Brain network signature of attention during cue-approach training predicts change in food preferences

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Background

- CAT (cue-approach training) is known to shift choice behavior by targeting specific items during training², 3.
- Indirect evidence indicates the importance of sustained attention to items in changing choice behavior in CAT².
- Precise behavioral measure of sustained attention during CAT training is not available because of the design of the task.

How do the attentional dynamics change across cue-approach training blocks? How do brain network dynamics relate to attention dynamics during cue-approach training?

fMRI Data

Data Source: CAT fMRI data with food items (N = 31) from Bakkour et al. (2017).
- 6 runs of training with 64 trials per run (5.2 min)
- 30% Go items, 70% No Go items

CAT task procedure

Quantifying brain interactions using co-fluctuation

No Relationship between trial-by-trial predicted sustained attention and training across blocks

- No difference between Go vs. No Go in sustained attention across training (t = 0.45, p = 0.65)
- No relationship between sustained attention across training & choice preference (β = 0.23 [-0.19 — 0.66], p = 0.29)

Co-Fluctuation Based Predictive Model (CFPM)

- Sustained attention connectome-based predictive model (saCFPM, Rosenberg et al., 2016)

Conclusions

- Predicted sustained attention across training cannot explain shift in choice preferences.
- The overlap between the go/no go network and sustained attention network will be further explored to better understand the shared brain dynamics during attention tasks and CAT.

References


Internal Cross Validation for Go/No Go CFPM

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<thead>
<tr>
<th># of Overlapped Edges</th>
<th>High</th>
<th>Low</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go</td>
<td>39*</td>
<td>41***</td>
</tr>
<tr>
<td>No Go</td>
<td>41**</td>
<td>24</td>
</tr>
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*significance assessed using hypergeometric function

The trained CFPM distinguished between trials
Go/No Go networks overlap with saCPM