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Evolutionary Predisposition to Fear Snakes but Not Spiders

Screaming (or hearing someone else scream) at the sight of a spider on the wall is an experience that is likely familiar to everyone, whereas—at least for people living in urban settings—seeing a snake is quite rare. However, in lab experiments, people are faster to detect pictures of snakes and spiders among other images and more quickly form fear associations to pictures of both snakes and spiders than to pictures of guns and knives, despite the fact that the latter are more dangerous in modern environments. These results have led researchers to suggest that quick visual detection of stimuli that could be harmful is not learned, but is rather an evolved predisposition. Consistent with this theory, non-human primates reared in captivity (and therefore never exposed to snakes) are also quicker to detect pictures of snakes than other pictures, suggesting a shared inherited mechanism for rapid detection of fear-relevant stimuli. However, evidence for a spider detection advantage in non-human primates is mixed.



Fear of snakes, but not spiders, has evolutionary origins.

Photo: Wesley Tolhurst/iStock

In a recent paper published in the *Journal of Comparative Psychology*, [Kawai and Koda \(2016\)](#) revisited the possible evolutionary origins of fear-relevant animals by comparing detection times for pictures of snakes and spiders among pictures of a non-threatening animal. Three adult female Japanese monkeys (*Macaca fuscata*) performed a visual search task in which they had to touch a target picture (e.g., snake) presented among distractor pictures (e.g., koalas) in a nine-picture array. All three monkeys responded faster to snakes among koalas than koalas among snakes. However, they responded equally fast to spiders among koalas and koalas among spiders. In other words, there was a visual detection advantage for snakes, but not spiders, in the context of a non-threatening animal.

These results suggest that spiders are not an evolutionarily relevant threat stimuli in non-human primates. Indeed, only 0.1% of all spider species are poisonous, and

several taxa of non-human primates actually eat spiders. In contrast, primatologists in the field frequently encounter venomous snakes. Although it is possible that there may be an evolved visual sensitivity to spiders in humans that is more evolutionarily recent than sensitivity to snakes, several other lines of evidence suggest a more qualitative difference between human snake and spider detection. For example, unlike the robust snake detection advantage, the detection advantage for spiders depends on search context (e.g., distractor image content) and can be modulated by whether participants explicitly express a fear of spiders. Thus, the visual sensitivity to spiders seen in humans may reflect an acquired, learned fear that affects attention via top-down influences rather than an evolutionary bottom-up perceptual predisposition.

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Kawai, N., & Koda, H. (2016). [Japanese monkeys \(*Macaca fuscata*\) quickly detect snakes but not spiders: Evolutionary origins of fear-relevant animals](#). *Journal of Comparative Psychology*, 130(3), 299-303. <http://dx.doi.org/10.1037/com0000032>



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