



The Effects of Switch Load on Sustained and Transient Costs

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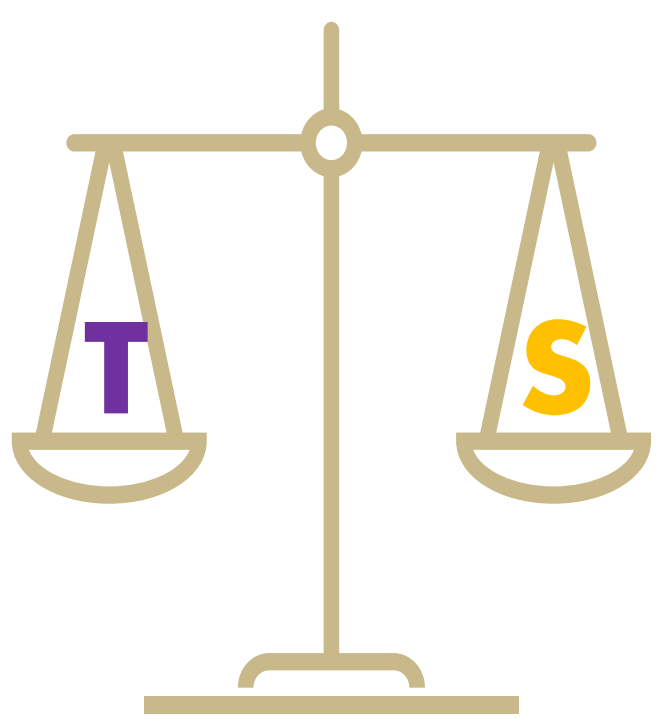
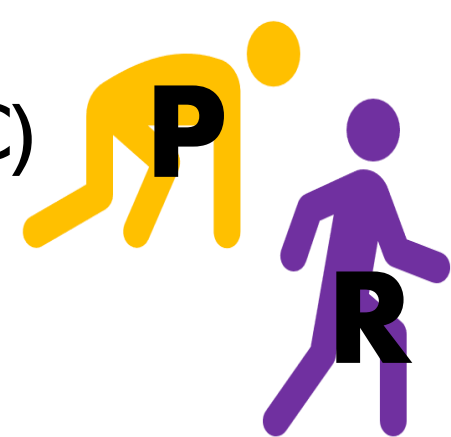
Introduction



Cognitive control, or the ability to guide goal-directed behaviors intentionally, is often assessed by measuring how quickly one can switch from one task or ruleset to another.



A prevalent model for task switching has been the dual mechanisms of control (DMC) model, which details two control policies - proactive and reactive control.



These policies involve two cognitive costs that may exhibit a trade off. The DMC would predict that reactive control would have lower sustained costs and higher transient costs for more efficient task switching in the

