



Training children to approach or avoid novel animals: Effects on self-reported attitudes and fear beliefs and information-seeking behaviors

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ABSTRACT

We examined the effects of training to approach or avoid novel animals on fear-related responses in children. Ninety-nine primary school children (9–12 years old) were instructed to repeatedly move a manikin toward or away from pictures of novel animals. The training produced more positive self-reported attitudes for the animal that was repeatedly approached and more negative attitudes for the animal that was repeatedly avoided. After the training, children reported more fear of the avoided animal than of the approached animal. Interestingly, children showed a training-congruent confirmation bias effect on an information-seeking task. That is, they displayed a tendency to seek more positive information about the approached animal, whereas they were inclined to search for more negative information about the avoided animal. No significant training effects were observed on implicit attitudes. The finding that a simple approach-avoidance training influences children's fear-related responses and leads to biased information-seeking behaviors lends support to general theories of fear acquisition in children as well as to models that try to explain the intergenerational transmission of anxiety.

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Introduction

Cognitive theories of anxiety propose that maladaptive structures in memory are a core feature in the onset and maintenance of anxiety disorders (e.g., Beck & Clark, 1997; Beck, Emery, & Greenberg, 1985; Ouimet, Gawronski, & Dozois, 2009). In high-anxious individuals, these structures are assumed to contain semantic-evaluative and behavioral-response information concerning the feared object that is negative, threat-related and avoidance oriented. This information is thought to be activated spontaneously upon encountering threat-related stimuli, and assumed to be an important determinant of subsequent fear responses. Support for the idea that high fearful individuals are characterized by such fear representations has been found in studies that focused on self-reported fear beliefs (e.g., Arntz, Lavy, van den Berg, & van Rijsoord, 1993), implicit fear-related attitudes (see Roefs et al., 2011 for a review), and relatively spontaneous avoidance tendencies (Heuer, Rinck, & Becker, 2007; Rinck & Becker, 2007).

Recently, researchers have started to address the proposed causal relation between the fear representation in memory and anxious responding. One successful approach has been to look at how these fear representations develop in children, and the effect that they have on fear-related cognition, behavior and physiology. For instance, in samples of children it has been found that manipulating semantic-evaluative information, by providing negative information about a novel animal, leads to a number of fear-related responses regarding this animal, including fear-related beliefs, avoidance behaviors, physiological changes, and attentional biases (see Muris & Field, 2010, for a review).

With respect to the causal status of behavioral-response information data are more scarce, because few studies have attempted to manipulate approach-avoidance tendencies. Studies using adult samples show that training to push a joystick away or pull it closer in response to a certain stimulus (e.g., photographs of individuals with various racial backgrounds or the concept math) has an impact on participants' implicit liking and behavioral responses with regard to that stimulus: For example, showing relatively strong body orientation toward an individual of the approached race, and attempting relatively more items on a math test after approaching the concept of maths (Kawakami, Phillips, Steele, & Dovidio, 2007; Kawakami, Steele, Cifa, & Dovidio, 2008; Woud, Becker, & Rinck, 2008). These studies show that approach and

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avoidance tendencies can be successfully manipulated, and that such a manipulation affects implicit affective evaluations and actual behavior. These studies tell us little, however, about the causal status of approach-avoidance tendencies within the context of fear.

To address this issue we recently explored the effects of manipulating behavioral-response tendencies on fear-related reactions in children (Huijding et al., 2009). In this study, children were instructed to repeatedly push away (i.e., avoid) or pull closer (i.e., approach) pictures of two novel animals: the quokka and quoll. We found that the training produced an increased self-reported liking of the approached animal and disliking of the avoided animal. After the training, girls reported more fear and avoidance of the avoided animal than of the approached animal, while such training effects were absent in boys. No significant training effects were observed on a test for measuring implicit attitudes. In addition, the results showed that pre-experimental levels of anxiety disorder symptoms to some extent moderated the training effects: higher levels of prior anxiety symptoms were related to stronger decreases in liking of the avoided animal as well as disliking of the approached animal. Furthermore, in boys, higher levels of prior anxiety were associated with stronger fear beliefs in relation to the avoided animal, whereas such a relation was absent in girls.

