

Fear information and the development of fears during childhood: effects on implicit fear responses and behavioural avoidance

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FEAR INFORMATION AND THE DEVELOPMENT OF FEARS DURING CHILDHOOD: EFFECTS ON IMPLICIT FEAR RESPONSES AND BEHAVIOURAL AVOIDANCE

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ABSTRACT

Field, Argyris & Knowles (2001), and Field, Hamilton, Knowles & Plews (2003) have developed a prospective paradigm for testing Rachman's (1977) proposition that fear information is important in the development of fears and phobias in children. Despite this paradigm being an advance on retrospective reports, the research so far has been restricted to self-reported fear beliefs measured after the information is given. This gives rise to two possible shortcomings: (1) the effects could simply reflect demand characteristics resulting from children conforming to the experimental demands, and (2) although fear information changes beliefs, this might not translate into the behavioural change that would be expected if this information has a powerful effect relevant to the development of pathological fear. This paper describes an experiment that attempts to address these concerns by improving Field et al.'s (2001, 2003) basic paradigm but with the addition of two measures: (1) a behavioural measure of avoidance, and (2) an implicit attitude task that should not be susceptible to deliberate attempts to conform to experimental demands. The result showed that negative and positive information have dramatic, and opposite, effects on self-reported fear beliefs, behavioural avoidance and implicit attitudes. There were no effects of gender on any of these results. This study fully supports Rachman's model and suggests that past work does not merely reflect demand characteristics and that fear information increases behavioural avoidance as well as fear beliefs.

FEAR INFORMATION AND THE DEVELOPMENT OF FEARS DURING CHILDHOOD: EFFECTS ON IMPLICIT FEAR RESPONSES AND BEHAVIOURAL AVOIDANCE

Children experience general patterns of normative fear throughout their development (see Field & Davey, 2001). These fears often appear and disappear spontaneously and follow a predictable course. What determines whether normative fears develop into persistent fears, or phobias, depends largely on experience (although, as Stevenson, Batten & Cherner, 1992, have eloquently demonstrated, genetics has a role to play too). According to Rachman's (1977, 1991) model there are three types of experience that contribute to adult phobia: (1) direct aversive experiences through which a stimulus comes to evoke a fear response by association with some traumatic outcome (see Davey, 1997); (2) learning through observing others (vicarious learning); and (3) the transmission of negative information. All three pathways have garnered empirical support (King, Gullone & Ollendick, 1998; and Merckelbach, De Jong, Muris & Van den Hout, 1996). For example, although early laboratory demonstrations of fear acquired through direct aversive experiences (e.g. Watson & Rayner, 1920) have been criticised (e.g. Rachman, 1977) more recent naturalistic studies have demonstrated the power of direct learning experiences (e.g. Yule, Udwin and Murdoch, 1990; Dollinger, O'Donnell and Staley, 1984). The role of modelling in fear acquisition has support from research on both humans (Gerull & Rapee, 2002; Muris, Steerneman, Merckelbach, & Meesters, 1996) and laboratory-reared rhesus monkeys (Mineka, Davidson, Cook, & Weir, 1984). Fear information also seems to have some effect on fear levels because children who report a lot of fear to items on the Fear Survey Schedule for Children—Revised (FSSC—R, a widely-used tool for measuring normative fear levels in children) will often attribute their fear to negative information (Ollendick & King, 1991). In fact, in some studies exposure to negative information

seems to be the most prominent of the three pathways (Ollendick & King, 1991; Muris, Merckelbach, Gadet & Moulaert, 2000).

However, the research has not been exclusively positive. It has been shown that not all dental patients (Lautch, 1971), or pilots (Aitken, Lister and Main, 1981) who experience pain or a traumatic event go on to acquire a phobia. Likewise people exposed to violent thunderstorms often do not develop fears (Liddell and Lyons, 1978). In addition, for a particular feared stimulus some individuals may remember an associated traumatic event while others who fear the same stimulus have no such memory (Withers and Deane, 1995). Menzies and colleagues have also suggested that some phobias (e.g. water and heights) appear to be hard-wired, requiring no learning at all (Poulton & Menzies, 2002; Menzies & Clarke, 1993a,b).

