



# Interpretation bias modification for youth and their parents: A novel treatment for early adolescent social anxiety



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## ABSTRACT

Social anxiety is the most prevalent anxiety disorder of late adolescence, yet current treatments reach only a minority of youth with the disorder. Effective and easy-to-disseminate treatments are needed. This study pilot tested the efficacy of a novel, online cognitive bias modification for interpretation (CBM-I) intervention for socially anxious youth and their parents. The CBM-I intervention targeted cognitive biases associated with early adolescents' maladaptive beliefs regarding social situations, and with parents' intrusive behavior, both of which have been theoretically linked with the maintenance of social anxiety in youth. To investigate the efficacy of intervening with parents and/or children, clinically diagnosed early adolescents (ages 10–15;  $N = 18$ ) and their mothers were randomly assigned to one of three conditions: the first targeted early adolescents' cognitive biases related to social anxiety (Child-only condition); the second targeted parents' biases associated with intrusive behavior (Parent-only condition); and the third targeted both youth and parents' biases in tandem (Combo condition). The use of a multiple baseline design allowed for the efficient assessment of causal links between the intervention and reduction in social anxiety symptoms in youth. Results provided converging evidence indicating modest support for the efficacy of CBM-I, with no reliable differences across conditions. Taken together, results suggest that online CBM-I with anxious youth and/or their parents holds promise as an effective and easily administered component of treatment for child social anxiety that deserves further evaluation in a larger trial.

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## 1. Introduction

Social anxiety disorder is the most prevalent anxiety disorder of late adolescence and adulthood (Ollendick & Hirshfeld-Becker, 2002), affecting up to 15% of teenagers in the United States (Heimberg, Stein, Hiripi, & Kessler, 2000). Social anxiety typically runs a chronic course over the lifespan (Keller, 2003) and is linked to poor long-term outcomes, such as major depression (Hayward et al., 2000), academic underachievement, and substance abuse (DeWitt, McDonald, & Offord, 1999). Yet, a mere 25% of youth with social anxiety have access to any intervention (Essau, Conradt, & Petermann, 1999). Moreover, among the minority of socially anxious youth who do receive the current gold standard treatment, cognitive behavioral therapy (CBT), approximately 40% fail to demonstrate a clinically significant treatment response (Kendall,

Settipani, & Cummings, 2012). Clearly, additional treatments are needed—both to reach underserved populations and to increase the efficacy of CBT.

### 1.1. Cognitive models of social anxiety

Cognitive models of social anxiety (Clark & Wells, 1995; Rapee & Heimberg, 1997; Schreiber, Hofling, Stangier, Bohn, & Steil, 2012) posit that, in social contexts, multiple cognitive biases are activated for socially anxious individuals. For example, their attention becomes especially self-focused, and they experience greater access to negative beliefs about themselves and others' evaluation of them. These cognitive processes may give rise to negatively biased interpretations of the many ambiguous cues that social situations present (Beard & Amir, 2008), which, in turn, amplify and/or maintain social anxiety symptoms. Empirical work corroborates the theorized connection between interpretation bias and anxiety symptoms in youth. For example, studies have shown that anxious youth tend to interpret ambiguous hypothetical stories as threatening (e.g., Bögels & Zigterman, 2000), and do so based on less

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information than non-anxious youth (e.g. Muris, Merckelbach, & Damsma, 2000).

The child anxiety literature also supports a role for family interactions in shaping interpretation bias. For example, two similar studies assessed clinically anxious youth's interpretation bias of ambiguous situations (Chorpita, Albano, & Barlow, 1996) and their hypothetical behavioral response (e.g., avoidance) to ambiguous situations (Barrett, Rapee, Dadds, & Ryan, 1996), both before and after discussions with family. Both studies found that anxious youth initially interpreted ambiguous scenarios more negatively than non-anxious youth, and, moreover, anxious youth's negative interpretations (Chorpita et al., 1996) and expected avoidant behaviors (Barrett et al., 1996) increased following discussions with their families. Further, Creswell and O'Connor (2006) found that the correlation between mothers' and children's threatening interpretations of ambiguous scenarios was partially mediated by mothers' expectations for the child's distress, suggesting that children's interpretation biases may have a "reciprocal relationship with mothers' expectations of children's anxious cognitions" (Field, Hadwin, & Lester, 2011). These findings indicate the possibility that modifying interpretation biases at both the parent and child level could lead to reduced anxiety symptoms in youth.