These results are in line with predictions from the aforementioned cognitive models, and indicate that merely training children to approach or avoid certain stimuli may give rise to fear of these stimuli. Nevertheless a number of questions remain. First of all, it is unclear whether the observed effects crucially depend on actual approach and avoidance congruent movements (i.e., arm flexion versus extension), or whether similar effects can be obtained by training actions that are not directly linked with actual bodily approach or avoidance. This issue has important implications for the range of potential 'training' situations in daily life. In addition, although the previous study indicated that training approach and avoidance toward novel animals produced a change in affective responses to these animals, it is unclear whether the training also has an impact on the way information concerning these animals is processed. This is an important question because information processing biases are assumed to play a major role in the onset and maintenance of anxiety (e.g., Muris, 2007). In addition, the previous study had several limitations. For instance, the observed effects could have been due to demand effects caused by the training instructions, rather than by the actual training itself. This possibility can be easily tested by providing the experimental instructions prior to the first evaluative rating of the novel animals. Another issue concerns the absence of any training effects on implicit attitudes as measured with an Implicit Association Test (IAT; Greenwald, McGhee, & Schwarz, 1998). A possible explanation for the lack of effects is that the task was not sensitive enough. Huijding et al. (2009) argued that the procedure of the original IAT is susceptible to effects of the order of test blocks, which appeared to overshadow any effects of the behavioral training. Therefore, these authors suggested employing alternative implicit measures in subsequent research that are less prone to such unwanted effects.

The present study aimed to replicate and extend our previous work on the fear-related effects of an approach-avoidance training in children. We aimed to address a number of novel aspects in this study. One important difference with respect to the earlier study is that we used a more symbolic approach-avoidance training task to test whether similar effects can be obtained by training actions that are not directly linked with actual bodily approach or avoidance. The approach-avoidance training that was employed in this study involved moving a manikin toward or away from pictures of novel animals that were presented on the computer screen by pressing buttons on the keyboard, rather than moving a joystick to physically

push pictures away or move them closer. Another novel element of this research is that we included an information-seeking task after the training, to test the effects of the approach-avoidance training on children's information processing. Further, to rule out the aforementioned possibility that effects on the dependent variables were due to the experimental instructions, rather than the training *per se*, we started our assessment only after providing the specific training instructions. Finally, a different version of the IAT, the IAT-RF (Rothermund, Teige-Mocigemba, Gast, & Wentura, 2009), was employed, which rules out the previously encountered difficulties with block order effects.

It was hypothesized that consistent avoidance of an animal would lead to less positive and more negative evaluations, relatively stronger fear beliefs and a preference for seeking negative information. Consistent approach of an animal, on the other hand, was hypothesized to lead to more positive and less negative evaluations, relatively weaker fear beliefs, and a preference for seeking positive information. Because our previous findings showed that gender was to some extent related to the training effects, we included this variable in all analyses. In line with our previous work, we also explored whether the amount of change in self-reported attitudes caused by the training, was related to the general level of fear/anxiety prior to training. It was expected that the approach-avoidance training would have more impact in relatively high-anxious children, and thus would result bigger changes in self-reported attitudes than in low-anxious children.

Method

Participants

Children were recruited at two primary schools in the Rotterdam area of the Netherlands, after receiving approval of the directors of these schools. The experimenter went to the classrooms of group 7 and 8 (the final two years of primary school in the Netherlands) to introduce herself and explain the study. Children were given a letter explaining the experiment for their parents and a consent form, and were asked to return the form within a week. Of the 160 forms that were handed out, 117 (73.1%) were returned with written consent to participate, 8 (5%) were returned with no consent to participate, and the other 35 (21.9%) were never returned. We do not know the reason why forms were not returned or why some children were not allowed to participate, and have no information available about these children. Due to time constraints we were unable to test 18 children for whom consent to participate was given. Thus, a total of 99 children (44 boys, 55 girls) aged between 9 and 12 years ($M = 10.36$, $SD = 0.86$) participated. All of these children were born in the Netherlands and the majority of their mothers (84.8%) and their fathers (91%) was from Dutch descent. The other parents were from Western European countries (mothers: 5.1%, fathers 4.0%), Middle or Eastern European countries (mothers: 5.1%), Asian countries (mothers: 3.0%, fathers: 2.0%), the Antilles islands (mothers 1%, fathers: 1%), Suriname (mothers: 1%), Morocco (fathers, 1%), or Russia (fathers: 1%).

These children were randomly assigned to one of two conditions: a training to move a manikin toward quokkas and away from quolls, or a training to move a manikin away from quokkas and toward quolls. There were no significant differences between the children in both conditions with respect to gender distribution [$\chi^2(1, N = 99) < 1$] and age [$t(97) < 1$].

Assessments

To assess children's general level of fearfulness we used a shortened 25-item version of the *Fear Survey Schedule for Children-*

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