Comparing imagery and verbal instructions for the experimental modification of interpretation and judgmental bias in children

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ABSTRACT

Background and objectives: Using an interpretation training paradigm, previous research has demonstrated that it is possible to modify interpretation biases in socially anxious children and that trained interpretation bias affects important aspects of social anxiety (Vassilopoulos, Banerjee, & Prantzalou, 2009). The current experiment was designed to replicate and extend the results reported by Vassilopoulos et al. (2009).
Methods: In a benign interpretation training paradigm, descriptions of ambiguous hypothetical events were presented in a form requiring participants to endorse the more benign of two interpretations. Ninety-four primary school children aged between 10 and 12 years were asked to either imagine these hypothetical events or to read the same descriptions while thinking about their verbal meaning.
Results: Participants in the verbal instructions condition showed greater decreases in negative interpretations and negative emotional consequences of ambiguous events from pre-training to post-training than did those in the imagery instructions condition. Additionally, children in the verbal instructions condition reported a significant decrease in trait social anxiety as well as in their self-reported tendency to discount positive information compared with children in the imagery instructions condition.
Limitations: The results should be considered in the light of the exclusive use of self-report measures and the small effect sizes observed in some analyses.
Conclusions: These findings suggest that interpretation training in children can be effective with verbal instructions and highlight the need for further investigation of how to optimize the effectiveness of interpretation training in children.

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1. Introduction

There is increasing evidence that childhood anxiety is associated with a tendency to interpret ambiguous information in a threatening way (for a review see Muris, 2010; Muris & Field, 2008). Furthermore, it has been demonstrated that the interpretative bias can be modified through training. For example, in an investigation by Muris, Huijding, Mayer, and Hameetman (2008), children aged 8–12 years completed either a positive or negative interpretation induction involving an imaginary space journey and were then presented with a series of ambiguous events. Results indicated that children's perceptions of threat in these situations were affected by the interpretation manipulation, and that the effects of training were more pronounced for children scoring higher on anxiety. In a subsequent study (Muris, Huijding, Mayer, Remmerswaal, & Vreden, 2009) using pre- and post-training assessments to look for changes in interpretational biases, the experimental training was found to be successful in influencing children's interpretation biases and avoidance tendencies, although the relationship between the interpretation bias manipulation and actual anxiety outcomes was unclear.

Vassilopoulos et al. (2009) have reported the only study so far that has examined modification of anxiety-related interpretations in children with social anxiety symptoms. They trained a sample of socially anxious children aged 10–11 years to endorse benign rather than negative interpretations of potentially threatening social scenarios. In each training session participants were encouraged to imagine themselves as the central character in each description, irrespective of whether they thought such a situation could ever actually occur to them. Then, 45 event descriptions were

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presented in a form requiring participants to endorse the more benign interpretation. This group was subsequently less likely to endorse negative interpretations of new ambiguous social situations than children in a test–retest condition, suggesting that the training procedure was successful. Children who received interpretation training also showed reduced trait social anxiety and reported significantly less anxiety about an anticipated interpersonal encounter, compared with children in the control group.

The study reported by Vassilopoulos et al. (2009) suggests that it is possible to modify interpretation biases in socially anxious youths via a training paradigm, and that trained interpretation bias affects important aspects of social anxiety. While these data are taken as further support for a causal link between interpretative bias and social anxiety, there are still a number of issues that need to be resolved. To begin with, the Vassilopoulos et al. (2009) study does not reveal whether the instructions to *imagine* the described event were critical to the observed changes. Within an adult population, a series of studies has demonstrated that instructions to imagine the training stimuli are important for the success of interpretation training (Holmes, Coughtrey, & Connor, 2008; Holmes, Lang, & Shah, 2009; Holmes, Mathews, Dalgleish, & Mackintosh, 2006). In this version of an interpretation training paradigm, participants are repeatedly presented with auditory scenarios that start out ambiguous as to their potential resolution but are then all resolved in either a positive or negative way in order to train the corresponding bias. Instructions to process the scenarios using imagery (imagining being actively involved in the scenarios and seeing them from a first-person or 'field' perspective) have been contrasted with instructions to process the scenarios verbally (focusing on the words and meanings). Imagery instructions have been demonstrated to produce superior training effects than instructions to focus on the verbal meanings of the scenarios in both negative (Holmes & Mathews, 2005) and positive interpretation training paradigms (Holmes et al., 2006). The superiority of imagery versus verbal processing in training positive interpretation has since been replicated (Holmes et al., 2009; Holmes, Mathews, Mackintosh, & Dalgleish, 2008), and there is initial evidence that this imagery-based bias modification may be effective in clinical groups (Blackwell & Holmes, 2010; Lang, Blackwell, Harmer, Davison, & Holmes, submitted for publication). In adults, verbal processing of positive training material may even have a paradoxical effect of worsening mood (Holmes et al., 2009). These results form part of a wider body of evidence suggesting that imagery has a more powerful impact on emotion than does verbal processing of the same material (Holmes & Mathews, 2010).