In terms whether fear information is a viable pathway to fear, one major problem with the evidence has been that it is based upon retrospective accounts in which adult phobic patients are asked to assign their learning experiences to one of the three pathways some 10-20 years after the onset of their phobia. These reports will be prone to memory bias and forgetting of potentially important learning episodes (see King *et al.*, 1998). Although improvements have been made such as corroborating patient evidence with retrospective parental reports (e.g. Merckelbach, Muris & Schouten, 1996; Muris *et al.*, 1996), a better approach is to look at the effect of these pathways prospectively.

Field, Argyris and Knowles (2001) developed such a paradigm for looking at the effects of fear information in the development of fear beliefs in children. In two experiments, 7–9 year olds received either positive or negative information about previously un-encountered toy monsters. Field *et al.*'s results demonstrated that children's fear beliefs towards the monster about which they'd received negative

information significantly increased. What is more, these effects were stronger when an adult provided the information—when a peer provided the information, fear beliefs did not change significantly. Muris, Bodden, Merckelbach, Ollendick & King (in press) adapted Field et al.'s (2001) paradigm and also showed that the effect of negative information persisted a week after it was given.

However, one problem with Field et al.'s paradigm was that it used fictitious monsters, not real animals, and so the direct connection to animal phobias was not entirely made. Also, although between-group control conditions were used in which no information was given, a better method is to use a within-subjects control condition to act as a baseline for a given child's tendency to change their fear beliefs. Field (2002), therefore, adapted the paradigm by using Australian marsupials (the quoll, quokka and cuscus) that were unfamiliar to children in the UK, as stimulus materials. For a particular child, one of the animals was associated with positive information, one was associated with negative information and they were given no information about the third. In these studies, negative information significantly increased children's fear beliefs.

Despite the methodological improvements in these studies, there were still several shortcomings. First, the different types of information were not controlled for word frequency. Second, none of the previous studies have looked at whether fear information affects behavioural avoidance. Finally, the findings have been restricted to self-report measures of fear beliefs which are likely to contain high amounts of measurement error because of their explicit nature: responses on self-report measures can be moderated by self-presentation strategies aimed at concealing true attitudes (Greenwald, McGhee & Schwartz, 1998). Related to this point, response options (for example with 5-point Likert scales) are limited enough that participants may be able to recall some or all of the responses they give. This problem is

important when these scales are being used to assess attitude change across a short time (such as before and after an experimental manipulation): if participants, rightly or wrongly, think they are aware of the experimental demands, then any observed change in attitude could reflect this awareness rather than their true attitude. Although past findings have not always been consistent with a demand characteristic explanation (e.g. Field, Hamilton, Knowles and Plews, 2003) and positive information does not always significantly decrease fear beliefs as you might expect if children were responding to task demands (Field et al., 2001, Field, 2002), it is important to verify that the self-report measures used produce results that concur with less explicit measures.

One such measure is the Implicit Association Task, or IAT (Greenwald et al., 1998), which has been used extensively to measure attitudes in the social psychology literature and more recently as a tool to study various psychopathologies such as animal phobias (Teachman, Gregg & Woody, 2001), social anxiety (de Jong, 2002; de Jong, Pasman, Kindt, & van den Hout, 2001), and depression (Gemar, Segal, Sagrati, & Kennedy, 2001). The IAT is based on the simple idea that it should be easier to map two concepts onto a single response when those concepts are related in memory than when the concepts are unrelated. For example, Greenwald et al. (Experiment 1) presented names of flowers (e.g. ROSE), insects (e.g. WASP), positive words (e.g. LOVE) and negative words (e.g. ROTTEN) on a computer screen. Participants categorised these words by pressing one of two keys and their latency to respond in ms was recorded. If 'flowers' and 'positive' are associated categories, and 'insects' and 'negative' are associated categories, then when responses to the concept 'flower' are assigned to the same response key as responses to the concept 'positive' and the concepts of 'insects' and 'negative' are both assigned to the other key, response times should be faster than when the concepts of 'flowers' and 'negative' are assigned to

the same key and 'insects' and 'positive' are assigned to the other. In the latter case response times are slowed down because each key has incompatible categories assigned to it. In the current context, the IAT can be used to measure the relative association between different animals and the concepts of 'pleasant' and 'unpleasant'.

The aim of this study is to extend Field et al.'s (2001, Field, 2002) work to look at how negative information might affect behavioural avoidance of animals, and implicit associations between those animals and pleasant and unpleasant concepts. It is hypothesised that negative information should enhance both fear beliefs when measured explicitly and implicitly (using the IAT) and behavioural avoidance.

