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### **Proceedings of the Annual Meeting of the Cognitive Science Society**

#### **Title**

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#### **Permalink**

<https://escholarship.org/uc/item/088187kh>

#### **Journal**

Proceedings of the Annual Meeting of the Cognitive Science Society, 44(44)

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#### **Publication Date**

2022

Peer reviewed

# Using fMRI to study the neural basis of violation-of-expectation

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## Abstract

In studies of infant cognition, why do babies look longer when objects pass through each other, or someone behaves inefficiently? We test 3 candidate explanations (domain-specific prediction error, domain-general endogenous curiosity, and perceptual novelty), each with a distinct, non-mutually exclusive, predicted pattern of neural activity. We scanned 17 adults using fMRI while they watched videos of agents and objects, adapted from infant behavioral research [1–4]. Cortical regions preferring social vs physical information [5,6] showed similar preferences for these stimuli. These regions, in the first run of the experiment, responded to physical and social violations (unexpected > expected outcomes), with a greater response to violations from the corresponding domain. Regions that respond to general perceptual novelty also responded to social and physical violations, regardless of domain. Thus both domain-specific, and general perceptual, cortical regions encode violations of expectation involving agents and objects.

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