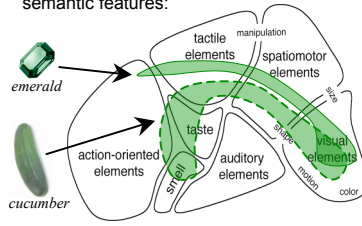


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Background

Distributed theories of semantic memory:

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



- Because of this architecture:
 - Attention can be focused on specific features
 - Concepts that share features have overlapping representations

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

- There is evidence that *shape* is an organizing feature of semantic memory (Schreuder et al., 1984; Kellenbach et al., 2000; 2006; Pecher et al., 1998; Yee, et al., accepted)

Color is a less reliable cue to object identity than shape Is color also an organizing feature?

Results have been mixed (Yes: Joseph, 1997; Taylor & Heindel, 2004; No: Huettig & Altmann 2004, Maybe: Yee & Thompson-Schill 2008; Huettig & Altmann, 2010)

- Color may be "less essential" than other features
- Color may be a component only for certain objects
- Color's activation may be context-dependent

Question

Will conceptual overlap based on color be more detectable after first focusing attention on color?

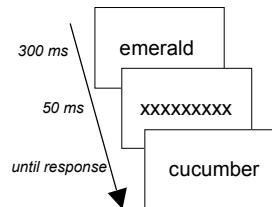
Will color priming be more robust after color Stroop?

Methods

- **Stroop task:**
 - Standard color stroop task (respond to ink color)
 - 5 color words (red, yellow, blue, green, black) • 50% incongruent trials

Animacy judgment task:

- Two counterbalanced lists of 60 pairs
 - Divided into 30 related (emerald-cucumber) and 30 control (pendant-cucumber) pairs.
 - Related and control primes matched for animacy, frequency, number of letters, semantic similarity as computed via LSA
 - 60 filler trials
- Make animacy judgment on target word
 - To ensure prime not ignored, on 12% of trials, after target judgment, participants cued to respond to prime also.



Color diagnosticity norming:

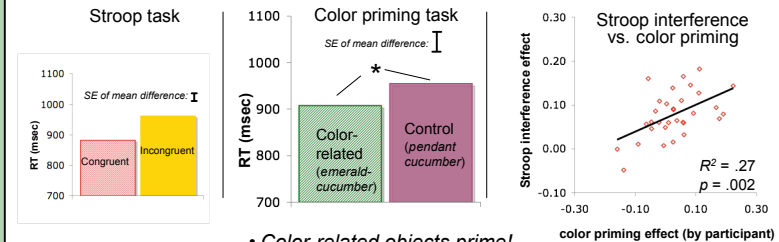
- Words rated on 1-7 scale according to "How important is color for recognizing this object?" by 30 separate subjects (M = 5.2)

Acknowledgements

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Results

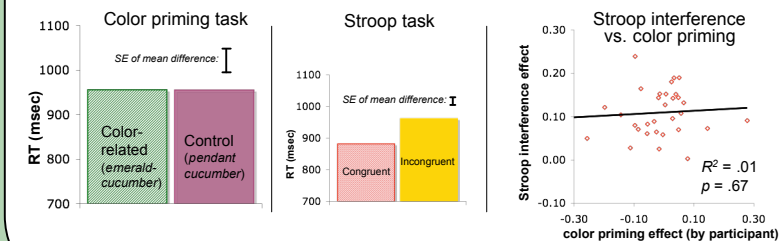
Experiment 1: Stroop task precedes priming task (n = 32)



• Color-related objects prime!

- Size of participant's Stroop interference effect predicts size of priming effect

Experiment 2: Priming task precedes Stroop task (n = 32)



• Color-related objects do **not** prime

- No relationship between Stroop interference and amount of priming

Conclusions

- Conceptual representations are not fixed - they can be dynamically affected by context (here, Stroop task)
 - Consistent with distributed models because distributed organization allows for independent activation of different features
- Objects similar in color can partially activate each other - *novel evidence of color priming*
 - Consistent with concepts that share color having overlapping representations (i.e., distributed architecture)
- Correlation between Stroop interference and color priming suggests individuals vary in how strongly associated color is with both names of color words (e.g., green) and names of objects (e.g., cucumber)
- Because color is a perceptual feature, findings support an important prediction of *sensorimotor-based* distributed models in particular

Huettig & Altmann, (in press). *Quarterly Journal of Experimental Psychology*.
 Huettig, F. & Altmann, G.T.M. (2004). In M. Carreiras, & C. Clifton (Eds.), *The on-line study of sentence comprehension*, 187-207.
 Joseph, J. (1997). *Acta Psychologica*, 97, 95-127.
 Kellenbach et al. (2000). *Cognitive Brain Research* 10(1-2), 67-75.
 Pecher et al., (1998). *JML*, 38, 401-418.

Schreuder, et al., (1984). *Psychological Research*, 45(4), 339-354.
 Tanaka, J. M., & Presnell, L.M. (1999). *Perception & Psychophysics*, 61, 1140-1153.
 Thompson-Schill, S. L., Kan, I. P., & Oliver, R. T. (2006). In R. Cabeza and A. Kingstone (Eds.), *Handbook of Functional Neuroimaging*, 149-190.
 Taylor & Heindel, (2004). *Journal of Vision*, 4(8) 516a.
 Yee, E., Huffstetler & Thompson-Schill, S.L. (accepted) *JEP:General*.

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