

# Effect of Left Supramarginal Gyrus TMS on Working Memory Interacts with Verbal Cognitive Style

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## Background and Methods

### Verbal and Visual Cognitive Styles

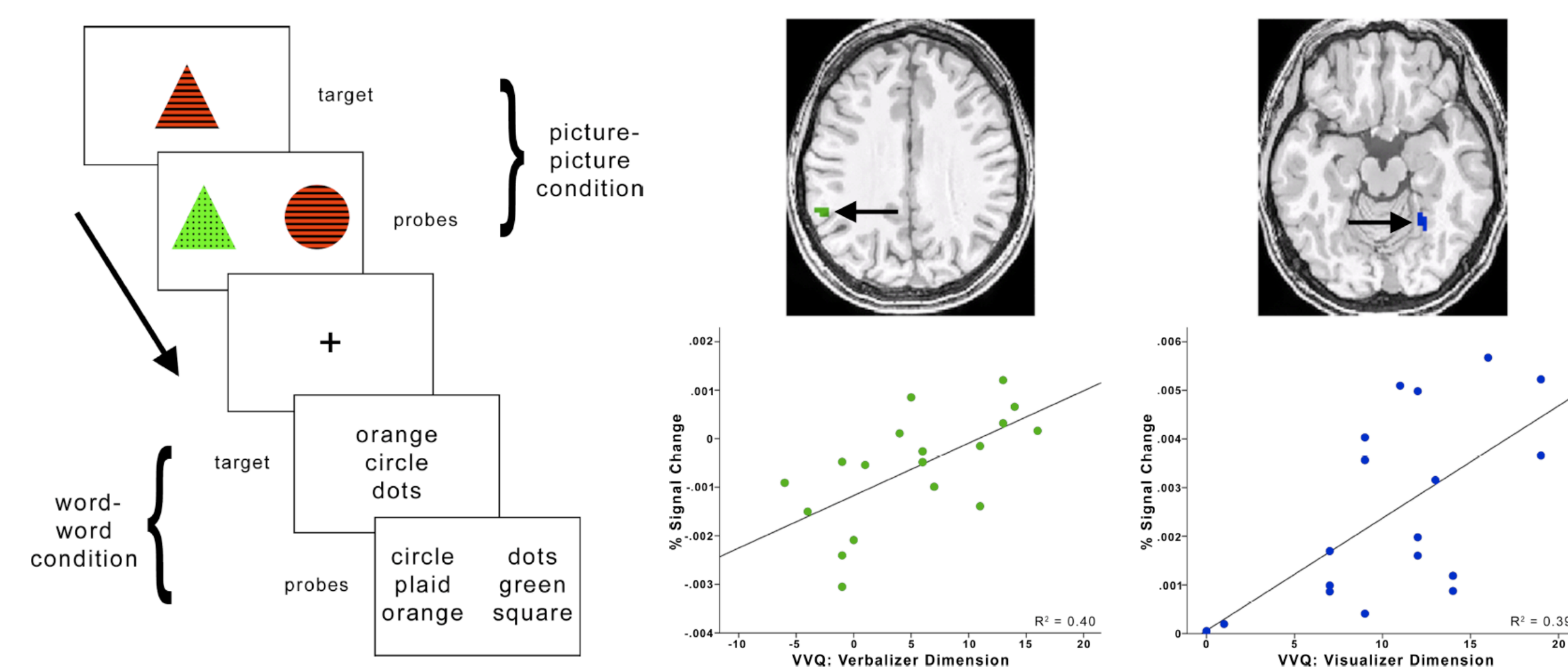
(Kirby et al., 1988, *ContempEdPsych*; Blazhenkova et al., 2008 *AppCogPsych*)

Self-reported preferences for modality of reasoning:

*Verbal: I enjoy doing work that requires the use of words.*

*Visual: I find illustrations or diagrams help me when I'm reading.*

### Previous Study: fMRI Paradigm



Kraemer, Rosenberg, & Thompson-Schill (2009), *J Neurosci*

*Does the verbal strategy rely on left supramarginal gyrus?*

### Current Study: fMRI-guided TMS Procedure

#### MRI Session:

- Anatomical Scan
- Functional Localizer

#### TMS Session 1:

- 15m @ 1Hz, 110% of threshold
- 12m: Visual/Verbal Task

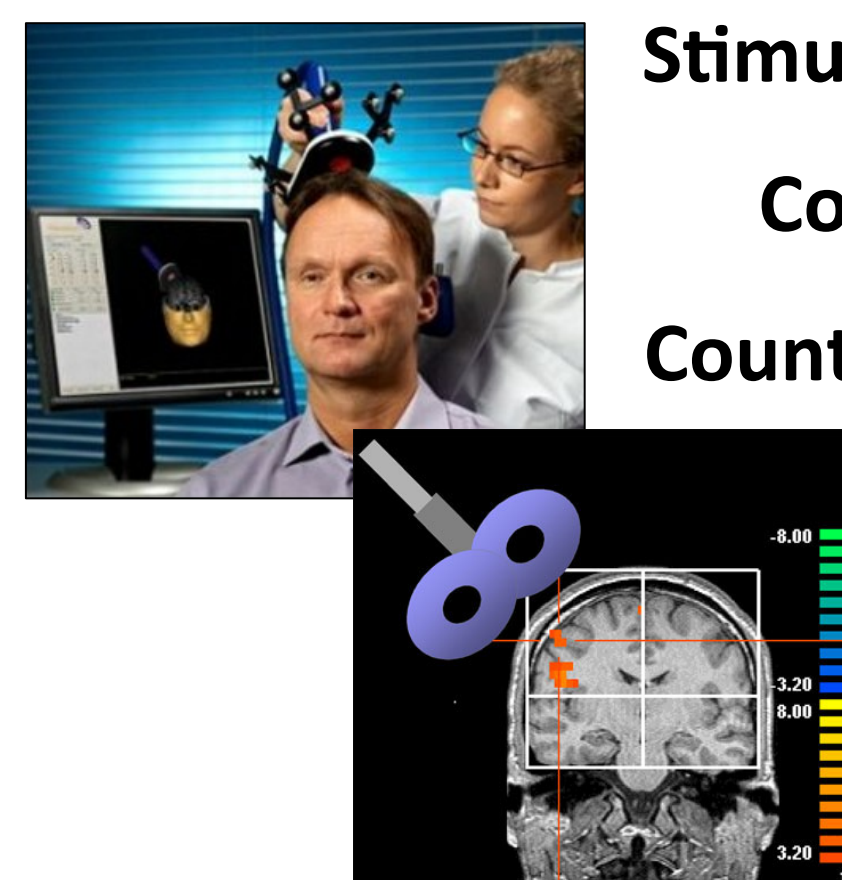
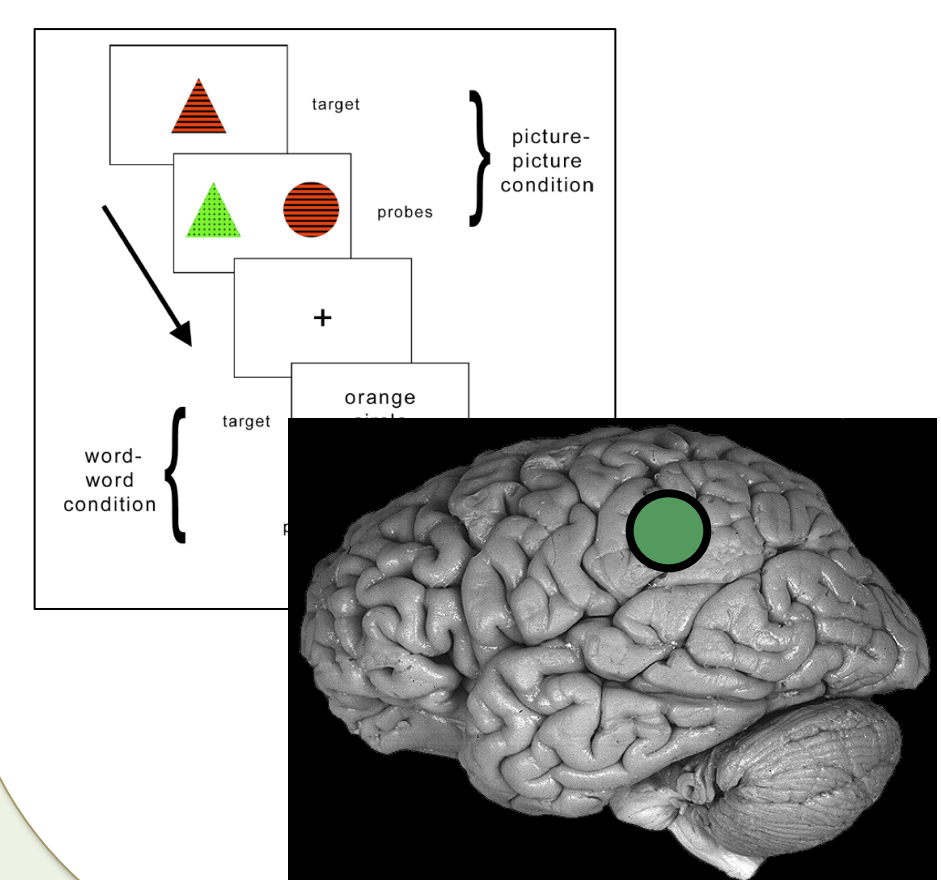
#### TMS Session 2:

- 15m @ 1Hz, 110% of threshold
- 12m: Visual/Verbal Task

Stimulation site: Left SMG

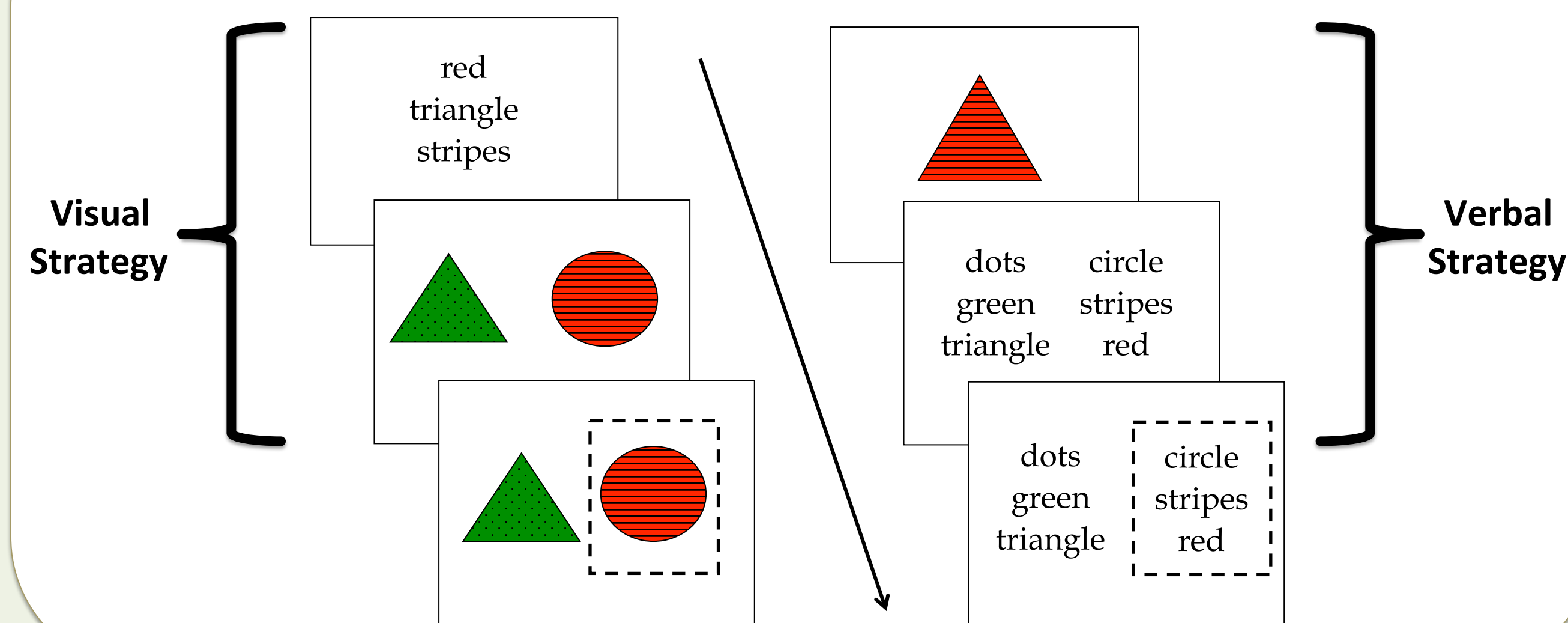
Control site: Vertex

Counterbalanced sessions

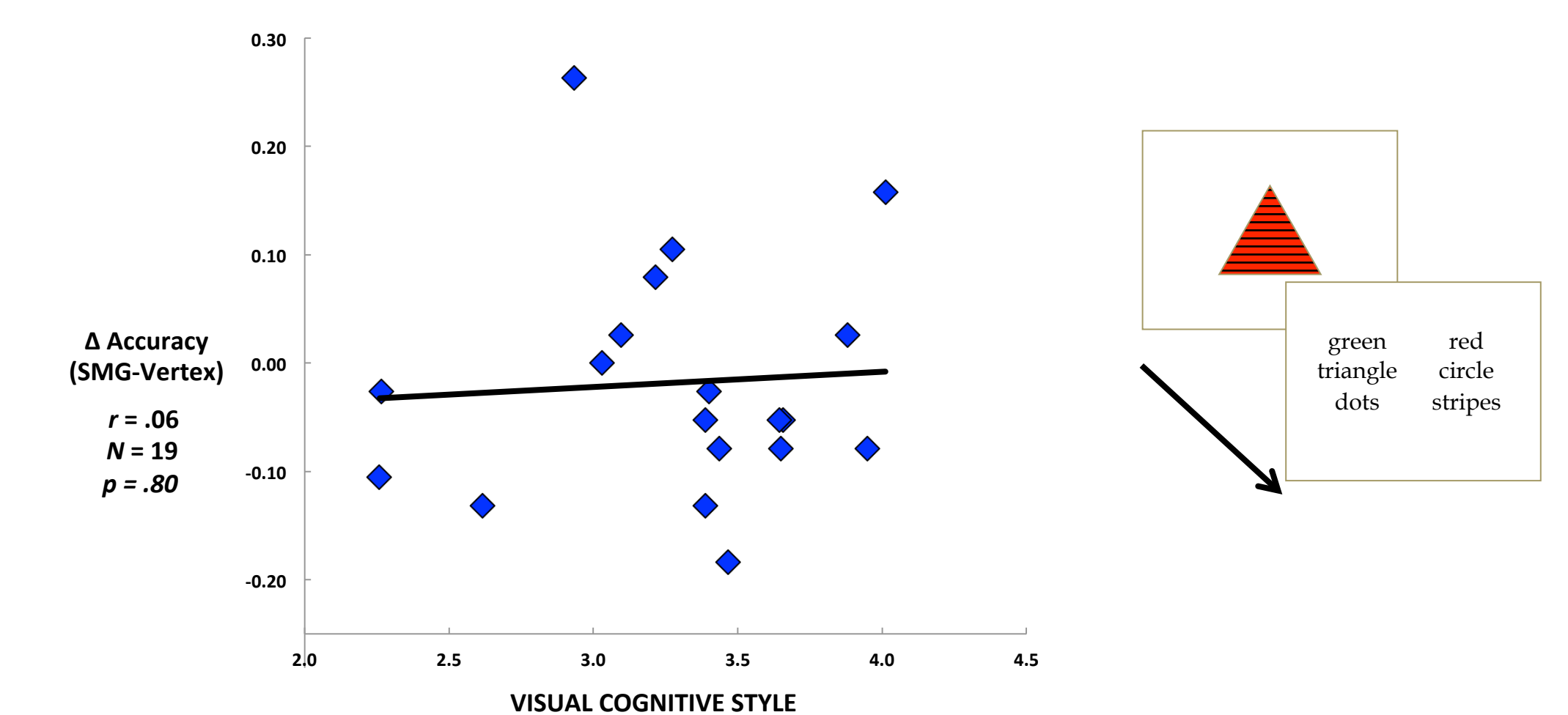


## Hypothesis and Results

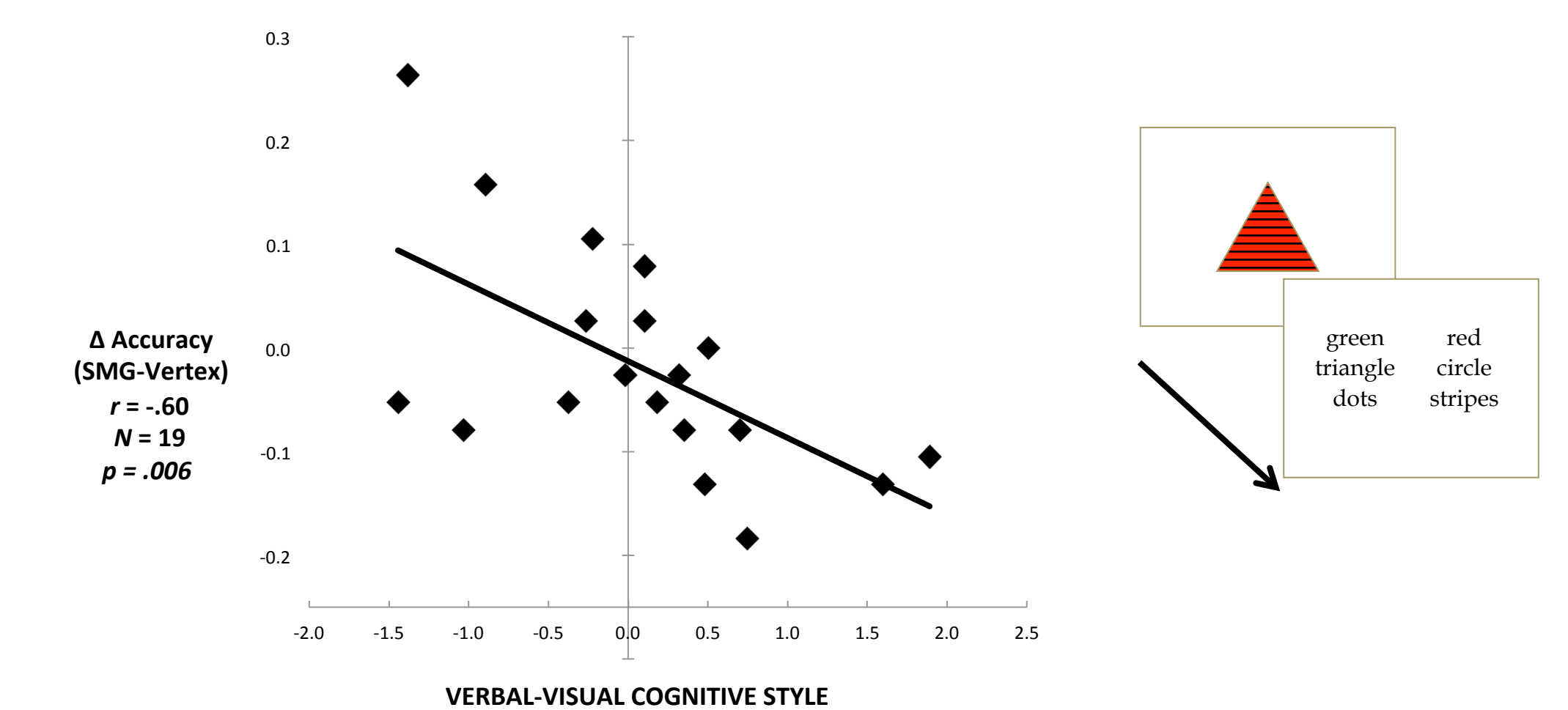
### Conversion Conditions



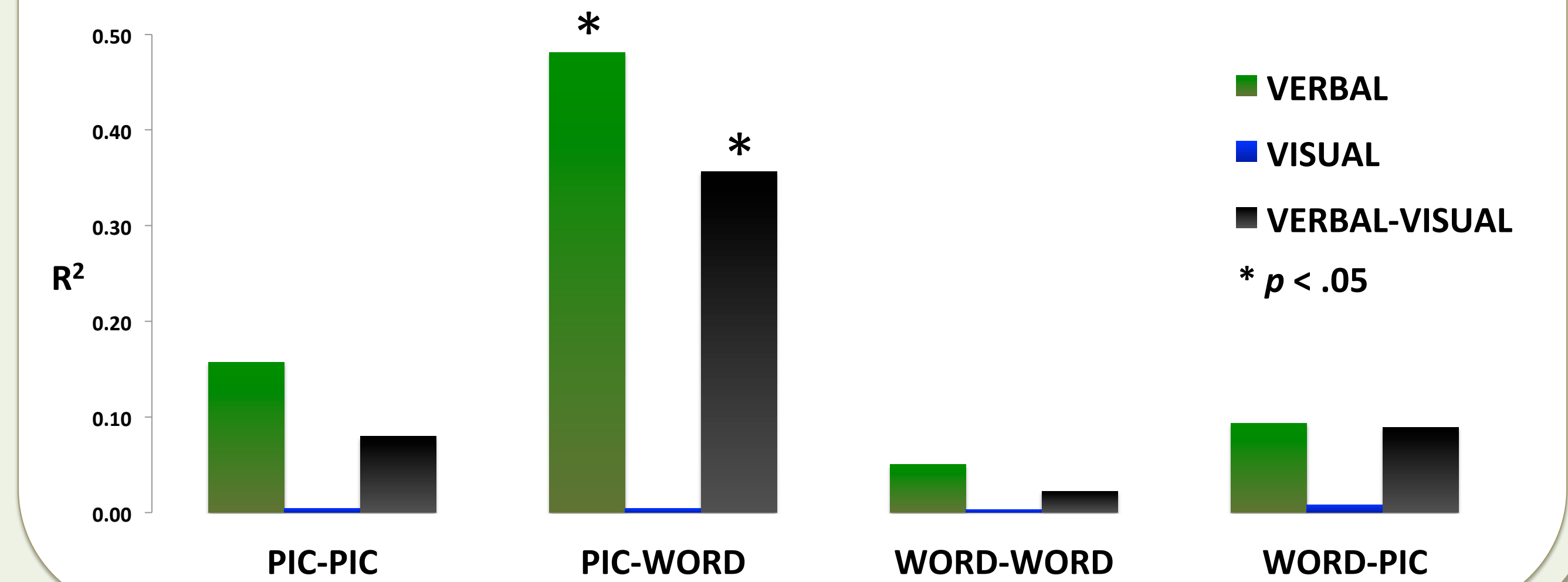
### Left SMG and Visual Strategy



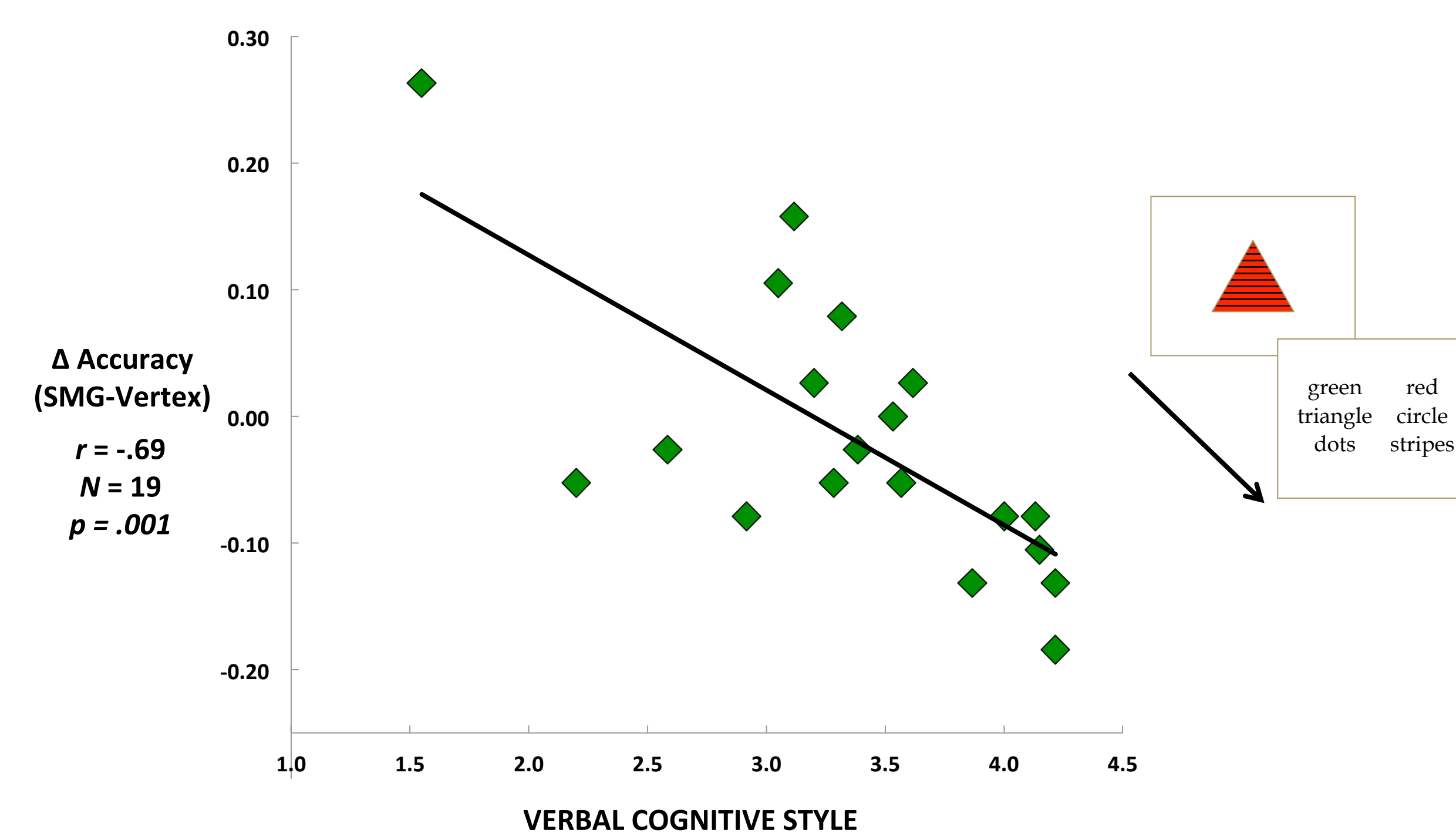
### Left SMG and Verbal-Visual Strategy



### Variance Explained by Cognitive Styles



### Left SMG and Verbal Strategy



*As hypothesized, LSMG TMS impairs performance on the visual  $\rightarrow$  verbal conversion condition, proportional to one's verbal cognitive style.*

## Reprints and Acknowledgment

Download a pdf reprint of this poster:  
[psych.upenn.edu/stslab/posters.html](http://psych.upenn.edu/stslab/posters.html)

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## Summary

Left SMG stimulation caused a decline in performance during the condition requiring conversion from pictorial image to verbal label. The magnitude of this effect was predicted by individuals' level of verbal cognitive style, supporting the hypothesized role of left SMG in the verbal labeling strategy.