Using Neurocognitive Mediation Analysis to Investigate Spectral Dynamics of Evidence Accumulation Across Domains

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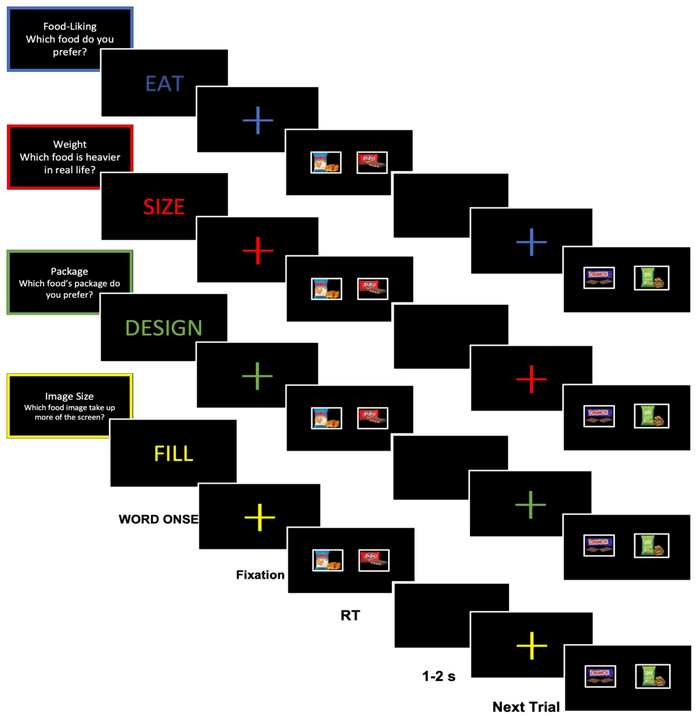
Decisions can sometimes be classified along two dimensions: subjective versus objective criteria, and evaluation based on stimulus versus representation. [1]

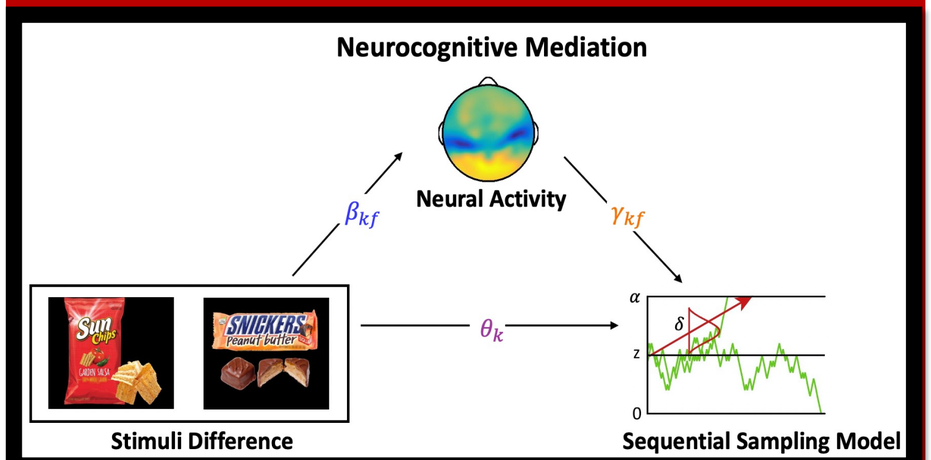
	Preference (P)	Objective (O)
Representation (R)	**PR** **Food-liking:** Which food do you prefer?	**OR** **Weight:** Which food is heavier in real life?
Stimulus (S)	**PS** **Package:** Which food's package do you prefer?	**OS** **Image Size:** Which food image takes up more of the screen?

Research using EEG and sequential sampling models (SSM) has provided evidence for different spatial and frequency-specific patterns of activation during choice. [2]



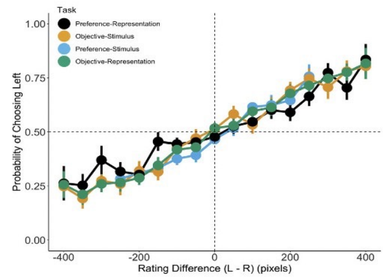
Experimental Design

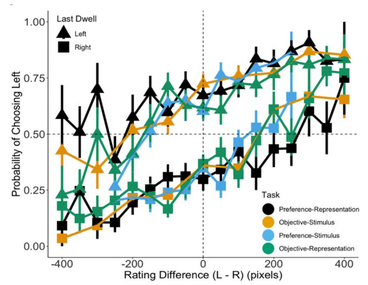
Jointly modeling neural and behavioral data, allows us to understand the mechanisms underlying the relationship between stimulus value, EEG, and evidence accumulation.



Scan here for details

Prior work suggest consistent behavior across decision tasks[1]





What is Neurocognitive Mediation analysis?

$$I_{ik} = |r_{ImageAi} - r_{ImageBi}| \quad (1)$$

$$EEG_{ikf} \sim N(\eta_{kf} + \beta_{kf} \cdot I_{ik}, \sigma_{noise}) \quad (2)$$

$$y_{ik} \sim W(\delta_k, \alpha_k, \tau_k, 0.5) \quad (3)$$

$$\delta_{ik} = v_{ik} + \gamma_{kf} \cdot EEG_{ikf} + \theta_k \cdot I_{ik} \quad (4)$$

$$\beta_{indirect_{kf}} = (\beta_{kf} \cdot \frac{\sigma_{EEG}}{\sigma_I}) \cdot (\gamma_{kf} \cdot \frac{\sigma_\delta}{\sigma_{EEG}}) \quad (5)$$