Many of the training procedures being developed to modify cognitive biases in children use explicit instructions to generate imagery (e.g. Lester, Field, & Muris, in press-a, in press-b; Vassilopoulos et al., 2009). However, it is also well-demonstrated that presenting verbal information can be highly effective for inducing or reducing fear-related cognitive biases in children (e.g. Field, 2006a, 2006b; Muris, Huijding, Mayer, Remmerswaal, & Vreden, 2009; Muris, Huijding, Mayer, Van As, & Van Alem, 2011). It is therefore not clear to what extent imagery instructions may add to the effectiveness of an interpretation training program that involves text-based presentation of verbal information as used by Vassilopoulos et al. (2009), and we cannot necessarily expect the same pattern of results found in adult studies to translate directly to children. There are developmental differences in cognitive maturation between children and adults (Schlaggar et al., 2002). Furthermore, it may be that the ability to learn effectively via verbal information, for example from parents, may have an important survival value in rapidly acquiring an understanding of what is or is not a source of danger, and verbal information may play a particularly important role in fear acquisition in childhood (e.g. Field,

2006a). Children are highly imaginative (e.g. imaginary friends, imaginary play, and so forth) and so may spontaneously use imagery (e.g. Harris, 2000; Levin & Divine-Hawkins, 1976; Rall & Harris, 2000). Thus, it may be that without any specific instructions to generate imagery, verbally-presented information evokes emotional processing to a sufficient degree to influence bias.

As one longer-term aim of this body of research is to develop clinically useful tools for treating anxiety in children, understanding how best to implement these training procedures is an interesting question to address at this early stage of research. Clarifying whether instructions to generate imagery add to the effectiveness of the training procedure is therefore interesting both from theoretical and treatment development perspectives, and experimental manipulation provides the best way of investigating this question. Therefore, the first aim of the current study was to investigate whether the superiority of imagery instructions compared to verbal instructions observed in adults also applies in children, when using the training paradigm developed by Vassilopoulos et al. (2009).

Further, previous research has demonstrated a highly significant correlation ($r = .52$) between childhood social anxiety and estimated negative emotional consequences of hypothetical social events (Vassilopoulos & Banerjee, 2008). Thus, a second aim was to investigate whether the experimental procedure has an effect on children's anticipated emotional consequences of social events (judgmental bias). Finally, we explored whether the change in interpretation bias induced by our training paradigm for children generalizes across content and task. Generalizability of cognitive bias modification to other modes of delivery within the social domain has already been demonstrated in adults (e.g., Mathews & Mackintosh, 2000). Given the growing interest in the interpretation of positive social events (Alden, Taylor, Mellings, & Laposa, 2008; Laposa, Cassin, & Rector, 2010; Vassilopoulos & Banerjee, 2010) we intended to determine the malleability of these interpretations by administering a new questionnaire measuring children's discounting interpretations of positive events before and after training. Thus, we measured not only interpretations in response to ambiguous vignettes (a proximal dependent variable, in terms of its similarity to the modification stimuli), but also self-reported tendencies to discount positive events using a questionnaire method (a distal dependent variable, in terms of being distinct from the modification stimuli in both content and format).

In sum, the aim of the present study was to replicate and extend the results reported by Vassilopoulos et al. (2009) and in particular to examine whether imagery and verbal processing instructions differentially affect training-congruent change in interpretation bias and judgments of negative consequences in children, and whether this translates into associated change in social anxiety.

2. Method

2.1. Overview

In a benign interpretation training paradigm, 72 descriptions of ambiguous hypothetical events were presented in a form requiring participants to endorse the more benign of two possible interpretations. Primary school children first received some practice and then were asked either to imagine these events or to read the same descriptions while thinking about their verbal meaning. Participants were randomly allocated to either the imagery instructions or verbal instructions condition, both of which used the same benign interpretation training materials. We assessed children's social anxiety and depressive symptoms together with their initial interpretation and judgmental bias prior to training, and repeated all these assessments after training four weeks later. Children were