

**An experimental investigation of the
FEAR effect in non-clinical children
and their mothers**

Hannah Murray

D.Clin.Psy. Thesis (Volume 1) 2008

University College London

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Overview

This volume consists of three sections: A literature review considering how parenting influences childhood anxiety, with particular reference to the role of threat perception; an empirical paper describing an experimental test of one potentially important variable in childhood anxiety – the Family Enhancement of Avoidant and Aggressive Responses (FEAR) effect; and a critical review of this study.

The literature review attempts to synthesise a varied body of research investigating how parents influence anxiety in children. It describes research considering how parenting styles such as control and warmth affect anxiety, and more recent cognitive studies suggesting that children internalise their parents' perception of potentially threatening stimuli and situations, leading to anxiety. Such studies are critically reviewed, and the mechanism by which parents communicate to their children a need to be vigilant to threat is considered.

The empirical paper explores one of these mechanisms, the 'FEAR' effect, by which parents inadvertently reinforce avoidant plans that their children make during conversations. The study explores this experimentally by training some mothers to mimic the FEAR effect and others to reverse it, by encouraging non-threat interpretations and non-avoidant plans. Although the FEAR effect was not found, children whose parents encouraged non-anxious responses were less likely to interpret subsequent scenarios as threatening. Potential clinical applications of these results are discussed.

In the third section the empirical paper is critically reviewed including some reflections on carrying out the research, a consideration of some of the limitations of the study and finally, a discussion of the implications of the findings and suggestions for further research.

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Acknowledgments

Many thanks to all of those who contributed to and helped with this study. Particular thanks to my three supervisors: Pasco, Cathy and Stephen. Also thanks to all of the mums and children who took part and to the schools who helped with recruitment. Finally, thanks to Claire for her help with the reliability checks.

Part 1: Literature Review

Why do anxious parents have anxious children? A review of the role of threat perception

Abstract

This review argues that a cognitive bias towards increased vigilance and perception of threat underlies childhood anxiety. It is hypothesised that parents of anxious children inadvertently reinforce this bias, or fail to help children inhibit it. The review explores the literature linking threat perception and anxiety, and considers how such a bias may develop. It is argued that parents of anxious children reinforce threat perception in the way they talk to their children, the behaviour that they model and their style of parenting. As few studies, reviews or models have directly tested these hypotheses, evidence from a range of relevant frameworks is considered.

Introduction

Clinical anxiety is one of the most common psychological problems experienced by school-aged children with prevalence estimates ranging from 3-14% (Cohen et al., 1993). Childhood anxiety can cause significant distress and impairment and is associated with poor academic achievement and peer relationships. It predicts further psychological problems in adolescence and adulthood (Rabian & Silverman, 2000).

The onset and maintenance of childhood anxiety has been linked to a range of variables, which appear to interact in complex ways. Research supports a role for genetics, neurobiological systems such as the behavioural inhibition system (BIS) and environmental influences including exposure to stressful life events and peer relationships in the development of anxiety (Vasey & Dadds, 2001).

Much recent research into childhood anxiety has focused on cognitive factors, and several cognitive models have been developed. It is hypothesised that a cognitive style characterised by threat perception and interpretation underlies the development and maintenance of anxiety (e.g Hadwin, Garner, & Perez-Olivas, 2006). It is suggested that children who more readily perceive threat in situations are more likely to feel anxious, and that this anxiety then makes the perception of threat more likely.

One of the most consistent and intuitive influences on childhood anxiety is the parent-child relationship. Traditionally, research in this area has focused on the dimensions of rejection and control in parenting style, but results vary and effect sizes are often small. More recent research considers other ways that parenting may

influence anxiety, which have the potential to explain a far larger proportion of variance.

There is, as yet, little research into the role that parents may play in the development and maintenance of a threat interpretation bias in their children. Given the suggested importance of this cognitive style, and the undoubted influence that parenting has on children, this seems a fruitful area to explore, and is the focus of this literature review. Limited research directly links these variables, but research from a range of other perspectives may be relevant.

Firstly, the hypothesis that cognitive biases underlie anxiety in adults and children is reviewed. The role of parenting in the development of such biases is then considered, including evidence that parents and children may share cognitions, and that children somehow internalise their parent's cognitive style. The second section of the review argues that children learn to be vigilant to threat, or fail to inhibit this bias where it already exists, via the interactions that they have with their parents. Evidence from studies of parent-child conversations, parental 'modelling' and parenting style are reviewed in line with this hypothesis. Finally, evidence from childhood anxiety treatment studies is considered.

Literature searches using databases such as PsycINFO and search terms including 'child', 'anxiety', 'threat interpretation', 'bias', 'family' and 'parent' have been utilised to find studies relevant to the research questions above. However this does not purport to be a systematic review which empirically compares all available research and it is acknowledged that scope is necessarily limited.

Threat interpretation and anxiety

Most research into cognitive factors in anxiety has used adult participants. Models of anxiety developed for adults are generally assumed to apply to children, but some researchers have questioned this, arguing that the experience, triggers and cognitive processes of anxiety may differ in childhood (e.g. Barrett, 2000). Studies have shown that children report less cognitions, for example during stressful tasks (Beidel, 1991), but when cognitions are reported, children endorse similar anxious thoughts to adults, and anxious and non-anxious children differ in reported cognitions (Alfano, Beidel, & Turner, 2002; Prins & Hanewald, 1997). Both adults and children who are anxious seem to show a bias towards threat interpretation, the evidence for which is reviewed in this section.

Threat interpretation in adults

Threat interpretation is central to most cognitive theories of anxiety. Laboratory tasks consistently show information processing biases in clinically anxious, high trait anxious, and participants exposed to anxiety-provoking material. Anxious patients show greater interference of threat material in Stroop tasks, for example using physical threat words with health anxiety patients (Mathews & MacLeod, 1985) and social threat words (Maidenberg, Chen, Craske, Bohn, & Bystritsky, 1996), or pictures of threatening faces (Mogg & Bradley, 1999) with social phobics. Anxious participants are more likely to interpret ambiguous phrases, for example 'the doctor examined little Emma's growth' as threatening (Eysenck, Mogg, May, Richards, & Mathews, 1991).

These studies indicate that anxious participants interpret threat more readily than non-anxious participants, but cannot indicate whether such a bias causes anxiety or vice versa. Cognitive models suggest that a circular process occurs: a threat interpretation bias causes neutral stimuli to be processed as threatening which increases anxiety, and higher levels of anxiety heighten threat interpretation. Mathews and MacLeod (2002) attempted to determine causality by inducing cognitive biases in non-anxious participants. In a series of experiments they showed that induced threat interpretation biases affected the processing of subsequently presented stimuli, with state anxiety increasing when emotionally significant information was presented. Such laboratory studies do lack ecological validity, but the findings provide tentative support for the hypothesis that a threat interpretation bias may be a causal factor in the development of anxiety.

Threat interpretation in children

Evidence is accumulating that similar mechanisms operate in childhood anxiety. Most studies have used equivalent paradigms to the adult literature, particularly interpretation of ambiguity, dot-probe and Stroop designs.

I) Interpretation of ambiguity

Barrett, Rapee, Dadds and Ryan (1996) found that, as with adults, anxious children were more likely to interpret ambiguous scenarios as threatening. Hadwin, Frost, French and Richards (1997) showed that children's self-reported trait anxiety significantly predicted threat interpretation in pictorial homophones, with more threat interpreted with increasing anxiety. In a similar study, Taghavi, Moradi, Neshat-Doost, Yule and Dalgleish (2000) found that anxious children and adolescents were

more likely than non-clinical participants to choose threatening interpretations of ambiguous homographs. Muris, Luermans, Merckelbach and Mayer (2000) asked children to decide as early as possible what would happen in a story and whether it would be scary. Anxious children interpreted threat earlier and more often and reported more negative cognitions and emotions about the story. Suarez and Bell-Dolan (2001) found that higher levels of worry in their large community sample predicted more interpretation of threat in ambiguous scenarios. Worried children were also more distressed about the situations and judged them as being more likely to happen in the future.

Other studies have used more ecologically valid designs to investigate whether anxious children interpret threat in 'real-world' scenarios. Magnusdottir and Smari (1999) found that anxious adolescents were more likely to endorse negative appraisals about the likelihood and negative cost of events. This finding contrasts with adult findings that negative cost but not increased probability appraisals are associated with anxiety (Foa, Franklin, Perry, & Herbert, 1996).

2) Dot probe studies

Dot probe studies, which measure attention by calculating latencies in probe-detection after a target has been presented, have found that anxious children attend more to threatening stimuli (e.g Vasey, Daleiden, Williams, & Brown, 1995) and that low-anxious children show an attentional bias away from threat stimuli (Schipell, Vasey, Cravens-Brown, & Bretveld, 2003; Vasey, El-Hag, & Daleiden, 1996). This effect has been found with clinically anxious, but not high state anxious children, who have even been shown to attend less to threatening probes (Vasey and Macleod,

2001). It is unclear whether this indicates that attention to threat plays a different role in clinically anxious children (who show more stable anxiety) and children who report being anxious at the time of the experiment (state anxiety), or whether methodological problems account for the discrepancy. Ehrenreich and Gross (2002) suggest that the results were caused by the presence of comorbid problems such as depression and aggression.

3) Stroop tasks

Stroop tasks measure attention by asking participants to name the colours in which words are written. Increased attention is indicated by slower colour naming. Studies have consistently shown slower colour naming of threatening words in anxious children (e.g. Kindt, Bierman, & Brosschot, 1997; Martin, Horder, & Jones, 1992), suggesting increased attention to threat. Results have been replicated with children with PTSD (Moradi et al., 1999) and in anxious adolescents (Richards, Richards, & McGeeney, 2000).

Despite discrepancies in results, and little evidence of causality, studies with both adult and child participants suggest a relatively consistent relationship between threat interpretation and anxiety. If an information processing bias that favours threatening interpretations of stimuli or events underlies and maintains anxiety, its origins could be important in understanding and treating anxiety disorders. The next section explores how parents may influence the development of a threat perception bias.

Anxious cognitions and parenting

Of the myriad of factors implicated in the development and maintenance of childhood anxiety, parenting is often considered important. Children of anxious parents are more likely to be anxious (Beidel & Turner, 1997) and children with anxiety disorders are more likely to have anxious parents (Cooper, Fearn, Willetts, Seabrook, & Parkinson, 2006; Last, Hersen, Kazdin, Orvaschel, & Perrin, 1991).

Shared cognitions

As research into cognitive models for psychological disorders has increased, interest in the influence that parents have on their developing child's cognitive style has grown. Correlational studies show similarities between children and parents in cognitive style including Beck's cognitive triad (cognitions about self, others and the world; Stark, Schmidt, & Joiner, 1996), attributional style (Seligman et al., 1984), negative inferential styles and dysfunctional attitudes (Alloy et al., 2001).

In relation to anxiety-related cognitions, Creswell, Schniering and Rapee (2005) used an ambiguous scenarios design (where participants decide what is happening and what they would do in hypothetical scenarios which could have threatening or neutral interpretations) to provide a measure of threat interpretation with a mixed group of anxious and non-clinical children and their parents. Mother and child threat interpretation scores were significantly correlated, and more strongly associated than mother and child self-reported anxiety scores. These studies show preliminary evidence of a shared cognitive style between children and parents but not how such an effect develops.

Parental expectations

A similar line of research has focused on parental expectations of children. One potential explanation for shared cognitions is that children somehow internalise their parent's cognitive style. Kortlander, Kendall and Panichelli-Mindel (1997) found that mothers of anxious children were more likely than mothers of non-anxious children to predict negative outcomes in tasks for their children. They suggest that such parental expectations teach children to expect negative outcomes to their actions.

Anxious parents seem to have lower expectations for their children. Cobham, Dadds and Spence (1999) found that anxious mothers of clinically anxious children expected their children to be more anxious and to select avoidant solutions to problems compared to non-anxious mothers of anxious children. However, child expectations did not differ in the two groups. Bögels, van Dongen and Muris (2003), using a mixed group of non-clinical and anxious children, found an association between children's negative interpretations of ambiguous situations and maternal anxiety. Additionally, children's interpretations were strongly related to the negative interpretations that parents attributed to them. Wheatcroft and Creswell (2007) found that parents of anxious children predicted they would make avoidant, anxious responses to ambiguous scenarios. The predictions correlated with parental anxiety.

Studies manipulating parental expectations (of child misbehaviour: Smith-Slep & O'Leary, 1998; and distress: Creswell, O'Connor, & Brewin, 2006) show changes in parenting behaviour. Clearly, the expectations that parents hold, whether driven by their own anxiety or experimentally induced, affect how they parent, which perhaps communicates that children should have similar expectations of themselves.

Such hypotheses must be tentatively made, as these studies suffer from important shortcomings. Firstly, they assume that the expectation of negative outcomes by parents reflects an information bias, and not an accurate prediction. Indeed, in Kortlander et al.'s (1997) study, anxious children did perform less well on tasks, when rated by an independent observer. Similarly, cross-sectional studies preclude conclusions about direction of effects. Whether parents communicate expectations to children, or whether the experience of having a child that is anxious or sensitive to threat predicts lower parental expectations, is indistinguishable in these studies.

Longitudinal designs are needed to indicate whether this shared bias is indicative of a causal variable in childhood anxiety. As discussed later, longitudinal studies have indicated a causative role of parental inferences in depression (Alloy et al., 2001). Cole, Jacquez and Maschman (2001) showed that appraisals made by peers, parents and teachers predicted change in children's self-competency four years later. Cole et al. relate this to the 'looking glass hypothesis' (Cooley, 1902) which suggests that the formation of self-image is influenced by others' appraisals.

Creswell, O'Connor and Brewin (2006) used a longitudinal design to investigate a causal relationship between parental cognitive biases and childhood anxiety. Parents and children were assessed for anxiety and threat interpretation style (using ambiguous scenarios) and parents were asked to predict their child's responses. Cross-sectional and longitudinal links between the variables were found, the strongest being that maternal expectations of distress predicted a change in child threat interpretation six months later. These findings are consistent with a hypothesis that children internalise parental expectations. Although a significant association

between the variables was found, it accounted for a relatively small amount of variance, meaning that other factors play a role in the development of cognitive style.

Child abuse

Studies of children who are exposed to highly irregular cognitive and emotional experiences, such as abuse, may also be consistent with a role for parenting in the development of threat interpretation biases. In a series of studies using behavioural and physiological measures, Pollak and colleagues have shown that children who have been physically abused attend more to angry facial expressions (Pollak & Tolley-Schell, 2003), show different neural activation (Pollak, Klorman, Thatcher, & Cicchetti, 2001), and have more difficulty accurately recognising emotional expressions (Pollak, Cicchetti, Hornung, & Reed, 2000) than controls. They suggest that maltreated children, like anxious children, allocate more processing resources towards threatening stimuli, and that this bias has a physiological correlate.

Inhibition of threat perception

Another possibility is that parents do not cause threat interpretation biases in children, but fail to help them inhibit them. Kindt and colleagues found that selective attention to threat words stayed constant in children with spider phobia as they got older, but decreased in the control group (Kindt et al., 1997; Kindt, Van Den Hout, Jong, & Hoekstra, 2000). They suggest that most young children attend to threatening material but the bias declines in non-anxious children with age. One hypothesis is, therefore, that failure to inhibit a naturally-occurring threat interpretation bias is a risk factor in anxiety development, which parents can help to counteract.

Transmission

As evidence grows that a parental style of threat interpretation may be communicated to children, the process by which this occurs is of interest. As emphasised by some models, particularly those in the developmental psychopathology field, studying the 'macro-processes' that lead to the development of a disorder is crucial in thoroughly understanding its psychopathology and developing suitable interventions. In this section three overlapping hypotheses about how parental cognitions about anxiety may be communicated to their children are considered: family conversations, direct verbal instruction and modelling.

Family conversations

One potential source of information about threat comes from a child's conversations with others. Over an average week, children and parents are likely to have numerous conversations about potential threats such as social situations and common phobic objects like animals. It may be that the content and process of such conversations is a mechanism by which anxious parents communicate to children a need to be vigilant to threat, for example by encouraging conversations about topics that reflect their own anxieties.