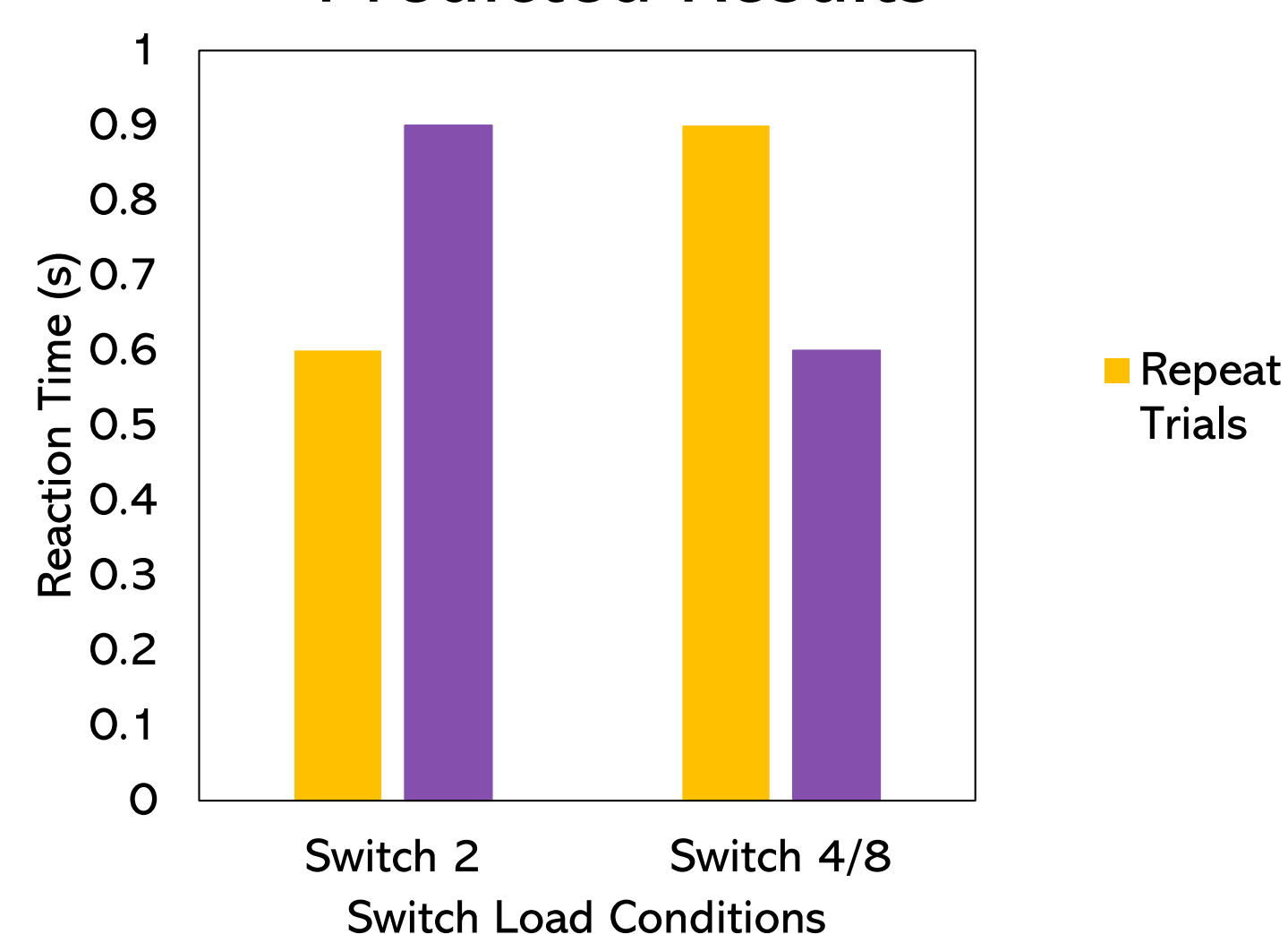
moment. Conversely, proactive control would show the opposite for better maintenance of relevant task rulesets.

The aim of this study was to investigate how control costs were influenced by task switching load.

Hypothesis

- During low switch load, it is predicted subjects would use reactive control, showing low sustained and high transient costs.
- During high switch load, it is predicted subjects would use proactive control, showing high sustained and low transient costs.

