

# Exploring Boundary Conditions of Conflict Adaptations During Task Shifts

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## INTRODUCTION

- An important aspect of cognitive control is handling distractor conflict (i.e., situations where distractors bias a competing response, Botvinick, et al., 2001; Faust & Balota, 2007).
- Conflict Adaptation**, a transient reduction of distractor conflict following a conflict trial (Notebaert et al., 2006) may reflect the operation of reactive general cognitive control processes (Botvinick et al., 2001) that operate across a range of distractor conflict tasks, perhaps involving common neural systems in the dorsolateral prefrontal cortex (Liu et al., 2004).
- However, conflict adaptation may not occur for trial sequences where the distractor conflict task shifts across two successive trials (Funes, Lupiáñez, & Humphreys, 2010), calling into question the generality of cognitive control processes associated with conflict adaptation effects.
- The present study examines the generality of conflict adaptation by searching for the boundary conditions of conflict adaptation across tasks. We will use 2 tasks that differ in the target decision (i.e., color vs. word identity), but not in location and type of distractors (i.e., flanking words).
- Conflict adaptation effects may also be due, at least in part, to repetition priming of the distractor/target across successive trials (e.g., BLUE then GREEN on successive trials in a Stroop color naming task, Mayr, Awh, & Laurey, 2003).
- It is therefore important that conflict adaptation effects be assessed separately for trial sequences where distractors/targets repeat (**Repetitions**), and do not repeat (**Alternations**, Notebaert et al., 2006).

## Tasks

- A manual Stroop color identification task (Faust et al., 2011) and a matching Eriksen flanker task (Eriksen & Eriksen, 1974) were used.
- 3 colors and names (Red, Green, Blue), 200 ms RSI between trials.
- Proportion of conflict trials High (67%) versus Low (33%) across subjects.
- 2 Trial Sequence Types:**
  - Alternation Sequences:** Target & distractor do not repeat
  - Repetition Sequences:** Target and/or distractor repeat
- Example Stimuli:** Color Patch vs. Word Identity Target Decisions

—Stroop: Conflict= Nonconflict=   
 —Flanker: Conflict= Nonconflict=   
 —**Distractor Conflict Effect** = Conflict RT – Nonconflict RT.

## Questions

- Will shifts in target items (i.e., color vs. word), with constant distractor locations, reduce or eliminate conflict adaptation?
- Will varying control demands (i.e., proportion conflict trials) modulate the robustness of conflict adaptation?

## Acknowledgments

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## RESULTS

**Basic Conflict Adaptation (CA):** Reduced interference on a trial immediately following a conflict trial versus a nonconflict trial. Indicated by p-values for comparison of paired light/dark colored bars in Figures.

### Figure 1: High (67%) Proportion Conflict Trials

**Alternations:** Task Match x CA interaction ( $p = .023$ ).  
No CA with task shift.  
**Repetitions:** Task Match x CA interaction ( $p < .001$ ).  
Reduced CA with task shift.

### Figure 2: Low (33%) Proportion Conflict Trials

**Alternations:** No Task Match x CA interaction ( $p = .623$ ).  
Marginal CA with task shift.  
**Repetitions:** Task Match x CA interaction ( $p = .010$ ).  
Reduced CA with a task shift.

### Figure 3: Current Trial Stroop Task, Low (33%) Conflict

**Alternations:** No Task Match x CA interaction ( $p = .647$ ).  
Equivalent CA with task shift.  
**Repetitions:** No Task Match x CA interaction ( $p = .239$ ).  
Equivalent CA with a task shift.

## DISCUSSION

- Conflict adaptation effects in the Alternation Sequences (i.e., no repetition of distractor or target across successive trials) were not totally eliminated across task shifts (2 tasks involving different target decisions but constant distractors), and may be more general than suggested by previous researchers (e.g., Funes et al., 2010).
- For Alternation Sequences, conflict adaptation was eliminated for high but not low rates of conflict trials, suggesting that general control processes are more likely to be engaged as the size of distractor conflict effects increase.
- For the Alternation Sequences, a shift from the Flanker to the Stroop task yielded significant conflict adaptation (see Figure 3), but the reverse was not the case.
- For the Repetition Sequences, there was reduced, but still robust, conflict adaptation with task shifts. This may be indicative of general reactive cognitive control processes, but may also reflect contamination from repetition priming effects.