Method

Design

Three different types of information were used in this experiment: negative, positive and no information. Three different animals were also used, about which children in the UK have no prior experience (all are Australian marsupials): a Quoll, a Quokka and a Cuscus. For a given group of children, positive information was given about one animal, negative information about a different animal and no information about the final animal. The type of information associated with each animal was counterbalanced across groups (see Table 1). As the effects of gender have not previously been explored, all analyses included gender as an independent variable.

As such, a 3 (type of information: negative, positive, none) × 2 (Time: before vs. after information) × 2 (gender: male, female) mixed design with repeated measures on the first two variables was used. The dependent variables were (1) the latency to approach three touch boxes; (2) the mean self-report fear belief; and (3) response latencies on an IAT task.

Participants

The participants were 59 children (32 male, 27 female) aged 6-9 years ($M = 7.64$, $SD = 0.54$). This age range was selected because normative fears are focused on animals during this developmental period. The children were recruited from a school in East Sussex, UK. Parental consent was obtained before the study took place. The children were tested individually.

Materials

Animals: Pictures of three Australian marsupials, the Quoll, the Cuscus and the Quokka were used. These were animals about which the children had no prior experience and so they would have no prior fear expectations. Each picture had a caption below clearly naming the animal.

Stories: Two stories were constructed that portrayed information about the animals. One story contained positive information about the animal, whereas the other provided negative information. The name of the animal in the story could be changed to fit the experimental condition. Unlike previous research, the stories were approximately controlled for the number of words and word frequency: the positive story contained 93 words and had a mean lemmatised word frequency of 10633.69 ($SD = 16626.40$) compared to the negative story, which had 91 words with a mean word frequency of 9559.57 ($SD = 15375.56$) (calculated from the Brown Corpus; Francis, Kucera & Mackie, 1982)¹. A Mann-Whitney test confirmed that these word

¹ These word frequencies exclude the animal names, which were interchanged to fit each counterbalancing order, and so are based on the 88 and 86 remaining words in the positive and negative story respectively. It is reasonable to assume that the frequencies of the three animal names are not substantially different from one another (in the UK), given that they were all unknown to the children tested.

frequencies were not significantly different ($U = 3457.5, Z = -0.98$). Both stories can be found in Appendix A.

Fear Beliefs Questionnaire (FBQ): The FBQ consisted of 23 items and asked children to endorse various statements about the animals and situations involving them using a 5-point Likert scale (0 = No, not at all; 1 = No, not really; 2 = Don't Know / Neither; 3 = Yes, probably; 4 = Yes, definitely). There were two practice questions to begin with, followed by 21 randomly ordered questions. These 21 questions were made up of seven different questions (see Appendix B), each of which was repeated three times: once for each animal. All items were scored 0-4; so that a high score was always consistent with having a fear belief and a low score was always consistent with not having a fear belief, several items (those marked with an asterisk in Appendix B) were reverse-scored. The scores for each animal were averaged to create a single fear belief score for each animal that could range from 0-4.

Touch Boxes: Three touch boxes were constructed (one for each animal). These consisted of large wooden boxes, each with a round hole at one end. A Hessian curtain covered this hole with a slit in the middle. As such, the child could put their hand into the box but could not see what the box contained. Each box had a clear label (Cuscus, Quokka and Quoll respectively) and contained a furry cuddly toy.

The Implicit Association Task (IAT): A Pentium III Toshiba Tecra 8000 laptop computer running Windows 2000 was used to administer the IAT. The IAT was run using specialist software that ensures high precision accuracy of reaction time recordings (Inquisit version 1.32; Millisecond Software, 1996-2001). The IAT is, generally speaking, a valid and versatile measure of associations in memory that can be used to indirectly infer beliefs (see De Houwer, 2002, for a review of the relative merits and shortcomings of the task).