Barrett et al. (1996) used a novel methodology to study the effect of parent-child conversations. Children with clinical anxiety, oppositional defiant disorder (ODD) and a control group made threat interpretations and plans for ambiguous scenarios. They then discussed two of the scenarios with their parents, who were asked to help the child to choose a plan. As in previous studies, anxious and ODD children were

more likely to interpret threat in the scenarios. The anxious group chose more avoidant plans, and the oppositional group more aggressive plans. Parents of anxious children were more likely to predict their child would make threat interpretations and avoidant plans. Following the discussions, a large proportion of anxious children changed to an avoidant plan, and ODD children to an aggressive plan, even if this plan was not predicted by parents. Barrett et al. conclude that family conversations may play a causal role in how children respond to threat, calling this the 'family enhancement of avoidant and aggressive responses' (FEAR) effect.

In an accompanying paper, Dadds, Barrett, Rapee and Ryan (1996) analysed the content of a subset of the conversations to identify the key components of the FEAR effect. Having categorised the speech samples, conditional probability analyses were used to identify parental responses to their children. Contrary to predictions, parents in different groups did not differ in frequency of verbalised threat interpretations or plans, so were not simply modelling threat interpretation. Rather, differences occurred in parental responses to the interpretations and plans that children suggested. Parents of anxious children were more likely to reciprocate avoidant plans. Mothers of anxious and oppositional children agreed with and listened to their children less than controls whereas parents of non-clinical children were more likely to respond positively to 'prosocial' plans that their children put forward. These parental responses were associated with the child's chosen plan.

These studies suggest that one of the macroprocesses by which parents influence their child's thinking is how they respond to plans that they make. Several limitations to the studies may be important. The analyses provide a snapshot of discussions

about artificial scenarios, and generalisability to other contexts may be limited.

Additionally, children were only asked for their final plan after the discussion.

Changes in threat interpretation were not assessed, and may be of interest given their proposed role in anxiety. Finally, as Barrett et al. acknowledge, the FEAR effect was statistically significant, but did not apply to all participants. Whilst the process may be important in childhood anxiety, it is unlikely to be the only active variable.

Replications of the experiment have produced varied results. Chorpita, Albano and Barlow (1996) found a correlation between the number of anxious responses made by parents during the family discussion and a change to more avoidant plans, and a non-significant trend towards a change in threat interpretations. However the study had limited power, with a sample size of just twelve children (four of whom were clinically anxious). Logsdon-Conradsen (1998) found partial support for the hypothesis with a slightly older cohort (13-17 years) of socially phobic adolescents. The majority of participants did not change their responses post-discussion, possibly reflecting the decreased influence of parenting in adolescence. However, those changing to avoidant plans were more likely to have anxious parents, while those who changed to a proactive solution had parents scoring lower on anxiety measures.

Other studies have not replicated the FEAR effect. Bogels et al. (2003) found that their sample of six clinically anxious children were more likely to interpret threat in ambiguous scenarios, which was related to parental anxiety and interpretation bias. However, all children, regardless of anxiety level, thought less negatively about the scenarios after a family discussion, perhaps indicating that the conversations had a reassuring effect on children. Cobham, Dadds and Spence (1999) adapted the

paradigm to include a 'real-life' task where children made a three-minute speech. In contrast to Barrett et al. (1996), family discussion did not lead the anxious children to change their predictions about anxiety or performance on a second task, nor make them more likely to choose an avoidant solution. However, the task did not elicit high levels of anxiety in the cohort so the FEAR effect may not have been activated.

Cobham et al. (1999) suggested that methodological differences account for these discrepant findings. They hypothesised that, as children in the Barrett et al. (1996) experiment were being assessed for treatment, parents were motivated to make their child's anxiety more salient. However, Shortt, Barrett, Dadds and Fox (2001) manipulated this variable by telling some parents that the study would affect the decision to offer treatment, and others that it would not. They actually found a stronger FEAR effect in the 'treatment-irrelevant' condition. Interestingly, in this study the FEAR effect was found only in social threat scenarios. When families discussed physical threats, the opposite effect occurred with more anxious children changing to non-avoidant plans.

Overall these studies provide a mixed picture of how family discussions influence threat interpretation and plans. The FEAR effect appears to vary under different experimental conditions, and how it translates to 'real-world' interactions is not yet known. The few studies that have replicated the effect rely on small samples and varying age-groups. Although the discussion paradigm is a useful way of studying family interactional patterns and their consequences, further research needs to answer important questions about generalisability, demand characteristics and causality.

Verbal instruction

One way in which parents may communicate threat to their children is via direct verbal instruction. Retrospective studies show that adults with anxiety disorders often remember receiving parental instructions about threatening stimuli. For example, Bruch and Heimberg (1994) found that adults with social phobia recall their parents emphasizing the importance of other peoples' opinions. Ehlers (1993) found that adults with panic disorder remember parental encouragement of sick-role behaviour as children. These findings have been replicated, but retrospective studies rely on weak methodology, with participants sometimes recalling experiences over 20 years later which limits accuracy and introduces biases. Another criticism is that, as a 'critical period' for the acquisition of phobias in early childhood has been suggested, studies asking about experiences in later childhood may be irrelevant.

Ollendick and King (1991) surveyed over a thousand children to reveal the most common way in which phobias were acquired. Most children reported instructional (89%) or vicarious (56%) learning experiences, supporting their importance in anxiety acquisition. A series of prospective studies by Field and colleagues found that verbal information (from adults) about stimuli such as animals and monsters, and social situations (Field, Argyris, & Knowles, 2001; Lawson, Banerjee, & Field, 2007) significantly changed fear beliefs, and that such information led to an attentional bias in subsequent dot-probe experiments, suggesting that an information processing bias had been created (Field, 2006).

Retrospective studies have also found evidence for other mechanisms. For example, reports of childhood physical illness show contingency learning of behaviour.

Whitehead et al. (1986) found that children who receive attention and toys when ill are more likely to take sick leave and to visit the doctor as adults. Notably, in the Dadds et al. (1997) paper on the FEAR effect, the groups did not differ in how often parents suggested threat interpretations (verbal instruction). It was parental responses to their children's suggestions which led to changes.

Research into the role of verbal instruction is limited by the reliance on retrospective reporting. Nevertheless, experimental studies, such as those by Field, do suggest that parental instructions about potentially threatening stimuli and situations may have a role in generating or maintaining threat perceptions. As yet these better-designed studies have not been implemented in 'real-world' contexts, and more ecologically valid designs are needed to assess how parental information affects threat perception.

Modelling

One way that parents may communicate threat is by 'modelling' anxiety, which children observe and copy. As in the previous section, few studies have focused on the effect that modelling has on cognitions, but more general studies may be relevant. Parents who model anxious behaviour may be demonstrating to children a need to be cautious, which becomes internalised as a cognitive bias.

Retrospective studies indicate that many adult sufferers of anxiety disorders recall their parents behaving anxiously. For example, socially anxious adults recall their parents interacting socially less than non-clinical controls (Bruch, Heimberg, Berger, & Collins, 1989; Rapee & Melville, 1997). Adults with specific phobias often recall parental phobic behaviour (Öst & Hugdahl, 1981).

Observations of parent-child interactions provide a stronger research design to investigate modelling. Whaley, Pinto and Sigman (1999) observed eighteen clinically anxious mothers with their children (half of whom had anxiety disorders). Anxious mothers were more likely to catastrophize (defined as blowing problems out of proportion and asking lots of 'what if?' questions) and were more critical of their children. These factors predicted whether the child had an anxiety disorder. Parental criticism (discussed later) and catastrophising may be important mediators of the association between maternal and child anxiety. Although this study had a strong design, methodological limitations including a small sample size, mixed diagnoses in the group (with panic disorder the most common diagnosis in mothers, and specific phobia in children) and the use of a diagnostic measure with limited validity (Ambrosini, 2000), reduces the conclusions that can be drawn.

Murray, Cooper, Creswell, Schofield and Sack (2007) observed mothers with social phobia, GAD and non-clinical controls interacting with their 10-week old infant and a stranger. When interacting with the stranger, the social phobic (but not GAD) mothers were more anxious, had more difficulty engaging and were less encouraging of the infant's interactions. Babies in this condition paid more attention to their mothers, and were less likely to communicate positively with the stranger. Infants in this group were also twice as likely to score highly on measures of neonatal irritability at 10 days, possibly reflecting genetic transmission or early reactions to an anxious mother. Either way, this finding supports suggestions that anxiety develops bidirectionally, with parents responding to and modelling anxiety for their children.

Experimental designs also provide strong evidence of modelling. The influential studies by Bandura and colleagues (Bandura, Blanchard, & Ritter, 1969; Bandura, Grusec, & Menlove, 1967; Bandura & Rosenthal, 1966) showed the powerful effects of observational learning by children. Cook and Mineka (1989) demonstrated fear acquisition in rhesus monkeys, which learned to avoid stimuli such as toy snakes having watched videos of other monkeys appearing afraid of them.

Closely linked to modelling is the process of social referencing, whereby children use others' reactions to form their appraisals of stimuli or events (Feinman, 1992). This effect is more pronounced when negative emotions are modelled (Moses, Baldwin, Rosicky, & Tisball, 2001). Gerull and Rapee (2002) asked mothers to make fearful and disgusted or happy and encouraging expressions when looking at toy snakes and spiders. When offered the toys to play with later, toddlers in the first condition looked more fearful and avoided the toys. From a relatively brief period of modelling, children had learnt to associate stimuli with threat and to avoid them.

De Rosnay, Cooper, Tsigaras and Murray (2006) found that infants who observed their mothers acting anxiously when talking to a stranger showed more anxiety and avoidance. The effect was more pronounced in infants scoring highly on anxious temperament, suggesting an interaction between infant sensitivity and maternal behaviour. Further, if these infants observed their mother behaving non-anxiously, no effect was found, indicating that parental behaviour can counteract infant anxiety.

Murray et al. (2007) note that the social referencing develops at a similar time as stranger anxiety, and suggest that infant sensitivity to parental expression of negative

emotions combines with a natural anxiety of strangers to set the conditions for social anxiety to be transmitted from parent to child. Children whose parents model anxiety around strangers, or other stimuli, adopt this style via social referencing.

Modelling appears to be one way in which children learn from their parents. The studies discussed have not measured whether cognitive change occurs, but it is conceivable that children who consistently see their parents behaving anxiously learn to be aware of potential threats in their environment. Further studies are needed to assess whether modelling creates cognitive biases, and whether parents inadvertently reinforce threat interpretation in children via their behaviour.

Studies comparing transmission hypotheses

In the field of anxiety, no study has yet directly compared the three hypotheses described above. However, studies in the fields of emotional development, and depression provide an interesting comparison.

Denham, Zoller and Couchoud (1994) used questionnaires, interviews and observations of parent-child conversations to compare the influences of 'modelling', 'coaching' (including conversations) and 'contingency' influences (where parents, usually inadvertently, reward or punish certain types of emotional expression) on the development of emotional expression in a longitudinal study of preschoolers. They found that mothers who modelled more negative emotions impeded later emotional understanding in their children. Children of parents who spontaneously explained their emotions (the coaching hypothesis) during a laboratory task showed better emotional understanding. Mothers' positive responses and lack of negative responses

(the contingency hypothesis) also predicted better emotional understanding. This study suggests that all three communication types can influence subsequent emotional understanding, a conclusion supported by an observational study of mother-child conversations about emotions (Suveg, Zeman, Flannery-Schroeder, & Cassano, 2005). Compared to controls, mothers of anxious children spoke less to their child, used less positive emotion words and discouraged the emotional conversations that their children initiated by ignoring them or changing the topic. These findings have similarities to those observed in conversation tasks.

Alloy et al. (2001) studied these mechanisms in depression. They identified high and low-risk students based on measures on cognitive style and dysfunctional attitudes. Their parents were assessed on modelling negative cognitions, giving inferential feedback about causes and consequences and parenting practices. Mothers of high-risk students were more likely to have a negative inferential style and express dysfunctional attitudes. Fathers in this group showed less emotional acceptance and warmth. Both parents communicated more stable, global attributions and negative consequences when talking to children about life events. Inferential feedback and fathers' emotional acceptance predicted the likelihood that depression had developed two years later. In summary, partial support for all three learning mechanisms was found, although modelling of negative cognitions did not predict later depression, and the effect of paternal but not maternal parenting style was significant.

Studies of this design may be applicable to anxiety disorder research, and could be expanded to measure cognitive change. It is hypothesised that how anxious parents talk, behave and parent their children maintains a bias towards threat interpretation.

Parenting style

Numerous studies have linked parenting style with childhood anxiety. This section provides an overview of this research, with the help of several comprehensive reviews (Gerlsma, Emmelkamp, & Arrindell, 1990; Masia and Morris, 1998; Rapee, 1997; Wood, McLeod, Sigman, & Chu, 2003), before considering how theories linking parenting and anxiety may fit with the role of threat perception.

Control and warmth

As early as 1965, Schaefer identified three key childrearing variables: firm/lax control, acceptance/rejection and psychological autonomy/control. Numerous factor analyses of parenting variables have subsequently highlighted the factors of warmth (or acceptance) and control and most studies of parenting style utilise these variables.

Retrospective studies have found that anxious adults recall more rejecting and controlling parenting than controls (e.g Bruch & Heimberg, 1994). Studies that have calculated correlations between these variables and anxiety in non-clinical participants (e.g de Man, 1986; Eastburg & Johnson, 1990) reveal small but consistent associations, with higher anxiety correlated with controlling and rejecting parenting. Again, such studies suffer methodological weaknesses as they rely on distant memories and the experience of having an anxiety disorder may bias recall.

Questionnaire studies have been used to assess children's current experiences of being parented, although a different set of potential biases affect such designs. Stark, Humphrey, Crook and Lewis (1990) found that anxious children score their families

as less 'cohesive' (related to rejection) and more 'enmeshed' (related to control) than non-anxious children. However, with a small sample of ten anxious children, and the use of vague variable descriptions, these findings lack power and have been difficult to replicate. For example, Perry and Millimet (1977) found no difference between high and low anxious adolescents on reported parental control or warmth. Similarly, Gruner, Muris and Merckelbach (1999), using self-reports of 117 school-children (aged 9-12), found a significant relationship between anxiety and parental control, but not warmth. McClure, Brennan, Hammen and Le Brocque (2001), also using a large sample, did not find that perceived parenting mediated the relationship between adolescent and parent anxiety. Although differences in design and sampling may explain such discrepancies, they do perhaps indicate that if critical parenting does create anxiety, it is an inconsistent and not particularly strong effect.

Wood et al. (2003) summarise ten further child-report studies. Most studies found that anxious children report more critical parenting but only three were statistically significant, with small effect sizes. Space precludes discussion of all such studies and methodologies did differ. One well-designed study, by Scott, Scott and McCabe (1991) used a large sample across several countries and parent and teacher anxiety ratings. A small effect of parental acceptance on childhood anxiety was found accounting for 1-3% of variance. Out of fourteen studies using child-report to link parental control with anxiety, only six reported significant results. Many of these also measured acceptance, so are included in the results above. As before, methodology, such as sample size, measures and participant ages, did vary but it seems improbable to assume that the discrepant results can all be attributed to such differences.

Some parent-report studies have supported a link between controlling or rejecting parenting and anxiety. Barling, MacEwen and Nolte (1993) used path analysis to show a specific link between self-reported maternal rejecting behaviour and anxious behaviour in children. Wood et al. (2003) review four studies of warmth and two of control using parent-report methodology. Results for both constructs were inconsistent, and when links were found effect sizes were often small. A bias which may affect results is parental reluctance to endorse items implying bad parenting. Rubin, Mills and Krasnor (1989) reduced the negative connotations associated with their variables, by using terms such as 'power-assertive' instead of controlling. These items were associated with higher levels of internalizing symptoms in their children.

The reliance on self-report methodology, with its related biases, may explain the mixed results in these studies. Observational studies are limited to visible behaviour and can be difficult to conduct but provide useful information to supplement self-report data. Observational studies of warmth and control have often used ratings of parent-child interactions while attempting complex cognitive tasks. Early studies using this paradigm by Perry and Millimet (1977) and Hermans, ter Laak and Maes (1972) found no difference in parental involvement with high or low anxious children. Notably, in the Hermans et al. study, parents of anxious children were less likely to respond when their child expressed insecurity. As in the conversation tasks discussed previously, these parental responses to children may be important.

More recently, Krohne and Hock (1991) observed more controlling behaviour where parents interacted with high-anxious girls, but not boys. Kagan, Snidman, Arcus and Reznick (1994) found that mothers of high (but not low) behaviourally inhibited

infants were more likely to hold their baby when this was not needed. This variable, indicative of excessive protection, predicted anxiety several months later, supporting a hypothesis that temperament and parenting style interact in anxiety development. Reviewing five observational studies, Wood et al. (2003) found that only 8 out of 18 statistical tests significantly linked parental warmth to anxiety. From six studies observing parental control, 8 out of 10 statistical tests were in the expected direction.

