social pictures 54.5% popular.

Reliability

Cronbach's alpha for the category ratings, the valence ratings, and for the chosen categories of the ambiguous pictures are reported in Table 3. Results generally supported good internal consistencies. However, as expected, reliability of chosen category for ambiguous pictures showed the lowest Cronbach's alpha.

Construct validity

Correlations of valence ratings and category ratings, and correlations between questionnaire scores and valence ratings within the social or separation category are presented in Table 4. Correlations between the valence ratings and the category ratings indicated that the pictures categorised as arrival and popular were significantly associated with pleasantness, whereas the pictures categorised as departure and unpopular were significantly associated with unpleasantness. Pictures categorised as

TABLE 3
Internal consistency (Cronbach's α) for category ratings, valence ratings, and chosen responses of the separation and social ambiguous pictures

| | <i>Cronbach's α</i> |
|------------------------------|---------------------------------------|
| <i>Category rating</i> | |
| Separation ambiguous picture | .59 |
| Social ambiguous picture | .71 |
| <i>Valence rating</i> | |
| Separation ambiguous picture | .79 |
| Social ambiguous picture | .83 |
| <i>Chosen category</i> | |
| Separation ambiguous picture | .44 |
| Social ambiguous picture | .57 |

TABLE 4
Correlations between valence ratings and category ratings and between valence ratings and questionnaires

| Category rating | Valence ratings | | | | | |
|----------------------|-----------------|-----------|-----------|---------|-----------|-----------|
| | Separation | | | Social | | |
| | Arrival | Departure | Ambiguous | Popular | Unpopular | Ambiguous |
| Arrival | .35** | .09 | .15* | – | – | – |
| Departure | –.26** | .16* | .02 | – | – | – |
| Ambiguous separation | .01 | .13* | .49** | – | – | – |
| Popular | – | – | – | .63** | .08 | .11 |
| Unpopular | – | – | – | –.23** | .19** | .14* |
| Ambiguous social | – | – | – | .09 | .06 | .42** |
| <i>Questionnaire</i> | | | | | | |
| RCMAS | .10 | .23** | .16** | .08 | .21** | .12 |
| CASI | .01 | .30** | .22** | .05 | .32** | .25** |
| SAD | .03 | .14* | .15* | .08 | .16* | .09 |
| SOC | .04 | .08 | .08 | .01 | .15* | .09 |
| CDI | .09 | .23** | .12 | .15* | .21** | .13* |

Note: ** $p < .01$; * $p < .05$.

ambiguous were rated as pleasant. Correlations between questionnaire scores and valence ratings displayed the expected pattern, in that higher levels of anxiety were accompanied with more unpleasantness when viewing negative (departure and unpopular) and ambiguous separation and social pictures. The same pattern was found for the correlations between arousal and anxiety level: as children's separation anxiety (SAD) and anxiety sensitivity (CASI) increased their tendency to be aroused when viewing departure pictures, $r(110) = -.28$, $p < .01$; $r(109) = -.25$, $p < .01$, and ambiguous separation pictures, $r(110) = -.28$, $p < .01$; $r(109) = -.22$, $p = .02$, increased also. Analyses were redone while controlling for gender, age, and state anxiety yielding the same results. Furthermore, when viewing ambiguous separation pictures, unpleasantness was associated with significantly more separation relevant threat (departure) interpretations, $r(259) = .16$, $p = .04$; controlled for gender and age, and when viewing ambiguous social pictures, unpleasantness was significantly correlated with social relevant threat (unpopular) interpretations, $r(259) = .26$, $p < .01$; controlled for gender and age.

In addition, correlations of valence ratings and chosen categories, as well as correlations of category rating and chosen categories were computed. The correlation of the valence of ambiguous separation pictures and arrival chosen for ambiguous separation pictures was significant, $r(259) = .16$, $p = .01$, as well as the correlation of the valence of ambiguous social pictures and

popular chosen for ambiguous social pictures, $r(259) = .26$, $p < .01$, indicating that the unpleasantness of the pictures was associated with more threat interpretations. The correlation of category rating and chosen category was significant for ambiguous social pictures, $r(261) = .29$, $p < .01$, as well as for ambiguous separation pictures, $r(260) = .31$, $p < .01$, indicating that ratings and chosen categories are related, but do not measure the same construct.

Disorder specificity

Partial correlations (controlling for gender, age and state anxiety) between disorder-specific anxiety scores and chosen category indicated that as separation anxiety increased the tendency to chose arrival when viewing an ambiguous picture also increased, $r(252) = .15$, $p = .01$. The association between social anxiety and chosen category was significant, in that as children's social anxiety increased the tendency to chose unpopular when viewing an ambiguous social picture also increased, $r(252) = .13$, $p = .05$. In both cases the effects sizes were relatively small.

Additional analyses

There was a significant age effect, in that younger children categorised the ambiguous separation pictures as arrival significantly more often than older children, $F(1, 6) = 3.18$, $p = .01$. Conversely, older children categorised these pictures as departure significantly more often than younger children, $F(1, 6) = 3.59$, $p < .01$. No age effect was found for social ambiguous pictures. No differences were observed for error rates on the non-ambiguous pictures, indicating that younger children did not make more mistakes categorising the non-ambiguous pictures.

