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Hypervigilance and avoidance in visual attention in children with social phobia

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ABSTRACT

Background and objectives: Attentional bias towards threat in socially anxious adults is well documented; however, research on this bias in children with social phobia is rather scarce. The present study investigates whether the hypervigilance-avoidance hypothesis also applies to children with social phobia.
Methods: Thirty children (aged 8–12) with social phobia and 43 control children participated in an eye-tracking experiment while their attentional distribution was recorded. Social anxiety was induced in half of the children before the eye-tracking task. Stimuli were presented for 3000 ms, and bias scores for initial fixations and the time span of attention were assessed.
Results: Results indicated initial vigilance towards angry faces for all children independent of anxiety induction, while hypervigilance (but not avoidance) was only established in children with social phobia for angry–neutral face pairs and with social fears induced. Self-report measures of anxiety correlated with bias towards threat with more pronounced associations occurring in the anxiety induction condition.
Limitations: We did not record reaction times simultaneously which limits the opportunity to compare our results to some previous studies which focused on this variable as an indicator of attention.
Conclusions: Cognitive biases in elementary school children (between 8 and 12 years) relate to hypervigilant rather than to avoidant information processing. Attentional distribution varies over time. Differences between clinical anxious and healthy children seem to be modified by anxiety induction, symptom severity and contextual stimuli, such as the emotional valence of a face and the context in which the threat stimulus appears.

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1. Introduction

Cognitive models of social phobia (SP) have stimulated much research in adults targeting information processing (Clark & Wells, 1995; Eysenck, 1997; Mogg & Bradley, 1998; Rapee & Heimberg, 1997). One important aspect of these models addresses selective attention towards threatening cues in patients with anxiety disorders in general. Anxious individuals are more likely to selectively attend to threatening cues. Such an attentional bias subsequently leads to an increased perception of danger accompanied by more intense anxiety. A meta-analysis conducted by Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, and van Ijzendoorn (2007) revealed that a bias towards threat cues is a robust finding in anxious individuals, although effect sizes were low to medium.

In order to strengthen theoretical models and clarify underling mechanisms of social phobia (SP), experimental research is needed and has repeatedly been requested in the literature on childhood anxiety in general as well (Field, Cartwright-Hatton, Reynolds, & Creswell, 2008). Some recent research suggests that Clark and Wells' (1995) cognitive model of SP may also be applicable to children and adolescents (Hodson, McManus, Clark, & Doll, 2008). Negative social cognitions, self-focused attention, safety behaviours and pre- and post-processing were all significant predictors of social anxiety in a questionnaire-based study by these authors. Schmitz, Kraemer, Blechert, and Tuschen-Caffier (2010) also reported evidence in an experimental study to support the significance of post-event processing in children with social phobia (CSP). In addition, important variables in the Clark and Wells model, like

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safety behaviours, negative thinking and especially self-focused attention, played an important role in group differences between high socially anxious and healthy control children (Kley, Tuschen-Caffier, & Heinrichs, 2012). To our knowledge, there is only one study by Waters, Mogg, Bradley, and Pine (2011) investigating bias in visual attention in younger children (5–12 years) in a sample of healthy controls and a group of children with social phobia. The direction (hypervigilance or avoidance) depended on the level of children's anxiety: High anxious children in the clinical group showed hypervigilance towards angry faces relative to neutral faces, whereas children with lower levels of social anxiety were avoidant. Healthy controls showed no bias to either face. A growing interest in the experimental research of attentional bias in anxious children in general has emerged in recent years (Bar-Haim, Morag, & Glickman, 2011; Gamble & Rapee, 2009; In-Albon, Kossowsky, & Schneider, 2010; Pérez-Edgar et al., 2011; Roy et al., 2008; Waters, Henry, Mogg, Bradley, & Pine, 2010). However, findings regarding attentional bias in anxious children are inconsistent so far.

Many studies reveal a bias towards threatening stimuli for anxious children, compared to non-anxious peers (Bar-Haim et al., 2011; Pérez-Edgar et al., 2011; Roy et al., 2008; Waters, Henry et al., 2010). Other studies, however, especially studies focussing on younger children (below age 12), document an attentional bias towards threatening stimuli for both anxious and non-anxious children (Bar-Haim et al., 2011; Field, 2006; Puliafico & Kendall, 2006; Taghavi, Neshat-Dost, Moradi, Yule, & Dalgleish, 1999). Some authors have claimed a common bias towards threat among children (Kindt, Biermann, & Brosschot, 1997; Waters, Lipp, & Spence, 2004; Waters, Wharton, Zimmer-Gembeck, & Craske, 2008), which is enhanced in anxious children (Taghavi et al., 1999; Waters, Kokkoris, Mogg, Bradley, & Pine, 2010). Kindt et al. (Kindt et al., 1997; Kindt & van den Hout, 2001) claimed a lack of inhibiting selective attention towards threat in children. They propose that the skill to process threatening information underlies cognitive development, occurring in adolescence. Again there have been inconsistent findings, whether this bias was specific to negative (i.e. threat) cues (Mogg & Bradley, 1998; Waters et al., 2008) or occurred in response to either positive or negative emotional cues (angry and happy faces compared to neutral faces: Waters, Henry et al., 2010). Moreover, some authors have reported attentional avoidance of threat in anxious children (Monk et al., 2006; Stirling, Eley, & Clark, 2006). Possible explanations for these inconsistencies in research may be the different methodological approaches, the confounding effect of samples with diverse anxiety disorders and levels of anxiety as well as developmental factors (In-Albon et al., 2010; Puliafico & Kendall, 2006; Waters et al., 2008).