The IAT is based on the categorisation of targets into concept categories (see Greenwald et al., 1998 for full details of the task). In the IAT used here one concept was pleasant-unpleasant, and children were required to categorise words as being either pleasant or unpleasant. The other concept used was animal types. The IAT task had five stages:

1. *Concept 1*: Target words randomly appeared centre screen and children categorised these words as 'nice' by pressing 'E' on the keyboard or 'nasty' by pressing 'I' on the keyboard². As such a nice response was assigned to the left hand, and a nasty response was assigned to the right. Labels appeared on the left and right of the screen to remind children of which key to press for 'nice' and 'nasty' words respectively. A set of 16 words was used that appeared randomly with replacement: 8 were nice words (lucky, rainbow, love, peace, heaven, pleasure, cheer, and happy) and 8 nasty (evil, death, pain, disaster, ugly, vomit, stink, and rotten). If a word was miscategorised then a red 'X' appeared on the screen. Children were asked to make their categorisations as quickly as possible.
2. *Concept 2*: Target pictures randomly appeared centre screen and children categorised these pictures as being one of two types of animal. The animal types used depended on which animals were presented with positive information (we will call this the positive animal) and which with negative (we will call this the negative animal) earlier in the experiment. For example, in counterbalancing order 1 (see Table 1), the cuscus was the subject of the negative information and the quoll was the subject of positive information and so children in order 1 would have

² 'Nice' and 'nasty' were used rather than 'pleasant' and 'unpleasant' because children more easily understood these terms.

categorised photographs of quolls and cuscuses³. A set of 12 pictures was used (6 of each animal) that appeared randomly with replacement. Like the previous stage, these pictures were categorised by pressing 'E' if the picture showed the positive animal (in order 1, the quoll) or 'I' if the picture was of the negative animal (in order 1, the cuscus) and labels showing the appropriate animal names appeared on the screen to remind children of the response required for each (e.g., in order 1, 'quoll' appeared on the left of the screen and 'cuscus' on the right). So, the positive animal was assigned a left hand response and the negative animal a right hand response. If a picture was miscategorised then a red 'X' appeared on the screen.

3. *Compatible Trials*: In this stage children categorised both words and pictures. The responses to both nice words and the positive animal were assigned to the left hand response key ('E') and the responses to both nasty words and the negative animal were assigned to the right hand response key ('I'). Again, labels appeared on screen to remind children of the responses. These trials are known as compatible trials because the responses to anything positive (nice words and positive animals) are assigned to the same key, and the opposite key is used to respond to anything negative (nasty words and negative animals). If the information has changed a child's attitudes and they do indeed feel positive about the animal associated with positive information and negative about the animal associated with negative information then this task will be relatively easy for them and reaction times should be lower (they will respond relatively quickly). This

³ In order 2, cuscuses and quokkas were used, and in order 3 quolls and quokkas.

stage was repeated: the first time was a practice run, and the second time was for data collection.

4. *Concept 2 Reversed*: This is the same as stage two except the response key for the target pictures was reversed. That is, the positive animal (in order 1 the quoll) was assigned to the right hand response ('I') and the negative animal (in order 1 the cuscus) was assigned to the left-hand response ('E'). Labels showing the appropriate animal names appeared on the screen to remind children of the response required. Again, pictures of the two types of animals randomly selected with replacement from a set of 12 (6 of each animal) appeared centre screen and were categorised using the reversed responses. If a picture was miscategorised then a red 'X' appeared on the screen.
5. *Incompatible Trials*: Like stage 3, in this stage children categorised both words and pictures; however, responses to the words and pictures were now incompatible. That is, the response to nice words and the negative animal were assigned to the left hand response ('E') and the response to nasty words and the positive animals are assigned to the right hand response ('I'). Again, labels appeared on screen to remind participants of the responses. These trials are known as incompatible trials because the response to nice words is incompatible with the response to positive animals because they are assigned to opposite keys (the former is assigned to 'E' and the latter to 'I'). Likewise, the responses to nasty words and animal pictures are incompatible because they are assigned to opposite response keys (the former is assigned to 'I' and the later to 'E'). If the information in the experiment changed a child's attitudes and they did indeed feel positive about the animal associated with positive information and negative about the animal associated with negative information then this task will be relatively difficult (compared to the compatible trials) for them and reaction times should increase (they will respond relatively

slowly). This stage was repeated: the first time was a practice run, and the second time was for data collection

Half of the children received the IAT in this exact form, however, half of the children received the incompatible trials before the compatible ones, that is the order of stages 3 and 5 in the IAT were reversed.

Procedure

The children were randomly allocated to a counterbalancing order (see Table 1): (a) *Cuscus Negative* ($N = 20$): received negative information about the cuscus, positive information about the quoll and no information about the quokka; (b) *Quokka Negative* ($N = 18$): received negative information about the quokka, positive information about the cuscus and no information about the quoll; and (c) *Quoll Negative* ($N = 21$): received negative information about the quoll, positive information about the quokka and no information about the cuscus. Therefore, all types of information were associated with all animals across groups.

