Synesthesia, visual search and the N2pc

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Reed College

Synesthesia

- Sound-Color
- Lexical-Gustatory
- Shape-color
- Color-grapheme

Synesthesia

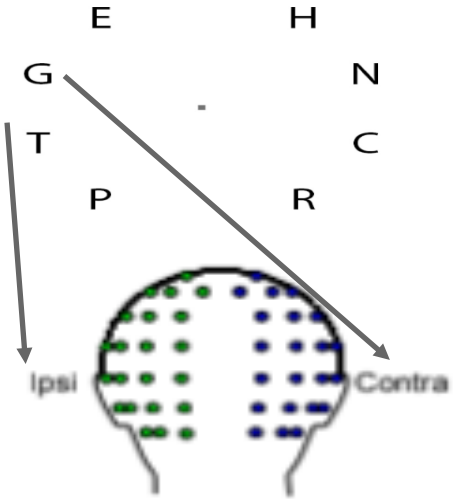
Synesthesia

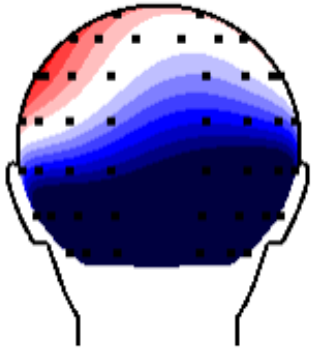
Does synesthetic color perception provide an advantage in visual search tasks?

N2pc

An event-related potential (ERP) component that is a neural marker of an attentional shift to a target item.

Example Trial: If “G” was the target, attention would shift to the left, and the electrodes on the right hemisphere would be contralateral to the target.

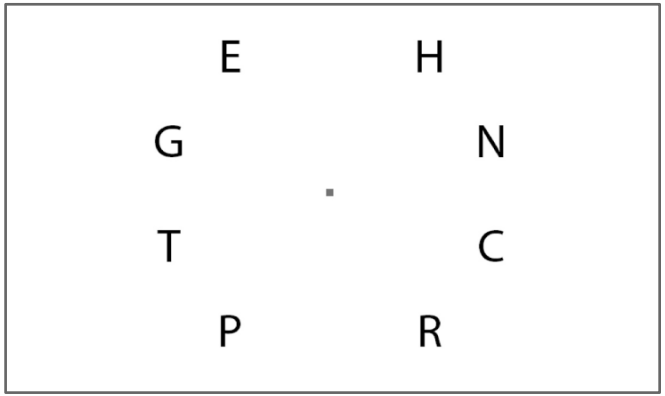




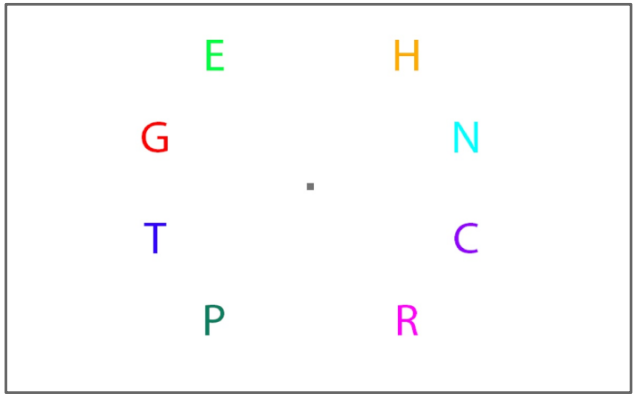
Experiment 1

synesthetes (n=12) and matched non-synesthetic controls (n=12)

