



Forced choice reaction time paradigm in children with separation anxiety disorder, social phobia, and nonanxious controls

Tina In-Albon^a, Kathrin Dubi^a, Ronald M. Rapee^b, Silvia Schneider^{a,*}

^a Clinical Child and Adolescent Psychology, University Basel, Switzerland

^b Macquarie University, Sydney, Australia

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ABSTRACT

Cognitive distortions refer to cognitive processes that are biased and therefore yield dysfunctional and maladaptive products (e.g., interpretation bias). Automatic aspects of information processing need to be considered and investigating these aspects requires forms of assessment other than self-report. Studies focussing on the specificity of cognitive biases across different types of anxiety disorders in childhood are rare. Thus, a forced choice reaction time paradigm with picture stimuli was used to assess the interpretation bias in anxious children online. The study investigated disorder-specific interpretation bias in 71 children with separation anxiety disorder (SAD), 31 children with social phobia, and 42 children without mental disorders, aged 5–13 years. Results indicated that children with SAD rated ambiguous separation pictures as significantly more unpleasant and more arousing than nonanxious children. However, no support was found that children with SAD and social phobia interpret ambiguous separation or social pictures in a more negative way than nonanxious children. Furthermore, no group differences were found in reaction times to all picture categories.

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Cognitive models assume that cognitive phenomena mediate the relationship between experienced events and subsequent emotional responses. Thus, between the situation and the individual's response comes the important step of information processing and cognitive appraisal. Cognitive models of anxiety disorders have postulated that cognitive processes are crucial for the maintenance of anxiety disorders (e.g., Beck, Emery, & Greenberg, 1985; Foa & Kozak, 1986; Williams, Watts, MacLeod, & Mathews, 1997). According to these theories, anxious individuals interpret ambiguous information as threatening and it is this threat bias that maintains their anxious affect.

In order to understand the processes involved in cognitive biases, it is essential to differentiate between online and offline processes (Mathews & MacLeod, 2005). Online refers to interpretations made when encountering current ambiguous information and offline judgments refer to past or future interpretations of ambiguity. Offline judgments do not always reflect and thus cannot inform us about actual online processing of ambiguous information. Offline measures are typically assessed through self-report,

where people are asked how they would interpret emotionally ambiguous situations.

So far, research on information processing has primarily focused on offline cognitive processes (Muris & Field, 2008). However, cognitive biases associated with childhood anxiety may be unavailable to conscious awareness (Vasey, Dalgleish, & Silverman, 2003). Therefore, the development of online forms of assessment is necessary (Alfano, Beidel, & Turner, 2002; Daleiden & Vasey, 1997; Vasey & Lonigan, 2000), but is currently very rare (Alfano et al., 2002; Muris & Field, 2008; Schniering & Lyneham, 2007). As yet, two types of measures have been used in investigating the interpretation bias. One approach is the use of homophones (e.g., Eley et al., 2008; Hadwin, Frost, French, & Richards, 1997). In studies using homophones reading abilities are required. Due to problems of individual differences in reading and writing, Hadwin et al. (1997) presented the homophones with words in auditory and visual forms. They found that the level of trait anxiety was associated with threatening interpretation of homographs. However, the use of homophones has limitations, e.g., its reliability, the limited number of homophone words that are age-appropriate, and significant different levels of threat intensity for the negative and neutral/positive interpretations (Eley et al., 2008). The other instrument to assess interpretation bias has been the use of questionnaires or vignettes. These studies found that anxious children and children at risk for anxiety disorders tend to favor threatening

* Corresponding author at: Klinische Kinder- und Jugendpsychologie, Institut für Psychologie, Universität Basel, Missionsstrasse 60/62, CH-4055 Basel, Switzerland. Tel.: +41 612670340; fax: +41 612670339.

E-mail address: silvia.schneider@unibas.ch (S. Schneider).

over nonthreatening interpretations in ambiguous situations (e.g., Barrett, Rapee, Dadds, & Ryan, 1996; Chorpita, Albano, & Barlow, 1996; Schneider, Unnewehr, Florin, & Margraf, 2002). However, Alfano, Beidel, and Turner (2002) mentioned in their review that negative cognitions are not consistently associated with clinically anxious children (e.g., Beidel, 1991; Kendall & Chansky, 1991). Bögels and Zigterman (2000) did not find significant differences between children with anxiety disorders and healthy children and Eley et al. (2008) found that correlations between interpretation of ambiguous situations, anxiety, and depressive symptoms were stronger in depression than anxiety, when controlling for the other disorder.

Contrary to studies with children, experimental tasks have frequently been employed in adult research to investigate the automatic manifestations of interpretation bias (see Harvey, Watkins, Mansell, & Shafran, 2004). For example, Hirsch and Mathews (1997, 2000) investigated an online interpretation bias in social phobia using narrative texts (Hirsch & Mathews, 1997) and a lexical decision task (Hirsch & Mathews, 2000). Both studies found no support for the hypothesis that social anxious individuals favor a negative interpretation of ambiguous stimuli in these online tasks. Similarly, McNally, Otto, Hornig, and Deckersbach (2001) found no evidence that the influence of strategic and automatic processing is stronger for completing threat stems than nonthreat stems in panic patients compared to healthy control participants when using a stem completion task involving threatening, positive, and neutral material.