First, the children were introduced to the three animals. The pictures of all three animals were shown briefly to the children and were then placed in a position where they could be clearly seen. Next, the fear-belief questionnaire was administered. Children were told that the questions related to the three animals that they had just seen and that it asked questions about how they felt about these animals. Two practice questions were included to orientate the children to the Likert scale. Children were told to tell the experimenter if they had any trouble in completing the questionnaire.

The child was then told the two stories. The animals that were the subject of the stories depended on the group to which the child was assigned and the order of

positive and negative information was counterbalanced within these groups. The female experimenter read both stories.

The child was then given the fear-belief questionnaire for a second time. Following this the IAT was administered on the laptop PC. Finally a behavioural task was administered. The child was shown the three touch boxes and one by one was asked to place their hand in each of the boxes. (So that the order in which they were asked was counterbalanced across the type of information given, the order in which they were asked to approach the boxes was the same for all children: the quoll, then the cuscus then the quokka⁴). When the experimenter finished giving the verbal instruction to approach a given box, she started a stopwatch. The stopwatch was stopped when the child had placed their hand up to the wrist into the box. The time was noted, the stopwatch reset and the child asked to approach the next box.

At the end of the experiment, the children were fully debriefed and given factual information and worksheets about the three animals.

Results

All significant effects are reported at $p < .001$ unless otherwise stated, and all non-significant effects are reported at $p > .05$. Where appropriate, effect sizes are reported as Pearson's r .

Self-report Measures

Figure 1 shows the mean fear beliefs before and after the three types of information split by gender. Before the information, fear beliefs across conditions were between 1

⁴ By keeping this order constant we could ensure that the first box the child approached (the quoll) was sometimes the animal associated with positive information, and sometimes the animal associated with negative or no information.

and 1.5 on the scale and so if anything were on the positive side: children assumed the animals were relatively harmless. After negative information fear beliefs increased dramatically in both males and females indicating that their expectations about the animal associated with negative information became more negative. After positive information self-reported fear beliefs decreased and after no information fear-beliefs stayed the same.

A 3 (type of information: negative, positive, none) \times 2 (Time: before vs. after information) \times 2 (gender: male vs. female) mixed ANOVA with repeated measures on the first two variables was conducted on the data⁵. The assumption of sphericity was violated for the type of information \times time interaction ($W = 0.783$, $\chi^2(2) = 13.70$, $p < 0.01$) and so Greenhouse-Geisser corrected F -values are reported (see Field 2000).

There were significant main effects of time ($F(1, 57) = 18.08$) and the type of information ($F(2, 114) = 60.57$). However, more important, the crucial type of information \times time interaction was significant ($F(1.64, 93.68) = 77.36$) indicating that the change in fear beliefs over time was dependent on the type of information provided. Bonferroni corrected contrasts compared the change in fear-beliefs for the three different types of information. These revealed a significant increase in fear beliefs after negative information ($CI_{.983} = -2.08$ (lower), -1.19 (upper), $t(58) = -8.98$, $r = .76$) and a significant decrease in fear beliefs after positive information ($CI_{.983} = 0.45$ (lower), 1.00 (upper), $t(58) = 6.52$, $r = .65$). There was no significant change in fear beliefs after no information ($CI_{.983} = -0.43$ (lower), 0.11 (upper), $t(58) = -1.46$, $r = .19$).

⁵ An initial analysis revealed that the profile and strength of effects was the same regardless of which counterbalancing order was used.

Gender had no significant main effect and did not significantly interact with time, type of information or the type of information \times time interaction (all $F_s < 1$).

Implicit Attitude Task

Figure 2 shows the mean reaction times (in ms) to compatible and incompatible trials on the implicit association task split by gender. If, after information, children's attitudes have changed then this is shown by faster reaction times to the compatible trials compared to the incompatible ones. These faster reaction times reflect the fact that because they now have a positive attitude towards the animal about which they were given positive information and a negative attitude towards the animal about which they were given negative information, they find the compatible trials relatively easy to do (because the response key for pleasant words and animal about which they now feel positive is the same). The incompatible trials should be performed slower because the response key for pleasant words is the opposite key to that for the animals about which they now feel positive. Figure 2 does show this pattern of results: in both males and females the compatible trials were performed more quickly than incompatible trials. The second panel of Figure 2 shows the errors made in the two types of task and although males generally made more errors than females the errors across tasks are very similar indicating that the faster speed in the compatible trials is not simply because the children sacrificed accuracy for speed in these trials.