## References

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Figure 1: High (67%) Conflict

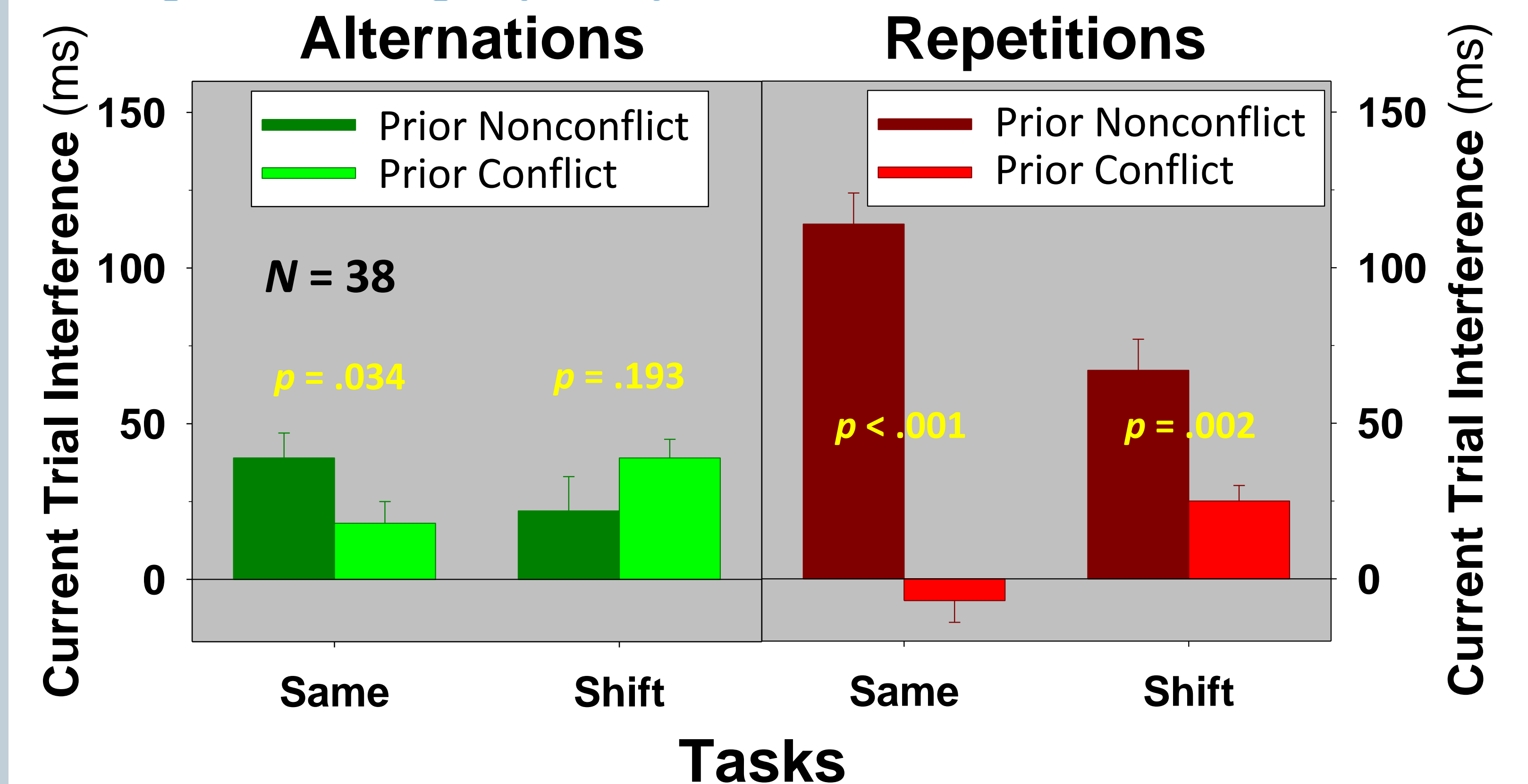


Figure 2: Low (33%) Conflict

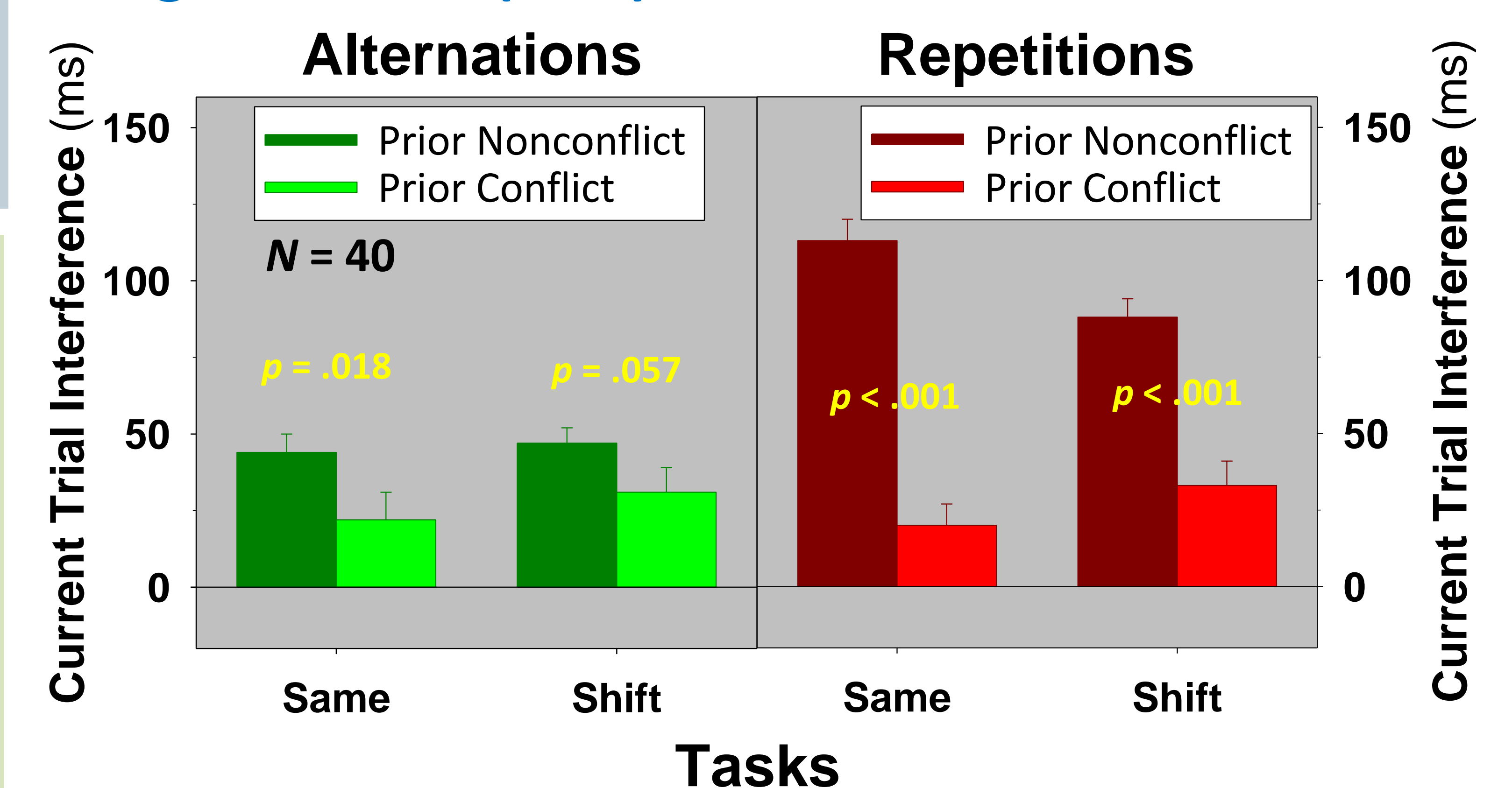
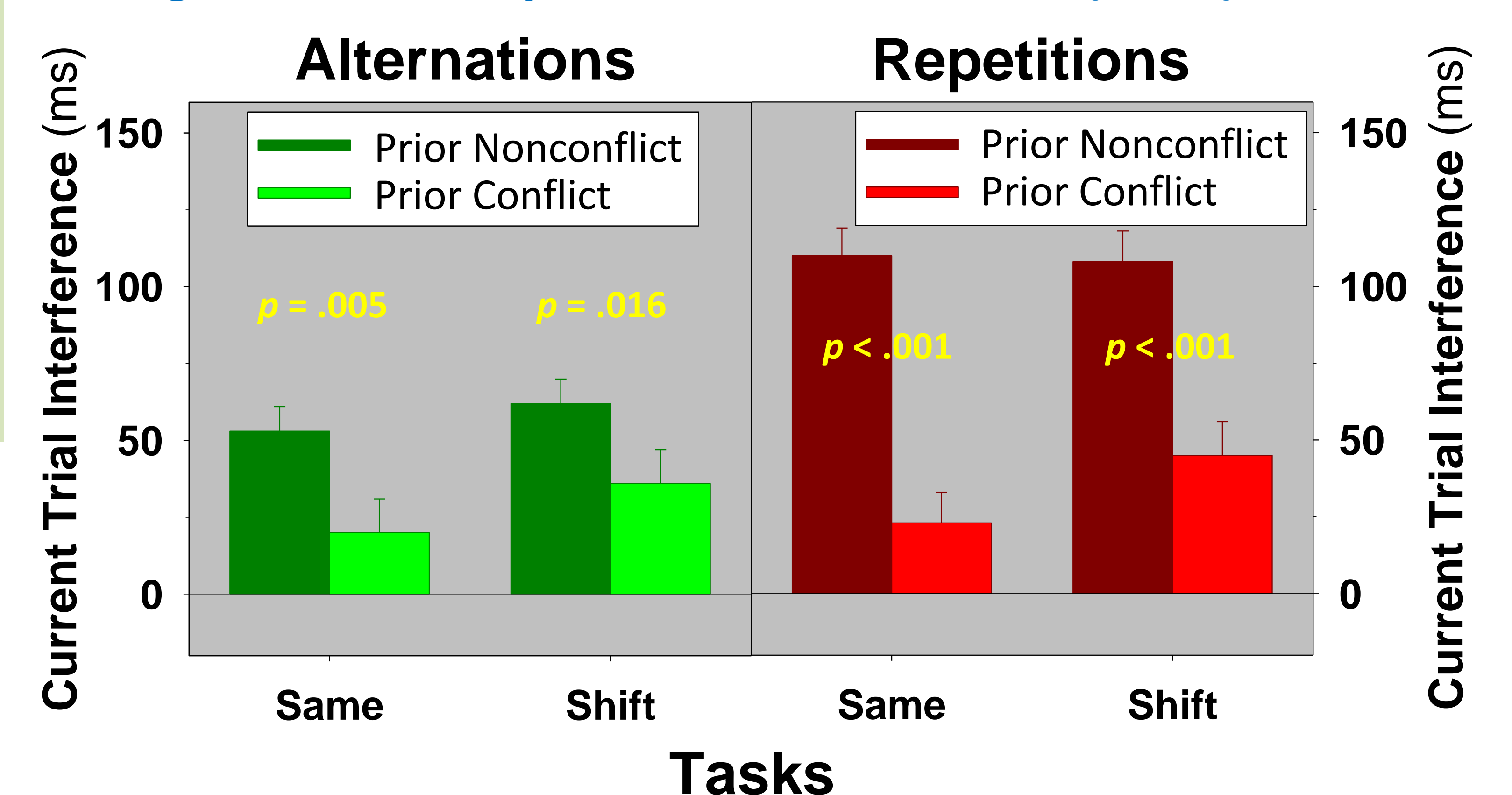


Figure 3: Stroop Current Trial, Low (33%) Conflict



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