In the adult literature, interpretation bias is usually investigated for disorder specificity. 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 have investigated groups of mixed anxiety disorders without differentiating between specific subtypes (e.g., Barrett et al., 1996; Bögels & Zigterman, 2000; Chorpita et al., 1996), or content-specificity was only a side focus (Bögels, Snieder, & Kindt, 2003; Dalgleish et al., 2003; Muris et al., 2000). Bögels et al. (2003) found evidence for content-specificity only for SAD, but not for GAD, while no evidence for content-specificity could be found among children with GAD and PTSD (Dalgleish et al., 2003; Muris et al., 2000). As a result, it remains unclear whether cognitive biases among anxious children are specific to the type of anxiety disorder experienced.

One major weakness of studies on cognitive bias in childhood anxiety is that the material used was often not developed for investigating disorder-specific interpretation bias and since most methods were originally developed for adults, no reliability and validity data for children have been established (e.g., Bögels et al., 2003; Dalgleish et al., 2003; Muris et al., 2000). Few studies have systematically investigated the psychometric properties of the questionnaires or other measures of interpretation bias utilized in their studies (e.g., Muris, Jacques, & Mayer, 2004; Schneider, In-Albon, Rose, & Ehrenreich, 2006), which is an essential prerequisite for a solid investigation of disorder-specific interpretation bias. Another weakness of existing measures is that the currently used methods often include words, which require an ability to read. Thus, there is need for studies using language-free methods when investigating preschool children.

In this study, we focused on children with separation anxiety disorder (SAD) and social phobia. Children suffering from SAD have excessive and unrealistic fears of being separated from an attachment figure (Schneider & In-Albon, 2004). SAD is one of the most common anxiety disorders in childhood, and one of the earliest emerging (Cartwright-Hatton, McNicol, & Doubleday, 2006; Kessler et al., 2005). SAD is also a risk factor for various mental disorders in adulthood (Brückl et al., 2007; Lewinsohn, Holm-Denoma, Small, Seeley, & Joiner, 2008). The key feature of social phobia is a marked

and persistent fear of situations in which the person feels that he or she is the focus of attention or evaluation by others. SAD and social phobia were selected for this study because these anxiety disorders are common in childhood and can be represented pictorially.

In summary, interpretation bias toward threat in anxious children is supported by several offline studies (e.g., Barrett et al., 1996; Chorpita et al., 1996). The focus of the present study was to investigate interpretation bias among children with SAD, social phobia, and nonanxious children using an online measure. A forced choice reaction time (FCRT) paradigm using pictorial stimuli was used to reflect online associations. We showed children separation and social phobia relevant photographs representing non-ambiguous and ambiguous situations. The child was shown one picture at a time and had to press a response button as quickly as possible indicating whether the picture represented a departure/arrival situation or a popular/unpopular child, respectively. Children's responses and reaction times were measured. We hypothesized that compared to nonanxious children, children with SAD and social phobia would choose more threatening interpretations when viewing ambiguous situations. According to the fear network theory, faster reaction times in clinical anxious children would be expected compared to nonanxious children.

Method

Participants

144 children took part in this experiment. Participants were 71 children with a primary diagnosis of SAD (37 girls and 34 boys), 31 children with a primary diagnosis of social phobia (15 girls and 16 boys), and 42 nonanxious children (20 girls and 22 boys). Mean age of the children with SAD was 8.73 years ($SD = 2.35$, Range = 5–13), and children with social phobia had a mean age of 8.9 ($SD = 2.21$, Range 5–13). Nonanxious children had a mean age of 9.26 ($SD = 1.96$, Range 5–13). There were no group differences in age, $F(2, 141) = .76$, $p = .47$, or gender, $F(2, 141) = .13$, $p = .88$. The children were recruited for a cognitive-behavioral treatment study of SAD at the University of Basel, Switzerland. Nonanxious children were paid for participation. Children with an anxiety disorder received free treatment. In addition, 22 of these children (10 SAD, 12 social phobia) were recruited at Macquarie University in Sydney. The Basel and Sydney samples did not differ significantly regarding age, $t(142) = 1.84$, $p = .07$, and gender, $t(142) = .68$, $p = .50$. The sample size provided 99% power to detect a medium effect size (Cohen's $d = .50$).

To examine the children's current or past DSM-IV diagnoses, we conducted separate structured interviews with each child and its parents (i.e., either the mother or father or both together) using the *Diagnostic Interview for Mental Disorders in Children and Adolescents* (Kinder-DIPS; Schneider, Unnewehr, & Margraf, 2009) for the German-speaking sample and the *Anxiety Disorders Interview Schedule* (ADIS for DSM-IV; Silverman & Albano, 1996; see below) for the Sydney sample. Diagnoses were based on composite information from the two separate interviews. In both interviews, children are assigned a principal diagnosis, representing the most distressing/interfering current problem, and any additional diagnoses for which they meet criteria. Of the children who met criteria for a principal clinical separation or social anxiety disorder, 10 (9.8%) had a co-principal diagnosis (specific phobia, oppositional disorder, insomnia), 46 (45.1%) and 13 (12.7%) met criteria for one or two additional clinical disorders (specific phobia, oppositional disorder, insomnia), respectively. Children with a principal diagnosis of SAD and a co-principal diagnosis of social phobia were not included in the study ($n = 3$). The nonanxious control group never experienced any mental disorder when assessed with the Kinder-DIPS.

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