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Attenuating the Attentional Blink by Including Salient Temporal Events in the RSVP Stream

Introduction

- Stimulus properties of distractors in the RSVP stream modulate the AB (e.g., Chun & Potter, 1995)
- By changing the interstimlus interval (ISI) between distractors, we briefly disrupted temporal regularity at specific points in the RSVP stream to examine whether disruptions in temporal regularity modulate the AB
- We also analyzed T1|T2 identification to investigate effects of T2 on T1 (Nieuwenstein, 2006)

Methods

- RSVP Stream: 24 msec letters with 72 msec ISI. Targets were red letters while distractors were black letters
- *Disruption* Interval: ISI was 72, 24, or 0 msec allowing 1, 2, or 4 distractors to be presented during one 96 msec interval typically containing 1 letter (see Figure 1)
- Disruption prior to T1 & T2 onset in Experiments 1 & 2, and after T1 & T2 offset in Experiments 3 & 4 (see Figure 2)
- A regular distractor always preceded T1 and T2 producing a 72 msec pre and post ISI in all conditions
- In Experiments 1 & 4, lags were 1-5 and 7. In Experiments 2 & 3 lags were 3-7 because the disruption occurred between T1 and T2

Results

- See Figures 3-6; 'reversals' counted as correct

Figure 1: Illustration of Distractor ISI Manipulation

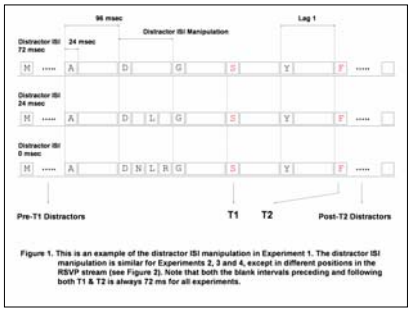


Figure 1. This is an example of the distractor ISI manipulation in Experiment 1. The distractor ISI manipulation is similar for Experiments 2, 3 and 4, except in different positions in the RSVP stream (see Figure 2). Note that both the blank intervals preceding and following both T1 & T2 is always 72 ms for all experiments.

Figure 2: General Schematics of Experiments 1-4

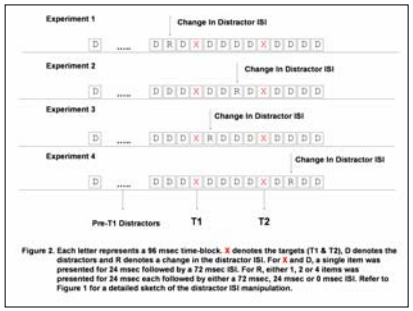
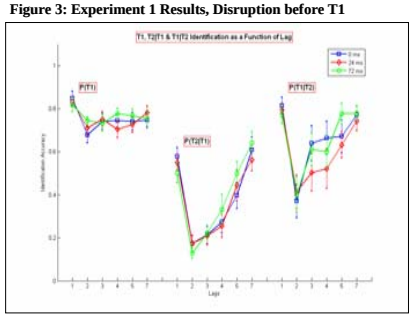


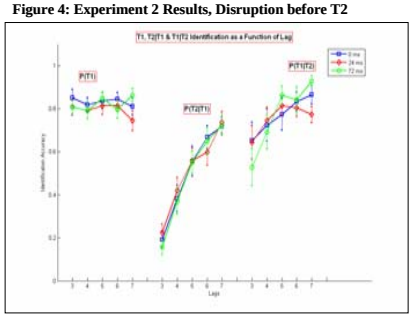
Figure 2. Each letter represents a 96 msec time-block. X denotes the targets (T1 & T2), D denotes the distractors and R denotes a change in the distractor ISI. For X and D, a single item was presented for 24 msec followed by a 72 msec ISI. For R, either 1, 2 or 4 items was presented for 24 msec each followed by either a 72 msec, 24 msec or 0 msec ISI. Refer to Figure 1 for a detailed sketch of the distractor ISI manipulation.

