Bound by sight, shared in the mind: the temporal emergence of object co-occurrence representations

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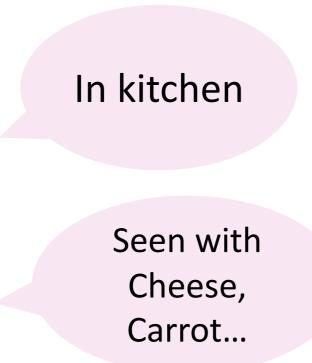


Introduction

• In the real world, objects reliably appear alongside other objects in a specific scene.

e.g.,





 Prior fMRI work suggests that object representations in the parahippocampal place area are organized by such cooccurrence statistics among objects.

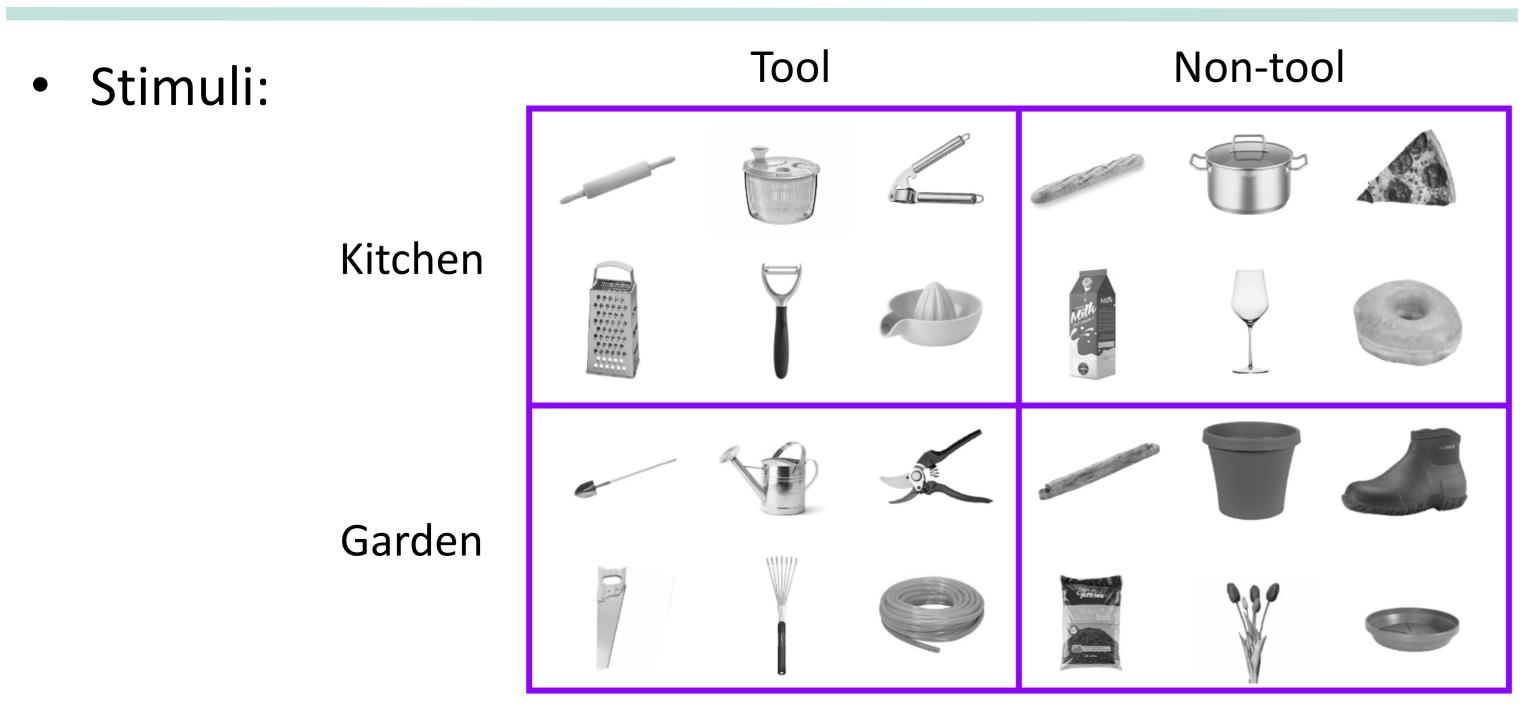
However, it remains unclear...

