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Look for good and never give up: A novel attention training treatment for childhood anxiety disorders

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ABSTRACT

Attention bias modification training (ABMT) is a promising treatment for anxiety disorders. Recent evidence suggests that attention training towards positive stimuli, using visual-search based ABMT, has beneficial effects on anxiety and attention biases in children. The present study extends this prior research using distinctive techniques designed to increase participant learning, memory consolidation, and treatment engagement. Fifty-nine clinically anxious children were randomly assigned to the active treatment condition (ATC) (N = 31) or waitlist control condition (WLC) (N = 28). In the ATC, children completed 12 treatment sessions at home on computer in which they searched matrices for a pleasant or calm target amongst unpleasant background pictures, while also engaging in techniques designed to consolidate learning and memory for these search strategies. No contact was made with children in the WLC during the wait period. Diagnostic, parent- and child-reports of anxiety and depressive symptoms, externalising behaviour problems and attention biases were assessed pre- and post-condition and six-months after treatment. Children in the ATC showed greater improvements on multiple clinical measures compared to children in the WLC. Post-treatment gains improved six-months after treatment. Attention biases for angry and happy faces did not change significantly from pre-to post-condition. However, larger pre-treatment attention bias towards threat was associated with greater reduction in anxiety at post-treatment. Also, children who showed greater consolidation of learning and memory strategies during treatment achieved greater improvement in global functioning at post-treatment. Attention training towards positive stimuli using enhanced visual-search procedures appears to be a promising treatment for childhood anxiety disorders.

1. Introduction

Paediatric anxiety disorders are common, debilitating, and costly conditions (Andrews, Issakidis, Sanderson, Corry, & Lapsley, 2004; Bodden, Dirksen, & Bögels, 2008; Cartwright-Hatton, McNicol, & Doubleday, 2006) that predict multiple problems throughout life (Bittner et al., 2007; Essau, 2005; Pine, Cohen, Gurley, Brook, & Ma, 1998; Strauss, Frame, & Forehand, 1987). There is a need for novel treatments, and attention bias modification therapy (ABMT) appears promising. The current paper presents preliminary results from a novel application of ABMT.

Cognitive-behavioural therapy (CBT) and selective serotonin reuptake inhibitors (SSRIs) are treatments for childhood anxiety disorders with the strongest empirical support. Approximately 55–65% of youth with anxiety disorders respond to these treatments (e.g., see Rapee, Schniering, & Hudson, 2009 for a review), leaving a sizable minority in need of other treatments. Moreover, many who do respond exhibit residual symptoms, which predict high rates of relapse at long term follow-up (Ginsburg et al. 2014). As a result, there is a need for novel interventions, particularly ones that are cost-effective and can be accessible to wide groups of affected children (Kendall, Settipani, & Cummings, 2012).

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Guided by well-established models (e.g., Clark & Beck, 2010; Eysenck, 1997; Mogg & Bradley, 1998; Williams, Watts, MacLeod, & Mathews, 1997), a notable research finding is biased attention to threat stimuli in anxiety *(i.e., a threat attention bias)*, which has been implicated in the aetiology and/or maintenance of anxiety disorders (see Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & Van-Ijzendoorn, 2007; Van Bockstaele et al., 2014 for reviews). Most empirical studies assess threat attention bias via the visual probe task in which participants view a series of face pairs, comprising a threat face paired with a neutral face, and press a button to locate a probe following one of the faces (Mogg & Bradley, 1999). Numerous experimental studies with anxious adults have found an attention bias towards threat stimuli using the visual probe task (Bar-Haim et al., 2007).

This work stimulated the development of ABMT, often using a modified visual probe paradigm (MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002) which trains threat avoidance by pairing threat-neutral stimuli followed by the visual probe appearing at the location of the neutral stimulus. Earlier studies found that ABMT-threat avoidance altered attention to threat stimuli and decreased anxiety symptoms (e.g., Amir, Beard, Burns, & Bomyea, 2009; Amir, Beard, Taylor, et al., 2009; Amir & Taylor, 2012; Amir, Weber, Beard, Bomyea, & Taylor, 2008; Hazen, Vasey, & Schmidt, 2009; See, MacLeod, & Bridle, 2009), with meta-analyses indicating significant effects in adults relative to placebo (see Hakamata et al., 2010; Hallion & Ruscio, 2011; Linetzky, Pergamin-Hight, Pine, & Bar-Haim, 2015; Mogoase, David, & Koster, 2014). However, mixed findings have accumulated (e.g., Behar, McHugh, Peckham, & Otto, 2010; Eldar & Bar-Haim, 2010; Julian, Beard, Schmidt, Powers, & Smits, 2012; McNally, Enock, Tsai, & Tousian, 2013; Neubauer et al., 2013; Rapee et al., 2013; Van Bockstaele, Verschuere, De Houwer, & Crombez, 2010). Consequently, meta-analyses have raised questions about the consistency of ABMT effects (Cristea, Kok, & Cuijpers, 2015). On the other hand, others have argued that positive outcomes are reliably observed when evidence of the successful modification of threat bias is demonstrated (MacLeod & Clarke, 2015).