Figure 3: Experiment 1 Results, Disruption before T1



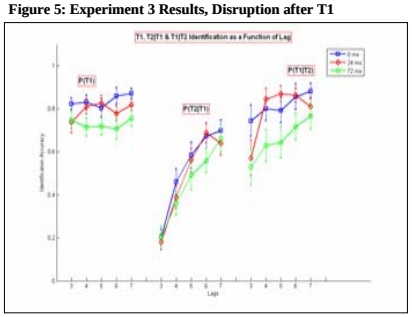
T1: Lag ($p < .001$) T2|T1: Lag ($p < .001$) T1|T2: Lag ($p < .001$)

Figure 4: Experiment 2 Results, Disruption before T2



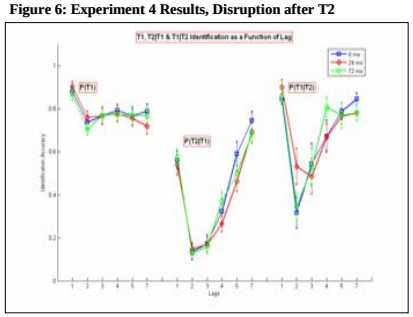
T1: ISI ($p < .02$) T2|T1: Lag ($p < .001$) T1|T2: Lag ($p < .001$)
24 ms < 0 ms = 72 ms

Figure 5: Experiment 3 Results, Disruption after T1



T1: ISI ($p < .001$) T2|T1: Lag ($p < .001$) T1|T2: Lag ($p < .001$)
ISI ($p < .001$) ISI ($p < .001$)
72 ms < 24 ms < 0 ms 72 ms < 24 ms = 0 ms 72 ms < 24 ms < 0 ms

Figure 6: Experiment 4 Results, Disruption after T2



T1: Lag ($p < .001$) T2|T1: Lag ($p < .001$) |T2: Lag ($p < .001$)

Discussion

T1 influence on T2: The Attentional Blink

- Cuing T1 onset with a brief change in rhythm did *not* enhance T1 identification
- Cuing T2 onset with a brief change in rhythm did *not* enhance T2 identification as does cuing with target features (e.g., Nieuwenstein, 2006)
- A brief change in rhythm after T1 offset *did* improve identification of both T1 and T2. Chua (2005) argued the AB is due to a delay in attentional disengagement from T1. Perhaps the change facilitated this disengagement. More research is needed to determine if this were the case

T2 Influence on T1: A Dynamic Attentional Blink?

- Most explanations of the AB assume a somewhat serial process in which T1 related processes are detrimental to T2 identification. However, T1|T2 identification showed an AB-like pattern in that T1 identification (consolidation?) was lower when T2 was identified and the T1-T2 lag was short
- If T2 also influences T1, models of the AB will need to be modified to include a dynamic (recurrent?) component. One suggestion is that the sharing of common resources by the consolidation and attentional control (selection) processes (Kawahara, Di Lollo & Enns, 2006). More research is required to elucidate this matter
- Tan and Dark (2006) demonstrated the lag effect of the T1|T2 is eliminated when T1 consolidation is facilitated, suggesting the brief change in rhythm after T1 offset influenced T2 selectivity rather than T1 consolidation

References:

Chua, F. K. (2005). The effect of target contrast on the attentional blink. *Perception & Psychophysics, 67*, 770-788.

Chun, M., & Potter, M. (1995). A two stage model for multiple target detection in rapid serial visual presentation. *Journal of Experimental Psychology, 21*, 109-127.

Kawahara, J. Di Lollo, V., & Enns, J. T. (2006). The attentional blink is not a unitary phenomenon. *Psychological Research, 70*, 405-413.

Nieuwenstein, M. R. (2006). Top-down controlled, delayed selection in the attentional blink. *Journal of Experimental Psychology, Human Perception & Performance, 32*, 973-985.

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