Observational studies of clinically anxious children have revealed more persuasive findings. Whaley et al. (1999) found that anxious mothers of anxious children were less warm and less positive than non-anxious mothers of non-anxious children, but did not differ on these measures from anxious mothers of non-anxious children. Anxious mothers of anxious children were also less granting of autonomy (a measure of control) than the other two groups. Hudson and Rapee (2001) found that mothers of anxious children were more negative, involved and intrusive than controls during challenging word puzzles. However, levels of negativity and intrusiveness were similar to mothers of children with ODD, suggesting that this style may be linked to general psychopathology rather than specifically anxiety. In a rare longitudinal study, Rubin, Cheah and Fox (2001) found that maternal 'oversolicitous behaviour' and intrusive control observed during free-play significantly predicted later shy and fearful behaviours. Turner, Beidel, Robertson-Nav and Tervo, (2003) observed anxious parents and their children playing on potentially risky equipment including climbing walls and cargo nets. Anxious parents were no more likely to restrict their children's play, but reported higher levels of distress, suggesting that parents may communicate threat even in the absence of direct control behaviours.

Difficulty in reaching conclusions based on this research arises from differing and often problematic methodology. Questionnaire and observational studies are subject to biases such as demand characteristics and poor ecological validity. As Rapee (1997) points out, self-report data can by definition only measure perceived and not actual parenting. Important variables such as the use of clinical or 'normal' populations, the tasks used, age and gender of the child, settings and whether treatment is planned vary across studies, and may affect results. Most studies rely on cross-sectional designs, making it difficult to conclude whether certain parenting styles cause childhood anxiety, whether anxious children encourage certain styles of parenting, or whether a third variable mediates both. Many contemporary models of anxiety consider an array of potential influences which interact and vary over time, and as most of the studies discussed consider the effect of a single, static variable, conclusions are likely to inadequately explain the complex interactions between different processes, and conclusions must be cautiously made.

Across numerous studies, using various methodologies, evidence linking parenting style with anxiety remains inconsistent, although more persuasive for the dimension of control than warmth. It remains unclear how much variance control and warmth account for or how they interact with other factors. In a recent meta-analysis of 47 studies (McLeod, Wood, & Weisz, 2007), parenting accounted for only 4% of the variance in childhood anxiety. Parental control was a small but significant moderator of this relationship while warmth accounted for under 1%. The authors acknowledge that methodological differences account for much discrepancy between studies but suggest that parenting has less influence on anxiety than many researchers assume. How parenting style may affect threat interpretation is considered in the next section.

Models of parenting and threat perception

Several models of how parenting influences anxiety have been put forward, but few incorporate a role for threat perception. This section considers how these models fit with the hypothesis that anxious parents reinforce threat perception in their children.

Models of control

Chorpita (2001) suggests that early experiences of parental over-control lead children to process later events as uncontrollable, creating anxiety. Chorpita draws on Gray's (1982) concept of the behavioural inhibition system. The BIS is a functional brain system hypothesised to control tasks such as attentional focus, scanning and vigilance to stimuli, central nervous system arousal, priming of motor systems designed for rapid action (i.e. flight/fright) and inhibition of gross motor actions. The actions of the BIS are thought to be affected by early experiences and have much in common with cognitive processes described in anxiety. In Chorpita's model, over-controlling parenting activates the BIS, affecting processing of subsequent events.

The model assumes that high parental control teaches children that they are unable to influence events and limits opportunities to experience and respond to threat, causing anxiety. Empirical support for the model is limited. However, Chorpita, Brown and Barlow (1998) found that cognitive perceptions of control mediated between parental control and anxiety in clinically anxious children. Ballash, Pemble, Usui, Buckley and Woodruff-Borden (2006) found a mediating not moderating role for perceived control in family functioning and anxiety. Affective involvement and behavioural control predicted perceived control, which led to anxiety, but perceived control did

not directly affect the relationship between family functioning and anxiety. The study used undergraduates implying that control is important later than Chorpita predicted. Chorpita's model fits a hypothesis that parenting can increase threat perception in children. Controlling parenting may teach children to interpret the world as threatening and themselves as unprepared to cope. One of the functions of the BIS is to scan for and respond to threat, a potential physiological basis for this bias.

Parental cognitions may affect this process. Wheatcroft and Creswell (2007) found that parental locus of control and perceived control of child anxious behaviour were primarily associated with parental anxiety, while perceived control of child's anxious mood was primarily associated with child anxiety level. This suggests that parental anxious cognitions may influence the control they exert, a potential route by which anxiety is communicated to children. Bugental, Lewis, Lin, Lyon and Kopeikin (1999) showed that parents with a low sense of control when parenting in difficult situations used more intrusive, controlling strategies. In a series of studies they found that parents with low perceived control tended to interpret subtle child behaviours as evidence that their control was threatened, leading to more controlling parenting (Bugental et al., 1993; Bugental, Brown, & Reiss, 1996; Bugental, Lyon, Krantz, & Cortez, 1997) or disengagement from the interaction (Bugental & Lin, 1997).

Taken together, these findings suggest that parental anxious cognitions influence their sense of perceived control and how much control they exert when parenting. Highly controlling parenting may lead children to become more aware of threat, and less likely to believe they can cope. Restrictive parenting may also limit a child's opportunities to disprove these beliefs, leading to higher levels of threat perception.

Parental expectations

As discussed previously, parental expectations may be one route by which parents communicate cognitive biases to their children. Creswell and O'Connor (2006) used measures of parent and child threat interpretation, anxiety, and parenting to compare different mechanisms by which anxiety may be communicated. Maternal expectations about child threat interpretations were found to partially mediate the association between mother and child threat cognitions. Although measures of parenting behaviour correlated with child-reported threat scores, they did not account for the association between mother and child cognitions.

A model by Mills and Rubin also fits with cognitive theories in which parental expectations are communicated to children via parenting. Rubin, Nelson, Hastings and Asendorpf (1999) found that parental perception of child temperament (but not objective measures of child shyness) predicted parental behaviour, with parents who perceived their children as shy aged 2 years being less likely to encourage their independence at 4 years. In a series of studies with 4-year old and 9-year old children (Mills & Rubin, 1990, 1992, 1993; Rubin & Mills, 1990, 1992), mothers of anxious children were more likely to consider social withdrawal to be a difficult to change dispositional trait and to respond to withdrawal with negative emotions and directive, over-controlling parenting behaviours. This model fits with the suggestion that parental expectations and cognitions affect parenting leading to the internalisation of cognitive biases in children.

A similar model by Ginsburg and Schlossberg (2002) highlights the importance of both parent and child characteristics in the development of anxious cognitions. They

suggest that parental anxiety arises from temperament and attachment style, which interferes with the development of parental coping skills and to 'anxiety-enhancing' behaviours. This moderates the development of anxiety in children, interacting with differences in temperament to lead to the development of cognitive distortions such as threat and uncontrollability and the failure to develop adaptive coping strategies.

Developmental psychopathology

Developmental psychopathology models (Cicchetti & Cohen, 1995; Masten & Braswell, 1991; Vasey & Dadds, 2001) seem particularly relevant in understanding how parenting affects anxiety, as they describe multiple pathways and risk factors, incorporating many of the variables considered in this review for which research has shown small individual effects. In this model, the influence of parenting depends on the biopsychosocial context, and affects the influence of other factors.

A cognitive style emphasising threat may mediate some pathways linking parent and child anxiety. For example, a child with a genetic predisposition towards increased neurobiological activation or an anxious temperament may be more sensitive to parental behaviour such as modelling, over-control or inadvertent reinforcement of threat. Such behaviours may exacerbate a sense of threat and a self-perception of inability to cope, and increase scanning for, and interpretation of, threat in ambiguous situations. As threat is more readily seen, anxiety increases and creates further vigilance, maintaining the cycle. Experimental evidence exists for parts of this pathway. For example, Sorensen (2005) found that childhood temperament predicted later interpretation of threat in ambiguous scenes.

Attachment theory

Another concept which has attracted research attention is that of the attachment relationship (Bowlby, 1969) and an abundance of research has linked early parent-child relationships with later pathology (e.g. Manassis, Bradley, Goldberg, Hood, & Swinson, 1994). As with cognitive studies, these studies suggest that parental attachment influences parenting behaviour (Crowell & Feldman, 1991) and that this parenting style predicts later anxiety. For example, Warren, Hudson, Egeland and Stroufe (1997) found that anxious-resistant mother-infant attachment in 1-year olds predicted anxiety disorders 16 years later, even when maternal and initial child anxiety were controlled.

Attachment theory is also compatible with cognitive models of threat perception. Bowlby's 'internal working models' are constructed from early experiences and guide expectations and reactions to subsequent relationships and events, a concept with clear similarities to models of cognitive development. Children who experience parenting such as over-control may develop internal working models based on the world as threatening, themselves as unable to cope, and a need to rely on a caregiver. As in information processing models of anxiety, these children are then more likely to scan for and interpret threat in the environment. In support of this, Dykas (2006) found insecurely attached adolescents processed ambiguous information as more threatening. The attachment relationship may also interact with other risk factors in such a pathway, as indicated by a well-designed, longitudinal study by Shamir-Essakow, Ungerer and Rapee (2005) showing that insecure attachment, behavioural inhibition and maternal anxiety were all independently related to anxiety in children, but the highest levels of anxiety were found when all three were present.

Conclusions

Most models linking parenting with anxiety have not incorporated a role for threat perception but the hypothesis that anxious parental cognitions may be communicated to children via parenting style does fit well with the current evidence base.

Overall the studies linking parenting with anxiety paint an unclear picture, with often contradictory findings which vary depending on experimental conditions. Many of the models which focus on such general factors thus rely on limited empirical support, and those which claim large effects based on specific factors are difficult to replicate. More promising, and probably more realistic, are models which focus on the interaction of numerous factors. These models need further development, as few currently specify how and when different factors are involved and run a risk of being unfalsifiable and over-inclusive if they simply conclude that many factors play a role.

The role of threat perception may fit with more than one such pathway. For example, it is hypothesised that anxious parents may exacerbate vigilance to threat in their children by using more controlling parenting strategies, creating a cycle by which children then become more sensitive to threat, and more reliant on their parents, who become more protective and controlling. In another potential pathway parents may expect their child to interpret more threat and to behave more anxiously, expectations which children internalise and think and behave accordingly. Alternatively, parents who have anxious attachments to their child may develop more controlling parenting styles, leading children to be more aware of potential threats. Such suggestions fit with the available evidence but need further research and consolidation.

Treatment studies

Over recent years, treatment studies of childhood anxiety have begun to target parenting. Wood et al. (2003) review four studies showing that outcomes are better in 'family-focused' than 'child-focused' cognitive behavioural treatments for anxiety. If parenting is an important variable in maintaining cognitive biases, interventions which target parental anxious cognitions and/or how they are communicated to children would be expected to reduce child threat interpretations. This has yet to be directly tested, but evidence from other treatment programs may be relevant.

Cobham et al. (1998) found that adding a four-session parental anxiety management (PAM) component to their standard CBT package improved the proportion of children who no longer met criteria for an anxiety disorder from 39% to 77% when parents were also anxious. The difference between the groups reduced at follow-up, which the authors conclude was due to the brevity of the parental intervention.

Nevertheless, the findings in this well-designed study are impressive. The PAM component was specifically designed to educate parents about their possible role in the development and maintenance of their child's anxiety and taught them to manage their own anxious responses and model anxiety management strategies to children. The study did not measure changes in threat perception for either parents or children, but it seems possible that the intervention helped to reduce parental threat cognitions and inadvertent reinforcement of child threat perception.

As in the above study, most treatment programs have used multi-faceted interventions, making it difficult to identify how individual components relate to

specific changes in anxiety. The FRIENDS program devised by Barrett, Dadds and Spence (1998) improved efficacy of their standard child CBT by adding a parenting skills component. This program taught parents to reinforce approaching behaviours, ignore complaints, help in cognitive restructuring, use family 'fun-time' as a reward and to model positive problem-solving. Again, these interventions may have reduced the reinforcement of threat perception biases by parents but this was not measured.

Silverman et al. (1999) compared different forms of parental involvement in a ten-week phobia intervention comprising either 'self-control' (self-evaluation and self-talk about cognitions), contingency management training or an active control condition involving access to information about phobias. All conditions produced positive changes at follow-up and, as Alfano et al. (2002) note, even conditions in this study which did not target cognitions produced cognitive change. Changes to cognitions, such as threat perception, may have been the underlying factor leading to anxiety reduction, but was not measured in the study. Another possibility is that a general parenting factor, such as emotional support, rather than the specific elements targeted in the intervention, was responsible for the improvements.

Rapee and Jacobs (2002) designed an intervention aimed at parents of behaviourally inhibited preschoolers. They included parental anxiety reduction, designing exposure hierarchies and psycho-education on modelling and parental over-involvement. The treatment group became less inhibited and anxious, while the control group became more anxious suggesting that without intervention behavioural inhibition in young children develops into anxiety, and that parents can play a role in preventing this. This finding may also link with suggestions that parents play a role in helping

children to inhibit threat interpretation biases. The behaviourally inhibited children may have been predisposed to develop cognitive biases towards threat, which non-anxious parents help to counteract. However, cognitive biases are maintained when parents fail to help children to learn this inhibition.

Barrett, Dadds, Rapee and Ryan (1996) measured changes to threat interpretations following child CBT. Reductions occurred with and without parental involvement, but were more pronounced when a 'family anxiety management' component, comprising contingency management and communication skills, was included. A subsequent test of the FEAR effect in this sample also showed reduced enhancement of avoidant responses following family conversations. Creswell et al. (2005) also found a reduction in both child and parental threat interpretations following CBT for childhood anxiety, including a parental anxiety component.

The family-based treatment studies described remain somewhat vague about which elements of parenting are being targeted and rarely distinguish between general factors such as 'improving communication' and more specific interventions. No studies have directly targeted cognitive biases, but seem likely to have indirectly reduced them via the strategies taught to parents. The studies which have measured cognitive change suggest that improvements in therapy when parents are involved also relate to a reduction in child threat interpretations, and may have led to reduced parental reinforcement of threat perception via parent-child interactions, modelling and parenting behaviours. This research shows promise for reducing cognitive biases through therapy.

Conclusions

This review has aimed to synthesise a varied body of research to consider the role of parenting in the development of a cognitive style emphasising threat, a bias which is central to many models of childhood anxiety.

The first part of the review considered the hypothesis that threat interpretation is important in anxiety development. Research from a variety of methodologies, using both adult and child participants, provides relatively consistent evidence that an information processing bias favouring threat is associated with anxiety, although evidence showing a causal link is limited.

The second part of the review considered the role of parenting in this bias. Studies show that parents of anxious children are also more likely to interpret threat in situations. It is hypothesised that parents of anxious children inadvertently reinforce this bias in children. Research shows, for example, that parents who expect their children to interpret more threat and to make more avoidant plans have more anxious children. One possibility is that children internalise these expectations, leading to the development of the cognitive biases which maintain anxiety.

Based on the hypothesis that parents somehow communicate threat interpretation biases to their children, the next section reviewed the mechanism by which this occurs. Most studies in these areas have not assessed cognitive change, but it can be hypothesised, based on studies showing the effects of parental modelling of anxiety

and verbal instruction on child behaviour and anxiety, that one way that children learn to be vigilant to threat is from observing their parents.

Studies focusing on family discussions about potentially threatening situations have shown that parents of anxious children seem to exacerbate their child's interpretation of threat by the responses they make in conversations. Parents of anxious children seem to positively reinforce threat interpretations and avoidant plans, leading to an increase in these cognitions. Such an effect provides strong evidence for the hypothesis that parents may reinforce threat interpretation in their children, but replications of this effect have been inconsistent, and further research is needed to consolidate the findings.

Results from other studies have also produced results in line with this theory. For example, Kindt et al. theorise that all young children attend to threat, but anxiety develops where children fail to learn to inhibit this response. It is conceivable that it is through parenting, perhaps conversations in which parents respond to child threat interpretations and plans by encouraging non-anxious interpretations and plans, that children learn to inhibit this bias.

General parenting style may be another way in which parents communicate cognitive biases to their children. Most research in this field has focused on the hypothesis that parents who are controlling and rejecting of their children are more likely to encourage anxiety. It is suggested that controlling and rejecting parenting also increases threat perception, as children learn to be aware of potential threats, are not reassured by parents and are not given opportunities to discover their own self-

efficacy. Threat perception may also play a role in other pathways to anxiety, including the link between the attachment relationship and psychopathology.