Anxious children are just as likely to show threat vigilance as threat avoidance compared to healthy controls who show no bias (see Salum et al., 2013; Waters, Bradley, & Mogg, 2014). ABMT-threat avoidance may be contraindicated for anxious children who avoid threat. Some studies addressed this issue by excluding children who do not show a pre-treatment attention bias towards threat stimuli and found significant reductions in threat attention bias scores and anxiety symptoms at post-treatment in the ABMT-threat avoidance condition compared to control conditions (e.g., Eldar et al., 2012). While this might minimize deleterious effects, it limits applicability to subsets of anxious children. Other studies that have not pre-selected on the basis of pre-treatment bias direction have found mixed results regarding bias modification and anxiety reductions (e.g., Bechor et al., 2014; Cowart & Ollendick, 2011; Rozenman, Weersing, & Amir, 2011; Shechner et al., 2014).

Training anxious children to preferentially focus attention on positive stimuli could address some of these problems. Using visual-search ABMT with adults, Dandeneau, Baldwin, Baccus, Sakellaropoulo, and Pruessner (2007) were among the first to train participants to search matrices for one smiling face embedded amongst disapproving faces. In the control condition, participants searched for a particular flower embedded among other flowers. Participants in the 'attention to positive' condition experienced significant reductions in physiological and self-report stress responses, relative to participants in the control condition. Other similar findings have since accumulated in adults (Heeren, Reese, McNally, & Philippot, 2012; Johnson, 2009; Wadlinger & Isaacowitz, 2008; but see McNally et al., 2013 for null results) and anxious children and adolescents (De Voogd, Wiers, Prins, & Salemink, 2014; Waters, Farrell et al., 2014; Waters, Pittaway, Mogg, Bradley, & Pine, 2013). Several factors may account for the beneficial effects of such training. For example, it might enhance attention to information related to safety, success and mastery which could assist with the violation of danger expectancies and the reappraisal of the objective threat value of stimuli that children fear (Waters, Farrell et al., 2014). It might enhance approach motivation which in turn might counteract avoidance tendencies (Pessoa, 2009) and assist with emotion regulation during stressful situations (Taylor, Bomyea, & Amir, 2011; Zimmer-Gembeck & Skinner, 2011).

With such training, enhancing the learning and retention of the strategy to look for positive stimuli may improve effects. Cognitive-developmental theories emphasise overt verbalization as a key process in the development of self-regulated learning among children (Luria, 1961; Meichenbaum, 1977; Vygotsky, 1962). In particular, overt private speech can include information relevant to learning and emotion regulation that could consolidate the benefits of training and enhance the generalisation of learning to other tasks and situations (see Schunk, 1986 for a review). Verbalization might enhance children's attention to important task features (Fuson, 1979), and assist with emotion regulation by including coping statements (Kendall & Treadwell, 2007; Meichenbaum & Asarnow, 1979). It also makes salient the particular strategies that can improve task performance and enhances explicit memory of such strategies over time (Forrin, MacLeod, & Ozubko, 2012; Schunk, 1986).

One way that verbalizations can become more salient and memorable is through their expression as rhythmic melodies. The production of such melodies (e.g., jingles) is associated with numerous cognitive benefits (Rainey & Larsen, 2002; Silverman, 2010; Wolfe & Noguchi, 2009) and is a widely-used strategy in classroom settings with children to facilitate learning (e.g., the melodic production of the alphabet) (Brewer, 1995). Thus, verbalizing distinctive catch-phrases expressed as rhythmical jingles that reinforce the search strategies required during attention training (i.e., to look for positive stimuli) and other situations (i.e., to never give up doing this), might enhance children's learning and memory of these search strategies and in turn, improve outcomes after treatment and over time. It may also increase children's enjoyment and engagement during attention training, a treatment which is repetitive and has been described by participants as tedious (Rapee et al., 2013).

This study provides the first initial test of efficacy for a novel form of attention training towards positive stimuli for anxious children using visual-search ABMT supplemented with distinctive verbalization techniques designed to increase children's learning, memory consolidation, and engagement. The ABMT paradigm used pleasant and calm targets to encourage generalization across a wide range of stimuli and enhance ecological validity, given that explicitly pleasant stimuli will not be present in all situations children encounter. Treatment was delivered on PCs in the participants' homes. We hypothesised that relative to the waitlist control condition (WLC), the active treatment condition (ATC) would produce significantly greater reductions in children's anxiety symptoms and diagnoses across clinician-, parent- and child-report measures by post-treatment, and that these gains would be maintained at a six-month follow-up assessment. As additional goals, we evaluated whether pre-treatment threat attention bias predicted outcome, and whether changes in attention bias for threat and positive stimuli predicted treatment outcome. Also, we examined whether greater consolidation of the learning and memory strategies during treatment predicted outcome.