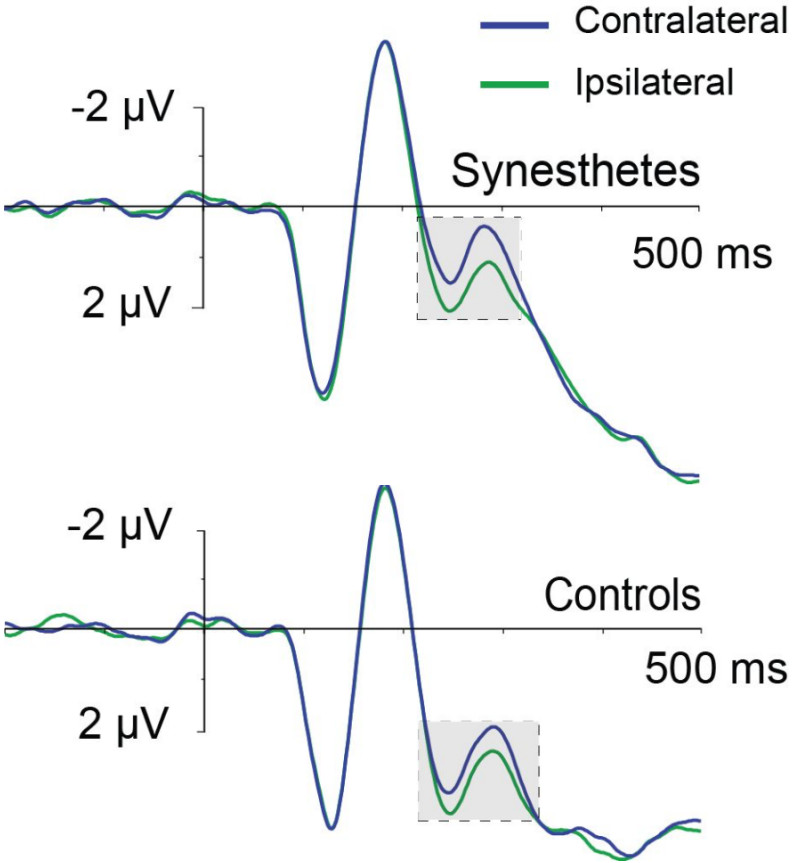
Physical Stimuli (and Perceived by Controls)

