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Authors

GAVROIS, Rayanne
Claidiere, Nicolas

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Colour Processing: the Perceptual, Affective, and Social Determinants of Executive Control in Guinea Baboons

Rayanne GAVROIS

Aix-Marseille Université, Marseille, France

Nicolas Claidiere

Aix-Marseille Université, Marseille, France

Abstract

Colours are not merely decorative; they influence perception, emotion, and behaviour, and can modulate executive functions. In humans, red is associated with danger and facilitates inhibition, possibly reflecting innate biases. Consistent with this hypothesis, studies in non-human primates reveal a perceptual advantage for red over green, and green over blue, in executive control tasks. However, how such perceptual biases interact with learned affective associations remains unclear. We investigated this question in Guinea baboons by combining a match-to-sample task and a stop-signal task in a population extensively trained to associate green with negative feedback. Red and green similarly facilitated inhibition, but green selectively slowed action execution relative to red. Moreover, social context further shaped performance: inhibition increased in low-ranking individuals in the presence of a higher-ranking partner, but decreased in dominant individuals. These results suggest that colour influences executive control through innate perceptual tendencies, learned affective association and social context.