A 2 (type of trial: compatible vs. incompatible) \times 2 (gender: male vs. female) mixed ANOVA with repeated measures on the first variable was conducted on the reaction time data. There was a significant main effects of the type of trial ($F(1, 56) = 16.41, r = .48$) indicating that compatible trials were performed significantly faster than incompatible trials. Gender had no significant main effect ($F(1, 56) = 1.03$) and did not significantly interact with the type of trial ($F(1, 56) = 1.60$).

The same analysis was performed on the error data and revealed no significant effect of the type of trial or the gender \times type of trial interaction (both $F_s(1, 56) < 1$). The main effect of gender was also non-significant ($F(1, 56) = 1.63$).

Behavioural Data

The distance at which the child began each touch box task could not be controlled because once the child had approached the first box they were reluctant to return to a fixed starting position before the next task. As a consequence approach times for the first box were always longer because the child had to get up and walk over to the end of the table to reach it. To compensate for this, the times taken to place a hand in the touch box were all converted to z-scores to centralise them around zero and, therefore, make times for the different boxes comparable. Sixteen of the children would not approach any of the boxes (within a 15s limit) and for ethical reasons were not further coerced into taking part in the task. Data from the remaining 43 children (24 males and 19 females) were analysed⁶.

Figure 3 shows the mean time to approach the boxes containing the animals associated with positive, negative or no information for a particular child. The data shown are z-scores; a positive score indicates a greater than average time to approach the box, and a negative score represents a less than average time to

⁶ Measures other than approach times could have been used to avoid data exclusion; for example, whether the child completed the task or not. However, the type of information was manipulated within-participants and the vast majority of children were willing to complete the task eventually. Consequently, it would be impossible to make comparisons between the box containing the 'positive information' animal and the box containing the 'negative information' animal (if they approached both boxes the variance would be zero). The time to approach has a sensitivity advantage in this respect.

approach the box. The Figure shows that both males and females took longer than average to approach the box containing the animal about which they had heard negative information, and took less than average time to approach the boxes containing the animals about which they had heard positive or no information.

A 3 (type of information: negative, positive, none) \times 2 (gender: male vs. female) mixed ANOVA with repeated measures on the first variable was conducted on the data. There was a significant main effects of the type of information ($F(2, 82) = 7.28$) but no significant effects of gender of the type of information \times gender interaction (both $F_s < 1$). Bonferroni corrected one-sample t -tests were performed comparing the approach times to zero. These revealed a significantly longer than average time to approach the box if it contained the animal about which negative information had been given ($CI_{.983} = .00$ (lower), .86 (upper), $t(42) = 2.24$, $p = .015$, $r = .33$) and a significantly shorter than average time to approach the box if it contained the animal about which positive information had been given ($CI_{.983} = -0.54$ (lower), 0.00 (upper), $t(42) = -2.44$, $p < .01$, $r = .35$). There was no significant difference from the average approach time when the box contained the animal about which no information was given ($CI_{.983} = -0.46$ (lower), 0.16 (upper), $t(42) = -1.20$, $r = .18$).

These results indicate a reluctance to approach the box containing the animal about which negative information was given, and a keenness to approach the box containing the animal about which positive information was given.

Discussion

This study has made several advances in our understanding of how fear information contributes to the development of fears: (1) fear information affects not only self-report measures of fear beliefs, but also behavioural avoidance of the animal about which information has been given; (2) fear information has an effect on implicit

measures of attitudes towards the animals, indicating that these effects are not just due to children picking up on the demands of the experimental task; (3) positive information can reduce fear beliefs; and (4) the effects of fear information are the same for males and females. Along with other research (Field et al., 2001, 2003; Field, 2002; and Muris et al. (in press)) a growing body of evidence is now accumulating that children's fear beliefs can indeed be changed through information.