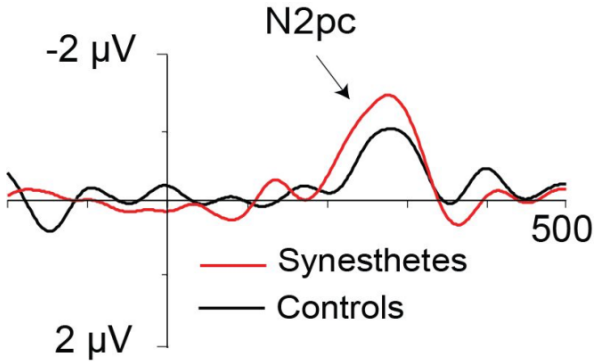


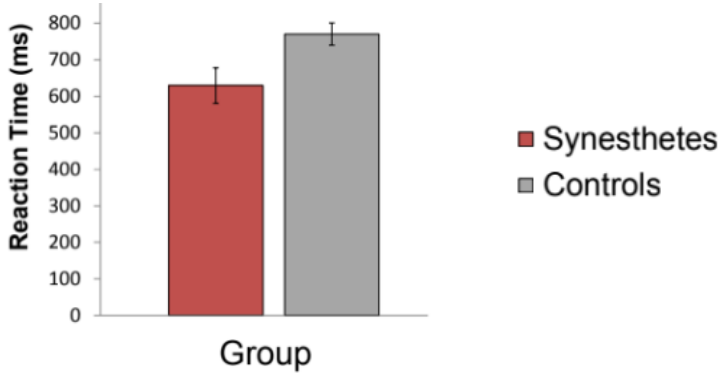
Stimuli as Perceived by Synesthetes



Exp 1 Results



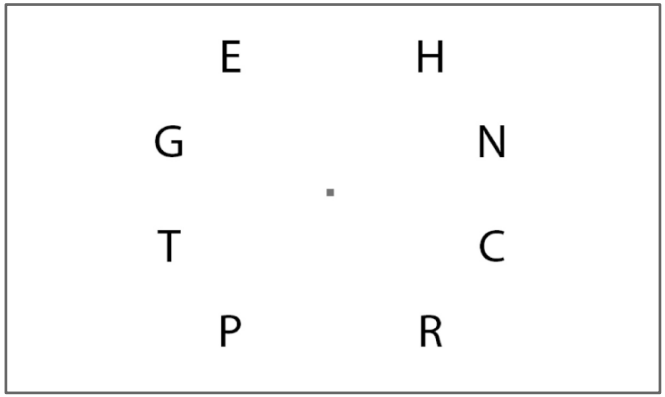




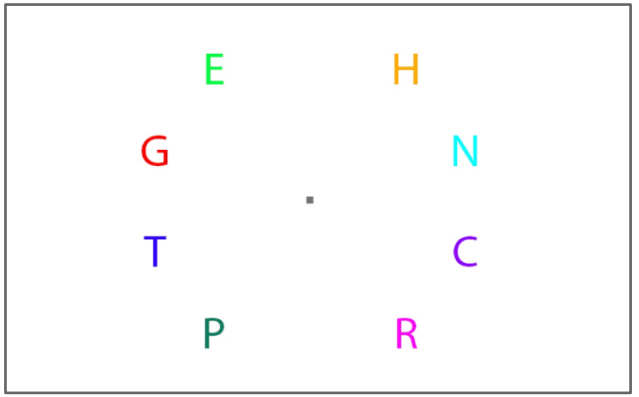
Experiment 2

non-synesthetic controls (n=12)

