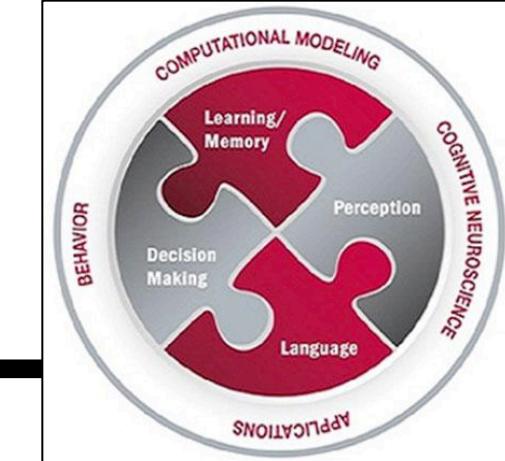


Exploring the Generalizability of Visual Search Strategies



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Background



Every day, we look for objects through the process of **visual search** with different **strategies**.

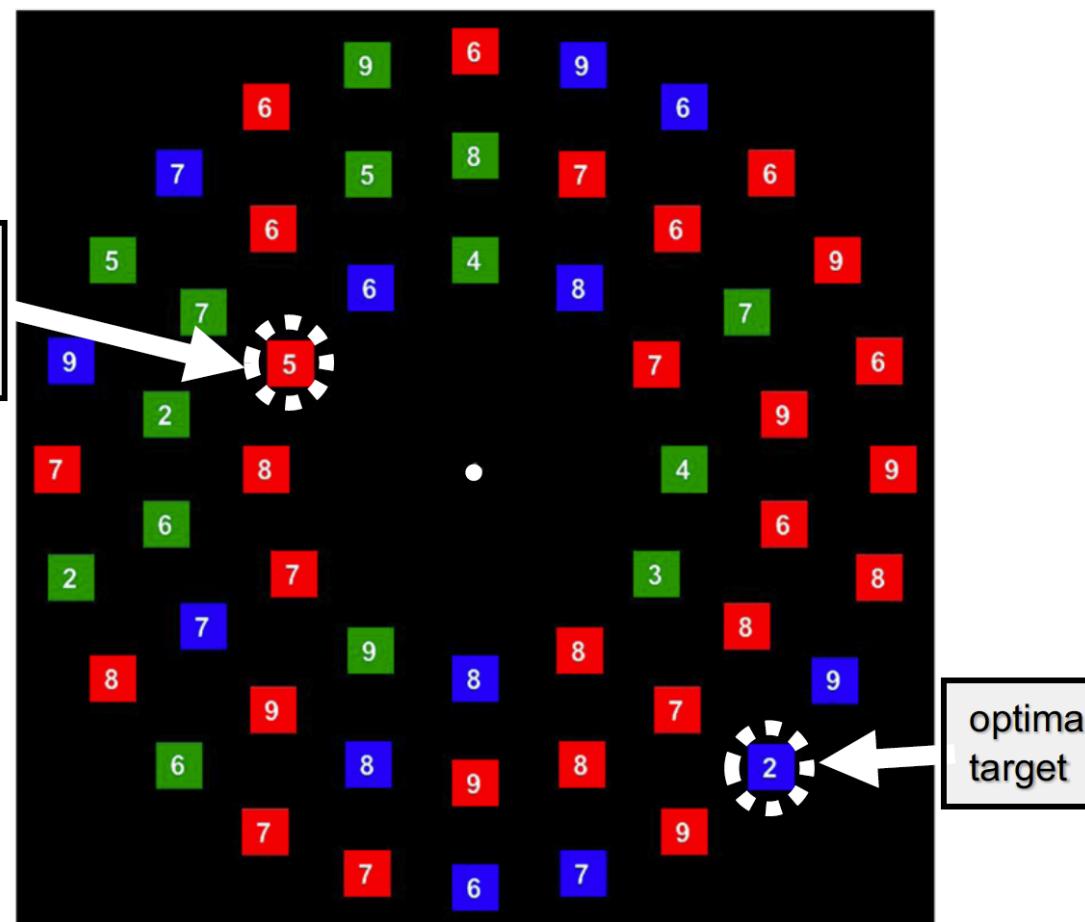
- Some strategies are more efficient than others.
Think of finding a tomato (an object like this ●) from a crowded grocery store shelf.
 - Searching for red colors (fewer things to look through) will be much faster than searching for ○ shapes (more things to look through).
- How do people **choose** their visual search **strategies**?

Adaptive Choice Visual Search (ACVS)^{1,2}

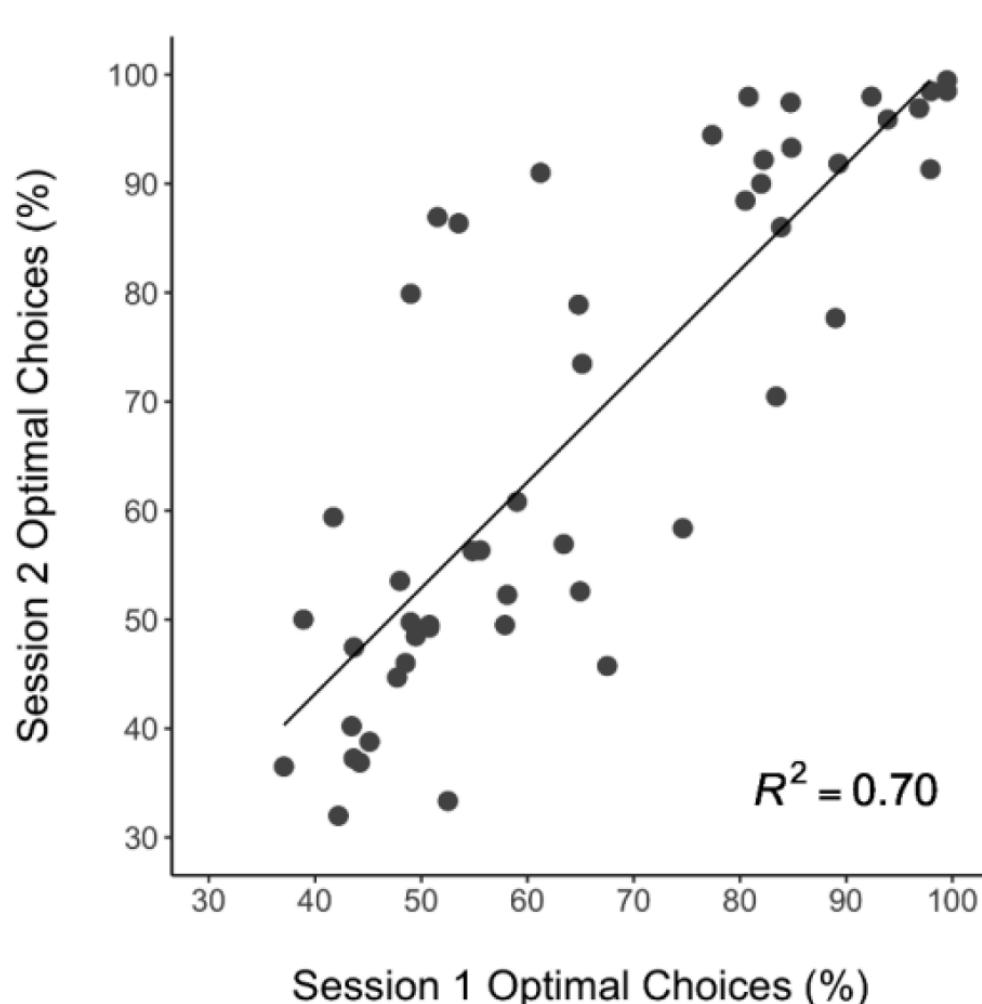
Task: Find a red OR blue square with a digit

2-5.

- ❖ **Two** targets present on each trial
 - One ■ and one □, both with a digit 2-5
- ❖ Only need to find **one** target
 - Free choice: either red or blue is always correct
- ❖ Targets not equivalent
 - More red squares in this example display
 - Faster to search for blue (**optimal choice**)³
 - Optimal color changes periodically in runs of 1-6



Strategy Measurement: Proportion of Optimal Choices, over three blocks of approx. 250 trials



Findings: Broad and stable individual differences

- ❖ Individuals' proportion of optimal choices in two sessions separated 1-10 days apart ($M = 3.1$) were positively correlated²

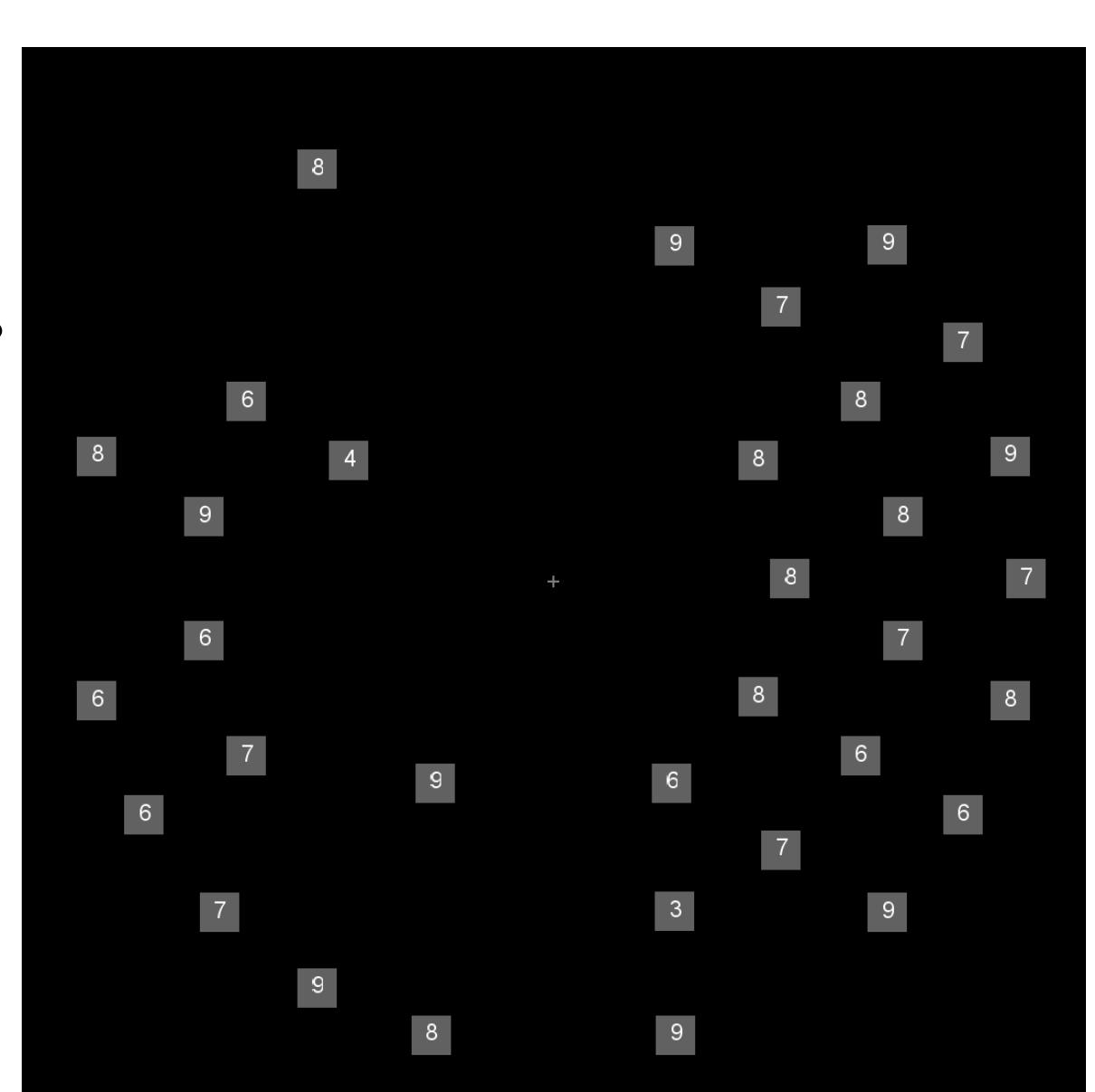
Question: Are visual search strategies generalizable?

If an individual performs optimally in the ACVS, will they do so in other visual search tasks?

Methods

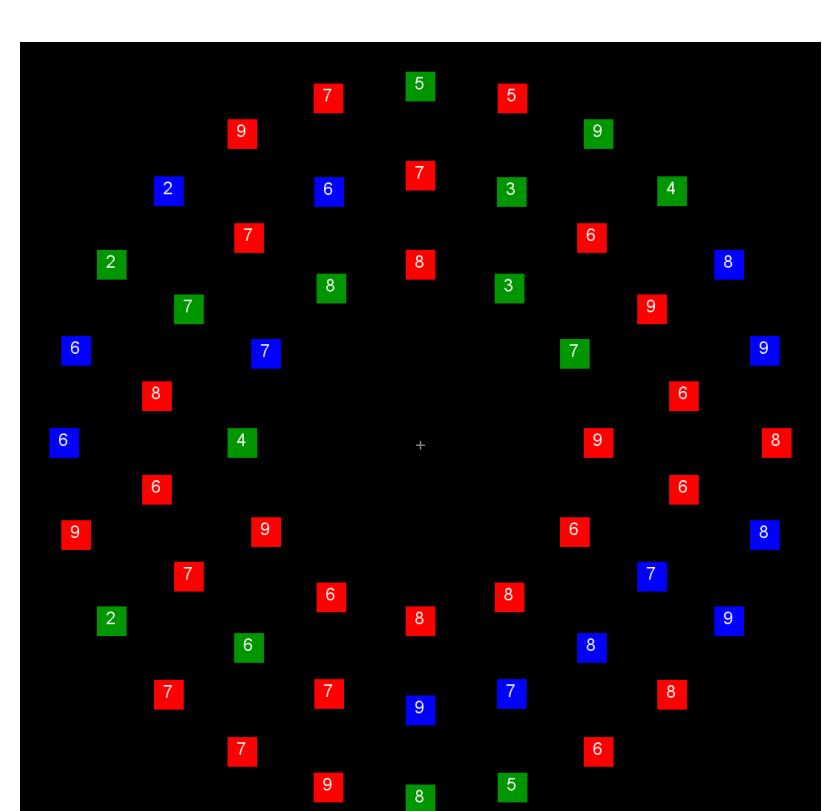
Task: Find a target square with a digit 2-5.

- ❖ Two targets present on each trial
 - Now, one will be on the **left** and one on the **right**
- ❖ Only need to find one target
 - Free choice: either one is always correct
- ❖ Targets not equivalent
 - More squares on **one side** of the display
 - Faster to search **the other side** (optimal target)

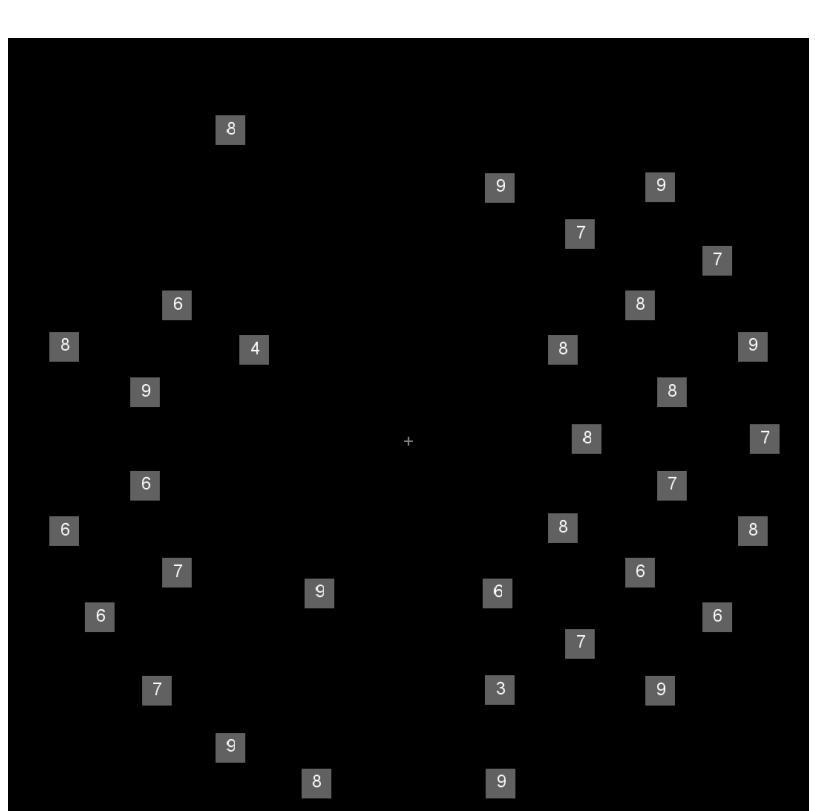


Optimal target side changes periodically in runs of 1-6 (avg. 3.5)

Experimental Procedure

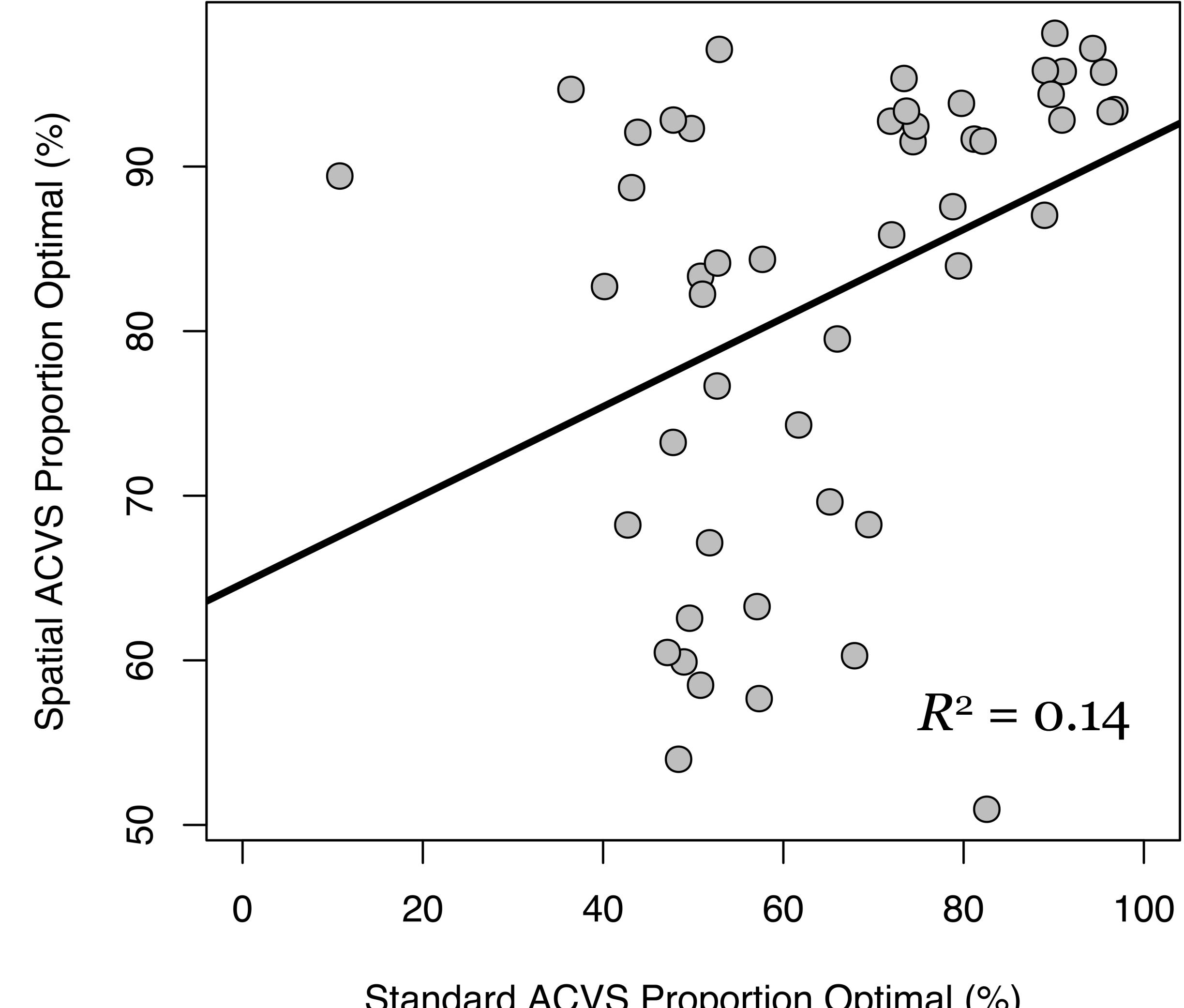
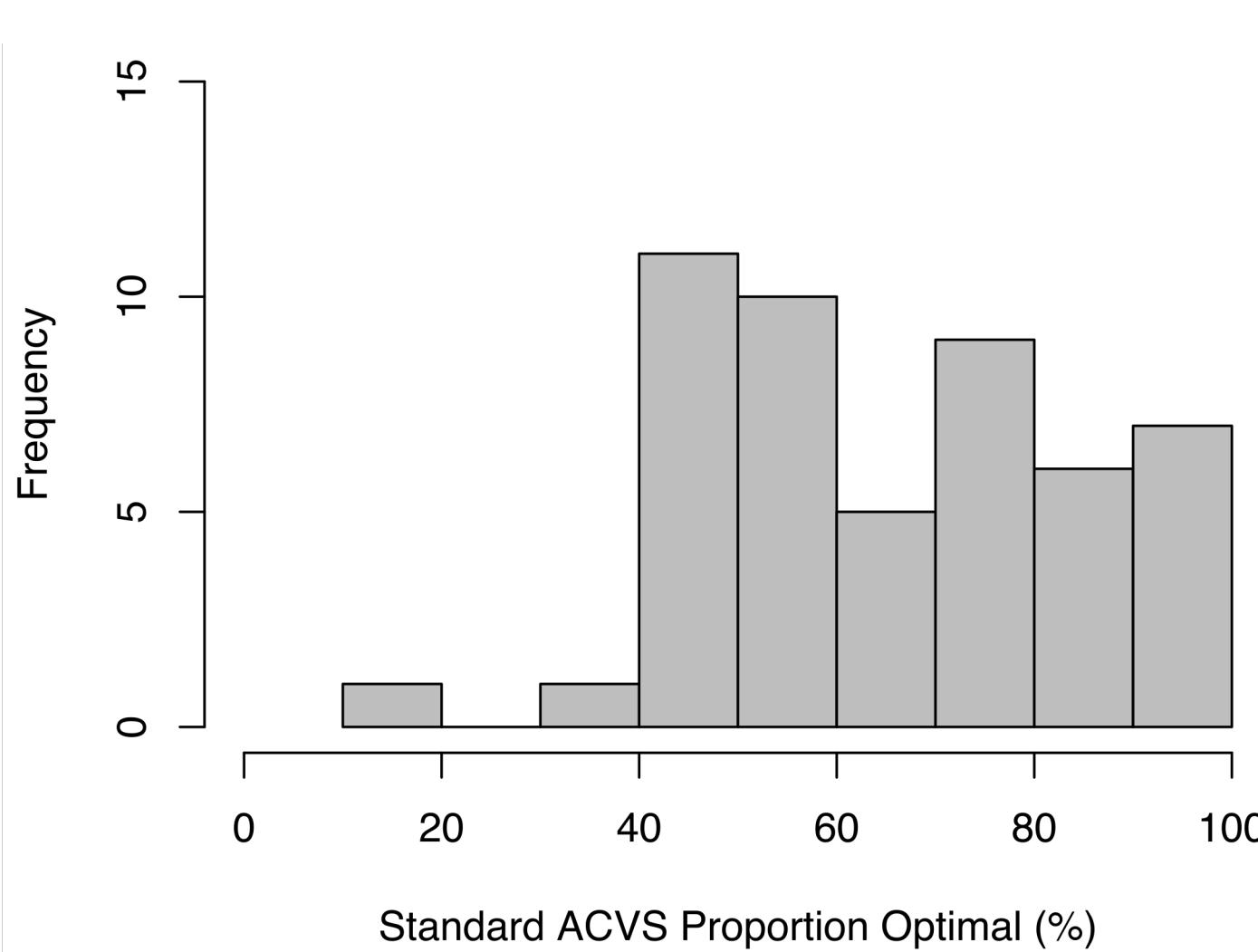
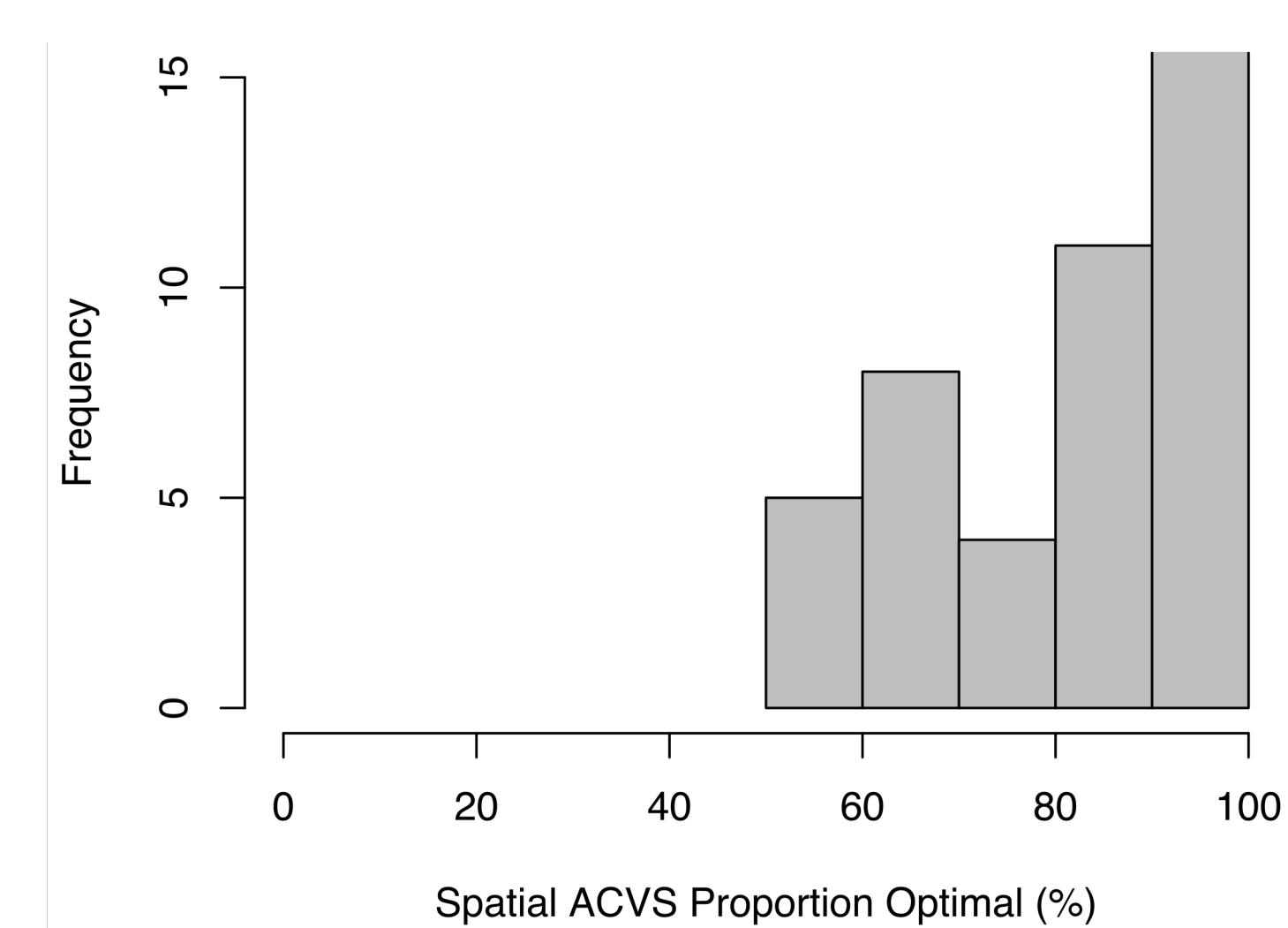


Standard ACVS
3 blocks (~20 min)



Spatial ACVS
3 blocks (~20 min)

Results



Discussion

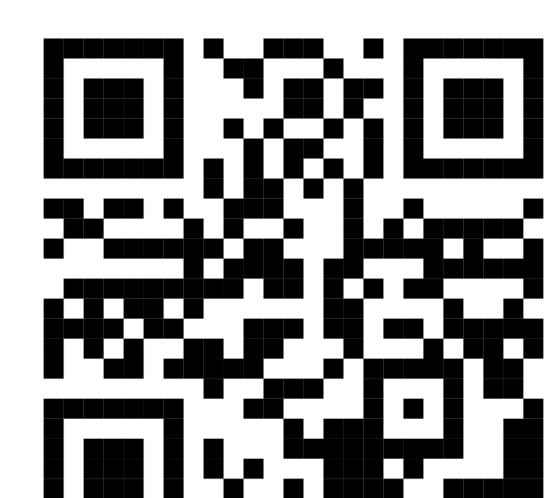
Results showed a **positive correlation** in optimal target choices, indicating similar strategy usages in individuals. The extent to which one is optimal in ACVS at least generalizes to some other tasks.

- ❖ The two tasks were completed in one sitting. This might have resulted in the lower correlation between tasks ($r = .38$) than the test-retest reliability ($r = .83$) of the ACVS, which was assessed by two sessions completed about a week apart².
- ❖ Enumeration has been a main strategy component in both tasks. However, the optimal strategy to a certain visual search task does not necessarily require enumeration.
 - Will people use same strategy in tasks without requiring enumeration?
 - We need to develop more visual search tasks with different strategy sub-components and see if people generalize their strategies to them⁴.
- ❖ The final goal is a complete understanding of how people use their attentional control settings in unconstrained, real-world environments.

References

- 1 Irons, J. L., & Leber, A. B. (2016). Choosing attentional control settings in a dynamically changing environment. *Attention, Perception, & Psychophysics*, 78(7), 2031-2048.
- 2 Irons, J. L., & Leber, A. B. (2018). Characterizing individual variation in the strategic use of attentional control. *Journal of Experimental Psychology: Human Perception and Performance*, 44(10), 1637.
- 3 Treisman, A. M., & Gelade, G. (1980). A feature-integration theory of attention. *Cognitive psychology*, 12(1), 97-136.
- 4 Irons, J., & Leber, A. B. (2019). Developing an individual profile of attentional control strategy.

Data



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