Conclusions of bias in visual attention in children and adolescents by age group are hard to reach, due to the small number of studies focussing on children and the wide age range of participants, leading to wide standard deviations in age (Bar-Haim et al., 2007). Research has shown that it is important to pay attention to different developmental stages of childhood and youth when investigating visual attention in children and adolescents (Alfano, Beidel, & Turner, 2006; Gamble & Rapee, 2009; Rao et al., 2007). Moreover, studies addressing the specific fears of SP in the early years of the disorder (ages 8–12) are scarce (Bar-Haim et al., 2007; Beidel & Turner, 2007). However, separating anxiety disorders may be relevant since threatening cues are assumed to be fear-specific (In-Albon et al., 2010; Kindt et al., 1997). CSP should hence react differently to faces than children with separation anxiety or spider phobia.

Faces of people depict a threat cue with presumably greater ecological validity than words (Watts & Weems, 2006; Wells & Matthews, 1999). Moreover, most studies compared either negative–neutral and positive–neutral (Cooper & Langton, 2006;

Gamble & Rapee, 2009; Garner, Mogg, & Bradley, 2006; Nummenmaa & Calvo, 2006; Waters, Kokkoris et al., 2010) or negative–positive stimulus pairs (In-Albon et al., 2010). In contrast to adult research (Chen, Ehlers, Clark, & Mansell, 2002), non-facial stimuli comparison conditions have rarely been included in child research (Heinrichs & Reinhold, 2010). To detect the influence of contextual factors, including social and non-social contexts, it is important to provide a stimulus set that covers more than just one (emotional) context.

Only few studies investigated the relationship of anxiety level or intensity and attentional bias. Garner et al. (2006) found enhanced bias towards threatening faces in high social anxious adults, when anxiety was induced prior to the assessment of attention. Wieser, Pauli, Reicherts, Mühlberger (2010) also found enhanced fear processing in adults when a public speech was anticipated. Relatedly, child's symptom severity (Waters, Mogg, Bradley, & Pine, 2011) as well as separating children in high vs. low clinical anxiety (Waters, Henry et al., 2010) may be regarded as critical variables in visual bias. The level of anxiety as well as symptom severity hence seem to modify bias effects and may play an important role for the size of bias effects.

Some studies have compared different presentation times (Gamble & Rapee, 2009; Waters, Kokkoris et al., 2010) or time intervals (Heinrichs & Reinhold, 2010; In-Albon et al., 2010), revealing significant differences. Findings of Gamble and Rapee (2009) demonstrate that presentation time is crucial regarding attentional distribution. Anxious adolescents aged 12–17 years oriented away from threat faces, whereas anxious children aged 7–11 years oriented away from happy faces compared to their non-anxious peers when stimuli were presented for 500 ms. This bias in initial fixation did not occur for pictures that were presented for 3000 ms. All participants, then, showed a hypervigilant-avoidant pattern. The authors concluded an attentional bias in initial orienting for anxious youth compared to non-anxious children and adolescents, but no bias in subsequent processing stages. Furthermore they emphasized the relevance of contextual factors, such as presentation time and the importance of further research of the "hypervigilance-avoidance" (Bögels & Mansell, 2004; Heinrichs & Hofmann, 2001) pattern in youth.

In-Albon et al. (2010) specifically investigated the distribution of attention over 3000 ms presentation time in children with separation anxiety disorder. Interestingly, children with separation anxiety disorder did not show a bias towards threatening (i.e. separating) scenes in the initial 1000 ms, but after detection of threatening stimuli, they avoided these. Healthy control children showed a reverse pattern. The authors concluded that duration of presentation time influenced their findings.

In sum, the current literature suggests that investigating visual attentional biases in CSP may be worthwhile. However, a number of recommendations can be concluded from the existing literature: 1) Experimental research should include younger children (<12 years) to explore the role of biases in younger children in order to identify mechanisms associated with the development and maintenance of SP; 2) The sample should be homogeneous in terms of the respective anxiety disorder under investigation and sufficiently large to detect these information processing biases; 3) Stimuli should be fear-relevant, i.e. containing information that is potentially dangerous. In case of SP, pictures of faces should be used; 4) The influence of anxiety induction (prior to a task) should be assessed; and 5) eye-tracking methods should be used due to their power to record the natural course of attention over (the entire stimulus) presentation time.

The present study aims to realize these recommendations by investigating a possible hypervigilant-avoidant pattern towards