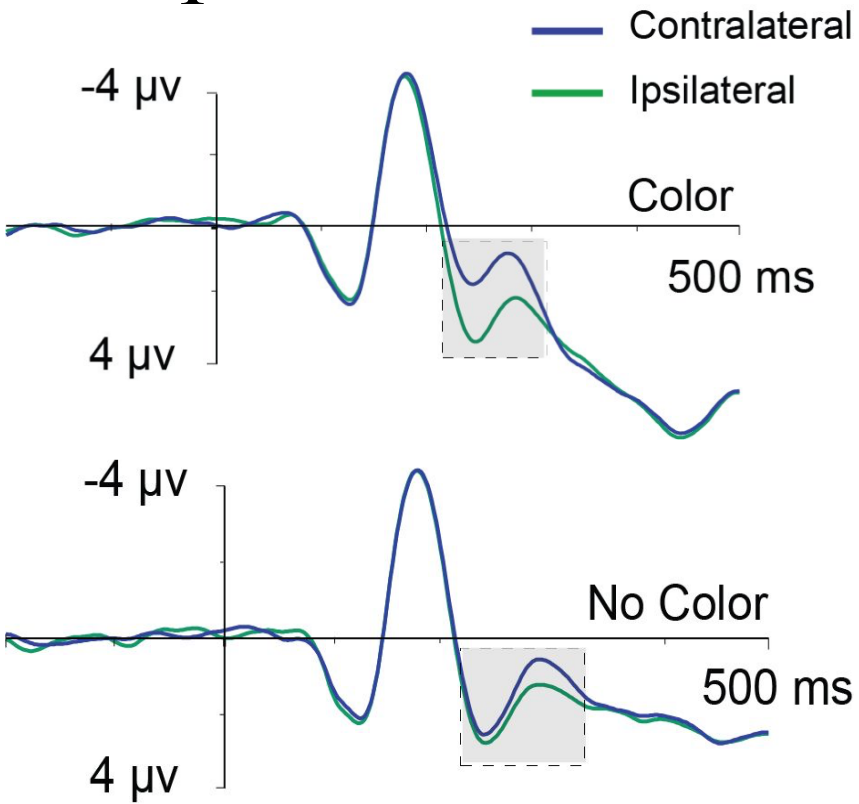
Block One

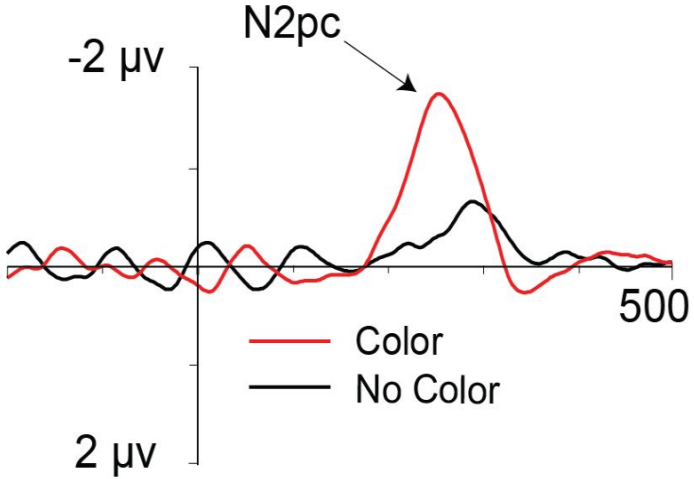


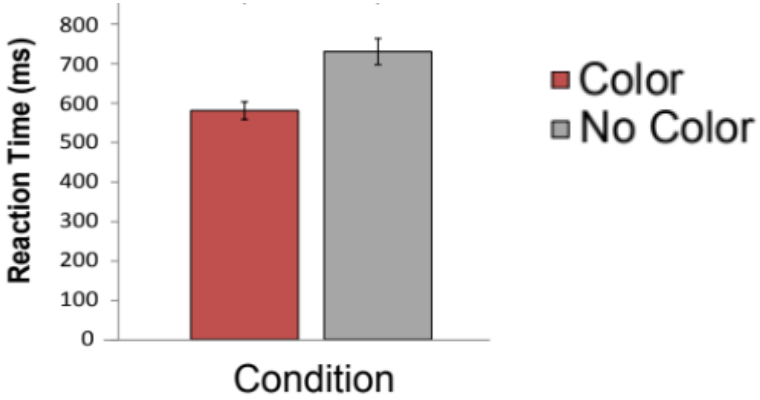
Block Two (Physically Colored)