As Cartwright-Hatton (2006) points out, the development of family-based treatments has been restricted by the absence of coherent models of how parenting affects anxiety. As yet, no studies have directly targeted threat perception in family-based treatments, but treatment studies are relatively consistent in concluding that therapy is more effective when parents are included and several of the interventions which have been found effective seem likely to be modifying parental cognitions and how they are communicated to children. One study which has measured cognitive change (Barrett et al., 1996) has shown that a family anxiety component reduces both child threat perception and family enhancement of avoidant responses. Together with the findings in the rest of the review, these results suggest that identifying and modifying how parents think, behave and talk about potentially threatening situations and stimuli in treatment has the potential to improve therapeutic outcomes.

Although few studies have directly considered the role of threat interpretation in the development of anxiety, a review of research from a variety of perspectives suggests that the way in which parents talk to their children, model anxious behaviour and how they parent may exacerbate their children's perception of threat. As yet, important questions about this link have not been investigated but the evidence in this review suggests that targeting this association in research and treatment would be beneficial.

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Part 2: Empirical paper

An experimental investigation of the FEAR effect in non-clinical children and their mothers

Abstract

The Family Enhancement of Avoidant/Aggressive Responses (FEAR) effect suggests that parents of anxious children inadvertently reinforce their child's avoidant plans during family conversations, thereby maintaining their anxiety. To explore a causal basis for this effect, mothers of non-clinically anxious children were trained either to mimic the FEAR effect, by encouraging their child's threat perceptions and avoidant plans, or to reverse it by encouraging their child's non-threatening interpretations and non-avoidant plans. Following a training period, 30 children (aged 7-8 years) and their mothers discussed two ambiguous scenarios. Contrary to predictions, children in the 'Anxious' condition did not change their interpretations following the conversations, nor did they interpret later situations as more threatening, or make avoidant plans. However, in the 'Non-anxious' condition, children were more likely to change to non-threatening responses, and interpreted less threat in subsequent scenarios following the discussions. The implications of the results for theories of childhood anxiety and the potential for clinical application are discussed.

Introduction

Childhood anxiety

Clinical anxiety affects up to 14% of school-aged children (Cohen et al., 1993), making it one of the most common psychological problems in childhood. Anxiety can significantly impair a child's ability to function academically and socially, and can cause considerable distress. Childhood anxiety is a risk factor for adolescent and adult anxiety disorders as well as other psychological problems (Rabian & Silverman, 2000).

Much recent research has explored the different variables involved in anxiety and evidence has been found for a role of genetics, child temperament factors such as behavioural inhibition, parental factors such as parenting style and environmental influences such as exposure to stressful life events (Vasey & Dadds, 2001). Most current models suggest a biopsychosocial model for the development of anxiety, with genetic, environmental and parental factors interacting. For example, the influential developmental psychopathology approach to understanding childhood anxiety considers all such influences as risk factors which interact in different ways in different individuals at different life stages.

Parenting

The role of parenting has often been considered important in the development of anxiety, and as young children spend much of their time with and learn a lot from their parents, it seems logical that they play an influential role in anxiety development. Research shows that parents with anxiety disorders are more likely to

have children who are anxious (Beidel & Turner, 1997; Merikangas, Dierker, & Szatmari, 1998) and 'bottom-up' studies also show that children with anxiety disorders are more likely to have anxious parents (Cooper, Fearn, Willetts, Seabrook, & Parkinson, 2006; Last, Hersen, Kazdin, Orvaschel, & Perrin, 1991). Although there is convincing evidence for a genetic basis in anxiety, with estimated heritability of approximately 30% (Kendler, Neale, Kessler, Heath, & Eaves, 1992), it does not fully account for the overlap between parental and child anxiety, suggesting that psychological factors are also important.

Much of the research into the influence that parents have on child anxiety has focused on parenting style. It has been suggested that parents who show low levels of warmth and high levels of control are more likely to have children who are anxious. However, research into these factors has produced inconsistent findings and effect sizes are often low. A recent meta-analysis (McLeod, Wood, & Weisz, 2007) of 47 studies found that, although control was a significant variable, parenting factors accounted for only 4% of the variance in childhood anxiety.

Threat perception

Cognitive models have become popular in explaining the development and maintenance of anxiety, and recent research has begun to explore how parents may influence the developing cognitive style of their child. One variable of particular interest is threat interpretation, and recent models have suggested that a cognitive bias emphasising the interpretation of situations and stimuli as threatening may play a role in the development and maintenance of anxiety.

In the adult literature on anxiety, Mathews and MacLeod (2002) have shown that such interpretation biases can be induced in normal participants using training tasks, and that these biases then affect the encoding of new material. These studies suggest that interpretative biases have causal effects on vulnerability to anxiety via their influence on how significant events are processed.

Anxious children have been found to show a bias towards perception of threat in a number of studies, including showing more threat interpretations in ambiguous scenarios (e.g. Hadwin, Frost, French, & Richards, 1997) and longer processing speeds for threatening targets in dot-probe (e.g. Vasey, Daleiden, Williams, & Brown, 1995) and Stroop designs (e.g. Martin, Horder, & Jones, 1992).

Parenting and threat perception

Given the proposed importance of parenting in childhood anxiety, one possibility is that parenting may affect the development and maintenance of a threat perception bias. Recent research supports such a hypothesis. Creswell, Schniering and Rapee (2005) found that maternal threat interpretation scores (measured using an ambiguous scenarios design in which participants are asked what is happening in a situation which could be interpreted as threatening or not) correlated with child threat interpretation scores. This correlation was in fact slightly higher than the relationship between maternal and child self-reported anxiety scores. Researchers in this area suggest that children somehow internalise their parent's cognitive style, leading to the development of anxiety. For example, studies have shown that mothers' expectations of their child's reactions to ambiguous scenarios predict change in

children's anxious cognitions over time (Creswell, O'Connor, & Brewin, 2006), suggesting that children internalise such expectations.

If parental anxious cognitions are communicated to children, the mechanism by which this occurs is of research and clinical importance. One possibility is that parenting style teaches children where and when to interpret threat. Theories based on parenting style and anxiety, such as Chorpita's (2001) model suggest that early experiences with controlling parents teach children that the world is threatening and that they have inadequate resources to cope, as well as restricting opportunities for them to learn otherwise. However, studies of parenting style provide inconsistent support for the role of controlling and rejecting parenting in the development of anxiety and its cognitive correlates, so other mechanisms may also be important.

One way that parents may exacerbate childhood threat perception is by modelling it themselves. Unfortunately most modelling studies have not included measures of cognitive change, but they do suggest that children learn to be fearful and avoidant of stimuli from observing their parents. For example, Gerull and Rapee (2002) found that toddlers who observed their mothers making fearful or disgusted facial expressions when regarding certain toys, subsequently showed more fear and avoidance when presented with the toys. In a similar study, de Rosnay, Cooper and Murray (2006) trained mothers to behave in a socially anxious manner towards a stranger. Infants of 12-14 months who had observed these interactions were later significantly more fearful and avoidant of the stranger. Although threat perception was not measured in either study, it seems likely that modelling is one way that parents communicate to their children a need to be vigilant to threat.

Conversation tasks

Another way which parents may communicate threat perception to their children is via conversations. A novel paradigm for investigating this was used by Barrett, Rapee, Dadds and Ryan (1996). They asked children with anxiety disorders, oppositional defiant disorder (ODD) and controls to rate the outcomes of ambiguous scenarios before and after discussing them with their parents. They found that, following discussion, anxious children were more likely to change their answers to more avoidant plans for the scenarios, while children with ODD were more likely to change to aggressive plans. This so-called 'FEAR' effect (family enhancement of avoidant and aggressive response) supports a hypothesis that the way in which parents discuss events with their children may lead to an increase in threat perception

Dadds, Barrett, Rapee and Ryan (1996) provide an analysis of the content of these conversations in an attempt to identify the types of interactions which led to the change in children's responses. They found that parents of anxious children listened less to their child, were less likely to point out positive consequences of a plan, and were more likely to reciprocate avoidant plan proposals. These behaviours were linked to more avoidant solutions to ambiguous scenarios.

Attempts to replicate this study have produced mixed results, with some researchers replicating the results of Barrett et al. (1996), (Chorpita, Albano, & Barlow, 1996; Logsdon-Conradsen, 1998) and others failing to find evidence of the FEAR effect (Bogels, van Dongen, & Muris, 2003; Cobham, Dadds, & Spence, 1999). Although differences in experimental design may account for these discrepancies, the effect lacks a clear evidence base. The Barrett et al. study also leaves other questions

unanswered. For example, only brief conversations about artificial scenarios were studied and it is unclear whether the impact of the discussions would generalise outside the experimental situation.

In addition, Barrett et al. (1996) only measured the plans for ambiguous scenarios that children chose after the conversations. Given the central importance of threat interpretation in many cognitive models of anxiety, it is important to assess whether parental influences are also affecting threat perception.

Hypotheses

Firstly, in line with Barrett et al.'s 'FEAR' effect, it was predicted that children in the 'Anxious' group, where mothers were trained to encourage and reciprocate their children's threat interpretations and avoidant plans (as in Dadds et al., 1996), would be more likely to change their answers to more threatening interpretations and more avoidant plans following conversations with their mothers. Further, it was predicted that children in the 'Non-anxious' group, where mothers were trained to encourage their child's non-threat interpretations and non-avoidant plans, would be more likely to change to less threatening and less avoidant answers following the conversations. Secondly, it was hypothesised that children in the 'Anxious' group would be more likely to interpret subsequently presented ambiguous scenarios as more threatening and make more avoidant plans following the conversations, and that children in the 'Non-anxious' group would make less threatening interpretations and less avoidant plans in subsequently presented scenarios. Finally, it was hypothesised that more anxious children in both groups would be more likely to change their answers following the conversations with their mothers.

Method

Participants

The participants were 30 children and their mothers, recruited from schools in London and Devon. Schools were asked to distribute information sheets (appendix 1) about the project to any pupils aged 7 or 8 years. This age group was selected as clinical experience suggests it marks a stage at which anxiety, particularly social fears, begins to interfere with academic and peer functioning. Parents then contacted the experimenter to arrange testing. A circular email was also sent to a university mailing list, and interested participants were asked to contact the researcher. Demographic details of the sample are included in the results section.

Procedure

The procedure was piloted with 5 children to check methodology and to examine any ethical issues. Following the pilot several changes were made, including decreasing the length of the experiment and clarifying the training given to mothers.

The experiment was conducted in the participants' homes or at a room at University College London. Mothers who were primary caregivers were asked to participate.

Children were asked to fill in the STAI-Child questionnaire (details of the measures used are provided below, and copies are included in the appendices), and to suggest their interpretations of, and to make plans for, six ambiguous scenarios taken from the ASQ (Ambiguous Scenarios Questionnaire, modified from Barrett et al., 1996). The questions were read aloud to the children. Mothers were asked to fill in a brief demographics questionnaire, and then taken into another room for a 'briefing'.

Children were randomly allocated to either the 'Anxious' or 'Non-anxious' group. In both groups the mothers were informed that two questions from the questionnaire being filled out by their child would be discussed in more depth and asked to have a five-minute conversation with the child about the questions. Mothers were given a list of example child responses, and whether they implied threat or non-threat interpretations and a list of possible plans and whether they were avoidant or not. They were also given example parental responses of agreement or neutrality as well as prompt questions. Copies of these instructions and the examples sheet are included in the appendices section. In both groups, mothers were asked to read aloud the selected questions to their child and to decide whether their child's answer implied that the situation was threatening, and whether the plan they made was avoidant.

In the 'Anxious' condition, if children made a response implying that the situation was threatening or made an avoidant plan, mothers were asked to agree with the interpretation or plan, show enthusiasm for it and/or respond with a reciprocal interpretation or plan. If their child made an unthreatening interpretation or a non-avoidant plan, they were asked to respond neutrally, giving a minimal response and not providing any reciprocal responses. They were then asked to give a prompt question. If their child responded 'don't know' or the parent was uncertain about the response they were asked to use a prompt question.

In the 'Non-anxious' condition, if the child made a non-threat interpretation or a non-avoidant plan, mothers were asked to agree with the interpretation or plan, show enthusiasm for it and/or respond reciprocally. If the child made a threat interpretation, mothers were asked to respond neutrally and to ask a prompt question.

The mothers were then shown the 'training video' of example conversations and the experimenter role-played some possible responses to the scenarios with the mother. As much time was taken as needed to ensure full understanding of the instructions. In most cases reading the instructions and watching the training video was sufficient for the mother to feel confident in the procedure.

Following the 'briefing' the experimenter and mother returned to the testing room. The children were told that their mother had been asked to discuss some of the scenarios from the questionnaire with him/her. The conversation was video-taped. The experimenter gave no input unless asked directly. At the end of the discussions the children were asked to complete the second half of the ASQ (the order of presentation was counter-balanced, and no significant differences were found between each version). Children were then given an easy anagram task (a copy is included in the appendices section) to complete with their mother. Finally, they were debriefed and given time to ask questions. Children were told that the experimenter had asked their mother to ask certain questions and to behave in a certain way.

Questionnaires were scored by the experimenter. A subset (20%) were marked by a blind rater. A correlation of 89% was found between the raters, giving an interrater reliability Cohen's Kappa agreement of 0.77.

Measures and materials

Copies of all measures are included in the appendices.

Demographics questionnaire: This requested the following personal details: age, gender and ethnic group of the child and the age, employment and years of education of the mother.

Baseline anxiety: The children filled in the State-Trait Anxiety Inventory-Child Version (STAI-C; Spielberger, 1973, 1983).

Ambiguous Scenarios Questionnaire: This consists of 12 ambiguous situations which can be interpreted in threatening or non-threatening ways. Six are physical scenarios e.g. hearing a loud sound during the night, and 6 are social e.g. classmates giggling while you are doing a presentation. Participants make a 'free choice' interpretation about what is happening and are then given a forced-choice question with two possible interpretations. They are also asked what they would do in the scenario. Interpretations were scored as a threat if they indicated either a potential social threat (e.g. 'they are telling a nasty joke about me') or a physical threat (e.g. 'the dog is going to bite me'). Interpretations are scored as non-threat if they provide either a neutral or positive explanation (e.g. 'the teacher wants to tell me I've won a prize'). The plans are scored as avoidant if they suggest any course of action allowing escape or avoidance from harm or embarrassment. (Scoring criteria taken from Barrett et al., 1996)

For the discussion task, the ambiguous scenarios used in Barrett et al.'s study were used. These were a physical scenario: 'On your way to school you start to feel funny in the tummy', and a social scenario: 'You see a group of children from another class playing a great game. When you walk over to join in they are laughing'.

Ethics

Ethical approval for the study was obtained from the University College London Ethics Committee (appendix 8). Two major ethical questions were considered. Firstly, the study involved a degree of deception, as parents were asked to behave in a certain way, about which children were not informed. Secondly, the 'Anxious' condition involved parents acting in a way which could increase threat perception in children, which raises an ethical issue of causing harm.

Both of these issues were carefully monitored in the pilot phase, and no participants raised concerns or experienced distress during or after the experiment. Throughout testing care was taken to ensure that parents were fully informed and given opportunities to question or withdraw from the experiment at any point. A thorough debrief was also given. Children were asked if they had noticed anything different about the way that their mother was acting. Two children commented that she had been asking a lot of questions, but the rest did not notice any differences. None of the children were distressed by the experiment or reported experiencing anxiety.

Power calculation

Using the results reported by Barrett et al. (1996), a power calculation was performed using the Zumastat 2.3 software. In this study the percentage of children in the anxious condition choosing an avoidant answer to an ambiguous scenario following a family conversation increased from 29.7% to 67.8%, a medium effect size. The power analysis showed that, in order to achieve a power level of 0.80 at alpha = .05 level of significance, 24 children would therefore be needed in each group.

Results

Overview

The study tested three main hypotheses. Firstly, that children in the 'Anxious' condition would change to make more threat interpretations and more avoidant plans following the conversation with their mother, and that children in the 'Non-anxious' condition would make more non-threat and non-avoidant plans after the conversation. This was explored by comparing scores before and after the family conversations on the scenarios discussed in the experiment. The second hypothesis was that the effect of the conversations would generalise to 'new' scenarios presented after the family discussion, with children in the 'Anxious' condition interpreting more threat, and making more avoidant plans in subsequent scenarios, and children in the 'Non-anxious' condition making less threat interpretations and avoidant plans. Finally, the hypothesis that the conversations would have more effect on more anxious children was tested.

