Influences of Context Repetition on Sequential Congruency Effect Depend on Contingency

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Summary and Background

Background: Sequential congruency effect (SCE) is the reduction in size of the congruency effect following incongruent compared to congruent trials. Contingency biases and stimulus- and response-feature integration are two of the distinct sources of the SCE (Egner, 2007; Schmidt, 2013). The repetition of contextual feature (which has no obvious relation with congruency effect itself) determines whether SCE would be observed or not (Spapé & Hommel, 2008). In our previous study, we showed that the differential effects of context on SCE was not observed when consecutive trials did not share stimulus/response features (Inan & Atalay, 2014).

Objective and Method: In our study, we investigated whether the contextual feature would affect SCE when contingency bias existed. In Experiment 1 with 2-item vocal Flanker task, each trial contained stimulus or response repetitions without a contingency bias. In Experiment 2 with a 4-item vocal Flanker task, half of the trials contained stimulus or response repetitions and there was a contingency bias.

Exp-1 Results

- A main effect of context repetition
  F(1, 16) = 5.04, p < .05, ηp² = .24
- A main effect of current trial congruency
  F(1, 16) = 142.34, p < .001, ηp² = .90
- The SCE was significant
  F(1, 16) = 4.28, p = .055, ηp² = .21
- Differential effects of context on SCE was significant
  F(1, 16) = 10.66, p < .01, ηp² = .40
- SCE was significant in context repetition condition
  F(1, 16) = 13.37, p < .01, ηp² = .49
- SCE was not significant in context alternation condition
  F(1, 16) = 1.1, p > .05

Exp-2 Results

For trials with stimulus- and/or response-feature repetitions

- A main effect of current trial congruency
  F(1, 23) = 178.17, p < .001, ηp² = .89
- The SCE was significant
  F(1, 23) = 4.94, p < .05, ηp² = .18
- The three-way interaction between context repetition, previous trial congruency and current trial congruency was not significant, F < 1

For trials not sharing any variety of stimulus- and response-features with the previous trial

- A main effect of current trial congruency
  F(1, 23) = 93.18, p < .001, ηp² = .80
- The SCE was significant
  F(1, 23) = 10.41, p < .01, ηp² = .31
- The three-way interaction between context repetition, previous trial congruency and current trial congruency was not significant, F < 1

Conclusion

- In the absence of contingency (Exp 1), the SCE is driven by stimulus, response and contextual feature bindings.
- When contingency exists (Exp 2), the presence of stimulus- and response-feature repetitions is no longer informative, and the SCE is driven by the contingency.
- These results suggest a hierarchical relationship for information that event files encompass.
- Information about stimulus- and response-features in the event files is used depending on the existence of the contingency information.
- Since contingency between stimulus and response provides a direct shortcut to the correct response.

Context Manipulation

Flanker stimuli with or without noise (A and B) context. Noise mask was presented dynamically. Noise was generated in the frame randomly replacing 30% of the pixels with pure black or white color with a rate of 60 frames per second.

References


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