Q1: When do these representations emerge?

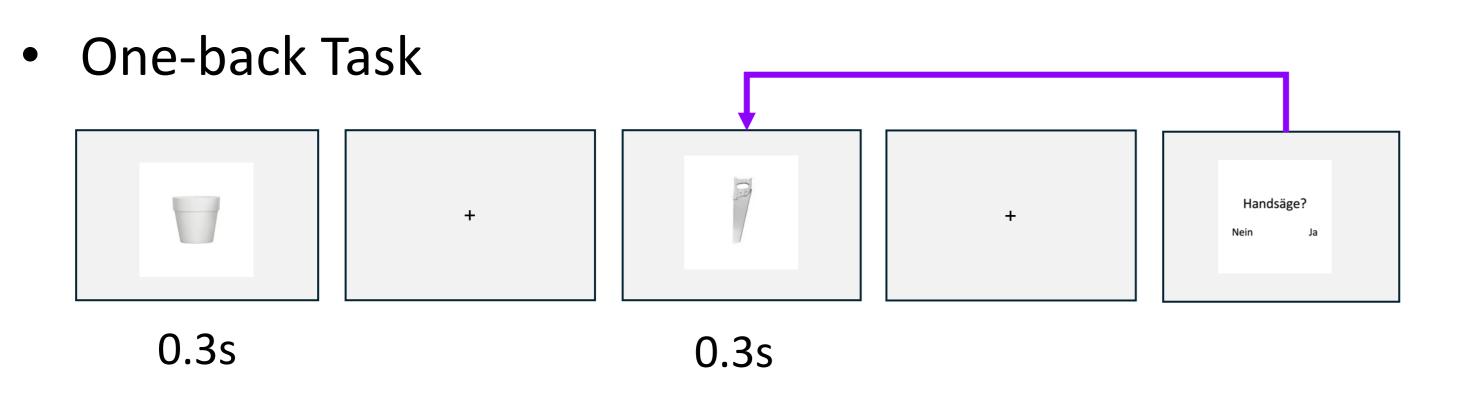
Q2: Do they differ from other representational dimensions (e.g., category)?

Q3: Do they reflect a mutual priming between co-occurring objects or the activation of shared scene representations?