In terms of the development of anxiety, these findings strongly support Rachman's (1977, 1991) idea that information is a viable pathway for the development of fear. They also justify the inclusion of the verbal transmission of information in models of specific phobias such as Davey (1997) and Muris and Merckelbach (2001) and models of generalised anxiety disorder such as Rapee (2001). The fact that the effect of fear information is comparable in males and females also suggests, as these models would predict, that there is a general mechanism at work that is not mediated by gender. However, whereas past work has shown that negative information can enhance fear beliefs, this study has demonstrated that it can also lead to a short-term reluctance to approach (which could be the first stage towards behavioural avoidance). Field et al. (2001, 2003) point out that past work has been only a first step in understanding the role that verbal information has in the development of anxiety because the fact that negative information changes fear beliefs does not tell us whether these beliefs are sufficient to evoke physiological arousal or avoidant behaviour when confronted with the stimulus. The current study moves a small step forward by demonstrating that these changed fear beliefs do translate into behavioural responses (in terms of reluctance to approach animals associated with negative information and a greater willingness to approach animals associated with positive information). The theory of reasoned action (Ajzen & Fishbein, 1980) predicts that avoidant behaviour stems from beliefs that this behaviour will prevent an unpleasant outcome and that individuals

and groups important to the person perceive avoidance as an acceptable response to the situation (subjective norms). As such, fear beliefs might translate into behavioural responses because the fear beliefs induced in the experiment establish subjective norms that avoidance is desirable, and create a belief that avoidance will prevent an unpleasant outcome.

As Field et al. (2003) point out, the self-report nature of the fear-belief questionnaires used in previous studies and the simplicity of the paradigm means that the paradigm may simply maximize on demand characteristics. That is to say, the results might merely reflect the compliance of young children to the demands of the experiment. The results from the IAT task suggest that this is not the case because children did indeed find compatible trials (in which the negative and positive animals were assigned to the same response key as pleasant and unpleasant words respectively) easier than incompatible ones (in which the negative animal is assigned to the same response key as pleasant words and the positive animal is assigned to the same response key as unpleasant words). This demonstrated that, even on a task designed not to be prone to bias from self-presentation strategies or conformity to task demands (Greenwald et al., 1998), animals about which children heard negative information were more associated with unpleasant words than were animals about which children heard positive information. This provides indirect evidence for the presence of positive and negative beliefs about the animals about which positive and negative information was given respectively (De Houwer, in press). These findings suggest that children in these studies are not merely responding to task demands, but are indicating genuine beliefs about the animals (hence the concurrence between the IAT and self-report analyses).

Having said this, these findings are just another small step in understanding how fear information might translate into phobias. Three important limitations are that (1)

changes in fear beliefs were measured only in the short term, (2) not all children engaged in the behavioural avoidance task, and (3) that these changes in fear beliefs and avoidance alone do not, at present, say anything concrete about how phobias develop. On the first point, Muris et al. (in press) have demonstrated, using a similar paradigm, that self-reported fear beliefs can last up to a week. Our own ongoing work is also looking at whether implicit and explicitly measured fear beliefs persist over a six month period. As such, this issue is being addressed. In terms of the behavioural avoidance task, 27% of the children tested would not approach any of the touch boxes. This is curious given that all children received both positive and negative information about different animals; therefore, it is likely to reflect dispositional factors such as behavioural inhibition (a reluctance to approach novel situations) or shyness, which have been proposed as risk factors for a broad range of anxiety disorders, including specific phobias (Muris & Merckelbach, 2001; Biederman et al., 1990; 1993; Biederman, Rosenbaum, Chaloff, & Kagan, 1995) and generalized anxiety disorder (Rapee, 2001). These dispositional factors, or others, may produce selective attention to the negative information, or increase the importance of it; this in turn may be sufficient to make the children reluctant to approach any box. The sort of paradigm used in the present study is suited to exploring the interaction between fear information and such dispositional factors, and future work should aim to do so.

Even overlooking these initial limitations, the present study is still several steps back from informing us about how changes in fear beliefs might contribute to phobias. One prediction that could be made is that if changes in fear beliefs through fear information contribute to phobias then there should be evidence that phobic individuals have been exposed to more of this form of information than non-phobic individuals. There is evidence that phobic adults can recall receiving negative information (see King et al., 1997) and that fears reported by children are a function

of the extent to which mothers express their own fears to their children (Muris et al., 1996); however, as King et al. point out, similar data have not been collected for non-phobic individuals. As such, it is unclear whether the exposure to fear information in phobic and non-phobic individuals is different. Even if such evidence was available, it supposes a very simplistic mechanism through which fear beliefs might transform into a phobia. The likelihood is that fear information interacts with other processes and future work needs to consider this possibility. For example, in the conditioning literature, if the beliefs about the outcomes of interacting with a particular stimulus are consistent with the actual outcome, this is known to speed up the formation of an associative link between that stimulus and the outcome (Davey, 1992).