Predicted Results



Methods

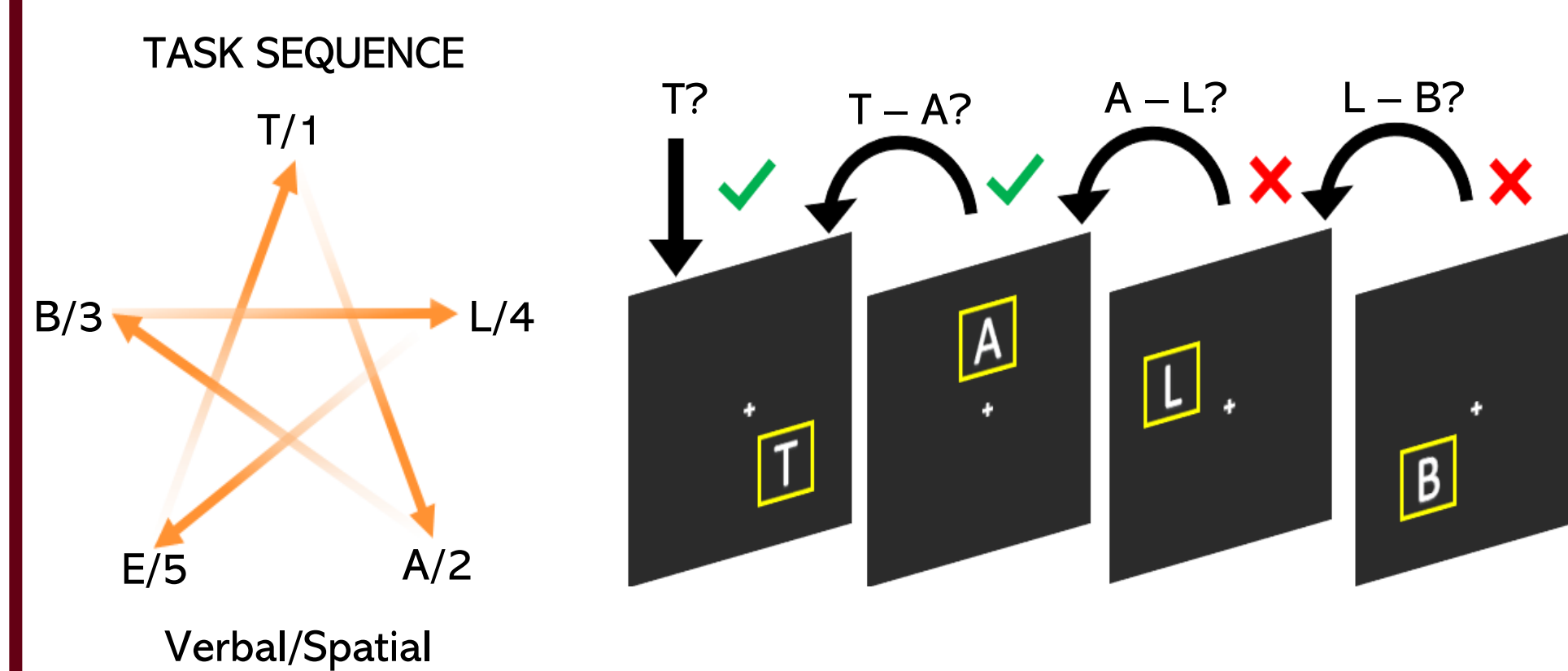
DEMOGRAPHICS

| Group 1 | Group 2 |
|--|--|
| Task Blocks - No Switch Blocks - Switch 2 Blocks - Switch 4 Blocks | Task Blocks - No Switch Blocks - Switch 2 Blocks - Switch 8 Blocks |
| Demographics - 6 Female / 2 Male - 8 recruited >> 7 analyzed | Demographics - 3 Female/ 2 Male - 5 recruited >> 5 analyzed |

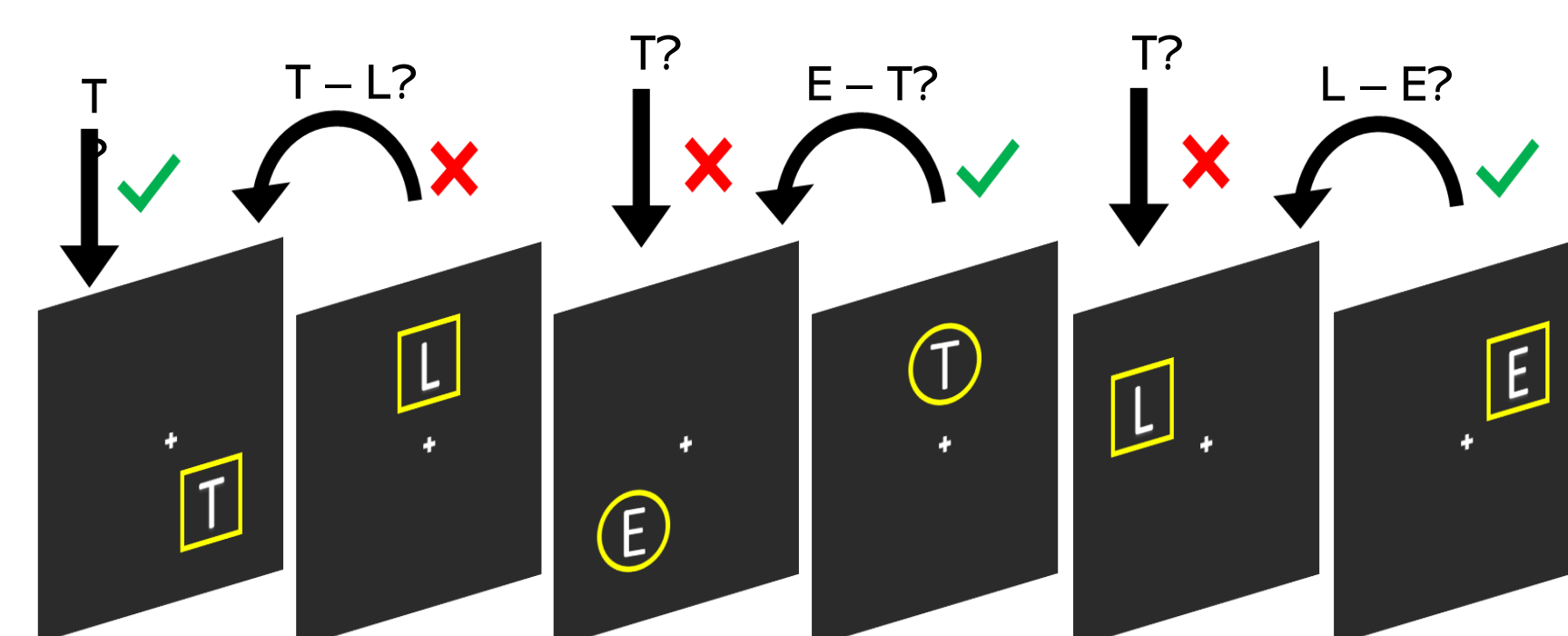
The main effect of group was not statistically significant in all cases ($p > 0.3$). To improve power, data was pooled across experiments.

TASKS

Sequence Start → Is the current stimulus the beginning of the sequence?
Sequence Back → Does the current stimulus follow the previous in the sequence?

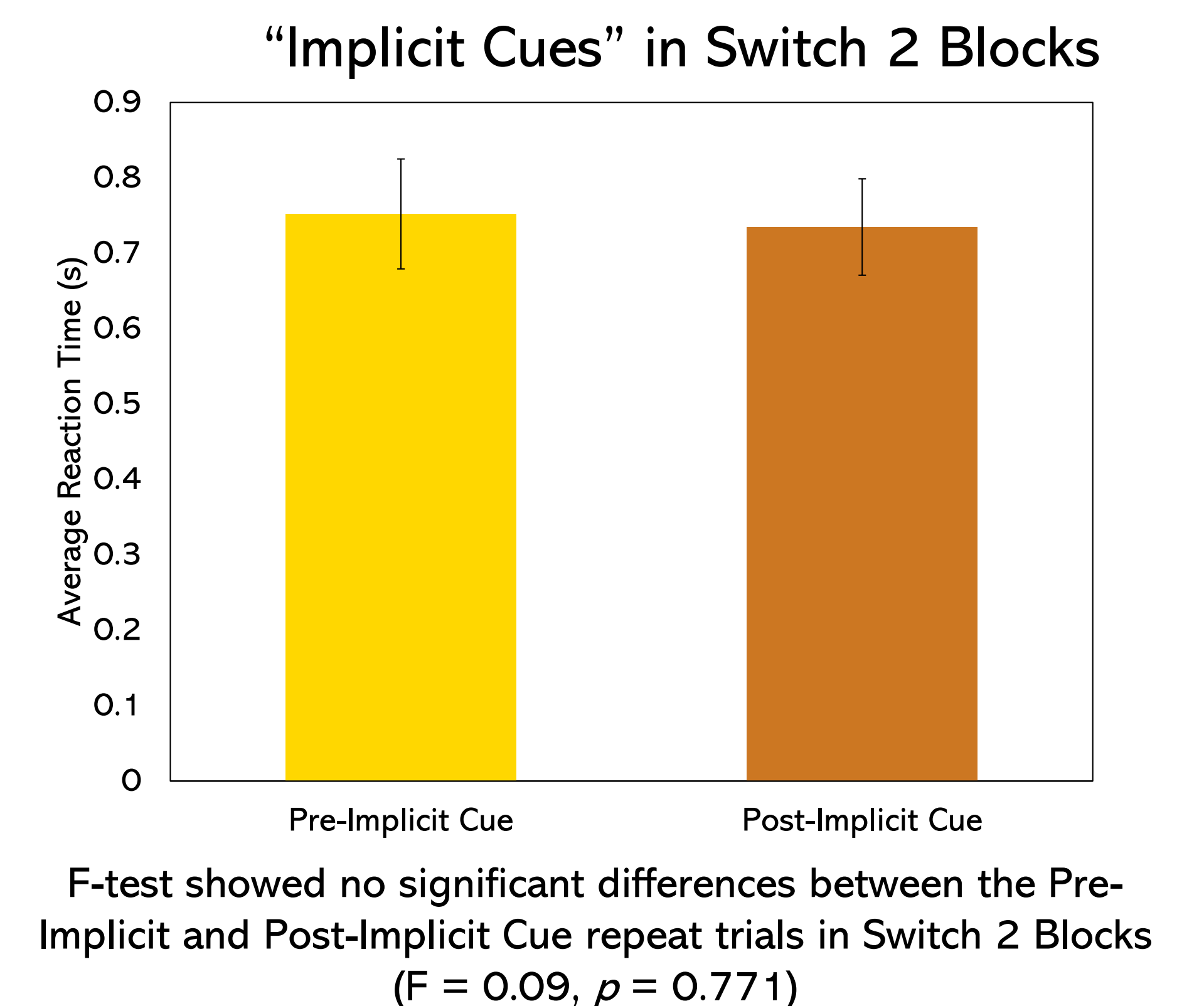
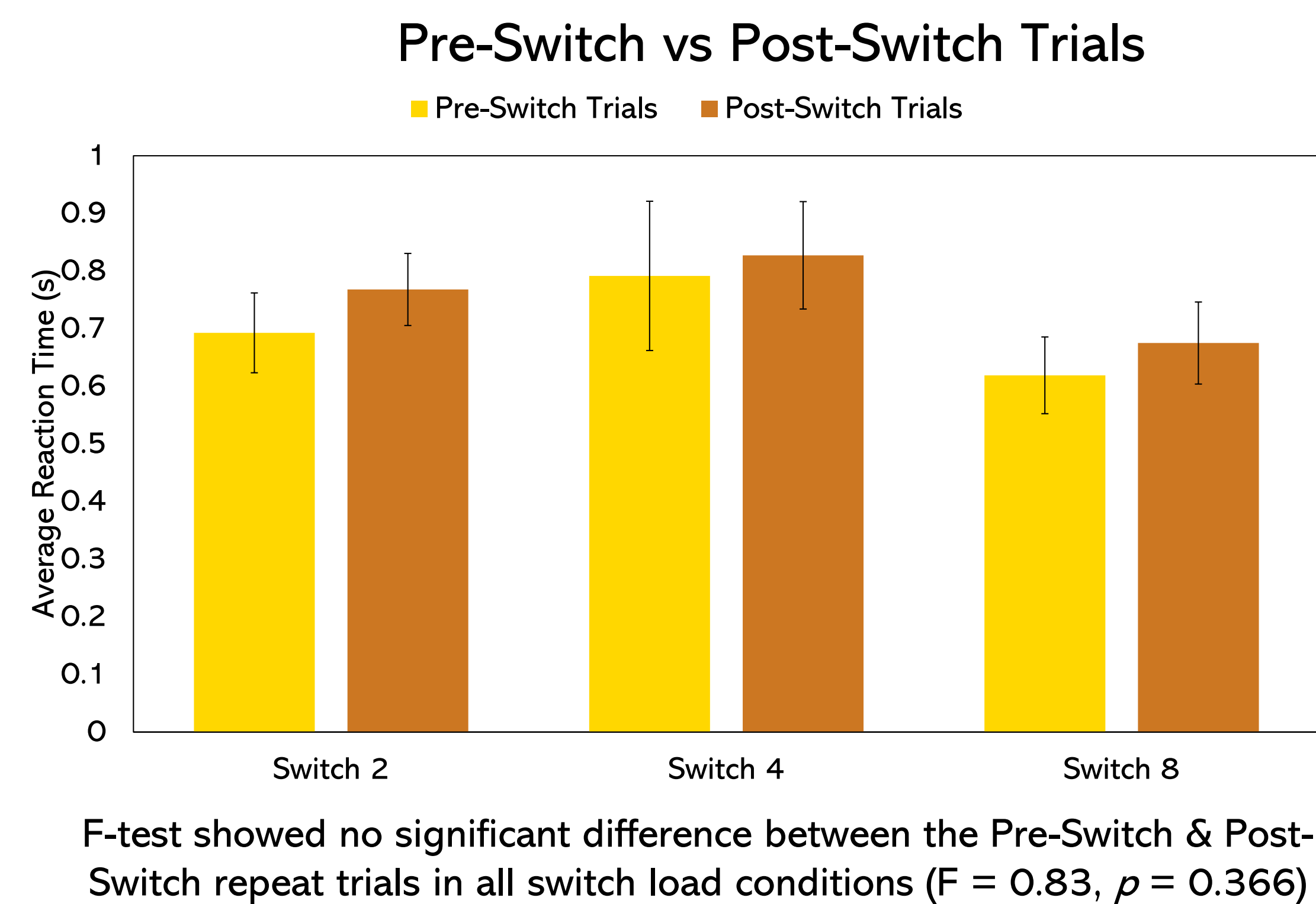
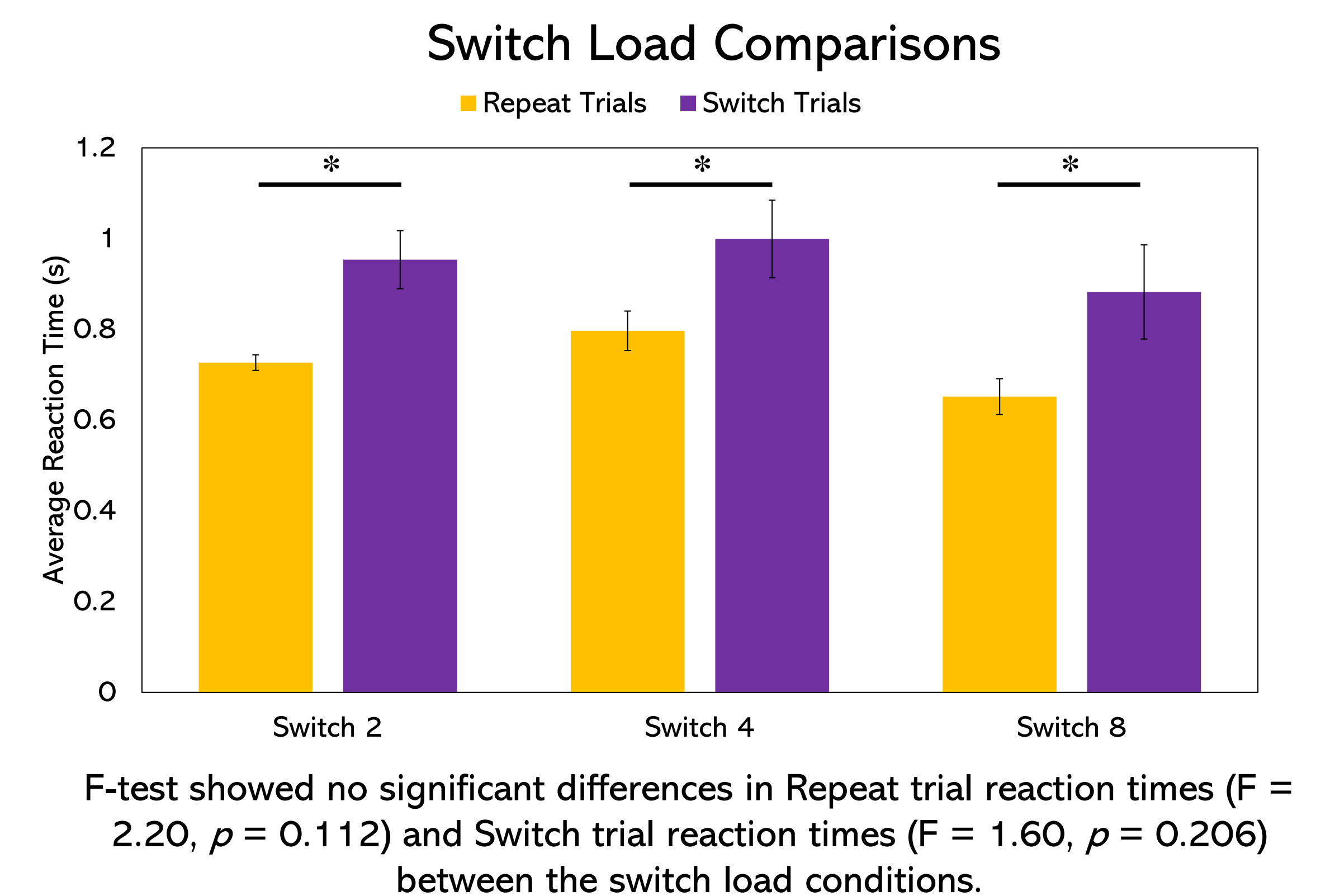
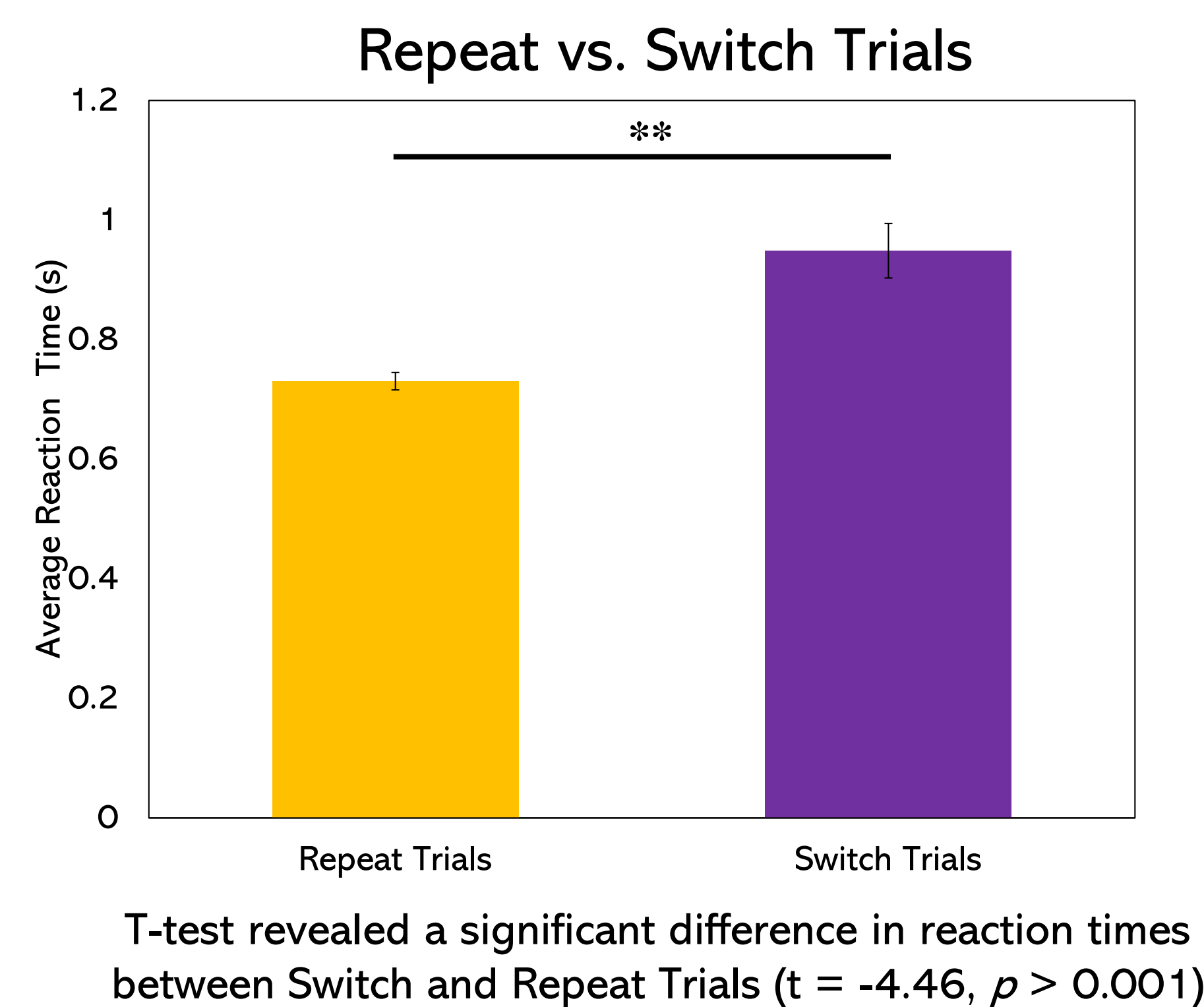


SWITCH → Is the current stimulus the beginning of the sequence?



Task switch cued by a change in frame shape.

Results



Conclusions

- Although sustained and transient costs are present, they remained stable regardless of switch load condition. This could suggest no cost trade-off between the control policies. It could also be subjects used the same policy regardless of switch load.
- Results also show no differences in behavior before or after a switch occurs, suggesting a consistent cost demand level in all trials. This was the case for all switch load conditions, suggesting consistent control policy use.
- Signs of implicit cueing for a possible switch were not present in low switch conditions. As subjects were not explicitly cued to which block type they were in, this may suggest subjects were not anticipating switch trials.
- **FUTURE DIRECTION:** Currently collecting new dataset with Switch 0/2/4/8 Blocks all in one paradigm. May also include exogenous cueing in a future paradigm.