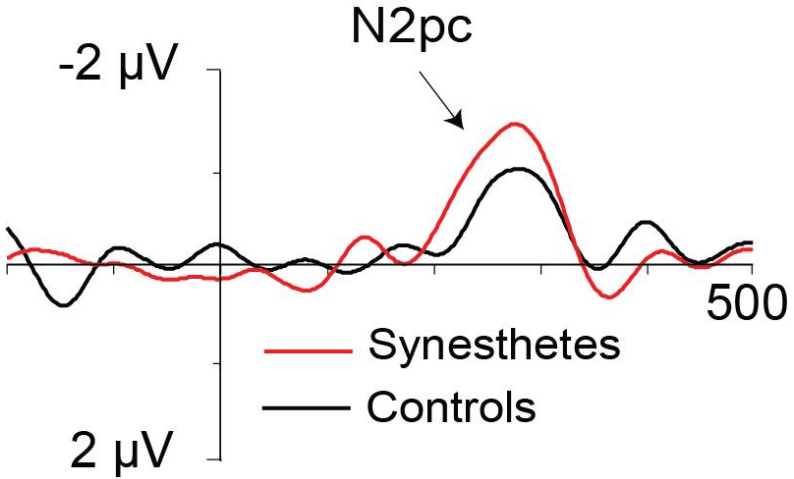
Exp 2 Results



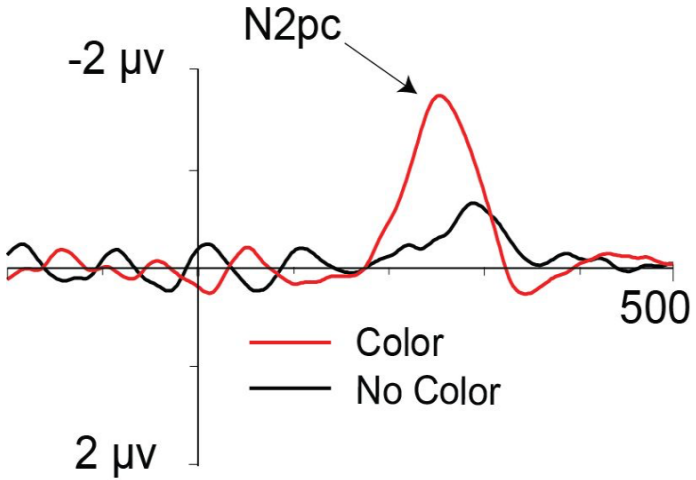




Exp 1 and 2 Summary



Exp 1

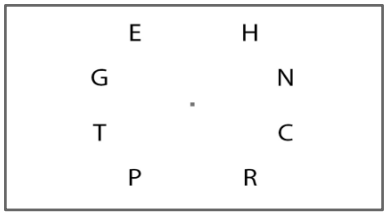


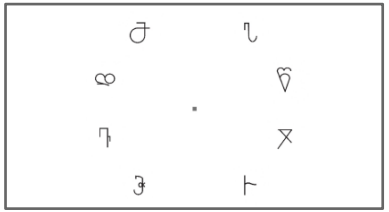
Exp 2

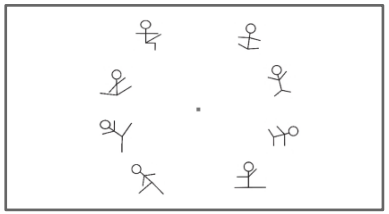
Experiment 3

Synesthetes (n= 12) and non-synesthete controls (n=12)

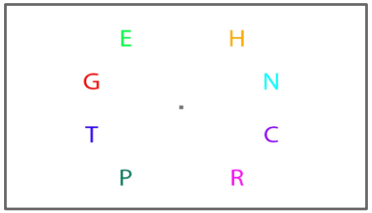
Physical Stimuli (and perceived by controls)

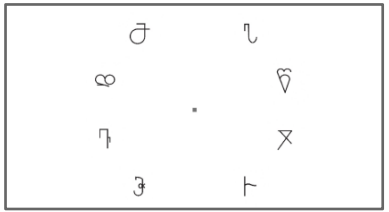


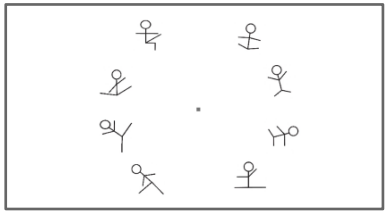




Stimuli as perceived by Synesthetes

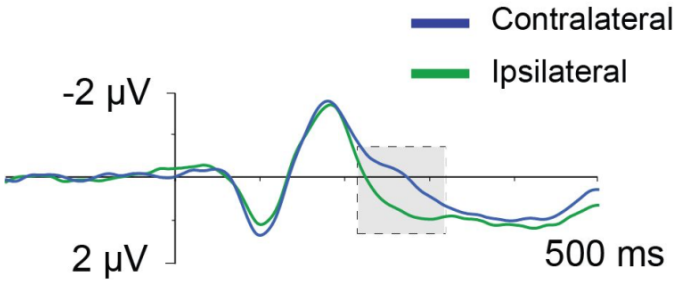




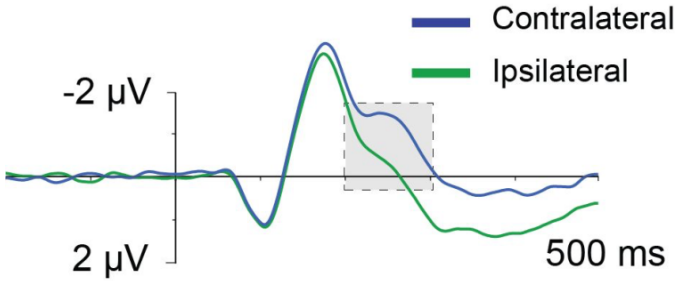


Exp 3 Results (ERPS)

