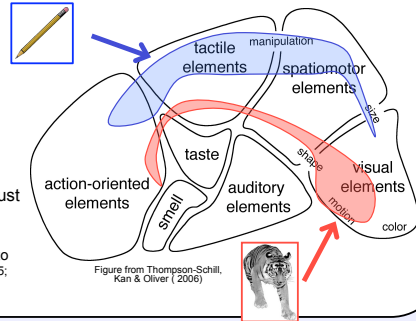


Eiling Yee<sup>1</sup>, Evangelia G. Chrysikou<sup>2</sup>, Esther Hofman<sup>3</sup>, & Sharon L. Thompson-Schill<sup>2</sup>  
 Basque Center on Cognition, Brain & Language<sup>1</sup>, University of Pennsylvania<sup>2</sup>, Cornell University<sup>3</sup>

Corresponding author: e.yee@bcbl.edu

## Background

- Distributed theories of semantic memory: Semantic information about an object is distributed over brain regions invoked when we perceive and interact with it (e.g. Allport, 1985)
  - Evidence: Motor regions are active when naming pictures of tools -- objects with which we interact manually (e.g., Chao & Martin, 2000)
- Because of this architecture:
  - Experience with an object should determine its representation
    - Evidence: Amount of manual experience with an object influences amount of activity in motor regions when making judgments about it (Oliver et al., 2009; Kan et al., 2006; Willems, 2010)
  - Motor information should be *part of* (not just "peripheral to") object concepts
    - Evidence: Engaging a brain region that is important to a concept may influence ability to access that concept (e.g., Pulvermuller et al. 2005; Glenberg et al 2007; Witt et al., 2010)



## Questions

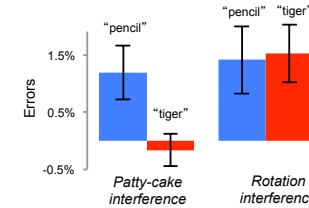
- Is activity in motor regions *part of or peripheral to* language comprehension?**
- Does performing an incongruent manual task interfere with thinking about manually experienced objects?
  - Does *amount* of manual experience predict amount of interference?

## Results (n = 72)

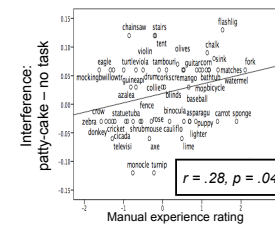
*Patty-cake (but not mental rotation task) interferes with classifying manually experienced objects:*



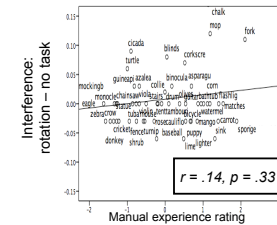
*Interaction between type of interference task and experience:*



*Amount of experience predicts amount of interference... from patty-cake task*



*... but not from mental rotation task*



## Methods

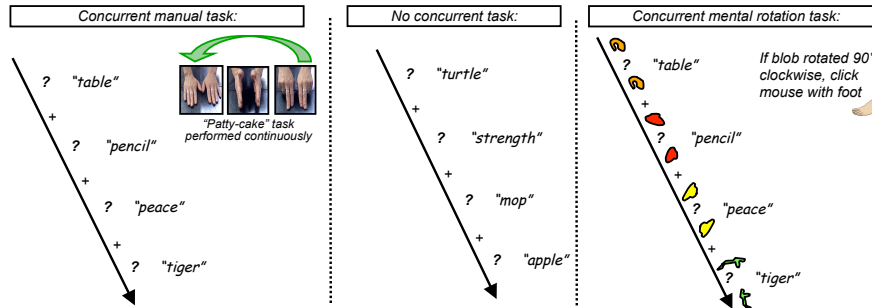
### Auditory Words:

- 208 concrete nouns: Animals, foods/plants, non-manipulable artifacts, tools
- Balanced on frequency, familiarity, number of syllables
- 70 abstract nouns

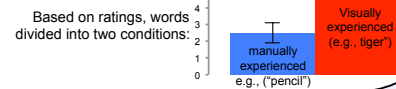
"POP" if concrete or "TWO" if abstract

### Procedure

- Classify words (say "pop" if concrete, "two" if abstract) while either:
    - Performing concurrent manual task or no concurrent task (blocked)
    - Performing concurrent mental rotation task or no concurrent task (blocked)
- Between subjects, orders counterbalanced. Each word occurs in both concurrent and no-task conditions (between subjects)*



*Post-experiment ratings: More experience touching with hands or looking?*



### Acknowledgements

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## Conclusions

- Engaging brain regions underlying manual interaction (with incompatible manual task) interferes with thinking about objects that are manually experienced
- These regions are *part of* (not peripheral to) the representation of frequently manipulated objects