Demographics

Brief demographic data for the participants are presented in Tables 1 and 2. There were no significant differences between the two experimental groups on any demographic variables.

Table 1: Demographics continuous data

Demographic variables	Experimental condition			
	Anxious		Non-anxious	
	Mean	S.D.	Mean	S.D.
Child age in months	92.60	(5.84)	92.53	(5.39)
Mother's age in years	42.67	(4.89)	41.27	(6.62)
Mother's years of education	17.87	(2.97)	18.73	(4.32)

Table 2: Demographics frequency data

		<i>Experimental condition</i>	
		Anxious (frequencies)	Non-anxious (frequencies)
Child gender	Male	8	7
	Female	7	8
Child ethnicity	White British	10	9
	White other	2	1
	Any Black background	1	0
	Any Asian background	0	1
	Mixed race	2	4
Maternal profession	Full-time mother	2	2
	Blue collar	0	1
	White collar	5	2
	Professional	5	6
	Academic	3	4

Baseline anxiety, threat interpretation scores and avoidance

As a further check on the comparability of the experimental groups, the two were compared for measures taken prior to the experimental intervention. Presented in Table 3 are the mean baseline scores, including an anxiety score as measured by the child version of the STAI (scored out of 60), a threat interpretation score based on the number of threat responses made in first half of the ASQ on both the free choice and forced choice items and the number of avoidant plans made (all scored out 6).

As can be seen in Table 3, the differences between the groups were not significant on these measures, although the scores on the STAI and baseline threat interpretation scores appear slightly higher in the ‘Non-anxious’ condition, a difference which is approaching significance.

Table 3: Baseline scores

	<i>Experimental condition</i>				Difference between groups
	Anxious		Non-anxious		
	Mean	S.D.	Mean	S.D.	
Score on STAI-Child	36.13	(5.04)	39.13	(5.19)	t(28) = 1.61 p = 0.12
Baseline free-choice threat interpretation score	2.00	(.85)	2.73	(1.44)	t(28) = 1.70 p = 0.10
Baseline forced-choice threat interpretation score	1.20	(1.21)	1.47	(1.55)	t(28) = 0.53 p = 0.60
Baseline avoidant plan score	1.33	(1.05)	1.47	(1.55)	t(28) = 0.28 p = 0.79

Correlations were also calculated between baseline scores on anxiety, threat interpretations and avoidant responses. Unexpectedly, baseline anxiety was not significantly correlated with free choice ($r(28) = 0.22$, $p = 0.24$) or forced choice ($r(28) = 0.12$, $p = 0.56$) threat interpretations or avoidant plans ($r(28) = 0.21$, $p = 0.26$). However, free-choice threat interpretations were found to correlate with forced choice threat interpretations ($r(28) = 0.40$, $p = 0.029$) and with the number of avoidant plans made ($r(28) = 0.51$, $p = 0.004$). Throughout this section these three variables are presented separately.

Manipulation check

Mothers were asked to follow a relatively complex set of instructions for the experiment, including adapting their response to what their child said. In order to check whether mothers were adhering to the protocol of the experiment, the videos of the conversation were analysed, and maternal responses were scored.

Only 37% of mothers completely followed the instructions and adhered to the protocol. However, as there were six points in the conversations at which mothers had been asked to make a response, it was possible to calculate the proportion of correct responses that mothers made (83%). The responses that mothers made were found to be significantly different in the two groups using a Mann-Whitney U test ($U(28) = 63.40, p = 0.038$). Therefore, protocol adherence was considered acceptable to allow analysis of group differences.

Hypothesis 1: Experimental condition and changes in interpretations and plans

The first hypothesis to be tested was that children in the 'Anxious' condition would be more likely to change to more threatening interpretations and more avoidant plans after the conversation while children in the 'Non-anxious' condition would be more likely to change their interpretations and plans in the opposite direction.

This was tested by looking at changes to the free and forced choice threat interpretations and plans made for the two scenarios which mothers and children discussed in the study, a physical threat scenario about 'feeling funny in the tummy' and a social threat scenario about 'children laughing'.

These changes are presented in tables below with the numbers of children in each condition who changed their answers after the conversation shown in bold.

McNemar tests were used to examine whether the number of changes was significant. As most changes were made in the 'Non-anxious' condition, when the McNemar test found changes to be significant, further analyses using Chi-Squared

tests were used to check whether the proportion of children changing from a non-threat to a threat interpretation following the conversation was significant.

Table 4: Physical threat, free choice interpretations

Experimental condition			Post-conversation free choice threat interpretation		Total
			Non-threat	Threat	
Anxious	Pre-conversation free choice Non-threat	3	1	4	
	threat interpretation Threat	1	10	11	
	Total	4	11	15	
Non-anxious	Pre-conversation free choice Non-threat	4	0	4	
	threat interpretation Threat	6	5	11	
	Total	10	5	15	

Table 4 shows that one child in the ‘Anxious’ condition changed his/her answer from a non-threat to a threat interpretation following the conversation, and one child changed from a threat to a non-threat interpretation, which are non-significant changes (binomial, $p = 1.00$). In the ‘Non-anxious’ condition, no children changed from a non-threat to a threat answer. However, 6 children changed from threat interpretations to a non-threat answer, suggesting that there was an effect of the parental input in this category. These changes were significant (binomial, $p = 0.031$). In the ‘Non-anxious’ condition a chi-squared test the proportion of children who changed from a threat to a non-threat interpretation was significant ($\chi^2(1, 14) = 8.53$, $p = 0.003$).

Table 5: Physical threat, forced choice threat interpretations

Experimental condition			Post-conversation forced choice threat interpretation		Total
			Non-threat	Threat	
Anxious	Pre-conversation forced	Non-threat	13	0	13
	choice threat interpretation	Threat	0	2	2
	Total			13	2
Non-anxious	Pre-conversation forced	Non-threat	10	2	12
	choice threat interpretation	Threat	3	0	3
	Total			13	2

With the forced choice threat interpretations in the physical threat scenario there were no changes in the 'Anxious' condition, and in the 'Non-anxious' condition 2 children changed from a non-threat to a threat interpretation. However, it is notable that very few children made threat interpretations to the scenarios in this condition and the only 3 children who did make a threatening interpretation changed to non-threatening interpretations in the 'Non-anxious' group. However, the cell counts were too small to reach significance on a McNemar test (binomial, $p = 1.00$). The 'Anxious' condition was also non-significant (binomial, $p = 1.00$).

Table 6: Physical threat plans

Experimental condition			Post-conversation plans		Total
			Non-avoidant	Avoidant	
Anxious	Pre-conversation plans	Non-avoidant	10	0	10
		Avoidant	1	4	5
	Total			11	4
Non-anxious	Pre-conversation plans	Non-avoidant	9	2	11
		Avoidant	2	2	4
	Total			11	4

Once again, when asked about their plans for the physical threat scenario, there were few changes following the family discussion in the 'Anxious' condition. In the 'Non-anxious' condition there were two changes in each category. Again, as very few children made avoidant plans, there was a proportionally greater change in the 'Non-anxious' condition towards more non-avoidant solutions, but the changes were non-significant in either condition (binomial, $p = 1.00$; binomial, $p = 1.00$).

Table 7: Social threat, free choice interpretations

Experimental condition			Post-conversation free choice threat interpretation		Total
			Non-threat	Threat	
Anxious	Pre-conversation free choice	Non-threat	10	2	12
	threat interpretation	Threat	2	1	3
	Total		12	3	15
Non-anxious	Pre-conversation free choice	Non-threat	6	0	6
	threat interpretation	Threat	7	2	9
	Total		13	2	15

As in the physical threat free choice interpretations, there was a non-significant pattern of changes in the 'Anxious' condition (binomial, $p = 1.00$) in the free choice threat interpretations for the social scenario discussed. However, in the 'Non-anxious' condition significant number of children changed from threatening to non-threatening interpretations (binomial, $p = 0.016$). In a chi-squared test the proportion of children who changed from a threat to a non-threat interpretation was significant ($\chi^2(1, 14) = 4.80, p = 0.028$).

Table 8: Social threat, forced choice threat interpretations

Experimental condition			Post-conversation forced choice threat interpretation		Total
			Non-threat	Threat	
Anxious	Pre-conversation forced choice threat interpretation	Non-threat	14	0	14
		Threat	0	1	1
	Total		14	1	15
Non-anxious	Pre-conversation forced choice threat interpretation	Non-threat	8	0	8
		Threat	6	1	7
	Total		14	1	15

Once again there were no significant changes in the 'Anxious' condition (binomial, $p = 1.00$) in the forced choice interpretations of the social threat scenarios, but there were significant changes in the 'Non-anxious' condition (binomial, $p = 0.031$). The proportion of children changing from a threat to a non-threat interpretation was significant according to a Chi-squared test ($\chi^2(1, 14) = 10.80, p = 0.01$)

Table 9: Social threat plans

Experimental condition			Post-conversation plans		Total
			Non-avoidant	Avoidant	
Anxious	Pre-conversation plans	Non-avoidant	12	1	13
		Avoidant	2	0	2
	Total		14	1	15
Non-anxious	Pre-conversation plans	Non-avoidant	13	1	14
		Avoidant	1	0	1
	Total		14	1	15

Children made few changes to their plans in the social threat scenario, and neither condition led to significant differences (binomial, $p = 1.00$; binomial, $p = 1.00$).

Overall there were significant effects only in the 'Non-anxious' condition, for the free choice threat interpretations in both scenarios, and in the forced choice threat interpretations for the social threat scenario. There were no significant effects for changes in the plans that children made in either condition.

Hypothesis 2: Generalised effects of conversations

The second hypothesis that the effect of the conversations would generalise to other scenarios was tested by comparing scores on the first and second parts of the questionnaire, excluding the items discussed in the conversations, using a repeated measures ANOVA. For the free choice threat interpretations there was a significant difference between the pre and post-conversation scores, suggesting that conversations had some effect on the subsequent interpretation of ambiguous scenarios ($F(28) = 7.78, p = 0.009$). However, there was not a significant effect of experimental condition nor an interaction between condition and changes to scores. Pre and post-conversation scores on the forced choice threat interpretations and plans were also compared. No significant effects were found, suggesting that the effect of parental conversations did not generalise to new scenarios on these measures.

As the analysis showed an effect of the conversation on free choice threat interpretations, post-hoc analyses were carried out to identify where changes were occurring.

Presented overleaf are the mean generalisation scores (out of 6) for the interpretations and plans before and after the family conversations. A higher score implies more threatening interpretations and more avoidant plans.

Table 10: Pre and post-conversation generalisation data

	Experimental condition			
	Anxious		Non-anxious	
	Pre-conversation	Post-conversation	Pre-conversation	Post-conversation
Mean free-choice threat interpretation score	2.00	1.60	2.73	1.87
Mean forced-choice threat interpretation score	1.20	1.27	1.47	1.33
Mean avoidant plan score	1.33	1.13	1.47	1.13

Wilcoxon Signed Ranks tests were used to test significant differences between the pre and post-conversation scores as presented above. The only significant difference was in the 'Non-anxious' condition, in the free-choice threat interpretation measure ($z(14) = 2.36, p = 0.018$), showing that children interpreted new scenarios presented after the discussion as less threatening.

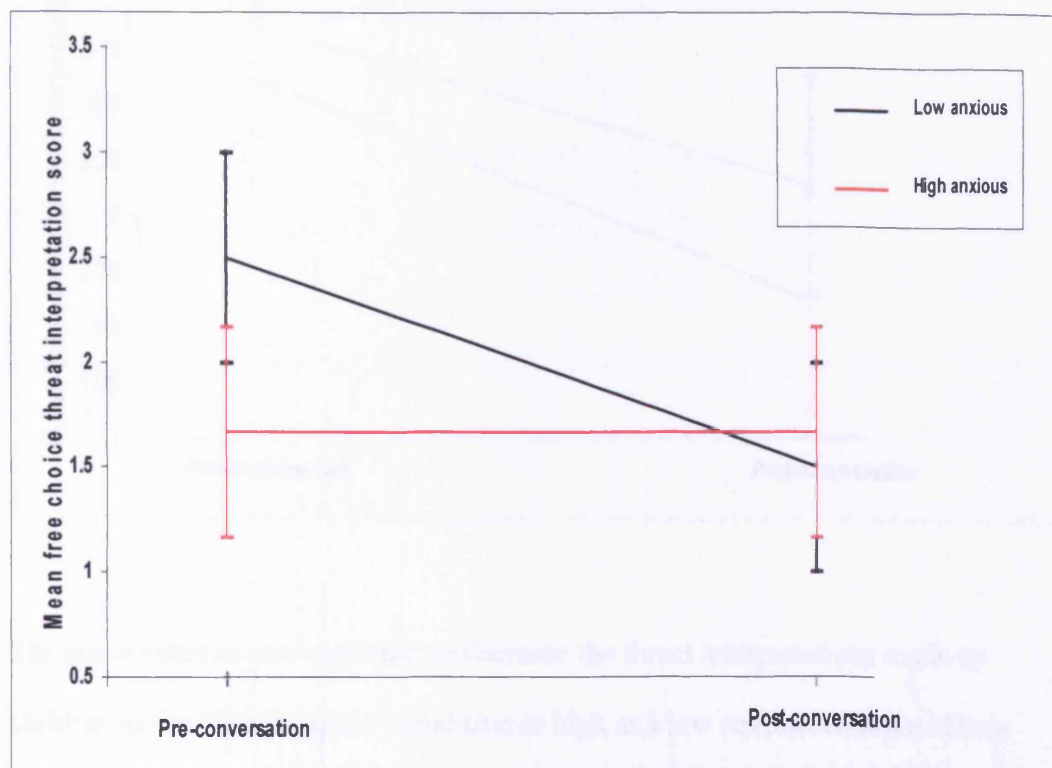
The data do appear to demonstrate some trends towards less threatening interpretations and less avoidant plans in the 'Non-anxious' condition. Interestingly, the free choice threat interpretations and plans in the 'Anxious' condition also appear to show a trend towards less threatening and less avoidant plans after the mother-child conversations, although these differences were not significant.

Hypothesis 3: Interactions with anxiety

A further hypothesis tested in this study was that more anxious children would be more likely to be affected by the family conversations. This was tested by entering anxiety as a covariate in the analyses comparing pre and post-conversation scores on the ASQ. A significant interaction was not found ($F(28) = 1.74, p = 0.19$). The

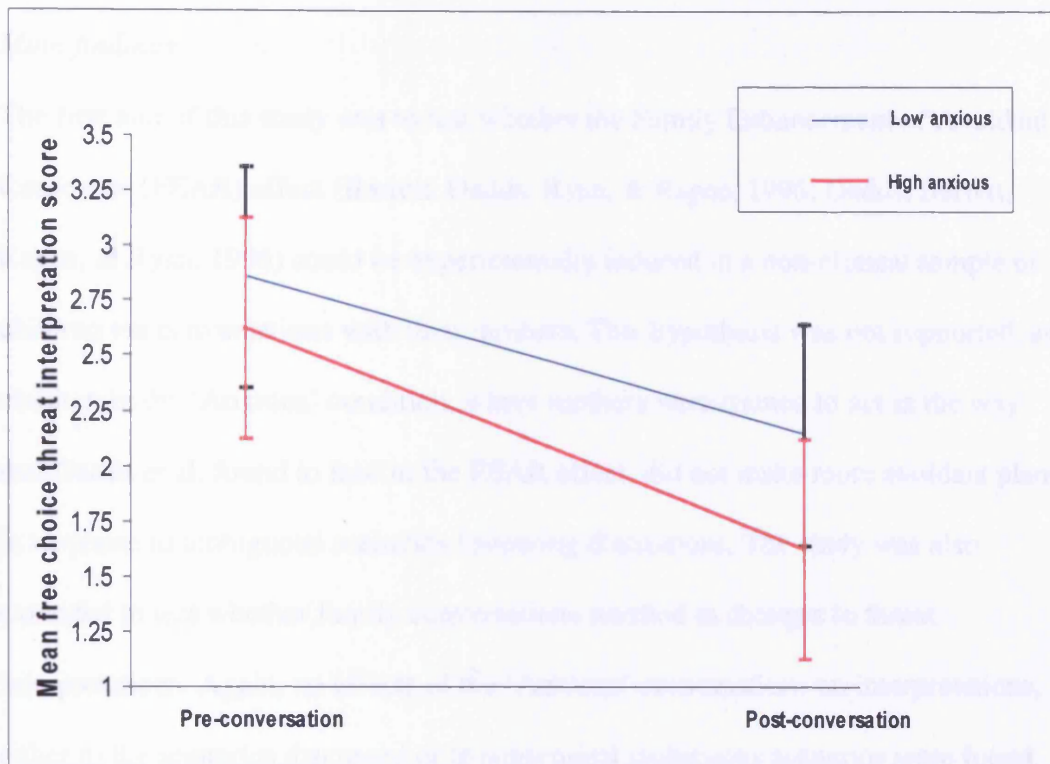
relationship was further explored by grouping children into high and low anxious based on a median split in anxiety scores. Line plots illustrate the trend observed:

Graph 1: Anxiety and threat interpretations, Anxious condition



In the 'Anxious' condition it appears that the conversation had a greater effect on more anxious children. Contrary to predictions, the conversation appeared to decrease the number of threat interpretations that more anxious children made.