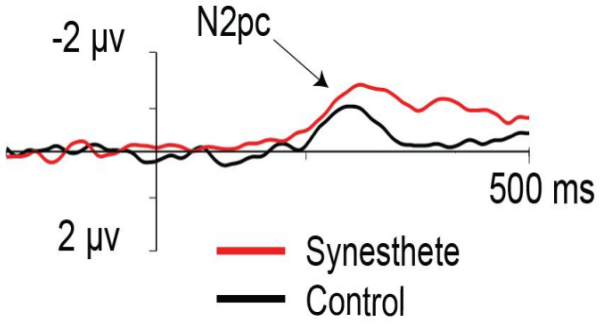
Letter Condition Controls



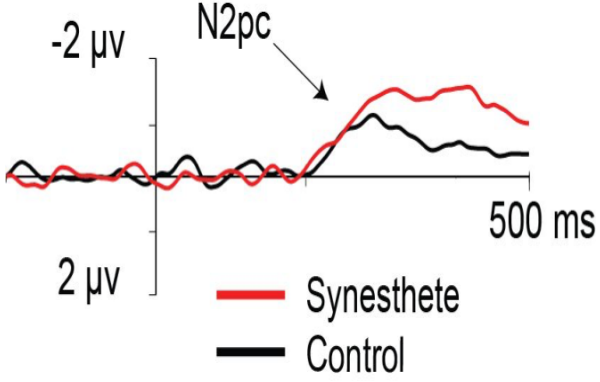
Letter Condition Synesthetes



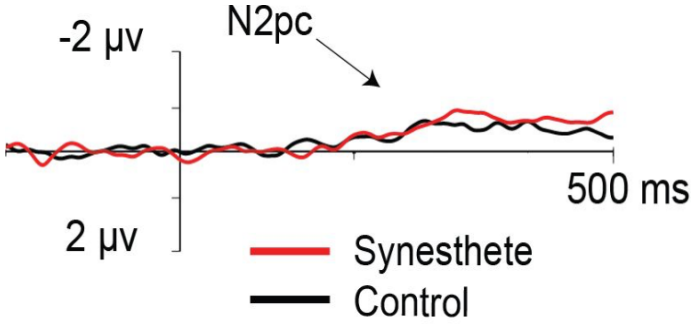
Letter



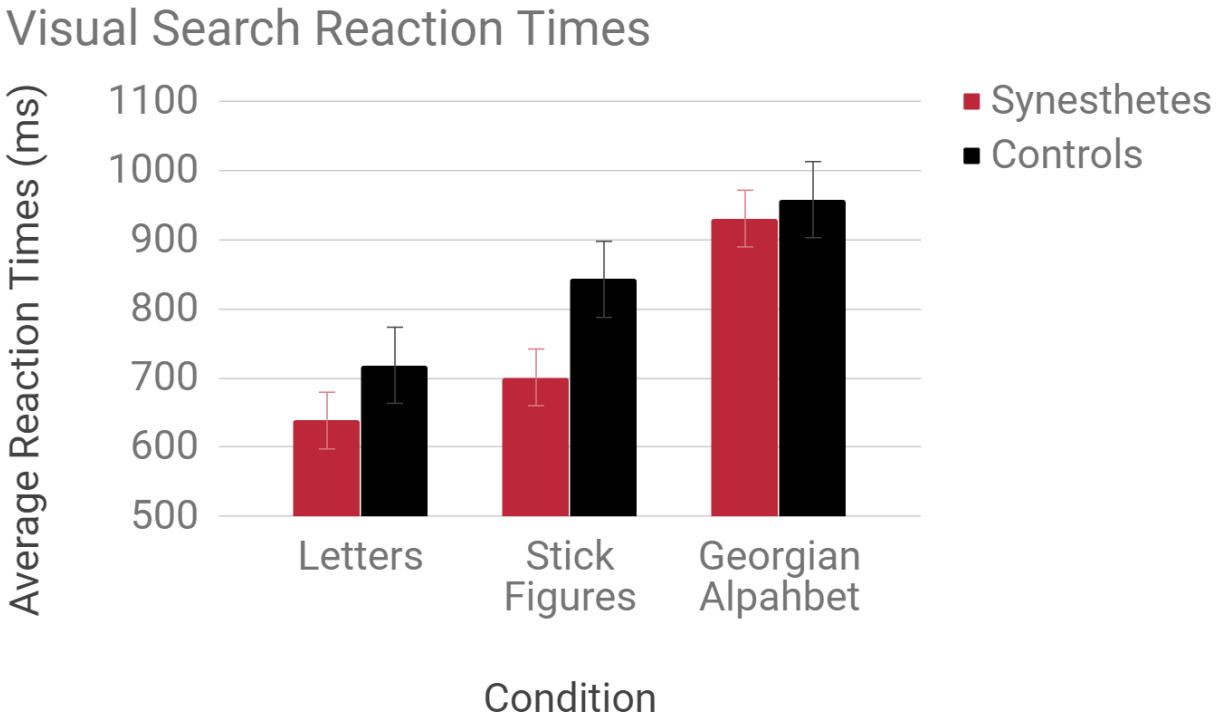
Stick Figures



Georgian Alphabet

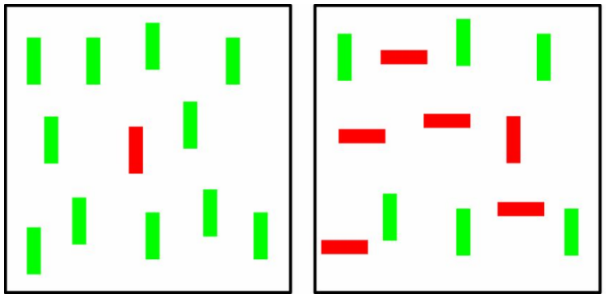


Exp 3 Behavioral data



What does it mean?

- Synthetic advantage may not only due to color perception
- Why did it not show up in the Georgian Alphabet?
- What about more traditional visual search paradigms ?



Thank you!

