Snakes, Angry Faces, and the Effect of Threat on Early Attention
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Introduction
• Attention is automatically allocated to stimuli that have evolutionary and thus emotional significance [1]
• Excitatory amygdala to visual cortex interactions have been shown to amplify visual processing of emotional stimuli [2]
• Snakes were the first predators of primates, and thus have had threat-relevance to primates since long before communication through facial expressions evolved [3 & 4]
• The predatory pressure of snakes shaped the primate visual system for rapid snake detection [3]
• Visual processing has been studied utilizing event-related potentials (i.e. electrical brainwave activity over the time-course following stimulus presentation) [1]
• Early posterior negativity (EPN) of the event-related potential is a relative negativity over the occipital scalp (visual cortex) which reflects early visual and attentional capture of emotionally salient stimuli [1]
• Research Question: Do threatening reptiles and threatening faces elicit comparable EPNs?
• Hypothesis: A larger EPN effect would be observed for snakes compared to angry faces

Methods
• 25 participants (18-32 yrs, 13 men)
• Pictures of snakes, lizards, angry faces, and neutral faces at a rate of 3 per second (fig. 1)
• Electroencephalogram (EEG) using 32 channels
• EPN difference wave (150-225 ms, 225-300 ms) at PO3, O1, O2, PO4
• Valence and arousal ratings of picture stimuli using the Self-Assessment Manikin (fig. 2)

Results
• 150 – 225 ms: Similar EPN for snakes and angry faces (fig. 3 & 4)
• 225 – 300 ms: EPN larger for snakes compared to angry faces (fig. 3 & 4)
• Valence and arousal: snakes and angry faces were subjectively more unpleasant and more arousing than lizards and neutral faces (fig. 5)
• 225-300 ms: The more participants rated angry faces as unpleasant compared to neutral faces, the larger the EPN for angry compared to neutral faces

Discussion
• Snakes elicited a larger EPN than angry faces
• The association between valence ratings and EPN suggests an interaction of automatic, bottom-up (angry face) and conscious, top-down (valence ratings) processes related to individual differences in fear of angry faces
• Findings suggest that snakes capture more extensive early attention than angry faces, possibly due to the prolonged pressure of snakes on primate evolution

References