### 1.2. Cognitive bias modification for interpretation

Cognitive bias modification for threat interpretation (CBM-I) refers to computerized training in interpreting ambiguity in a benign way, so as to reduce threat-related interpretations and increase benign interpretations of ambiguous situations in participants' everyday life (Mathews & Mackintosh, 2000). The adult anxiety literature has shown that directly reducing negative cognitive biases through CBM-I can lead to reductions in anxiety symptoms, highlighting a causal role for cognitive biases in anxiety and, in turn, the clinical utility of CBM-I (MacLeod & Mathews, 2012; Steinman & Teachman, 2014). Thus, several child and adolescent studies have adapted the ambiguous scenario paradigm that has commonly been used in adult CBM-I studies. This paradigm presents emotionally ambiguous scenarios that are resolved when participants complete a word fragment at the end of the scenario that assigns a benign meaning to the situation (in the positive training condition). Results suggest that youth's interpretation biases can be altered through CBM-I (see Lau, 2013), though many questions remain. For example, across studies, changes in anxiety symptoms have rarely accompanied changes in interpretation bias, and effect sizes have been small. Nonetheless, findings from the burgeoning youth CBM-I literature, taken together with those from the more established adult literature, suggest that several methodological modifications, which are applied in this study, could increase the efficacy of youth CBM-I and its ability to alter anxiety symptoms.

For example, ecologically valid training materials have been associated with larger effect sizes. Whereas early youth CBM-I studies used scenarios related to a fictional "space odyssey" theme, subsequent work (Lester, Field, & Muris, 2011) used materials involving real-life scenarios congruent with participants' anxiety symptoms related to either animal or social fears. In addition to finding that children's threat bias decreased after positive training in both the animal and social conditions, a non-significant trend suggested that bias modification was stronger for children trained with content that was congruent with their developmentally normative fears. Thus, all CBM-I scenarios in the current study targeted beliefs theoretically and/or empirically linked to intrusive parenting or social anxiety.

Of note, one of the few studies that employed a high social anxiety (vs. unselected) sample was also one of the few youth CBM-I studies to show reductions in participants' trait social anxiety

following training (Vassilopoulos, Banerjee, & Prantzalou, 2009). However, the only published youth CBM-I study that has employed a clinically diagnosed sample did not find reductions in emotional vulnerability following training (Fu, Du, Au, & Lau, 2013). The current study's inclusion of clinically diagnosed socially anxious youth aims to provide a clearer test of the clinical utility of CBM-I for children and maximize the likelihood of observing effects.

Finally, youth CBM-I studies have typically focused treatment on only the child or adolescent, which may neglect the need to address the family context in which youth anxiety develops. In the only published youth CBM-I study to include parents (Lau, Pettit, & Creswell, 2013), CBM-I scenarios were embedded in bedtime stories that parents read to their children over three nights. Children who received the intervention not only showed positive changes in interpretation bias, they also showed a significant reduction in social anxiety symptoms, relative to control participants. While the inclusion of parents marks an exciting new direction in youth CBM-I research, we note that Lau et al. included parents as administrators of treatment, as opposed to the recipients. Given the purported role of parents in child anxiety, it is possible that administering CBM-I to both parents and children could have additive benefits.

### 1.3. Role of parenting in child anxiety

Though the role of parenting in child anxiety has not been clearly specified, one aspect of parenting that may influence child anxiety is parental intrusiveness. McLeod, Wood, and Avny (2011) point to multiple mechanisms that may account for the positive relationship between parental intrusiveness and child anxiety. Parental intrusiveness may lower children's self-efficacy or sense of an internal locus of control, or it could block opportunities for exposure to feared stimuli, which has been strongly linked to fear reduction (Rachman, 1977). For example, some benign and developmentally appropriate situations, such as parties and class presentations, may make anxious youth fearful. In response to their child's distress, parents may enable their child's avoidance of these situations, thereby preventing the child from learning that he or she is capable of facing fears and managing anxiety.

Ollendick and Benoit's (2012) parent-child interactional model of social anxiety proposes that parents may inadvertently contribute to child social anxiety by modeling anxiety and communicating their own cognitive biases to their children, such as the overestimation of social threat and the belief that avoidance is a helpful response to perceived threat. These biases may lead to parenting practices, such as intrusive parenting, that shape and sustain child cognitive biases, which in turn maintain child social anxiety. According to this model, targeting parent cognitive biases that are thought to contribute to child anxiety (e.g., my child cannot tolerate anxiety; I will be a bad parent if I don't stop my child's anxiety) may interrupt the transmission of anxiety from parent to child at an early point in this process.

### 1.4. Internet delivery of CBM-I

Internet delivery of youth CBT has gained empirical support as being both feasible and efficacious (see Richardson, Stallard, & Velleman, 2010, for a review). Online youth CBM-I, on the other hand, has only been attempted once, to our knowledge (Sportel, de Hullu, de Jong, & Nauta, 2013). While the outcomes indicated only a trend for symptom reduction in the group who received CBM, it is notable that participants assigned to the Internet-based CBM condition completed more treatment sessions than those in the school-based group CBT condition, suggesting that Internet CBM is at least feasible and does not lead to unusually high attrition.

Though Sportel et al. (2013) intervened with a community sample, Internet delivery of CBM-I may be especially promising for

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