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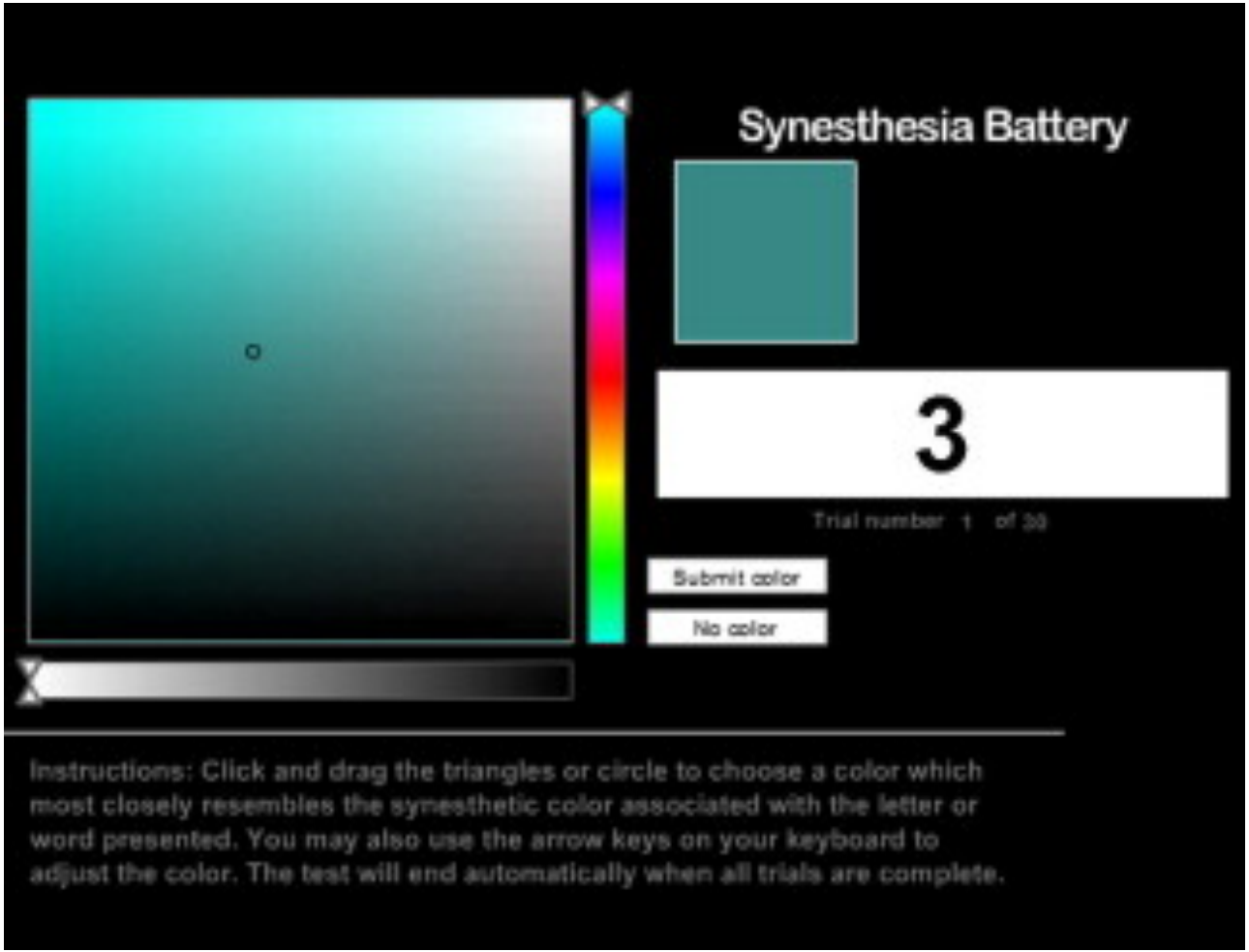
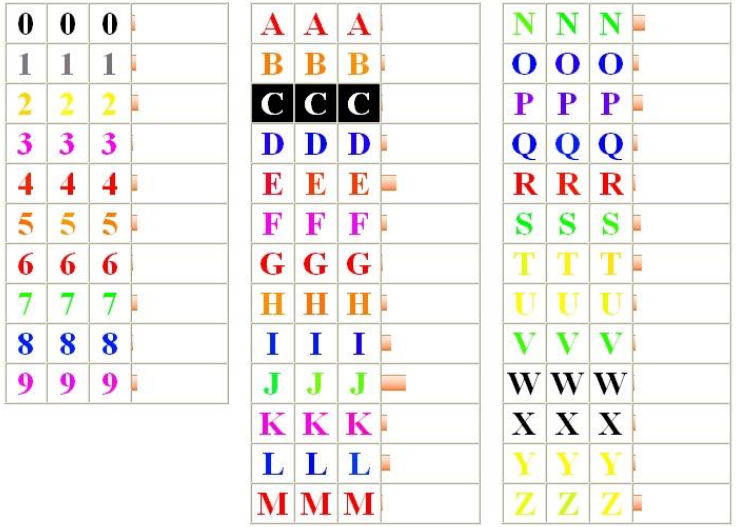

Synesthesia Battery
3
Trial number 1 of 30
Submit color
No color
Instructions: Click and drag the triangles or circle to choose a color which most closely resembles the synesthetic color associated with the letter or word presented. You may also use the arrow keys on your keyboard to adjust the color. The test will end automatically when all trials are complete.

Color Picker Test



Score: 0.27

In this battery, a score below 1.0 is ranked as synesthetic. Non-synethetes asked to use memory or free association typically score in the range of a 2.0. A perfect score of 0.0 would mean that there was no difference in the colors selected on each successive presentation of the same letter. For more information on the Univeristy of Texas Synesthesia Battery and the details of how it is scored, please refer to *D.M. Eagleman, A standardized test battery for the study of Synesthesia. UT Center for Synesthesia Internal Report. Oct, 2005* and or email us.

Speed-Congruency Test

Accuracy	94.44 %
Mean Reaction Time	1.33 seconds +/- 0.41

An accuracy percentage of right answers in the range of 90-100 typically indicates synesthetic association between the graphemes and colors. Those below 90% typically rule out synesthesia.