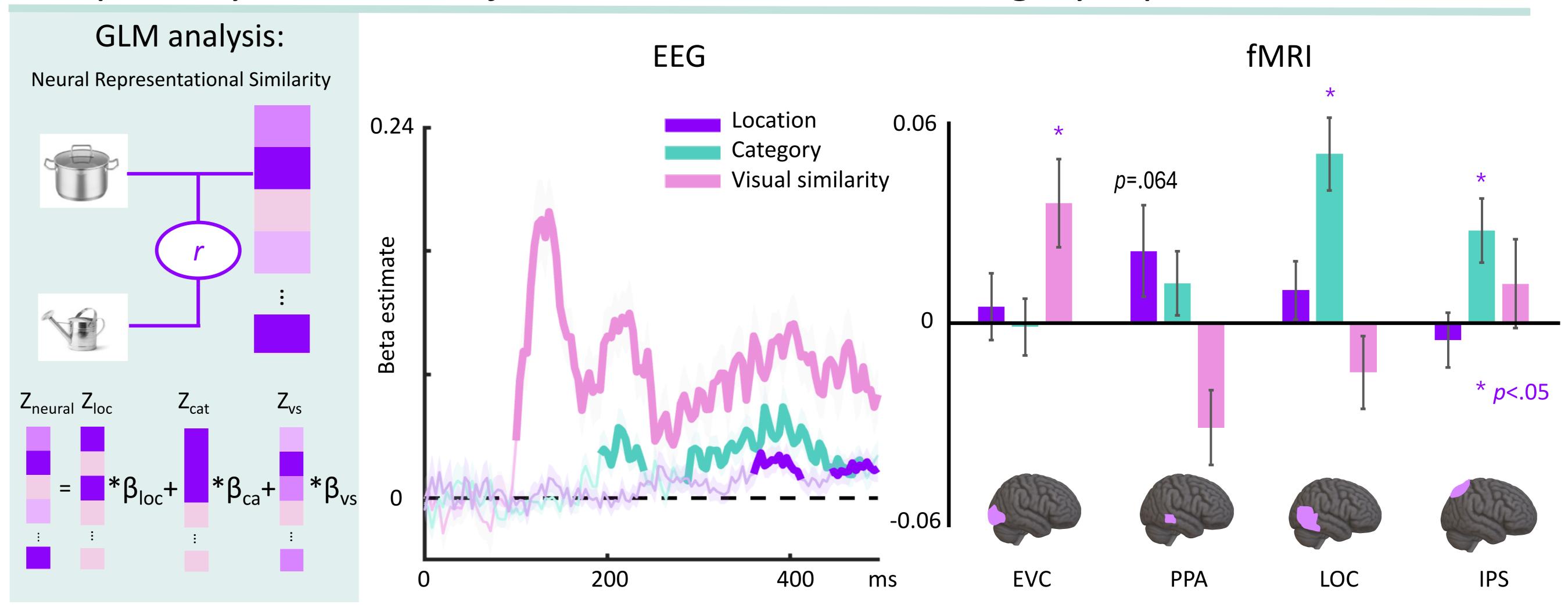
Methods



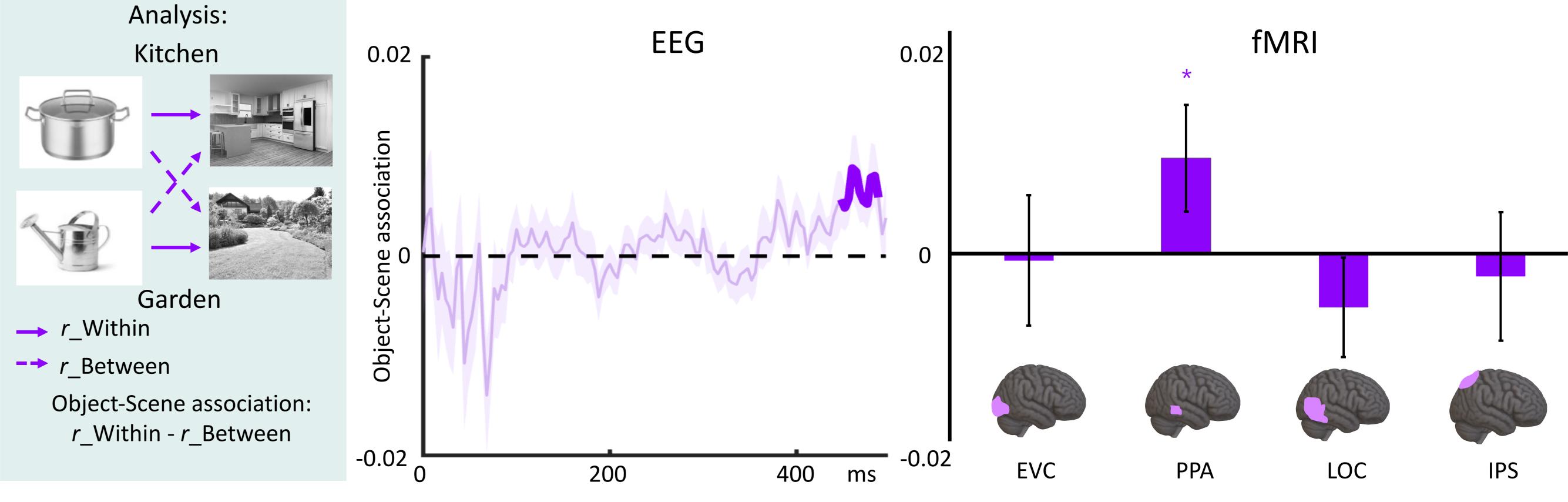
- EEG (N = 34)
- fMRI(N = 28)



Temporal dynamics of object co-occurrence and category representations



Late object co-occurrence representations reflect scene context activation



Conclusion

- Object co-occurrence representations (~350 ms) emerge later than perceptual (~100 ms) and categorical (~200 ms) representations.
- This effect is partly driven by the activation of associated scene representations (\sim 450 ms).
- Our findings provide detailed temporal and spatial information about object co-occurrence representations and highlight the involvement of scene context in shaping these representations.