Graph 2: Anxiety and threat interpretation, Non-anxious condition



The conversations also appeared to decrease the threat interpretations made by children in the 'Non-anxious' condition in high and low anxious children. There appears to be only a small difference between the high and low anxious groups, and the trend does not support the hypothesis that more anxious children would be more affected by the conversations.

The division into high and low anxious groups was based on small numbers and a normal range of anxiety scores. As the relationship between anxiety and the effect of the conversations was not found to be significant, the graphs above should be interpreted cautiously.

Discussion

Main findings

The first aim of this study was to test whether the Family Enhancement of Avoidant Responses (FEAR) effect (Barrett, Dadds, Ryan, & Rapee, 1996; Dadds, Barrett, Rapee, & Ryan, 1996) could be experimentally induced in a non-clinical sample of children via conversations with their mothers. This hypothesis was not supported, as children in the 'Anxious' condition, where mothers were trained to act in the way that Dadds et al. found to lead to the FEAR effect, did not make more avoidant plans in response to ambiguous scenarios following discussions. The study was also extended to test whether family conversations resulted in changes to threat interpretations. Again, no effects of the 'Anxious' conversations on interpretations, either to the scenarios discussed or to subsequent ambiguous scenarios were found.

A further aim of the study was to investigate whether the effect could be reversed. Mothers were trained to behave in the opposite way to parents in Barrett et al.'s (1996) study by encouraging non-threatening interpretations and non-avoidant plans that their children made. This manipulation did have a significant effect, with children being more likely to change their answers to less threatening interpretations in the scenarios discussed with their mothers. This result also seemed to generalise to new scenarios presented after the conversation, with children in this group being more likely to interpret subsequent ambiguous situations as unthreatening. However, contrary to predictions, the plans that children made in response to the scenarios did not appear to change following the conversations.

Interpretation of findings

As the influence of maternal input was found only when parents were encouraging non-anxious responses, it may be that the findings of the Barrett et al. (1996) explain only one aspect of how conversations influence anxiety. One explanation for the results of this study is that parents of anxious children do not encourage anxious responses in children, they simply fail to reassure them by encouraging their non-anxious responses. This explanation implies that anxious parents do not cause a threat perception bias, but exacerbate it where it already exists or fail to counteract it.

Such a conclusion fits with models suggesting that biological or genetic factors predispose anxiety (see Eley, 2001). It may be, for example, that temperamental emotionality or negativity is a necessary precursor to anxiety for most children, but the environment in which they develop affects whether anxiety becomes clinically significant (Lonigan & Phillips, 2001). Where parents fail to reassure or contradict their child's anxious interpretations, perhaps as a result of their own anxiety, a temperamental predisposition may be exacerbated to a clinical condition. Such a model fits with theories of anxiety such as the developmental psychopathology framework, whereby multiple variables interact to cause anxiety.

This hypothesis also fits with research from various other fields. Using Stroop tests in a series of studies, Kindt and colleagues (Kindt, Bierman, & Brosschot, 1997; Kindt, Van Den Hout, de Jong, & Hoekstra, 2000) found that all young children show selective attention towards threatening words. However, as they grow older, this attentional bias decreases in non-anxious children and remains present in anxious children. Kindt et al. suggest that threat interpretation is a naturally occurring bias in

young children, but where children fail to learn to inhibit it, they are at risk of anxiety development. It is conceivable that parents are instrumental in helping children to inhibit their tendency towards interpretation of threat, perhaps by encouraging their non-anxious interpretations and plans.

The model suggested above is also supported by research showing an interaction between temperament and parenting. For example, Rapee and Jacobs (2002) developed a treatment package aimed at parents of behaviourally inhibited preschoolers, encompassing parental anxiety reduction, exposure hierarchies and psycho-education about modelling anxiety and over-involved parenting. Children who received the intervention became less anxious and inhibited, while a control group, who also scored highly on measures of behavioural inhibition, became more anxious. This study suggests that parents can play a role in preventing a temperamental trait such as behavioural inhibition from developing into clinical anxiety, and that therapeutic intervention can aid this.

A similar conclusion may be drawn from a modelling study by De Rosnay et al. (2006). They found that infants who had observed their mother behaving anxiously when talking to a stranger later showed anxiety and avoidance towards the stranger. The effect was stronger in infants scoring highly on measures of anxious temperament. If these babies saw their mother behaving non-anxiously, they did not appear more anxious or avoidant than other infants, suggesting that mothers who model non-anxious behaviour can counteract a temperamental predisposition towards anxiety.

One alternative explanation for the failure to replicate the FEAR effect is that it is not an easily replicable finding and its importance may have been exaggerated in the literature. Indeed, studies aiming to replicate the FEAR effect have produced inconsistent results and while some studies have supported the role of family conversations (e.g Chorpita, Albano, & Barlow, 1996), others have failed to replicate it and have suggested that differences in experimental context have influenced the findings (e.g Cobham, Dadds, & Spence, 1999).

Another consideration is that a normative community sample was used in the study. It may be that the FEAR effect is only activated when children are clinically anxious. A similar conclusion was suggested in a study by Cobham et al. (1999), which also failed to find an effect of family conversation. As the task they used did not elicit high levels of anxiety in children, they concluded that effect simply may not have been activated. Contrary to this explanation, however, the data appear to display a trend towards all children, including those scoring more highly on the anxiety measure to interpret less threat after the conversations, even in the condition which was aimed to mimic the FEAR effect.

A linked problem was that children in the study made very few avoidant plans to ambiguous scenarios at any stage in the experiment, providing little opportunity for changes to be significant. Again, a closer look at the data does not reveal a trend towards more avoidant plans being made in the 'Anxious' condition, but data in the 'Non-anxious' condition do reveal that changes towards less avoidant plans were occurring but numbers were too small to meet significance.

Similarly, very few children chose threat interpretations to forced choice questions, limiting the potential for significant change. This may have affected the results in the generalisation analysis in the 'Non-anxious' condition, as the data reveal a non-significant trend in the expected direction. An alternative possibility is that conversations had more impact on the free choice threat interpretations as mothers spent more time discussing them, or were easier to change than forced choice interpretations, which perhaps required a more definite change of mind.

Significant changes were found in the 'Non-anxious' condition to forced choice interpretations for the social threat scenario, but not for the physical threat scenario. Looking at the data, only three children in this condition initially made a threat interpretation, and all changed to non-threat interpretations following the family intervention, suggesting an effect of the conversations in this condition. However, the small cell counts did not reach significance. An alternative possibility is that family conversations influence social threat interpretations more than physical, a result also found in a replication of Barrett et al.'s (1996) study by Shortt, Barrett, Dadds and Fox (2001).

Another possible by-product of using a normative sample was that scores on the anxiety measure did not significantly correlate with threat interpretation scores or avoidance. This is unusual, as the association has been replicated in numerous studies (e.g Creswell & O'Connor, 2006), but may have been due to the limited range of anxiety scores found in a non-clinical sample, and the low numbers of threat interpretations and avoidant plans made. Regardless, the lack of association between anxiety and threat interpretation or avoidance limits some of the conclusions which

can be drawn. For example, even though threat interpretations decreased in the 'Non-anxious' condition, this may not also represent a reduction in anxiety, which would be the goal of such a manipulation if it was applied to a clinical setting.

Limitations

This study used a novel design and has several potential limitations which may have influenced the findings. Firstly, the sample size was smaller than was anticipated and effect sizes were small. The measures used in the study were chosen to replicate previous research studying threat interpretation, but were designed for a clinical population. Using a more sensitive measure may be a worthwhile extension to the study to provide a confirmation of the effects of parental training.

One possibility is that the FEAR effect was not replicated due to low numbers and a corresponding lack of statistical power. However, when the data are examined in detail, there does not appear to be a trend towards more avoidant plans being generated following the conversations. In fact, the conversations encouraged very few children to change to a more avoidant plan. Furthermore, there appeared to be a trend towards children making less avoidant plans following the 'anxious' conversations with their mothers. This trend replicates findings by Bogels, van Dongen and Muris (2003), who found that their sample of anxious children all interpreted less threat in ambiguous scenarios following the discussion. It may be that having a conversation with their mother somehow reduced anxiety in children despite its content, perhaps simply as receiving attention provided reassurance.

Another potential limitation of the study is that the demographics data reveal that the sample were predominantly white, mothers were largely employed in academic, professional or white collar jobs and had on average 17-19 years of education, suggesting most were graduates or had post-graduate training. This limits the generalisability of the findings, as the sample may have been more educated, less ethnically diverse and of a higher socio-economic status than the general clinical population.

Even with such a highly educated sample, some mothers struggled to understand the instructions, and many made mistakes during the conversations. The protocol was complex with mothers required to decide whether or not the child was interpreting threat in the scenario, and whether or not the plan was avoidant, and to respond accordingly. Although adherence checks revealed that the majority of interactions were carried out as instructed, there was a degree of error which blurred the distinction between the two experimental groups. Also, as some mothers seemed quite uncertain about their responses during the conversations, their input may have been less convincing to children.

Another potential confound was that mothers may have felt more comfortable in encouraging their child's non-anxious responses thereby leading to a greater influence of the maternal input in this condition. Responding positively to threat interpretations or avoidant plans may have felt unnatural or unethical to some parents. Checks on adherence to the experimental protocol did not reveal that mothers were more likely to deviate from the instructions in the 'Anxious' condition,

but it still remains possible that they were more enthusiastic or convincing in the 'Non-anxious condition', leading to this skewed effect.

Children aged 7 or 8 years were recruited for the study. This age range was chosen as it is highlighted by clinical experience to be a life stage at which anxiety starts to significantly affect children's lives, and coincides with the development of social fears. Nevertheless, it constitutes a relatively narrow age range, and generalisability to other ages may be limited.

Implications of the results and further research

Despite these potential limitations, the changes observed in the 'Non-anxious' condition are encouraging regarding potential clinical applications. Clinical interventions for anxiety in children have increasingly incorporated parents in treatment, and some of the interventions designed, such as coaching parents to reinforce certain behaviours and model non-anxious behaviours (e.g Barrett, Dadds, & Spence, 1998), have been found to enhance treatment outcomes. Although interactions such as those encouraged in this experiment have not been specifically tested in intervention studies, some family-based treatment programs may be targeting similar mechanisms.

If parents can be trained in a relatively brief period to respond to children in a way which decreases their threat interpretations, this type of intervention may be useful in working with families where parents appear to be inadvertently reinforcing anxiety in their children. Such an intervention would need further development, but the impact of 'parent training' to decrease threat interpretation on childhood anxiety may be a

worthwhile goal of future research. Moreover, as the results in this study are based on a non-clinical sample, it would be interesting to determine whether such an intervention would be effective with children showing clinical levels of anxiety. In this study, the trend towards an interaction with anxiety does suggest that more anxious children may be more likely to be influenced by the discussions. It would also be important to assess whether changes generalised to situations outside the experimental context, including to 'real-world' situations. An important step would also be to refine the parental training, to make it accessible to all parents, and to allocate sufficient time to consolidate the necessary information and skills.

Further research would also be necessary to explore the theory that family conversations may exacerbate threat perception in children who already have a temperamental predisposition towards anxiety. Ideally this could be done using a longitudinal design, to assess whether the parenting styles described in this paper can either increase or help to inhibit threat perception in children with anxious temperaments.

Conclusions

Although this study did not support a causal role for the FEAR effect in childhood anxiety, when mothers reversed the effect by encouraging non-anxious responses in their children, threat interpretations reduced. This finding supports studies showing a role for parenting in children's perception of threat and suggests a model whereby parents of non-anxious children help them to inhibit a tendency to interpret threat while parents of anxious children fail to help inhibit this bias. This may exacerbate a pre-existing anxious temperament, leading to a clinical condition.

The study suffered from important limitations and effect sizes were small, so conclusions must be tentatively made. Replications of the training effect using a larger sample size and perhaps a more sensitive measure, such as an interpretation of ambiguity measure adapted for a non-clinical sample, may improve statistical power and strengthen the conclusions that can be drawn. The study was designed to investigate only one influence on threat perception, but interactions with other variables, for example to test the hypothesis that temperament predisposes children to be influenced by parenting, would be important developments of this research.

The findings may also be usefully developed into a clinical intervention. The theory above suggests that parents of anxious children could be trained to monitor their own responses to their child's threat interpretations and learn to help children inhibit them through reassurance and encouragement of their non-threatening interpretations. The training used in this study suggests that this intervention may be successfully taught to parents, although further development would be needed to ensure the usability of the training and the maintenance of its effect the experimental context.

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Part 3: Critical appraisal

Introduction

This review is divided into three sections. The first describes some personal reflections on the research process, the difficulties encountered and how they were overcome, and how my view of the processes being studied has altered. The second section discusses two elements of the study's design, and considers their implications and potential improvements. Finally, the third section places the findings in the broader context of child anxiety research and discusses directions for future studies.

Personal reflections

Developing the study

The idea for this research project was developed via a circuitous route. The study was originally designed for a population of children with Post-Traumatic Stress Disorder and their families, intending to explore the clinical observation that children with PTSD are much harder to successfully treat if their parents also have the disorder. It was hypothesised that the way that parents talked about the traumatic events and their consequences with their children influenced the maintenance of their symptoms. However, the clinic approached to help recruit for the project was closed down mid-way through developing the study, and had to withdraw their support. Another child PTSD clinic was approached, but they were already developing a similar piece of research and were unable to help.

The study was therefore adapted for a normal population, and a review of the literature on communication patterns and the development of anxiety suggested that

Barrett, Dadds and Ryan's (1996) and Dadds, Barrett, Rapee and Ryan's (1996) findings on the Family Enhancement of Anxious/Aggressive Responses (FEAR) effect may be a useful finding to develop. The effect has been found in several studies but important questions about causality, cognitive change and application to a clinical setting remain unanswered. As treatments designed to incorporate parental involvement in childhood anxiety have little considered macro-level communication processes, a study designed to manipulate such variables was of interest. The study was therefore developed both to replicate and extend the FEAR effect and to test the hypothesis that it was possible to train mothers to act in an anxiety-enhancing or anxiety-reducing way, and that this would impact on their child's perceptions of threat.

Recruitment

The most challenging part of the research process was recruitment. Initially, schools with personal connections or contacts were approached, and some agreed to distribute letters about the project. However, none were able to offer the additional involvement requested, such as allowing visits to the school to speak to a whole class or testing children and their parents on the school premises. When a letter to a class was distributed, a handful of parents generally replied. Recruitment therefore became a struggle to persuade enough schools to distribute letters so that if a few children from each school participated in the study, sufficient numbers would be tested.

The problems originated partly because there was little incentive to schools to participate, and although some eventually did, the majority refused as they had busy schedules and were involved in other activities. Had the study only involved testing

children, it would have been relatively easy to test whole classes at a time, once a school had granted access. However, as mothers also needed to be present, recruitment relied on them to respond to the letter when it had been taken home. Without strong incentives such as payment, many parents, particularly working mums, or those with other children, may have been interested in the study but were not sufficiently motivated to contact the researcher and arrange a time to meet.

Recruitment difficulties led to a smaller sample than was originally hoped. However, by contacting large numbers of schools, and being flexible in arranging times for testing, and visiting families at home, a reasonable number were eventually recruited.

Training

A second difficulty encountered was training mothers to have conversations with their child according to the protocol. As noted in the results and discussion sections, although most mothers followed the instructions for most of the conversation, very few completed the discussion exactly as asked. Checking over the data, this inaccuracy did not seem to be linked to a particular part of the conversations. For example they were no more likely to respond incorrectly to a threat interpretation than a plan. Nor did the error rate differ depending on experimental condition. One hypothesis may be that mothers were more reluctant to encourage anxious responses in their children leading to more 'errors' in this condition, but mothers were just as likely to inaccurately encourage an anxious as a non-anxious response.