A final word should be spared for the effects of positive information. Past work has found inconsistent results regarding the effects of positive information. Some studies have found nonsignificant decreases in fear beliefs following positive information (Field, et al., 2001; Field, 2002 Experiment 2) while others report significant decreases (Field, 2002, Experiment 1; Muris et al, in press). These differences may, in part, be explained by differences in the salience of the positive and negative stories (especially given the lack of effort to control the length and word frequency of the information presented). This current study, by controlling these aspects of the stories, may provide the purest comparison of the effects of positive and negative information to date. In general terms, the effects of positive and negative stories were comparable (the respective effect sizes, r , were .76 and .65 for self-report measures—both very large effects— and .33 and .35 for behavioural measures—both medium effect sizes). This demonstrates that positive information can be powerful in reducing fear beliefs and encouraging approach behaviour. These results have obvious implications for preventing the development of anxiety (perhaps by proactive use of positive information about stimuli that are the source of common phobias) and are also

consistent with evidence that cognitive restructuring is a useful tool in therapy for specific phobias (e.g. Callanan, 2000; Butler, 1989).

Summary and Conclusions

This paper presents results from a paradigm that has extended Field et al.'s (2001, 2003) paradigm for looking at the role of information in the development of anxiety in children by including measures of implicit attitudes and behavioural avoidance. In doing so, we hope to have demonstrated that fear information creates genuine changes in fear beliefs in children (they are not simply complying with task demands) and these beliefs translate into approach or avoidance behaviour.

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APPENDIX

Appendix A: Information

Positive Information

Have you ever heard of a cuscus/quoll/quokka? Well, cuscuses/quolls/quokkas come from Australia. They are small and cuddly and their fur is really soft. They are very friendly, and live in the park, where they love playing with children and the other animals. If you went to the park, a cuscus/quoll/quokka might come out to see you, and you could stroke and cuddle it. Cuscuses/Quolls/Quokkas eat berries and leaves, and you could feed it out of your hand, which would make it so happy. Everyone in Australia loves cuscuses/quolls/quokkas and they like people too.

Negative Information

Have you ever heard of a cuscus/quoll/quokka? Well, cuscuses/quolls/quokkas come from Australia. They are dirty and smelly and carry lots of germs. They are very dangerous, and live in dark places in the woods, where they hunt other creatures with their long sharp teeth and claws. Cuscuses/Quolls/Quokkas eat other animals, so their favourite food is raw meat and they like to drink blood. If you went to the woods, a cuscus/quoll/quokka might be hiding there, and you might hear its ferocious growl. I don't know anyone in Australia who likes cuscuses/quolls/quokkas.

Appendix B: Questions for the Fear Beliefs Questionnaire

1. Do you think a quokka and a quoll would get on well together? (Practice)
2. Do you think a cuscus would like to live in England? (Practice)
3. *Would you be happy to have a cuscus/quoll/quokka for a pet or look after a cuscus for a few weeks?
4. Do you think a cuscus/quoll/quokka would hurt you?
5. *Would you go up to a cuscus/quoll/quokka if you saw one?
6. Would you go out of your way to avoid a cuscus/quoll/quokka?
7. *Would you be happy to feed a cuscus/quoll/quokka?
8. Would you be scared if you saw a cuscus/quoll/quokka?
9. *Would you be happy if you found a cuscus/quoll/quokka in your garden?

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TABLES

- Table 1: Table showing the counterbalancing of different information across three animals

		Animal		
		Quoll	Cuscus	Quokka
Type of Information	Order 1	Positive	Negative	No Information
	Order 2	No Information	Positive	Negative
	Order 3	Negative	No Information	Positive

FIGURES

- Figure 1: Graph to show the mean fear-belief scores before and after the presentation of positive, negative, or neutral information split by the gender of the child.
- Figure 2: Graph to show the mean reaction time (top) and number of errors (bottom) for an Implicit Association task performed after the information was given (see text for details).
- Figure 3: Graph to show the mean latency to approach touch boxes labelled with the names of animals that had been associated with either positive, negative, or no information (scores have been converted to z-scores).





