Involvement of memory-based change detection in visual distraction

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INTRODUCTION

- **Distraction effect**
  Distracted behavioral performance by sudden stimulus deviants
- **Visual distraction effect**
  Distraction by location deviants (Berti & Schröger, 2001, 2004)
- **Purpose**
  - *?? Involvement of memory-based change detection in visual distraction ??*
  - *?? An ERP correlate of memory-based change detection ??*

  > We examined the effects of sudden energetic decrements

METHODS

- **Participants**
  12 students (m/f = 5/7, mean = 25.4 yrs.)
- **Stimuli** (Table 1)
  Central stimuli: Square & Triangle (11.5 cd/m², 2.0° x 2.0°)
  Peripheral stimuli: Light & Dark (79.5 & 2.5 cd/m², 2.5° x 2.5°)
- **Task**
  Forced-choice task for central stimuli
- **EEG recordings**
  EEG: 25 electrodes, referred to the nose tip
  Bandpass: 0.03-30 Hz, A/D: 250 Hz
- **Data analysis**
  Deviance effects: Deviant-minus-standard differences
- **Procedure**

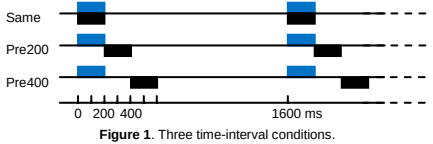

Figure 1. Three time-interval conditions.

Table 1. The stimuli and two probability conditions

	Peripheral stimuli		Central stimuli		
	(Light)	(Dark)	(Square)	(Triangle)	
Light deviant condition	15	85	50	50	
Dark deviant condition	85	15	50	50	(%)

RESULTS

- **Deviant-minus-standard difference ERPs**

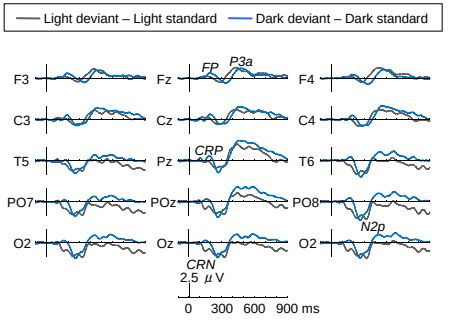

Figure 2. Deviant-minus-standard difference waves (time-interval conditions were pooled). CRN: change-related negativity; CRP: change-related positivity; FP: frontal positivity; N2p: posterior N2.

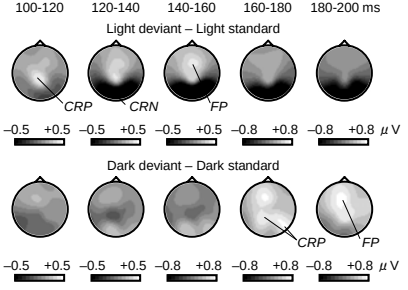

Figure 3. Topographical maps of the difference waves (time-interval conditions were pooled). CRN: change-related negativity; CRP: change-related positivity; FP: frontal positivity.

- Light deviant effects: CRN, CRP, FP, N2p, & P3a
- Dark deviant effects: CRP, FP, N2p, & P3a (No CRN)

- **Behavioral distraction effects**

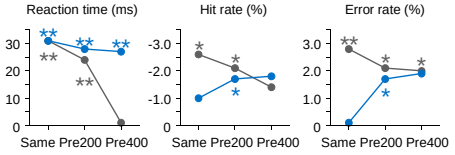

Figure 4. Behavioral distraction effects (i.e., deviant-minus-standard differences) in the three time interval conditions. **: $p < .01$, *: $p < .05$ by one-tailed *t*-tests.

Behavioral distraction by both Light & Dark deviant stimuli

DISCUSSION

- **Involvement of memory-based change detection in distraction**
  < Behavioral distraction and elicitation of N2p & P3a even in response to Dark deviants
- **CRP: Memory-based change detection**
  < CRP in response to both Light & Dark deviants (e.g., Fonteneau & Davidoff, 2007; Kimura et al., 2006)
- **CRN: Refractoriness-based rareness detection**
  < CRN in response to Light deviants only (e.g., Berti & Schröger, 2006; Kenemans et al., 2003)

CONCLUSION

- Involvement of memory-based change detection in visual distraction
- CRP as an ERP correlate of memory-based change detection

CONTACT INFO.

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