# Threat Detection

An ability to detect threatening stimuli more efficiently than nonthreatening stimuli.

People are born with automatic visual detection mechanisms for evolutionarily threatening stimuli, such as snakes. These threatening stimuli are detected more quickly than nonthreatening stimuli and are thought to have evolutionary origins; efficiently detecting threats no doubt provided a selective advantage for our human ancestors.[1]

For example, when presented with images containing threatening elements, such as spiders, and nonthreatening elements, such as flowers, people can locate the threatening elements more quickly than the non-threatening elements. The search times are not affected by the location of the threatening element or the number of distracters surrounding the element. Similarly, people can locate an angry face in a group of happy or sad faces more quickly than a happy or sad face in a group of angry faces. The ability to detect evolutionarily threatening stimuli is a function of perceptual processes that automatically scan the visual field below the level of conscious awareness. Unlike conscious processing, which is relatively slow and serial, threat detection occurs quickly and in parallel with other visual and cognitive processes.[2]

Almost anything possessing the key threat features of snakes, spiders, and angry faces can trigger the threat detection mechanism, such as the wavy line of a snake, the thin legs and large circular body of spiders, and the V-shaped eyebrows of an angry face. It is reasonable that other general predatory features (e.g., forward-looking eyes) will also trigger the threat-detection mechanism given their evolutionary relevance, but little research of this type has been conducted. In any event, the sensitivity to certain threat features explains why twigs and garden hoses often frighten young children, and why people have a general fear of insects that superficially resemble spiders (e.g., roaches). When people have conscious fears or phobias of the threatening stimuli, the threat detection ability is more sensitive, and search times for threatening stimuli are further reduced. Once attention is captured, threatening stimuli are also better at holding attention than nonthreatening stimuli.

Consider threatening stimuli to rapidly attract attention and imply threat or foreboding (e.g., designs of markers to keep people away from an area). Abstracted representations of threat features can trigger threat-detection mechanisms without the accompanying negative emotional reaction. Therefore, consider such elements to attract attention in noisy environments, such as a dense retail shelf display. Achieving a balance between maximum detectability and minimal negative affect is more art than science, and therefore should be explored with caution and verified with testing on the target audience.

See also Baby-Face Bias, Freeze-Flight-Fight-Forfeit, Inattentional Blindness, and Red Effect.

[1] The seminal theoretical work on threat detection in humans is *The Principles of Psychology* by William James, Henry Holt and Company, 1890. While the evidence suggests innate detection mechanisms for snakes, spiders, and angry faces, it is probable that similar detection mechanisms exist for other forms of threatening stimuli.

[2] See "Emotion Drives Attention: Detecting the Snake in the Grass" by Arne Öhman, Anders Flykt, and Francisco Esteve, *Journal of Experimental Psychology: General*, September 2001, vol. 130(3), p. 466–478; and "Finding the Face in the Crowd: An Anger Superiority Effect" by Christine H. Hansen and Ranald D. Hansen, *Journal of Personality and Social Psychology*, 1988, vol. 54, p. 917–924.
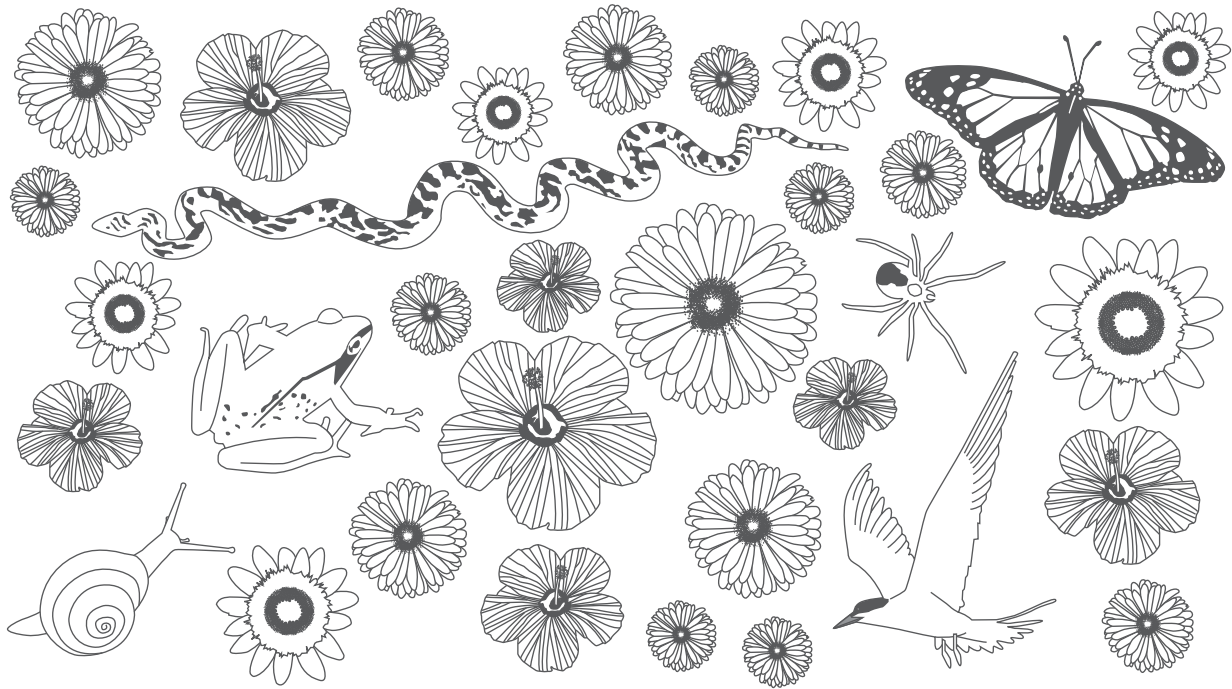
In visually noisy environments, the average search time for threatening stimuli is less than for nonthreatening stimuli.
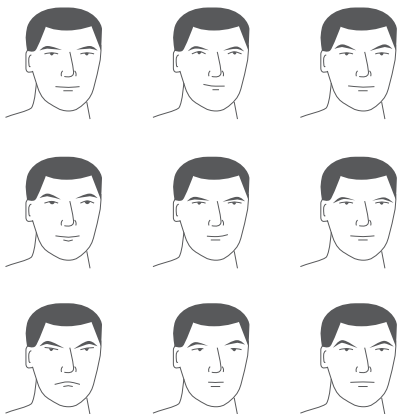


Angry faces are more quickly detected and maintain attention more effectively than neutral or happy faces.



Amid the many billboards lining Houston freeways, the University of Houston billboard pops out and commands attention. The design of the advertisement is certainly clean and well composed, but its unique ability to capture and hold attention may be due to threat detection.