The difficulty therefore seemed to lie in mothers having not completely understood the instructions and not being able to respond on the spot to the interpretation or plan

that their child suggested. The training process was designed to be quite thorough, encompassing written and verbal instructions, a video of example conversations and a role-play with the researcher. However, if mothers reported that they had fully understood the instructions after reading them and discussing them with the experimenter, the role-play was excluded, and in a minority of cases practical difficulties prevented the video from being shown.

An improvement to the study would be to incorporate all of the training elements even if mothers were confident they had understood the instructions. It appeared that the difficulty most mothers encountered was deciding on the spot whether their child had made a threat interpretation or avoidant plan and responding accordingly. The procedure may have been improved by role-playing numerous possible answers that their child could have generated. However, time constraints made this difficult and an additional task would have been required to occupy children during this stage of the experiment.

Pilot phase

Aside from problems with recruitment, the research process continued with little disruption. Piloting the study was extremely useful for identifying methodological problems. Following the pilot phase several changes to the procedure were made. In the original design, the whole Ambiguous Scenarios Questionnaire (ASQ) was administered before and after the parent-child conversation. The whole procedure therefore lasted about an hour, and most of the children in the pilot phase were losing concentration towards the end. Repeating the questionnaire also meant that the children were responding to the same questions twice, and one concern was that

children were simply repeating their answers in the second administration, meaning that any effects of the conversation would be lost. The decision was therefore made to administer half the ASQ before the conversation, and the other half afterwards (with the two versions counter-balanced). This shortened the procedure and ensured that children were thinking afresh about the second set of questions.

Ethics

Ethical issues were also a matter of consideration for the study. The protocol involved a degree of deception, as children were not informed that their mothers had been asked to act in a certain way during the conversation. The other concern was that the procedure might be harmful towards the children in the 'anxious' condition, as the mothers were asked to respond in a way thought to increase anxiety. During the pilot phase and throughout testing the concerns above were carefully monitored. None of the participants expressed concern about deception. Most children found it amusing when they found out that their mother had been 'acting' during the conversation. When asked whether they had noticed anything different, two children had noticed their mother asking more questions than usual, but none noticed the experimental manipulation. None appeared distressed at any point.

Although children did not notice the manipulation, a minority did make more anxious interpretations following the conversation. This change was thought to be temporary and any anxiety should have been reduced by the debrief and the pleasant task at the end of the study, but without a follow-up it was impossible to conclude this with certainty. Mothers did not express concerns about the design of the experiment, although one mother asked to discuss an alternative scenario with her

child, as the selected scenario had been a specific anxiety of her son's in the past, and she was unwilling to reawaken it. This was agreed, and the mother did not have concerns about discussing a different scenario.

Reflections on carrying out the research

Overall the process of carrying out the research was enjoyable. The hypotheses were tested quantitatively, but a few observations made while carrying out the study may be relevant. Particularly interesting was the effect of the conversations. In some children they seemed to have no effect at all, and despite the mother agreeing or disagreeing with their responses, children were very confident of their interpretations or plans and hardly seemed to notice their mother's comments. In other families, the mother's remarks seemed to have a considerable impact, and children readily changed their minds when questioned by the mothers.

The findings of the study perhaps reflect this discrepancy as, although levels of change overall were small, some individuals did appear affected by parental input, and only one condition of the study produced significant change. An interesting clinical and research question therefore concerns which children are susceptible to this manipulation. One hypothesis was that more anxious children would be affected more by the maternal input, but this prediction was not supported by the data. It did seem that children who were more certain about their original responses were less likely to change, but whether this certainty reflected lower anxiety is unclear. Gender and age were also considered as potential moderator variables, but were not found to have an effect.

Maternal anxiety and threat interpretation were not measured in this study, and may have been useful measures, as the impact of parental input may reflect how they normally act. For example, if a child is not used to a parent who questions or doubts their interpretations, their changed behaviour during the experiment may have had a lesser, or conceivably a greater, influence. Such hypotheses would require additional investigation to determine how mothers would themselves interpret conversations, and what happens in their usual conversations with their child.

A final observation was that, although research shows that more anxious parents are more likely to have anxious children, that high levels of control may increase anxiety and so on, meeting a number of mother-child pairs demonstrated to me the huge variation in such variables. For example, some children who appeared more anxious in the experiment, such as being shy to greet the experimenter, had mothers who also seemed anxious, but others had seemingly gregarious mothers.

This also led me to reflect that experiments such as this, and those reviewed while designing the experiment, are necessarily limited in their scope to explain the huge variation in presentations and different factors that affect children. Parenting undoubtedly influences anxiety, but as I observed, and research reflects, no one variable affects all families. The study considered one potentially important aspect of parenting but many other influences such as paternal parenting, family structure, siblings, school experiences and life events were unquantified and may be extremely important. This does not reduce the worth of such research, but was illustrative of the difficulty in identifying the important variables in anxiety, and the need for multi-faceted, individually-designed treatments.

Design

The major strengths and weaknesses of this study are mentioned in the discussion section. However, two aspects of the study's design may benefit from further exploration as they relate not only to this study, but to many others in the field.

Ambiguous Scenarios Questionnaire

An important design decision was the use of the ASQ, both as a measure of threat interpretation, and therefore the baseline and outcome measure, and as the topic of the conversations. The measure was chosen because it was used in the Barrett et al. (1996) study and in most of the attempted replications, as well as in other papers on threat perception. Nevertheless, its use does affect the study in potentially important ways.

One possible limitation of the ASQ, is that it involves hypothetical situations and, while it is designed to use scenarios familiar to most children, studies have not yet been carried out to show that it correlates with how children perceive threat in actual situations. One of the few replications of Barrett et al.'s study which used a real-life task instead of hypothetical situations did not find an effect of family conversation. Cobham, Dadds and Spence (1999) asked children to make a three-minute, video-taped speech, and to discuss this, and an optional second speech with their parents. Contrary to predictions, anxious children were no more likely to become more negative or to choose not to do the second speech following discussion with their parents. There are other possible explanations for these null findings, for example children did not rate their anxiety as very high in the situation, so the effect may not

have been activated. However, the possibility remains that the threat perceptions in hypothetical situations do not translate to real-world tasks.

Another implication of using hypothetical situations is that children may not react in reality as they answer on the questionnaire. For example, some children answered in impractical or joking ways to questions. One child suggested, for example, that if he heard a sound in the night and thought it was a burglar, he would come downstairs and kick him. The majority of children do think hard about the questions, but it is impossible to tell whether they reflect how participants would perceive threat in real situations. As Creswell, Schniering and Rapee (2005) comment about ambiguous scenarios measures, “what exactly is being measured is not entirely clear”.

Another observation about the ASQ was that very few children suggested avoidant solutions to problems or chose threatening interpretations on forced choice items, probably reflecting the non-clinical population. An alternative explanation is that the wording of the questions asking for plans encouraged non-avoidant responses even if, in reality, children would not have done anything. These questions asking were phrased: “What would you do?” which implies that some action should be taken. It may have been that a question phrased more ambiguously, such as “Would you do anything? If so, what?” may have led to more representative answers.

The ASQ was developed to measure threat perception, but has been little studied or validated, and as such, it warrants evaluation when used. It is a questionnaire commonly used in the literature and is useful to replicate studies, although it may have limited power when used with a non-clinical population.

Sampling

As described in the discussion, the participants included in the study were predominantly white British and highly educated. This probably reflected the recruitment process. Although letters were sent to a variety of schools, the minority of private schools that were contacted are probably over-represented in the sample, as they were slightly more likely than state schools to participate, possibly due to fewer concerns about participating in extra-curricular activities and perhaps being better-resourced and more willing to take the time to respond.

Which schools distributed the letter may have partially skewed the sample, but a pattern in which parents responded to the letter was also observed. Parents tended to mention one of two reasons for participating: either they had a particular interest in psychology and had participated in prior research, or they had a particular interest in childhood anxiety. The first group were often educated mothers who had perhaps studied psychology or a similar area themselves, or were involved professionally in an allied field. The second group included mothers who commented that their child had been anxious in the past, or who had current concerns about anxiety.

Unfortunately, whether the family had previous or current contact with mental health services, or had a history of anxiety, was not recorded. However, a number of mothers commented informally that this had been a reason for their interest in the study and, with retrospect, this would have been a useful variable to measure.

A further sampling bias may have been generated because about ten participants were recruited via a circular email on the university mailing list. These mothers were all therefore employed by the university and, while the email went to all

employees, the majority of those who responded were academics. Again, this contributed to the high average years of education in the sample.

It is possible to speculate about the implications of these possible sampling biases. Research based on a subset of the population raises questions of generalisability, and research populations are often criticised for being unrepresentative of the general clinical population, particularly in socio-economic status and ethnicity. Another consideration is that, as training even this highly educated sample to change their responses in conversations was difficult and led to relatively high error rate, if such a procedure was adapted for a clinical population, a thorough consideration of how to improve training would be needed. This is not insurmountable, as the time available for training in this experiment was brief, and could be extended in a clinical setting. Finally, if the sample also contained a subset of mothers with concerns about their child's anxiety levels, this may have skewed the sample in favour of more anxious children and/or mothers. However, it may also be that most mothers who replied to the letter did so with the knowledge that their child would agree to meeting a stranger and being video-recorded, perhaps encouraging a less anxious population.

Ideally a random sampling approach would be used in this study, although practical difficulties limit this. Paying participants may have improved sampling by encouraging parents besides those with a particular concerns or interest in the research to take part, although other biases may be introduced in this way. Finally, although schools tend to incorporate a representative sample of children, recruiting from other sources or actively compensating for these perceived biases may have helped to reduce sample effects.

Context of the research and future directions

Context of the research

The experiment was designed to further investigate the FEAR effect (Barrett et al., 1996, Dadds et al., 1996) which suggests that parents of anxious children enhance their avoidant plans by encouraging them during conversations. Barrett et al.'s study focused only on avoidance, so an additional measure of threat interpretation was included in this study. The study was also extended to test causality by manipulating the proposed 'anxiety-enhancing conversations' using an experimental design, thereby allowing conclusions about direction of effects to be drawn.

This study did not support a causal role for the FEAR effect, although it is possible that the use of a non-clinical population, who made few avoidant plans, prevented it from being revealed. The study does suggest that family conversations have an effect on threat interpretations however, as shown when mothers reversed the FEAR effect by encouraging non-threat interpretations and non-avoidant plans, leading to a subsequent reduction in threat interpretation.

The research literature on family involvement in anxiety is vast and varied and although cognitive theories are growing in popularity, a concept such as enhancement of threat perception via family conversations is only one of numerous potential influences. Theories such as developmental psychopathology models of anxiety (e.g Vasey & Dadds, 2001) suggest that different variables interact in different individuals at different life-stages to create a range of potential pathways towards anxiety development. Such models seem plausible because, as yet, only

small effects have been found for single variables. However, simply concluding that many variables are associated with anxiety does not help in the development of effective treatments. While useful therapies will probably involve multiple points of intervention, research into individual variables and how they interact must continue in order to specify these potential pathways and interventions.

The findings of this study may support a model which aligns well with developmental psychopathology approaches as it suggests that parents do not cause anxiety in children, but may exacerbate it by failing to reassure children or help them to inhibit a tendency towards threat interpretation. This effect may only occur, therefore, when children have a pre-existing predisposition towards anxiety, perhaps in the form of an anxious temperament.

The study was also designed with a view to treatment. It was hoped that if training mothers to modify their responses in conversations, albeit for a limited time period, proved possible and led to changes in child threat interpretations, this had the potential to be translated into a clinical intervention. In this respect the study was partially successful. The majority of mothers were able to understand the concept of threat interpretation and avoidance, and to judge when children were making such responses. Although the accuracy rate of their responses varied, it was acceptable in most cases, and may improve if more time was available for training. In the 'Non-anxious' condition mothers were trained to encourage their child's non-threat interpretations and non-avoidant plans, leading to a significant reduction in threat interpretation. This finding may be promising for a clinical application using 'parent-training'.

Future directions

In theoretical terms, this study implies that family conversations may be a worthwhile area of further research. As described above, it appeared that only some children responded to the maternal input in conversations and one useful extension to the study would be to explore what defines this group. Gender, age and anxiety were the only variables considered in this study. No effect was found for these variables, and in the case of anxiety, there appeared to be a trend for all children to become less anxious following the conversations. The limited range of anxiety scores in the sample limited such an analysis, and further research would be needed to clarify this effect.

The study suggests that family conversations have some impact on interpretation of threat, but did not find a FEAR effect as described by Barrett et al. (1996) and Dadds et al. (1996). To test the causal role of family conversations, a longitudinal study assessing whether family conversations which encourage threat perception and avoidant plans predict later anxiety in children may be helpful. Such a finding would support the theory that parental input in conversations is an important variable in causing anxiety, and that threat perception is a cognitive bias underlying anxiety development.

A further useful extension of the theoretical work could be exploring how family conversations interact with other variables likely to be important in anxiety development. This could include child characteristics such as temperament or behavioural inhibition, other influences on anxiety such as life events, peer and school experiences, as well as parenting variables such as control and warmth,

modelling and direct verbal instruction. In particular, studies could focus on how parental characteristics contribute to such conversations. It could be hypothesised that anxious parents are more likely to interpret threat and to inadvertently reinforce it via the conversations they have with their children. A limitation to the current study was also the involvement of mothers only, a result of practical considerations. The role of paternal enhancement of threat perception also warrants exploration.

The conclusions of the study also suggest that a future direction for research may be to develop the clinical applications of these findings. Further studies are needed to examine whether parental training such as that demonstrated in this study would be a useful addition to family-based anxiety treatments.

A first step towards this would be to attempt the training intervention with a sample of clinically anxious children. This could initially be done in the form of a one-session intervention with the outcome measure being a reduction in the child's threat interpretations and avoidance for some target scenarios, in a similar design to Barrett et al.'s (1996) study. If such an intervention was successful, research could then focus on whether the effect generalises. For example, even if parents were able to change their behaviour in a discrete period of time to specified hypothetical scenarios, this may not translate to everyday, real-life conversations about potential threats. A further phase of research would then focus on whether parents can be trained to respond in a less anxious way in real-life situations, and whether this causes a decrease in threat interpretations and anxiety in children.

Conclusions

Reflecting on the research as a whole provides a wider perspective than that covered in the empirical paper. Although a study is planned and piloted with care, unexpected situations and findings inevitably emerge, and a critical appraisal allows such factors to be discussed. Overall, carrying out the research was an enjoyable and interesting process, and I learnt a lot not only from designing and interpreting the study, but also from observing 30 mothers and children at home and the considerable variation in the everyday interactions they share.

Although the research ran relatively smoothly, some problems were encountered, particularly with recruitment, leading to a lower sample size than intended and potential sampling biases. These difficulties were not predicted and were partly a result of carrying out research without resources such as sufficient funds for payment. Another difficulty involved training mothers to follow the experimental protocol, leading to a less neat distinction between the two groups. Simple improvements to the training design could improve this, and it is an area which needs further improvement if such findings are to be translated to a clinical context.

Some unexpected findings were also encountered. The FEAR effect was not supported, contrary to predictions. Potential explanations for this have been described, but can only be ascertained through further research. However, more promising were findings that maternal input can reduce threat interpretation in children. Replications of this finding using a clinical sample would be needed, but the results suggest potential for a clinical application.

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Appendix 1

Adult information sheet and consent form

Family Conversations and Childhood Anxiety

We would like to invite you to participate in this research project. You should only participate if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, it is important for you to read the following information carefully and discuss it with others if you wish. Ask us (contact details below) if there is anything that is not clear or you would like more information. Thank you for taking the time to read this information sheet.

The study has been approved by the University College London Research Ethics Committee.

What is the study about?

The study is about childhood anxiety, a common and disrupting problem in many school-aged children. In order to find out better ways to diagnose and treat anxiety in children, psychologists also study non-anxious children.

Past research studies have indicated that many aspects of parenting can affect anxiety in children, and that the way that parents discuss potentially worrying situations with their children can affect how the children think about those situations. In this study, the parents will be asked to discuss different situations with their child. The experimenter will ask them to talk about the events in a particular way, and we will then assess how children think about different situations.

What exactly will I be asked to do?

