

Evidence for retarded extinction of aversive learning in anxious children

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Abstract

The habituation to intense acoustic stimuli and the acquisition of differentially conditioned fear were assessed in 53 clinically anxious and 30 non-anxious control children and young adolescents. Anxious children tended to show larger electrodermal responses during habituation, but did not differ in blink startle latency or magnitude. After acquisition training, non-anxious children rated the CS+ as more fear provoking and arousing than the CS– whereas the ratings of anxious children did not differ. However, anxious children rated the CS+ as more fear provoking after extinction, a difference that was absent in non-anxious children. During extinction training, anxious children displayed larger blink magnitude facilitation during CS+ and a trend towards larger electrodermal responses, a tendency not seen in non-anxious children. These data suggest that extinction of fear learning is retarded in anxious children.

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Introduction

Anxiety disorders are among the most common psychiatric disorders in children and adolescents, with between 8% and 12% of children meeting the diagnostic criteria for a clinical anxiety disorder at any one time (Anderson, Williams, McGee, & Silva, 1987; Essau, Conradt, & Petermann, 2000; Fergusson, Horwood, & Lynskey, 1993). Childhood anxiety disorders have been found to affect several areas of child functioning negatively, including academic work, social adjustment, and peer interactions (Ginsburg, La Greca, & Silverman, 1998). Anxiety disorders in children have also been found to have high comorbidity rates and, contrary to previous beliefs, they frequently persist over time. According to a number of longitudinal studies, a large proportion of children who suffered from an anxiety disorder at a given time, continued to do so 2–5 years later (Costello, Angold, & Keeler, 1999; Last, Perrin, Hersen, & Kazdin, 1996; McGee, Feehan, Williams, & Anderson, 1992). Most children who suffer from anxiety disorders go untreated, and a large number of studies has found that adults who suffer from anxiety disorders tend to report that the anxiety had its onset during their childhood or adolescence (Keller, Lavori, Wunder, Beardslee, & et al., 1992; Oest, 1987;

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Pollack, Otto, Sabatino, Majcher, & et al., 1996). One of the reasons for the high prevalence and adverse consequences of anxiety disorders is the fact that there is still a lack of understanding of and research into the psychological mechanisms and determinants of childhood anxiety disorders. In this vein, there is a need to determine the factors that underlie the development of anxiety disorders in children, in order to aid the development of effective prevention and treatment of these disorders.

One of the most frequently used accounts for the aetiology of fears and phobic disorders is Rachman's theory of three pathways for fear acquisition: conditioning, vicarious exposure, and instruction or the transmission of information (Rachman, 1977). Although there is currently good evidence that genetic factors play a role in the aetiology of anxiety disorders, in particular of panic disorder (for a review see Hettema, Kendler, & Eaves, 2005), most of the available empirical work has employed learning based frameworks like Rachman's. Several studies in adult sufferers from phobic and anxiety disorders used the three pathways model in their investigation of fear acquisition (Mulkens & Boegels, 1999; Oest, 1985; Oest & Hugdahl, 1981, 1983). Most of these studies have found direct conditioning to be the most important factor in the acquisition of phobic and anxiety disorders. Vicarious conditioning tends to be the second most important factor, whereas information or instruction tends to be of significant, but lesser importance. However, an important limitation of these studies is that they are based on self-report measures that ask participants to report what preceded the onset of a phobia or anxiety disorder that they have typically suffered from for many years (sometimes as many as 20–40). In such studies, there is a risk that memory errors decrease the reliability of the findings: did the conditioning experience precede the development of the phobia, or does the current experience of anxiety increase the chance that earlier events will now be interpreted as traumatic (Mulkens & Boegels, 1999; Muris, Bodden, Merckelbach, Ollendick, & King, 2003)?

In a recent meta-analysis of fear conditioning in anxiety disorders, a distinction was made between studies using simple conditioning procedures and those using discrimination conditioning. In simple conditioning, one conditional stimulus is paired with the anxiety provoking unconditional stimulus, whereas discrimination conditioning employs two conditional stimuli, one paired with the unconditional stimulus (CS+) and one presented alone (CS–). The studies that employed simple conditioning found significantly faster acquisition of fear learning and more resistance to extinction among anxious individuals relative to non-anxious controls (Lissek et al., 2005). The studies that used discrimination learning found did not find a difference in fear acquisition between anxious and non-anxious participants, but found anxious individuals to be more resistant to extinction, at least if electro-tactile shock was used as the unconditional stimulus. These studies, however, have assessed exclusively adult participants.

A number of studies has investigated the onset and acquisition of fears in children (Field, Argyris, & Knowles, 2001; Field, Hamilton, Knowles, & Plews, 2003; Muris, Merckelbach, & Collaris, 1997; Muris, Merckelbach, Gadet, & Moulart, 2000; Muris, Merckelbach, Ollendick, King, & Bogie, 2001; Ollendick & King, 1991). Until recently, all studies on the acquisition of childhood phobias were based on retrospective reports, without consideration of their reliability and validity (King, Gullone, & Ollendick, 1998). However, a few recent studies have used a prospective technique to examine the role of negative information in the acquisition of fears in children (Field et al., 2001, 2003; Muris et al., 2003). Both Field et al. (2001) and Muris et al. (2003) found that negative information significantly increased the children's fears of simulated animals/monsters. Furthermore, such fears generalised over time to related stimuli. Consistent with these findings, (Gerull & Rapee, 2002) reported that infants increased their fearfulness and avoidance of stimuli that had been paired with negative facial expressions. Contrary results were noted, however, by Field et al. (2003) who did not find that negative information influenced the acquisition of social fears in older children.

The startle potentiation paradigm has also been used to investigate the effect of aversive conditioning in children and adults (e.g. Ameli, Ip, & Grillon, 2001; Grillon, 2002a, b). In adults, the findings suggest that participants who are unaware of the relationship between a CS and an electric shock unconditional stimulus tend to show a different pattern of conditioning as indexed by startle responses, skin conductance and subjective fear ratings than those who are able to verbalise such a relationship. Participants who were unaware of the CS-UCS relationship showed greater startle and fear ratings to stimuli not paired with shocks (i.e. CS– and during inter-trial intervals) in comparison to their aware counterparts i.e., they did not identify the CS+ as the main signal of danger, but continued to show enhanced responding in all experimental conditions. This can indicate that the inability to predict the unconditional stimulus may lead to an enhanced contextual

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