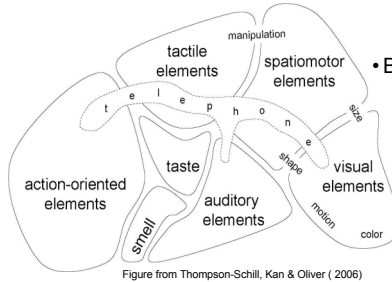


Background

Distributed theories of semantic memory:

- Concepts are represented as patterns of activation that are distributed over semantic features:



- Because of this architecture:
- Concepts that share features have overlapping representations
- Individual features can be independently activated

Figure from Thompson-Schill, Kan & Oliver (2006)

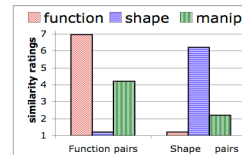
Concrete objects may have both "perceptual" (e.g., shape) and "abstract" (e.g., function) features

- Prior studies on shape and function have had mixed results:
- Shape-related words (e.g., frisbee-pizza) prime (only with short ISIs) in some studies (Schreuder et al., 1994; Kellenbach et al., 2000), but not others (Pecher et al., 1998)
- Function-related words (defined here as "purpose of use", e.g., tape-glue) prime more at long than short ISIs (Schreuder et al., 1984; Huettig & McQueen, 2007). Implicating controlled processing?
- Eye movement studies show effects of picture-based shape similarity (Dahan & Tanenhaus, 2005; Huettig & Altmann, 2007), but not conceptual shape similarity (Huettig & McQueen, 2007)

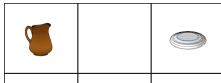
Methods

Materials

- Semantic relationship norming
- Participants rated word pairs on 1-7 scale
- Critical pairs selected to be high in shape (e.g., frisbee-pizza, 24 pairs) or function (e.g. tape-glue, 32 pairs) and low in other attributes



Sample display (shape-related)



Relatedness never apparent in visual depictions:



In shape-related condition, participants hear:
"Frisbee" [related to pizza]

- Critical displays contain:

- One target object
- One object related in shape or, function
- Two unrelated objects not phonologically, semantically or visually similar to target

Procedure

- Display appears for 1 sec (E1) or 2 secs (E2)
- Target word plays
- Subject touches picture that matches target word
- Display disappears when picture touched

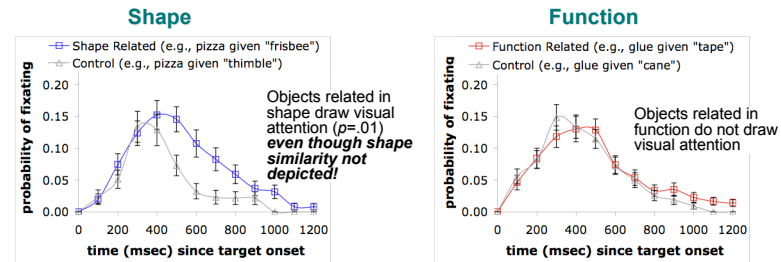
Question

Do objects related in shape or function partially activate each other?

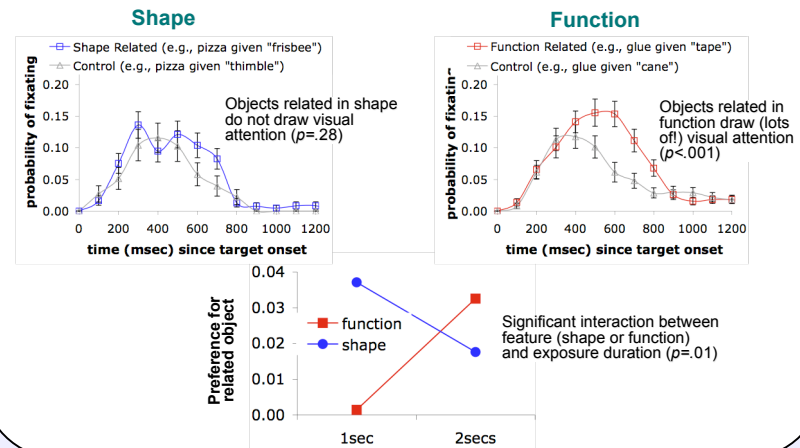
If yes, does time course of activation differ?

Results

Experiment 1: 1 sec exposure to display before target (n=38)



Experiment 2: 2 sec exposure to display before target (n=38)



Conclusions

- Objects related in shape and function partially activate each other -- consistent with representational overlap
 - Overlap on perceptual feature (shape) consistent with sensorimotor-based representations
 - Overlap on abstract feature (function) consistent with higher-order representations eventually being extracted
- When concept accessed, non-depicted/(conceptual) shape information rapidly activated
- Shape becomes active early, and then loses prominence to function
 - Why is shape first? • Shape more task-relevant? • Shape more "primary"? • Function builds on other features?
 - Why does shape lose prominence? • Limited ability to maintain activation of numerous features of multiple objects simultaneously? • Function tends to be ultimately more relevant?

Acknowledgements

This work was supported by NIH grant R01 MH067008 awarded to Sharon Thompson-Schill and by a Ruth L. Kirschstein NRSA Postdoctoral Fellowship awarded to Eiling Yee. We thank Tina Niess, Eva Gaudes, Emily McDowell & Amir Ezzamel for assistance with data collection.

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Dahan & Tanenhaus, (2005). *Psychonomic Bulletin & Review*, 12(3), 453-459. Kellenbach et al., (2000). *Cognitive Brain Research* 10(1-2), 67-75. Huettig & Altmann, (2007). *Visual Cognition*, 15(8), 985-1018. Pecher et al., (1998). *JML*, 38, 401-418.