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What we fear most: A developmental advantage for threat-relevant stimuli



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ABSTRACT

Fear is one of our most basic emotions. It is an important social signal and alerts us to when a situation is safe or risky. Interestingly, not all fears are created equal: Several researchers have proposed that humans develop specific fears, such as fear of *threatening* stimuli, more readily than others. Here we discuss three major theories of fear acquisition, and consider the possibility that some fears are privileged in learning. Second, we review a growing literature that suggests that humans have perceptual biases that quickly draw attention to threatening stimuli in the environment. In particular, we highlight recent developmental work that shows that even infants and young children respond rapidly to the presence of threat well before they acquire any threat-relevant fears. Finally, we argue that such biases may play a causal role in privileging fear learning for certain threats, and we suggest directions for future work that can clarify whether early biases in perception indeed facilitate the development of our most common fears.

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Introduction

Fear is one of the oldest and most basic emotions. Because fear holds such great importance for survival—for example, by alerting us when a situation is safe or potentially dangerous—it is not surprising that there is considerable debate about how fears and phobias are acquired over the course of development. One of the most interesting aspects of human fears is that many researchers suggest that they are not all created equal; that is, there is some evidence that certain fears and phobias are more

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common than others. Researchers have argued that this is the case for evolutionary recurrent threat relevant stimuli in particular, such as fear of heights, other humans, wide-open spaces, snakes, and spiders (Coelho & Purkis, 2009; Marks & Nesse, 1994; Seligman, 1971; Öhman & Mineka, 2001).

In the current review, we examine three major theories of how fears are acquired, including the possibility that some fears might be learned more readily than others. Next, we review both classic adult research and new developmental data that suggests that some threats—such as snakes and spiders—hold a special status in human perception even in infancy and early childhood, suggesting that perceptual sensitivities or biases for threatening stimuli appear as early as the first year of life. Finally, we discuss the possible relation between early perceptual sensitivities and fear acquisition, and how early biases might facilitate fear learning.

Three models of fear acquisition

General learning model

Traditional models of fear acquisition in the literature are typically domain-general learning models. The term domain-general refers to processes—namely, habituation, conditioning, associative learning, and imitation—that function across a wide range of knowledge areas, sensory modalities, and inputs. Before the 1970's, it was commonly believed that fears were only acquired via direct conditioning, much like John Watson famously demonstrated when he conditioned 9-month-old "Little Albert" to fear a white rat by pairing presentation of the rat with a loud aversive noise (Watson & Rayner, 1920). More recently, Rachman (1977) modified this traditional model of fear learning by proposing that humans can acquire fear via three domain-general learning pathways, including (1) direct learning through classical conditioning and indirect learning through (2) observation and (3) verbally transmitted information.

Although originally put forth nearly 40 years ago, modern theories of fear acquisition still adopt these three basic pathways, and research supports the existence of all three (e.g., Askew & Field, 2008; Field & Purkis, 2011; Mineka & Zinbarg, 2006). Findings from naturalistic examinations of trauma confirm the well-accepted notion that individuals can be directly conditioned to fear various stimuli. Studies from the clinical literature show that many adults and children suffer from symptoms of post-traumatic stress disorder (PTSD) after experiencing a trauma, which suggests that fearful behaviors are indeed acquired through conditioning (Meiser-Stedman, 2002; Meiser-Stedman, Smith, Glucksman, Yule, & Dalgleish, 2008; Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012). One study of the 25 girls who survived the sinking of the 'Jupiter' cruise ship in 1988 reported that survivors developed significantly greater fears of stimuli related to the sinking incident when compared to controls (Yule, Udwin, & Murdoch, 1990). Similarly, a study of 10–13-year-old children and their mothers who observed lightning strike a soccer field during a game reported that observers experienced several fears related to the incident (Dollinger, O'Donnell, & Staley, 1984). Although research on the effects of trauma cannot necessarily be interpreted as causal and findings with experimental data are absent from the literature because of ethical concerns, it is widely accepted that both children and adults learn fear through direct conditioning experiences.

Researchers have also reported evidence of fear acquisition through indirect pathways, such as vicarious conditioning or observational learning. Mineka and colleagues demonstrated that lab-reared rhesus monkeys learn snake fear through observation, quickly learning to fear snakes by observing the fearful behavior of a wild-reared conspecific (see Öhman & Mineka, 2001, for a review). Although limited in number, there are also a few experimental studies supporting observational fear learning in humans (Askew & Field, 2007, 2008). In two separate studies, researchers reported that toddlers learn to avoid toy snakes, spiders, flowers, and mushrooms after observing mothers' negative facial expressions (Dubi, Rapee, Emerton, & Schniering, 2008; Gerull & Rapee, 2002). Similarly, after repeatedly pairing photographs of novel animals with happy or fearful facial expressions, 7–9-year-olds are slower to approach animals paired with the fearful face than those paired with a happy face, and the children report a higher rate of fear when compared to a baseline measure (Askew & Field, 2007). Additional research has also shown that children can acquire positive responses to fear-relevant

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