DISCUSSION

The present study had two aims: First, the development of a disorder-specific paradigm with picture stimuli. Second, to test the reliability and validity of the paradigm in school children. These aims were accomplished to the furthest extent possible.

Results of the evaluation of the pictures indicated that they trigger an emotional state. First, the ratings of the pictures confirmed that the children in the present study assigned the pictures to the same categories as the children of the pre-study. Second, valence and arousal ratings indicated that pictures defined as positive (arrival, popular) were more pleasant and relaxing than pictures defined as negative (departure, unpopular). The low arousal elicited by the pictures indicated that they are ethically appropriate.

Overall, results indicated that the pictures and the paradigm were reliable and valid. Analyses of the internal consistencies regarding the ambiguous pictures indicated good levels of internal consistency for the category ratings and the valence ratings, and, as expected, somewhat lower internal consistencies for the chosen categories.

The first step in establishing the construct validity was to correlate anxiety scores with valence and arousal. Correlations between anxiety scores and valence ratings displayed the expected pattern: Higher levels of anxiety were accompanied by more unpleasantness when viewing negative (departure and unpopular) and ambiguous separation and social pictures. The same pattern was found for the correlations between anxiety scores and arousal: Children high on separation anxiety (SAD) and anxiety sensitivity (CASI) were significantly more aroused when viewing departure pictures and when viewing ambiguous separation pictures. These results indicate that the pictures elicited the expected reaction. The association between rating and chosen category was low but significant, indicating that they are related, but do not measure the same construct. Therefore, it is useful to assess both the ratings without time pressure and the forced choice as a spontaneous measure.

In a next step, as yet another evidence for construct validity, while viewing ambiguous separation pictures, unpleasantness was associated with significantly more separation-relevant threat (departure) interpretations and, while viewing ambiguous social pictures, unpleasantness was significantly correlated with social-relevant threat (unpopular) interpretations.

Taken together, these results indicate that the material developed is disorder specific, which is an essential condition to assess a disorder-specific interpretation bias. Thus, disorder specificity could be investigated. The association between disorder-specific anxiety scores in relation to choices for ambiguous pictures indicated that as children's social anxiety increased so did the tendency to interpret ambiguous social pictures as more threatening. The relationship between separation anxiety and choices for ambiguous separation pictures indicated that as children's separation anxiety increased so did interpretations of ambiguous separation pictures as arrival. The socially anxious children results were as expected. However, the results of the separation anxious children went in the opposite direction, in that they did not choose more threatening interpretations of ambiguous pictures, but chose the arrival interpretation significantly more often, which was defined as a positive interpretation. Weems, Berman, Silverman, and Saavedra (2001) reported that age moderated the relation between types of cognitive errors (catastrophising, over generalising, personalising, and selective abstraction) and manifest anxiety. According

to this, we conducted an additional analysis, to see whether the processing of ambiguous pictures was influenced by age, which was confirmed. Our finding that age moderated the interpretation of ambiguous situations may be due to cognitive development, in that younger children may “see” what they want to see and therefore show higher rates of positive interpretations, and chose more arrival when viewing ambiguous separation pictures. This interesting finding, indicating that young children may process threatening material differently to older children has to be further investigated. Independent of age, all children were accurate at identifying non-ambiguous separation and social pictures.

Another explanation for why separation anxious children may not have shown a threatening interpretation may be that, according to Mogg and Bradley (2004), one reason for lack of cognitive biases is low state anxiety. State anxiety in the current study, which was assessed before and after the paradigm, was low (< 1 , Range 1–10) and had little variance ($SD < 1.85$). In addition, self-reported anxiety and mood levels were low and had, in comparison to other school samples studies, little variance (see also Table 2, Muris et al., 2000). Because of the small variance in the current study, correlations also had to be low. Therefore, any effect could be hidden due to a “deflated correlation”.

Summarising the results of the present study, we found evidence for content specificity of the material, its reliability, validity, and ability to evoke emotional reactions. Furthermore, even in a school sample with small variance of anxiety we found first evidence for the association of disorder-specific threat interpretation in children showing higher social anxiety and a disorder-specific interpretation of ambiguous separation picture in children showing higher separation anxiety. In line with other studies (Bögels et al., 2003; Dagleish et al., 2003), current results encourage further research for a disorder-specific interpretation bias in childhood anxiety disorders. Therefore as a next step, this paradigm needs to be investigated in clinically anxious children.

Limitations

Because of low anxiety scores and few variances in the current sample, the present study was not able to assess clinically relevant interpretation biases. Thus, a test with clinically anxious children is needed. We are currently recruiting children with clinical diagnoses of separation anxiety disorder, children with social phobia, children with other anxiety disorders, and healthy controls. Except for the CASI, the items chosen from the original questionnaires to form their abridged versions may not be completely adequate in assessing the desired construct, even though the choice of the individual items were based on empirical data.

In conclusion, the forced choice paradigm using disorder-specific pictures seems to be suitable for triggering emotional responses in children with no or limited reading abilities.

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