The experimenter will arrange a time to come and meet with you and your child. For your convenience this may be in your own home, or at school if a room is available. You and your child will be asked to fill out some simple questionnaires. The experimenter will then give you and your child two situations in which it is not clear what is happening to discuss. You will be given 5 minutes to discuss these situations with your child. The experimenter will leave the room, but a video camera will be left to record the conversation. Before the discussion, the experimenter will provide the parent with instructions about how to talk to their child about the topic.

The researcher may ask you to discuss the scenario in the way you normally would, or they may ask you to alter your behaviour. You may be asked to respond neutrally to some of your child's plans and positively to their other plans. It is thought that this behaviour in parents can affect the likelihood of the child perceiving threat in subsequently presented ambiguous scenarios. This is not likely to be a long-lasting or very noticeable effect. The researcher will discuss this fully with you before the experiment commences. It is also important that your child is not aware that you have been asked to modify your conversation. As such, we ask you not to discuss this aspect of the experiment with your child.

After the two discussions, the child will be asked to fill in one more questionnaire. The experimenter will then discuss the experiment with both the parent and the child, and answer any questions that they might have. We expect that the experiment will take about 45 minutes in total.

Who is the researcher?

The experiment is being carried out by Hannah Murray, Trainee Clinical Psychologist. She is based at University College London, and her work is overseen by two Clinical Psychologists, Dr Pasco Fearon and Dr Cathy Creswell. Both are specialists in child research, and have carried out many experiments of this type. Further details of their publications is available, if you would like to know more.

Hannah _____ has carried out previous research projects with Exeter school-children while she was studying at Oxford University. To get in touch with her, please email _____ or call _____.

Do I have to participate?

No. It is up to you to decide whether or not to take part. If you choose not to participate it will involve no penalty or loss of benefits to which you are otherwise entitled. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. All data will be collected and stored in accordance with the Data Protection Act 1998. This means that copies of videos and paper forms will be stored securely until after the project is completed. They will then be destroyed.

Informed Consent Form for Participants in Research Studies

Title of Project: **Family Conversations and Childhood Anxiety**

This study has been approved by the UCL Research Ethics Committee

Participant's Statement

I
agree that I have

- read the information sheet and/or the project has been explained to me orally;
- had the opportunity to ask questions and discuss the study;
- received satisfactory answers to all my questions or have been advised of an individual to contact for answers to pertinent questions about the research and my rights as a participant and whom to contact in the event of a research-related injury.

I understand that my participation will be taped/video recorded and I am aware of and consent to, any use you intend to make of the recordings after the end of the project.

I understand that I am free to withdraw from the study without penalty if I so wish and I consent to the processing of my personal information for the purposes of this study only and that it will not be used for any other purpose. I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.

Signed:

Date:

Appendix 2
Child information sheet

Parent/Child information sheet

We would like you to take part in an experiment. Here is some information about it so please read the whole page with your mum.

What will I be asked to do?

The experiment will take about 45 minutes and will happen at your house.

The person doing the research is called Hannah. She will talk to you and your mum for a bit and will ask you to fill in some questionnaires. These questions aren't a test, and there are no right or wrong answers, we just want to know what you think. While you are doing the questionnaires, Hannah might go into a different room in the house and talk to your mum about the experiment.

After this, your mum and you will be given some questions to talk about together. Hannah will video your conversation. Again, there are no right or wrong answers to the questions, just tell us what you think.

After talking to your mum, Hannah will give you a couple more questionnaires to fill in and then the experiment is over. We will have some time at the end to have a chat and you can ask questions if you want.

Who will be there?

Just you, your mum, and Hannah. Hannah is a psychologist who works in London.

Do I have to take part?

No. It is up to you, and please tell Hannah or your mum if you don't want to do the experiment or if you want to stop halfway through.

What happens afterwards?

When you have taken part in the study you will be entered into a raffle to win £50 vouchers. Also, Hannah will give you her email address and telephone number so if you have any questions after the study you can get in touch and ask.

We hope that the experiment will be fun for you and your mum!

Thanks for reading and ask Hannah if you have any questions.

Appendix 3
STAI – Child version

Code number: (parent on child)

Date:

PRIVATE & CONFIDENTIAL

A number of statements about boys and girls are given below. Read each statement and decide if it is *hardly ever*, or *sometimes* or *often true* for you. Then for each statement put an X in the box that describes you best. There are no right or wrong answers. Do not spend too much time on any one statement. Remember, choose the word which describes how **you usually feel**.

1. I worry about making mistakes	Hardly ever	Sometimes	Often
2. I feel like crying	Hardly ever	Sometimes	Often
3. I feel unhappy	Hardly ever	Sometimes	Often
4. I have trouble making up my mind	Hardly ever	Sometimes	Often
5. It is difficult for me to face my problems	Hardly ever	Sometimes	Often
6. I worry too much	Hardly ever	Sometimes	Often
7. I get upset at home	Hardly ever	Sometimes	Often
8. I am shy	Hardly ever	Sometimes	Often
9. I feel troubled	Hardly ever	Sometimes	Often
10. Unimportant thoughts run through my mind and bother me	Hardly ever	Sometimes	Often
11. I worry about school	Hardly ever	Sometimes	Often
12. I have trouble deciding what to do	Hardly ever	Sometimes	Often
13. I notice my heart beats fast	Hardly ever	Sometimes	Often
14. I am afraid	Hardly ever	Sometimes	Often
15. I worry about my parents	Hardly ever	Sometimes	Often
16. My hands get sweaty	Hardly ever	Sometimes	Often
17. It is hard for me to fall asleep at night	Hardly ever	Sometimes	Often
18. It is hard for me to fall asleep at night	Hardly ever	Sometimes	Often
19. I get a funny feeling in my stomach	Hardly ever	Sometimes	Often
20. I worry what other people think of me	Hardly ever	Sometimes	Often

Appendix 4
Demographics questionnaire

Parent information sheet

Please fill in the following information about you and your child:

1. Age of your child:

_____ years and _____ months

2. Gender of your child (please circle):

Male

Female

3. Your child's ethnic group:

4. Your age: _____

5. Your job (If full-time mum, please fill this in):

6. Your years of education:

Appendix 5
Ambiguous Scenarios Questionnaire

Ambiguous Scenarios Questionnaire: Child self report

Part I

Here are some situations that you might find yourself in. You might have been in some of these situations before. For others you might have to imagine what it would be like to be in that situation. The important thing is that you put what you would really think if it happened to you and what you would really do.

1. You notice at school one day that a favourite book of yours is missing.

What do you think is most likely to have happened to the book?

What will you do about it?

Read the choices below and tick the one that you think is the most likely (it doesn't matter if none of the answers match the one you have just written, just choose the most likely one out of these two):

Please tick one

Someone has stolen the book	
You left your book at home	

2. On the way to school you start to feel funny in the tummy.

What would you think has made you feel funny?

What will you do about it?

Which is more likely?

You ate some bad food and are going to be really sick at school	
You didn't have enough breakfast and are just feeling hungry	

3. You see the School Headteacher walking around the playground and she/he has been asking other children where you are.

Why do you think the Head teacher is looking for you?

What will you do about it?

Which is more likely?

The Headteacher has a message from your mother for you	
The Headteacher thinks you have done something wrong	

4. *If you don't have a dog just pretend you do for this next situation.*

You are playing inside and your dog runs to the door and starts to bark and growl at the door.

What would you think he is growling at?

What will you do about it?

Which is more likely?

There is another dog walking past outside	
There is someone you don't know trying to get in to your house	

5. You see a group of children from another class playing a great game. When you walk over to join in they are laughing.

Why would you think they are laughing?

What will you do about it?

Which is more likely?

One of them has told a nasty joke about you	
They are laughing about something in the game	

6. You are reading and cannot see the words properly.

Why would you think you can't see properly?

What will you do about it?

Which is more likely?

Your eyes are tired	
There is something wrong with your eyes	

Part II

7. You are staying over at a friend's house and their parents seem to be very angry.

Why do you think the parents are angry?

What will you do about it?

Which is more likely?

They had an argument and are upset with each other	
They don't want you to be there and are angry at you	

8. You are lying in bed at night when you hear a big crash in the house.

What would you think it is?

What will you do about it?

Which is more likely?

Someone has dropped something on the floor	
One of your parents has fallen and is hurt	

9. You arrange to have a party at 4 o'clock and by half past 4 no one has arrived.

Why would you think no one has turned up?

What will you do about it?

Which is more likely?

No one wants to come to the party	
They are running a little late	

10. On the way to school you start to feel funny in the tummy.

What would you think has made you feel funny?

What will you do about it?

Which is more likely?

You ate some bad food and are going to be really sick at school	
You didn't have enough breakfast and are just feeling hungry	

11. You are walking to a friend's house and a big dog comes up to you.

What would you think the dog is going to do?

What will you do about it?

Which is more likely?

The dog wants to sniff you and have a pat	
The dog is going to bite you	

12. You are showing your school project in front of the class and two children at the back of the class are giggling.

What would you think they are giggling at?

What will you do about it?

Which is more likely?

They are laughing at something stupid that you said	
One of them told a joke and they are laughing at that	

Appendix 6

Instructions and examples sheets

Condition A

If your child has made a THREAT response or suggested an AVOIDANT plan, please agree with and encourage their answer:

- Agree with what they are saying e.g “Yes, I agree” and repeat what your child’s interpretation was.
- Sound enthusiastic, and use non-verbal signals such as nodding your head to show your agreement.
- Provide an equivalent interpretations, such as taking the child’s interpretation slightly further. E.g if your child says “I might be ill”, you could respond “so you might be sick.” You could also choose an equivalent response from the list of examples overleaf.

If your child has made a NON-THREAT interpretation nor a NON-AVOIDANT plan, then provide a NEUTRAL response:

- Provide a response which is neither agreement or disagreement, e.g ‘mmm’, ‘okay’ or ‘I see’.
- Try not to sound enthusiastic or positive.
- Don’t provide any reciprocal responses.
- Keep asking prompt questions until you receive a threat interpretation.

If your child has made a non-threat interpretation or a non-avoidant plan, or answered ‘don’t know’, use a PROMPT:

- Repeat the question, or a close version of it
- Ask ‘what else?’
- Ask ‘and then what may happen?’
- Ask ‘any ideas?’
- Try asking ‘imagine you were there, what would you think/do?’
- Try repeating back what your child has said to you

Condition B

If your child has made a NON-THREAT response or suggested an NON-AVOIDANT plan, please agree with and encourage their answer:

- Agree with what they are saying e.g “Yes, I agree” and repeat what your child’s interpretation was.
- Sound enthusiastic, and use non-verbal signals such as nodding your head to show your agreement.
- Provide an equivalent interpretations, such as taking the child’s interpretation slightly further. E.g if your child says “I might be hungry”, you could respond “so maybe you didn’t eat enough breakfast.” You could also choose an equivalent response from the list of examples overleaf.

If your child has made a THREAT interpretation or an AVOIDANT plan, then provide a NEUTRAL response:

- Provide a response which is neither agreement or disagreement, e.g ‘mmm’, ‘okay’ or ‘I see’.
- Try not to sound enthusiastic or positive.
- Don’t provide any reciprocal responses.
- Keep asking prompt questions until you receive a non-threat interpretation.

If your child has made a threat interpretation or an avoidant plan, or answered ‘don’t know’, use a PROMPT:

- Repeat the question, or a close version of it
- Ask ‘what else?’
- Ask ‘and then what may happen?’
- Ask ‘any ideas?’
- Try asking ‘imagine you were there, what would you think/do?’
- Try repeating back what your child has said to you

Example interpretations

- ❖ Scenario 1: On the way to school you start to feel funny in the tummy

What would you think has made you feel funny?

Threat examples	Non-threat examples
<ul style="list-style-type: none"> • I ate something bad/ something that was rotten • I might have caught a disease • I might be getting poorly • I am going to be sick • I'm scared about something • I'm nervous • I have to do something at school that I don't want to do 	<ul style="list-style-type: none"> • I am feeling hungry • Sometimes you just feel funny • I am feeling excited • I am feeling happy (or any other positive emotion)

What will you do about it?

Avoidant plans	Non-avoidant plans
<ul style="list-style-type: none"> • Nothing • Try not to think about it • Cry 	<ul style="list-style-type: none"> • Go to school • Have something to eat • I'd go home • I'd tell my mum • I'd tell the teacher at school • I'd go and sit down

Which of these options is more likely?

You ate some bad food and are going to be really sick at school	Threat
You didn't have enough breakfast and are just feeling hungry	Non-threat

- ❖ Scenario 2: You see a group of children from another class playing a great game. When you walk over to join in they are laughing.

Why would you think they are laughing?

Threat examples	Non-threat examples
<ul style="list-style-type: none"> • They told a joke about me • They are laughing at me • They don't want me to join in • They don't like me 	<ul style="list-style-type: none"> • They are laughing about the game • Someone told a joke • They are having fun • They are playing a funny game

What will you do?

Avoidant plans	Non-avoidant plans
<ul style="list-style-type: none"> • I wouldn't join in • Go away again • Cry/be upset 	<ul style="list-style-type: none"> • I'd join in the game • Ask if I can play with them • Ask what the joke is • Tell the teacher

Which of these options is more likely?

One of them has told a nasty joke about you	Threat
They are laughing about something in the game	Non-threat

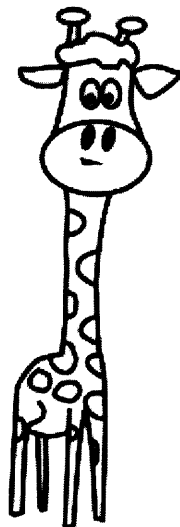
Appendix 7
Word puzzles

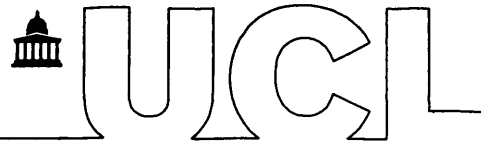
Just for fun!

Can you and your mum work together to solve these anagrams?

Clue: They are all something you might find at the zoo!

1. ELMAC _____
2. NOLI _____
3. PIPOH _____
4. FIGARE _____
5. GRITE _____





Sub-Department of Clinical Health Psychology
1-19 Torrington Place, UCL

23 March 2007

Dear Dr Fearon

Notification of Ethical Approval

Project ID/Title: 1010/001: An experimental study of the FEAR effect: Do families enhance children's anxious responses?

I am pleased to confirm that the UCL Research Ethics Committee has approved your research proposal for the duration of the project. However, it was suggested that:

- the parent information sheet should be revised using more informal prose;
- the child information sheet should have the title 'Parent/Child Information Sheet' with a recommendation that the information is explained to the child by the parent.
- the parent/carer should sign the consent form on behalf of the child and therefore there shouldn't be a separate consent form for the child;
- if the pilot cases refuse participation in the study on ethical grounds or experience distress and the experiment is modified it will not be necessary for you to complete a new ethics form but instead to submit an 'Amendment Approval Request Form' (see point 1 below) for my consideration as Chair of the Committee.

Approval is subject to the following conditions:

1. You must seek Chair's approval for proposed amendments to the research for which this approval has been given. Ethical approval is specific to this project and must not be treated as applicable to research of a similar nature. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued ethical approval by completing the 'Amendment Approval Request Form'. The Request Form can be accessed by logging on to the ethics website <http://www.grad.ucl.ac.uk/ethics/> and clicking on the button marked 'Responsibilities Following Approval'.
2. It is your responsibility to report to the Committee any unanticipated problems or adverse events involving risks to participants or others. Both non-serious and serious adverse events must be reported.

Reporting Non-Serious Adverse Events.

For non-serious adverse events you will need to inform _____, Ethics Committee Administrator (_____), within ten days of an adverse incident occurring and provide a full written report that should include any amendments to the participant information sheet and study protocol. The Chair or Vice-Chair of the Ethics Committee will confirm that the incident is non-serious and report to the Committee at the next meeting. The final view of the Committee will be communicated to you.

Reporting Serious Adverse Events

The Ethics Committee should be notified of all serious adverse events via the Ethics Committee Administrator immediately the incident occurs. Where the adverse incident is unexpected and serious, the Chair or Vice-Chair will decide whether the study should be terminated pending the opinion of an independent expert. The adverse event will be considered at the next Committee meeting and a decision will be made on the need to change the information leaflet and/or study protocol.

On completion of the research you must submit a brief report (a maximum of two sides of A4) of your findings/concluding comments to the Committee, which includes in particular issues relating to the ethical implications of the research.

In the meantime, I look forward to receiving feedback on the issues raised by the Committee.

Yours sincerely

Sir
Chair of the UCL Research Ethics Committee

Cc: