



Individual Differences in Value-Driven Attentional Capture: **VDAC magnitude is not a reliable trait measure.**

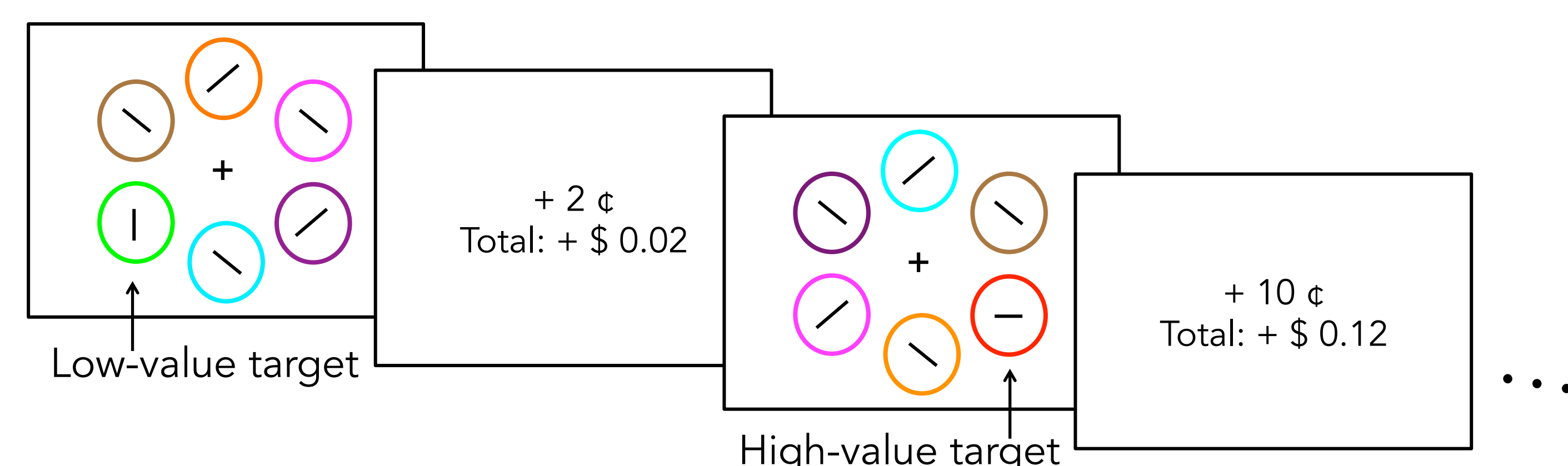
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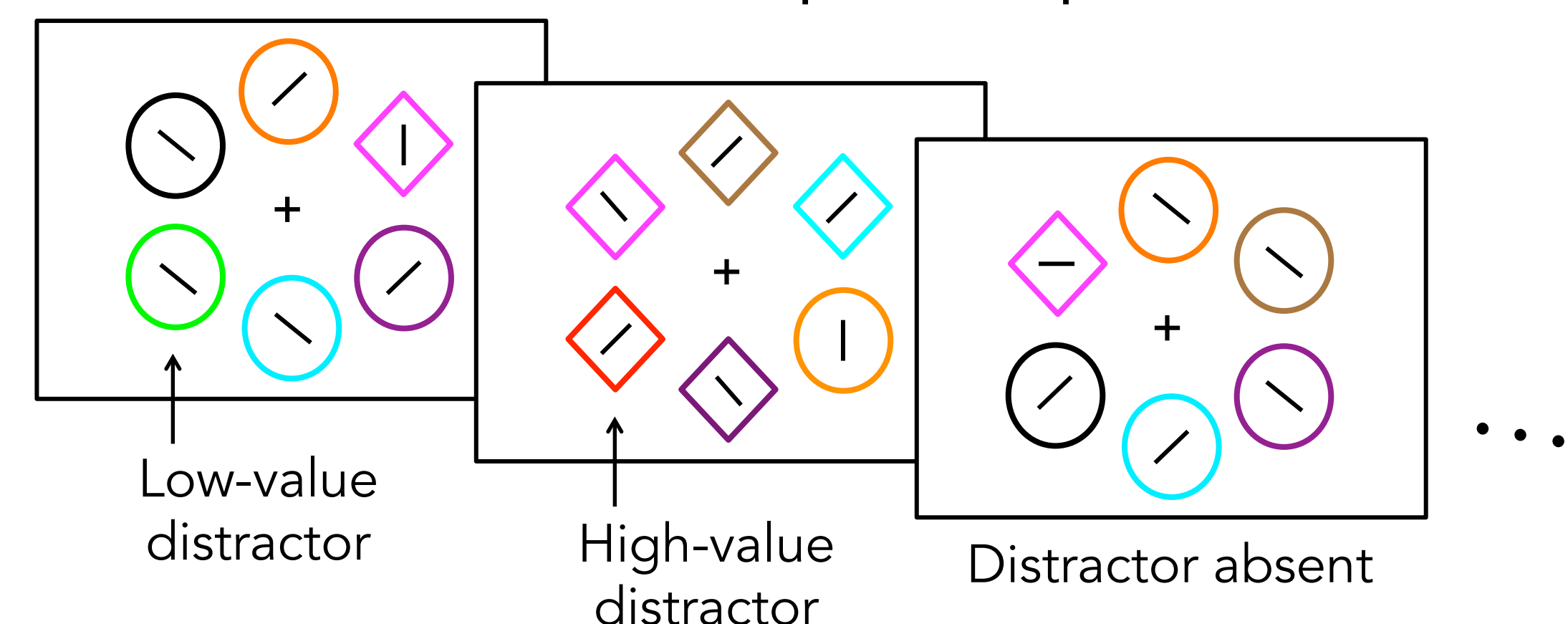
Value-Driven Attentional Capture

Numerous studies have employed variants of a paradigm used to measure value-driven attentional capture (VDAC)¹, the slowing of responses in the presence of a task-irrelevant, but previously reward-associated stimulus (e.g., color).

Training: Search for green or red circle



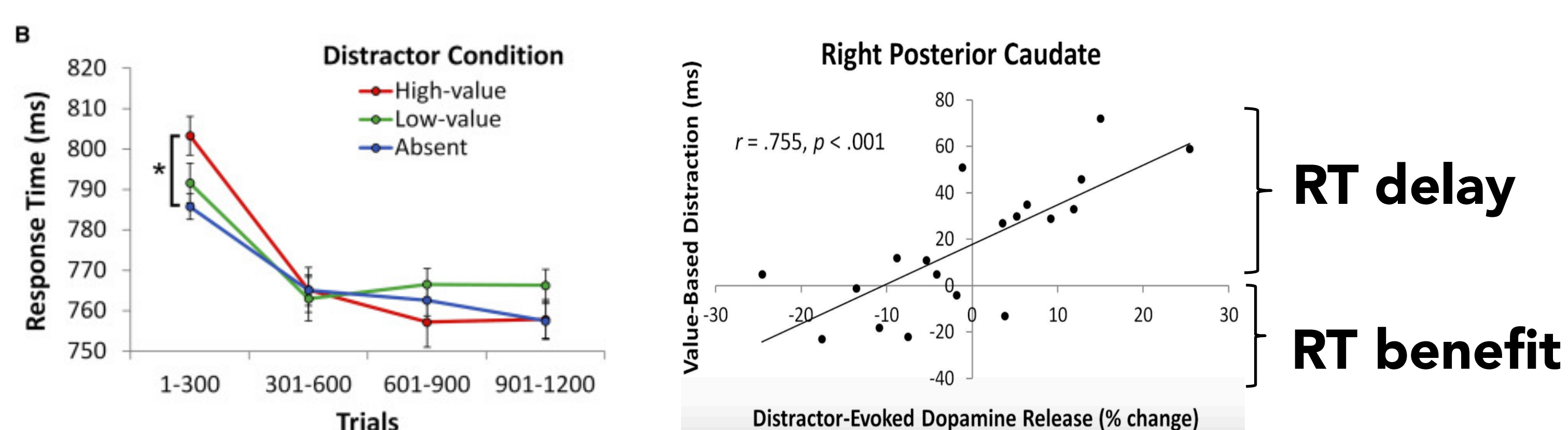
Test: Search for unique shape (color irrelevant)



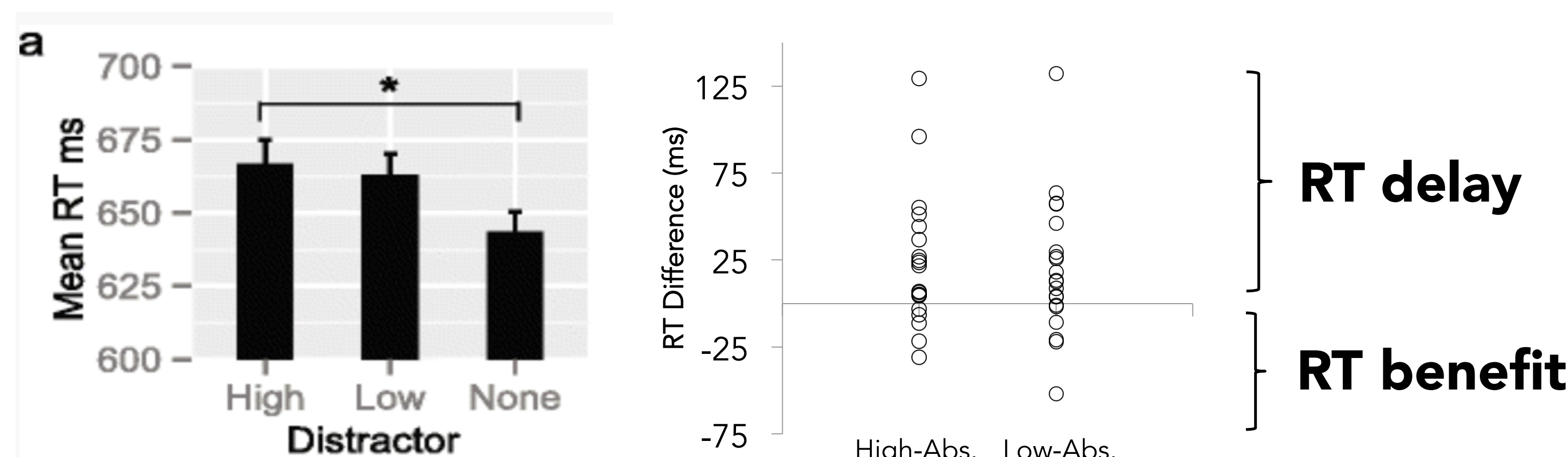
Individual Differences

Small group-level effects are consistently replicated, but there are large individual differences in VDAC. Many participants show no, or even negative, VDAC^{2,3}.

Anderson et al., 2016



Jahfari & Theeuwes, 2017

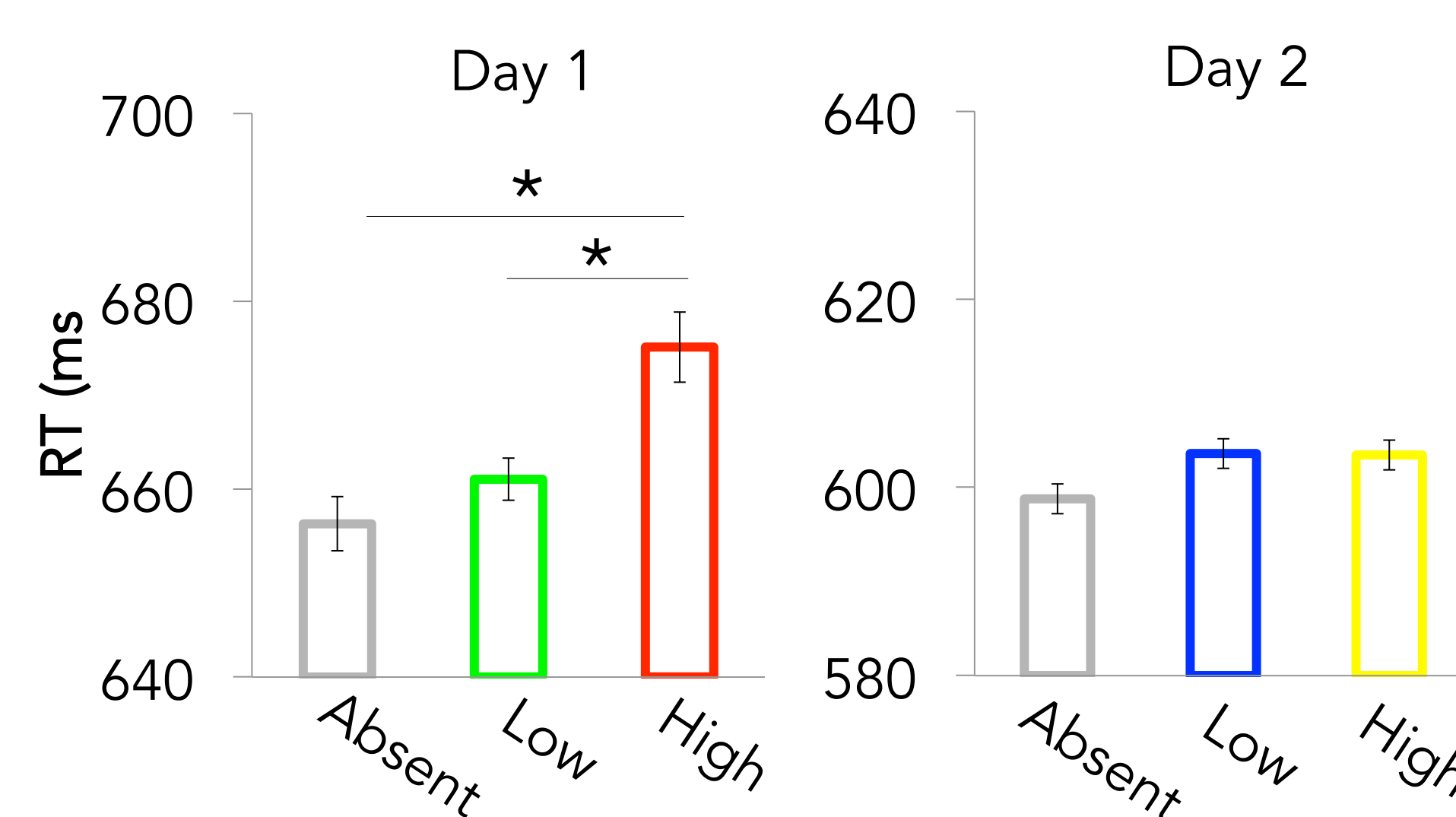


Is VDAC magnitude reliable?

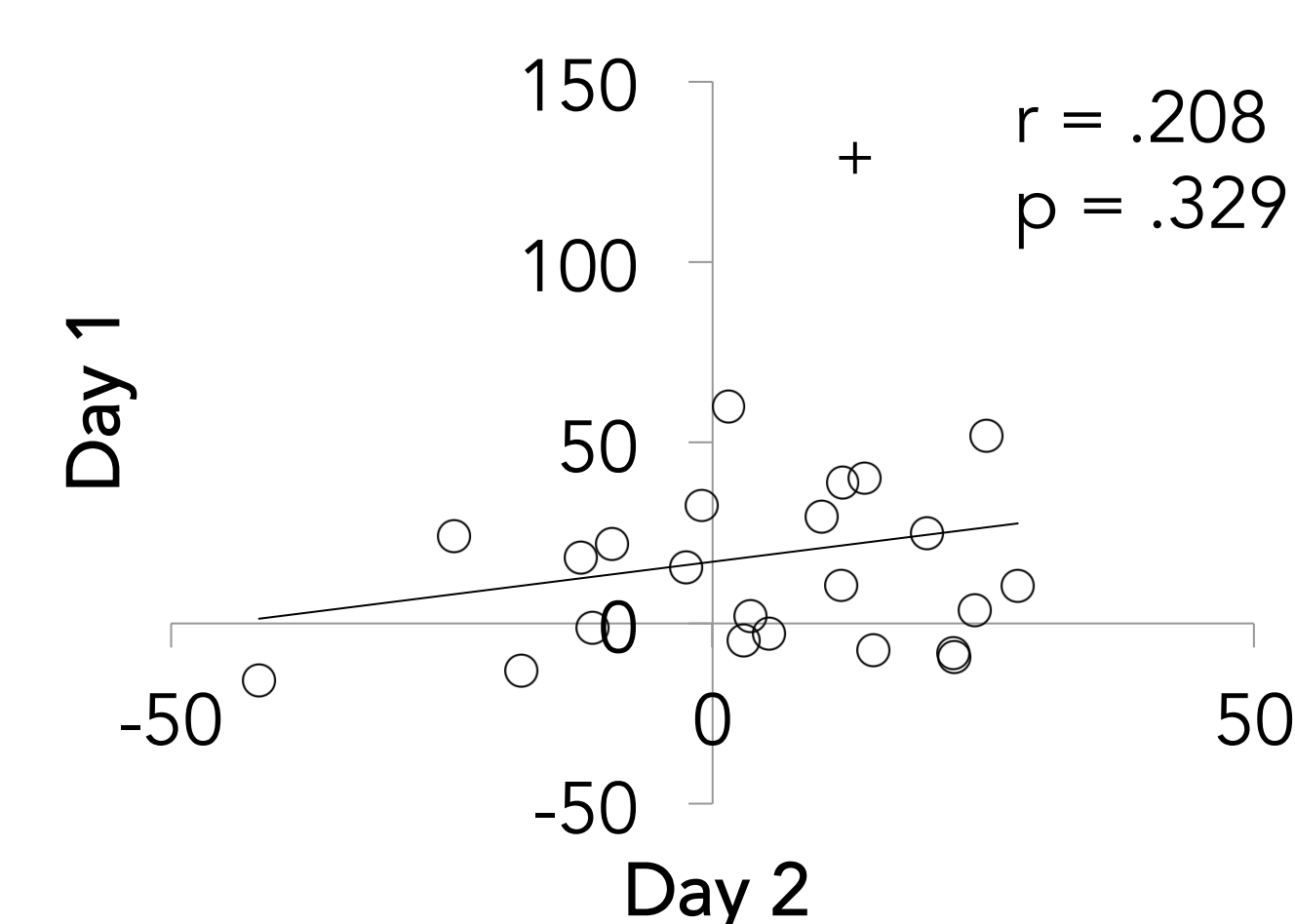
- **Test-Retest:** 48 participants completed 2 sessions, separated by 1-3 days (see diagrams above).
- **Reinforcement context:** during training, half the participants received rewards (High: 10¢, Low: 2¢) and half avoided losses (High: 10¢, Low: 2¢) for correct responses.
- Learning of the color-value associations was probed by questionnaire at the end of experiment.

VDAC magnitude is unreliable across and within sessions.

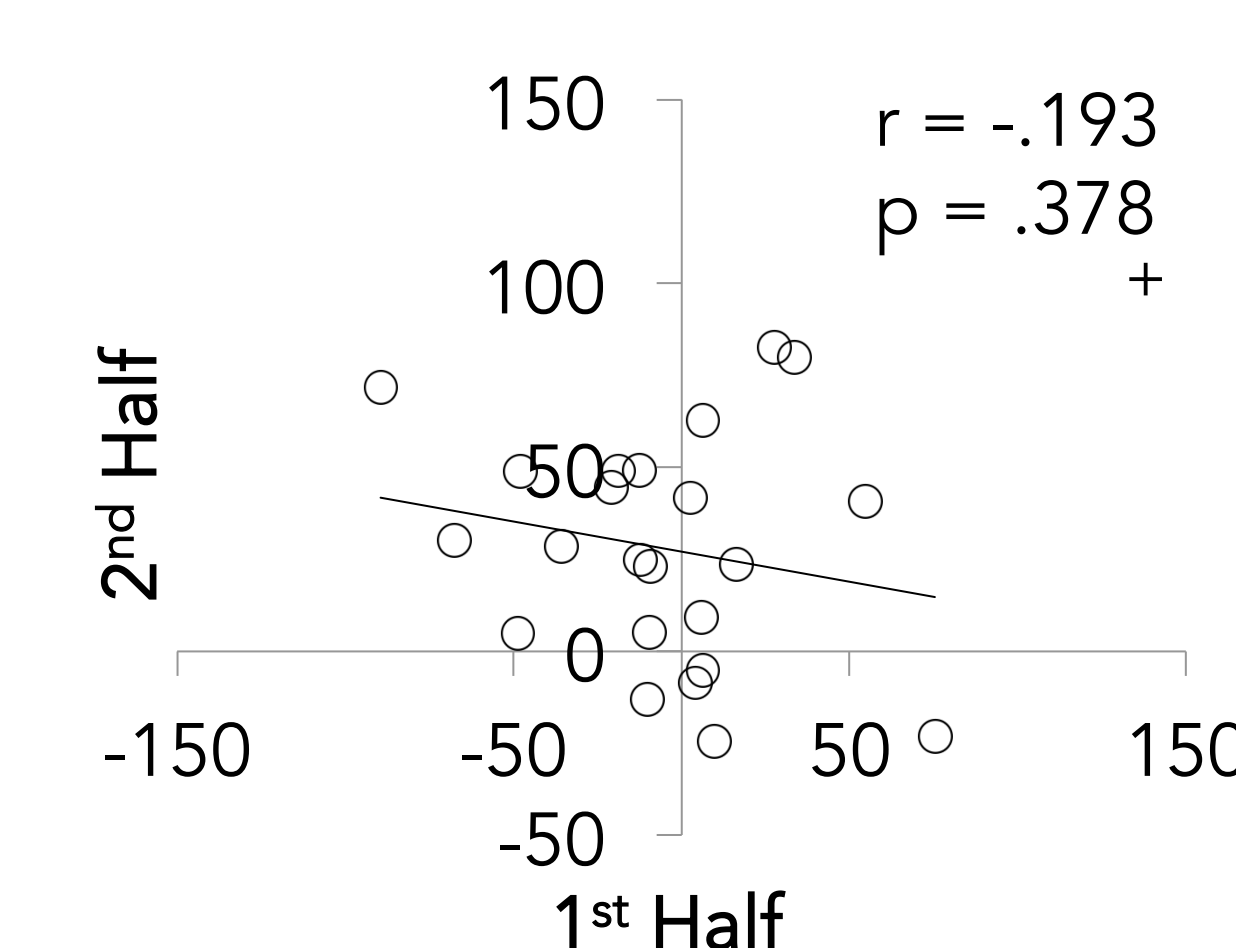
Reward Context:



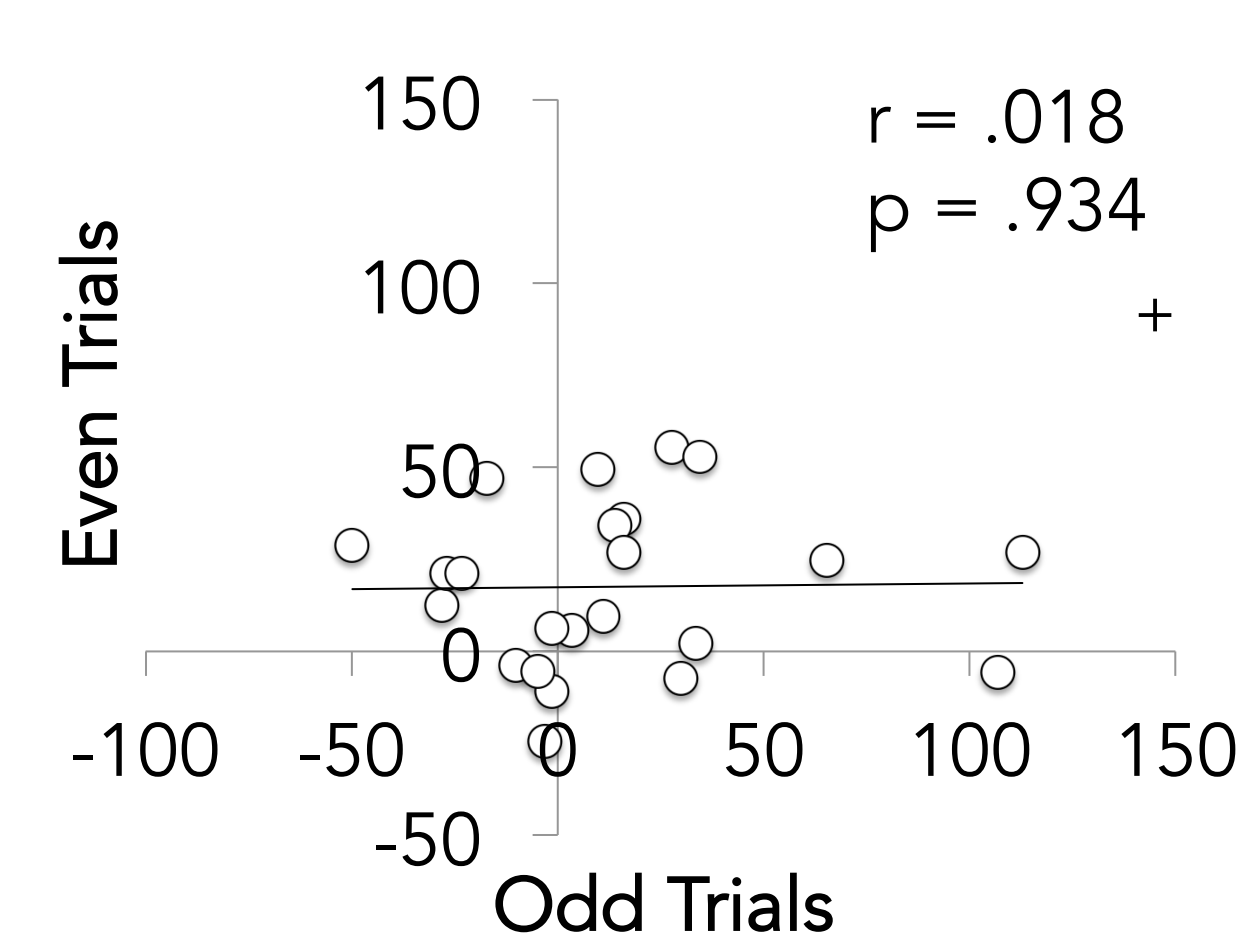
Across sessions



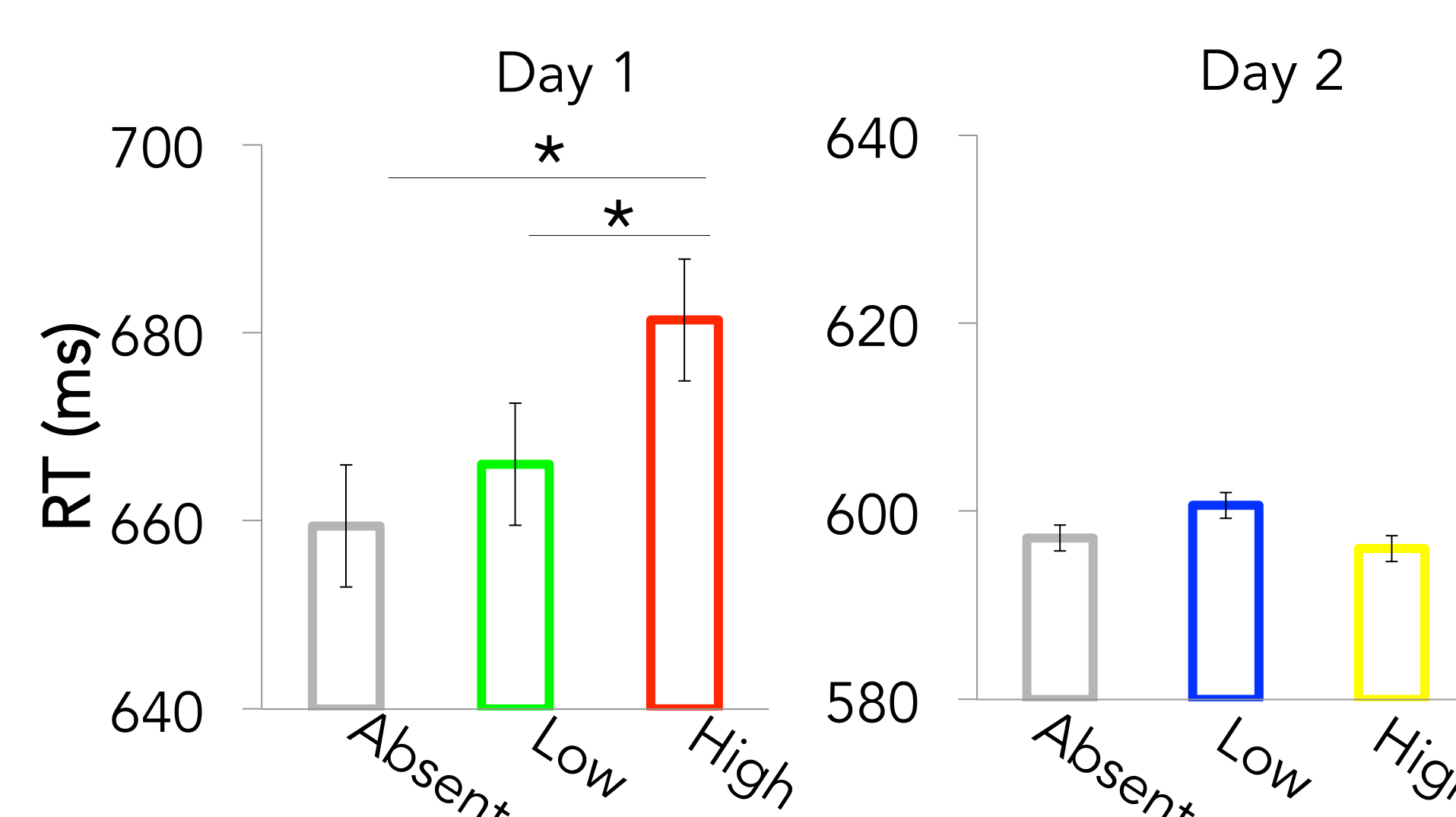
Within-session: 1st half vs. 2nd half



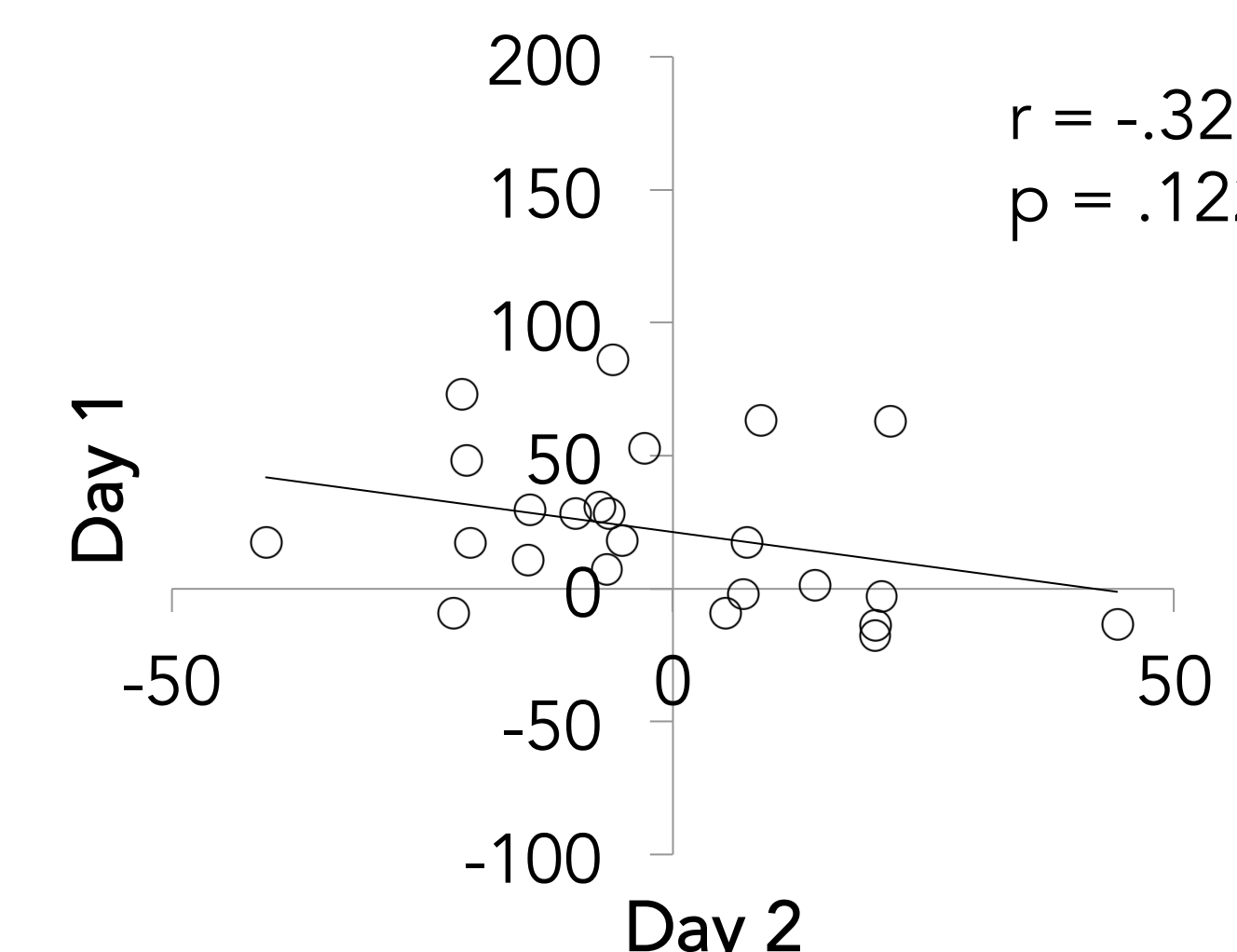
Within-session: odd vs. even trials



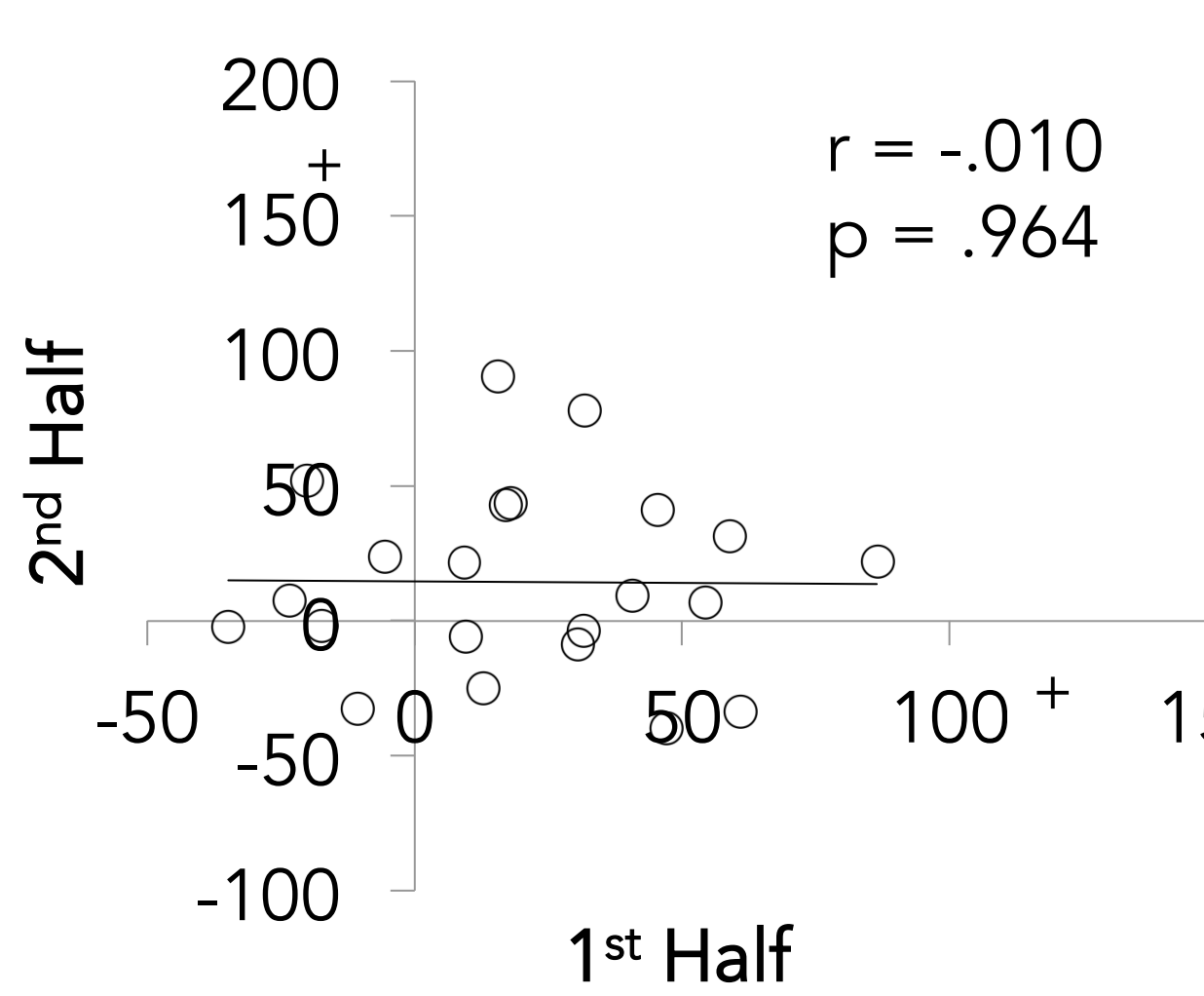
Loss-Avoidance Context:



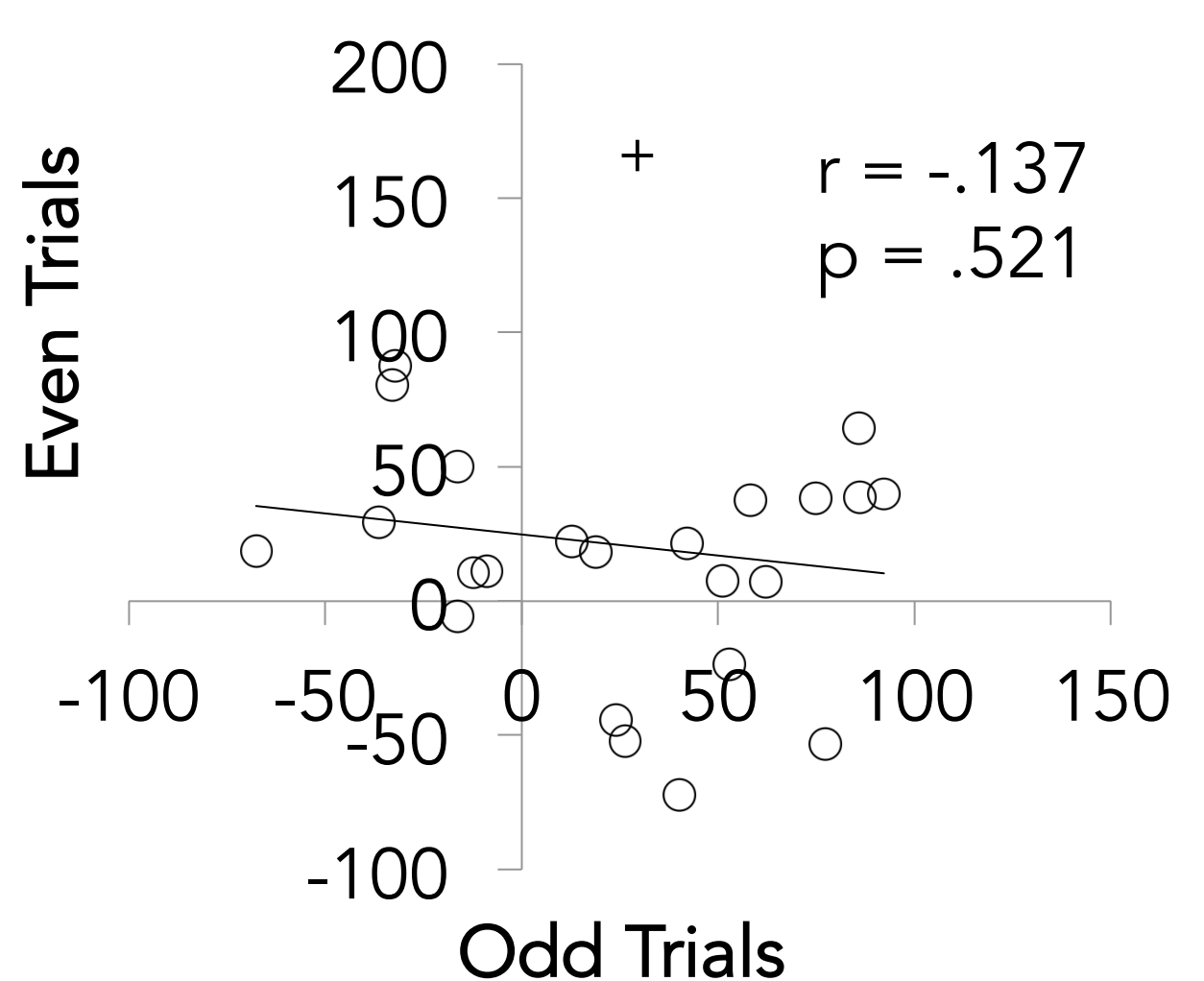
Across sessions



Within-session: 1st half vs. 2nd half

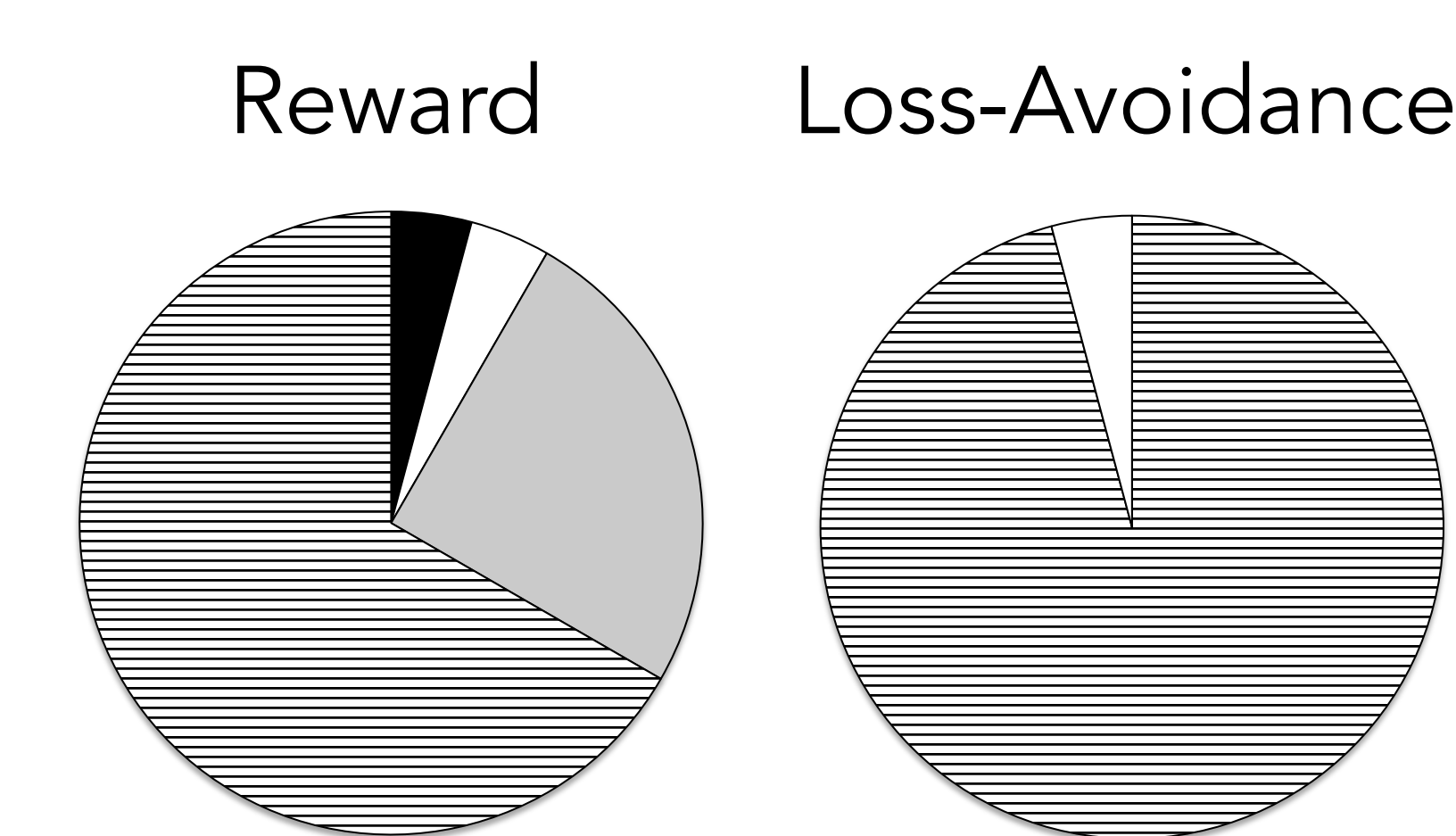


Within-session: odd vs. even trials

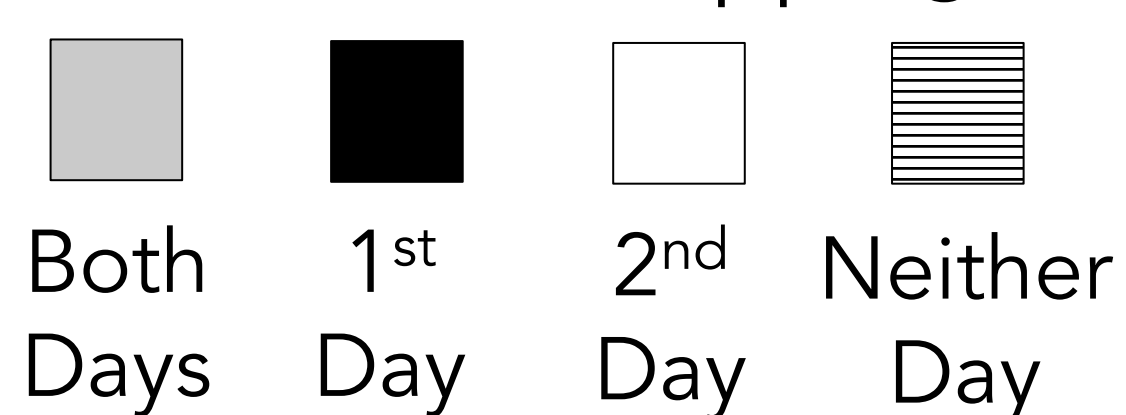


Participants who report color-value mappings show greater capture.

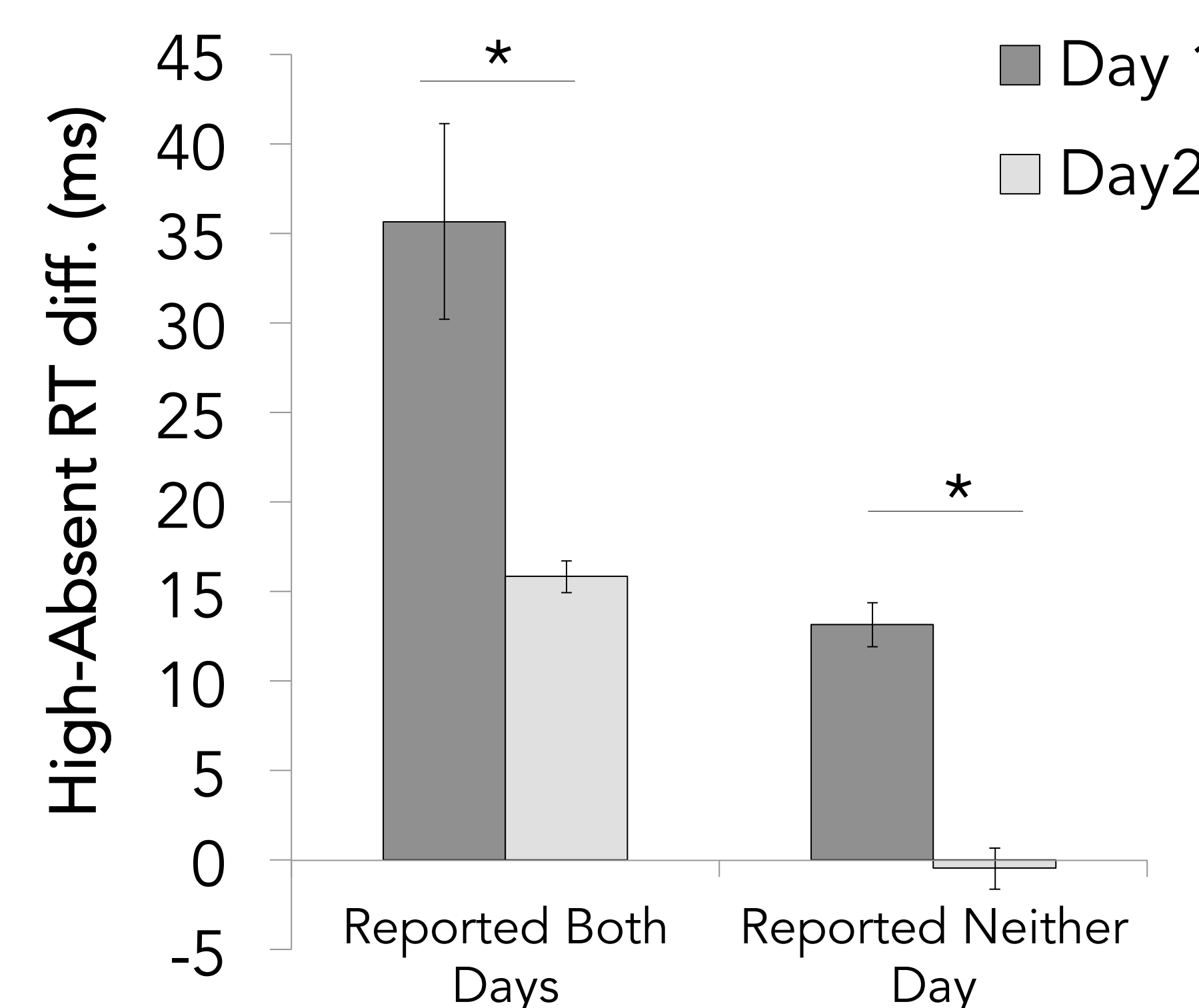
Post-study Reports of Color-Value Associations



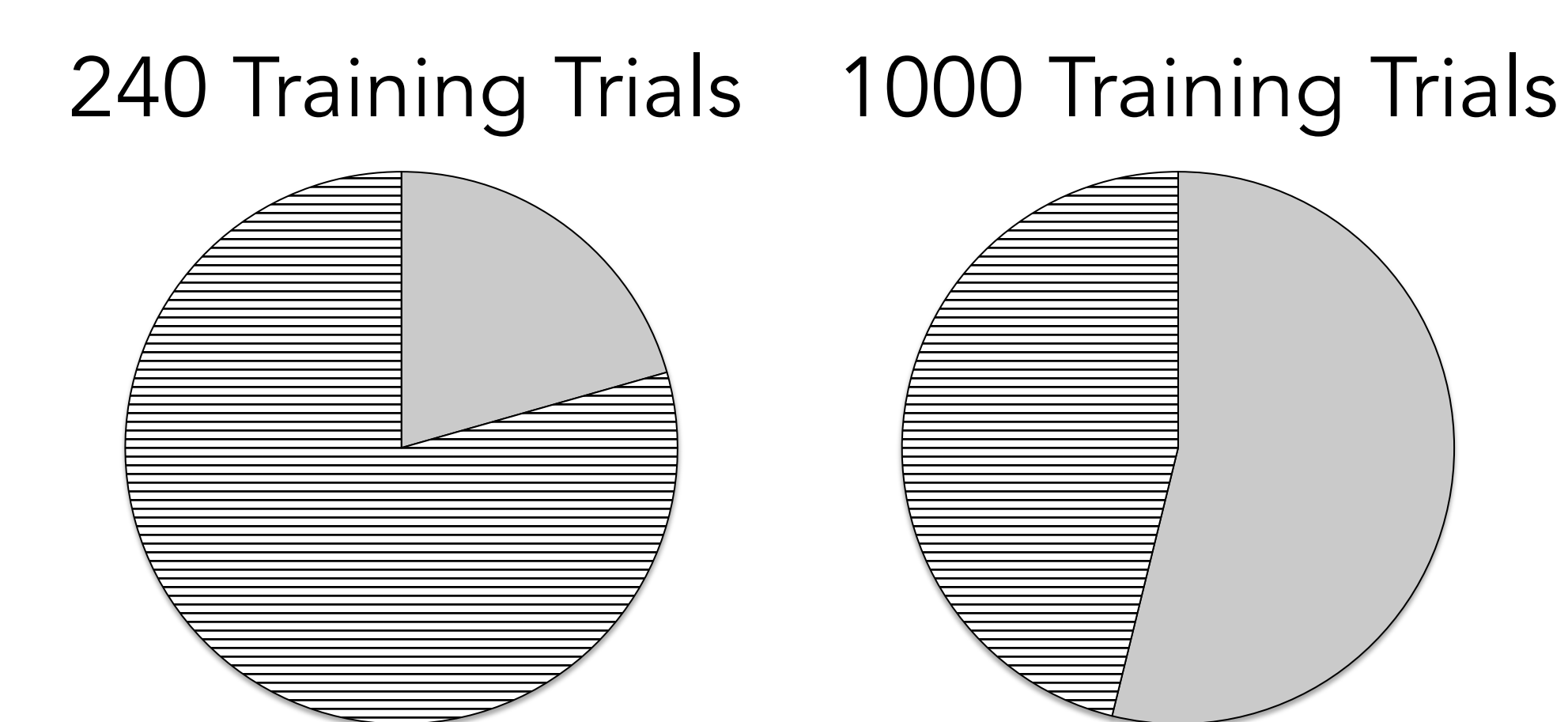
Correct Color-Value Mapping Reported



Reward VDAC by Group



Correct Reports by Training Duration



Color-Value Mapping reporting from two other studies. More training trials are associated with greater correct mapping reports following testing.

Conclusions

- The standard VDAC paradigm does not produce consistent or correlated individual differences in VDAC magnitude across or within sessions, for either reinforcement context. This raises concerns regarding its reliability as a performance measure.
- This paradigm might be most sensitive to state-dependent, rather than trait-dependent, influences on performance (e.g., vigilance), although this requires further investigation.
- One factor likely underlying individual differences in reward VDAC effects is the degree to which the stimulus-value associations are learned during training. Future studies should provide increased training (conditioning) and include assessments of learning independent of the VDAC RT-difference measure.