

# Twenty Years After “The Malicious Serpent”: Revisiting Snake Detection in primates

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Two decades after Öhman and Mineka's influential hypothesis on the evolution of snake detection in primates, our 2024 review revisits and critically evaluates this specialized threat response. Guided by five central questions, we synthesized recent findings that support the existence of subcortical mechanisms enabling rapid snake detection and attention. This work clarifies the state of the field, addresses common criticisms, and outlines key gaps to guide future research.

Our first question focused on neural specialization for snake detection. Although several studies highlight roles for the amygdala, superior colliculus, pulvinar, and visual cortex, we emphasize the complex interplay between cortical and subcortical systems in threat processing and their impact on outcomes.

Our second and third questions examined behavioral responses and their possible innate basis. Methodological issues in early studies led to new approaches—such as breaking-CFS, RISE, and research involving infants or lab-reared primates. Results from many experiments using

these methods still support a privileged visual attention to snakes but suggest that fear may emerge from later cortical processes.

We also reviewed which visual features of snakes drive faster detection. Evidence points to elongated, curvilinear shapes with low area/border ratios as especially effective. Additional features – like scale patterns and cortical-subcortical interactions – may modulate attention.

Lastly, we addressed conceptual inconsistencies across studies. Definitions of “fear,” “threat,” and even “snake” vary, complicating data comparisons. Different snake stimuli may influence the activation of distinct perceptual mechanisms depending on visual features and study design.

In sum, evidence supports a specialized visual sensitivity to snakes in primates. Future research should explore temporal activity patterns, isolate key variables, and broaden comparative approaches across species and threat types.