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Value-driven attentional capture under time constraints

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INTRODUCTION

- We need to avoid distraction by irrelevant stimuli to maintain a good performance (e.g., while reading, driving, etc.).
- Our ability to avoid distraction by irrelevant **salient** stimuli could be influenced by the **time constraints** of the task (e.g. vehicle speed) :
  - ***Less distraction under high temporal demands (Kiss et al., 2012)***
- Even when counterproductive for the task at hand, distractors associated with **rewards** receive high attentional priority because of their motivational significance (Le Pelley et al., 2016).
  - ***"Value-driven attentional capture"***
  - ***More distraction by high- rather than low-reward distractors***

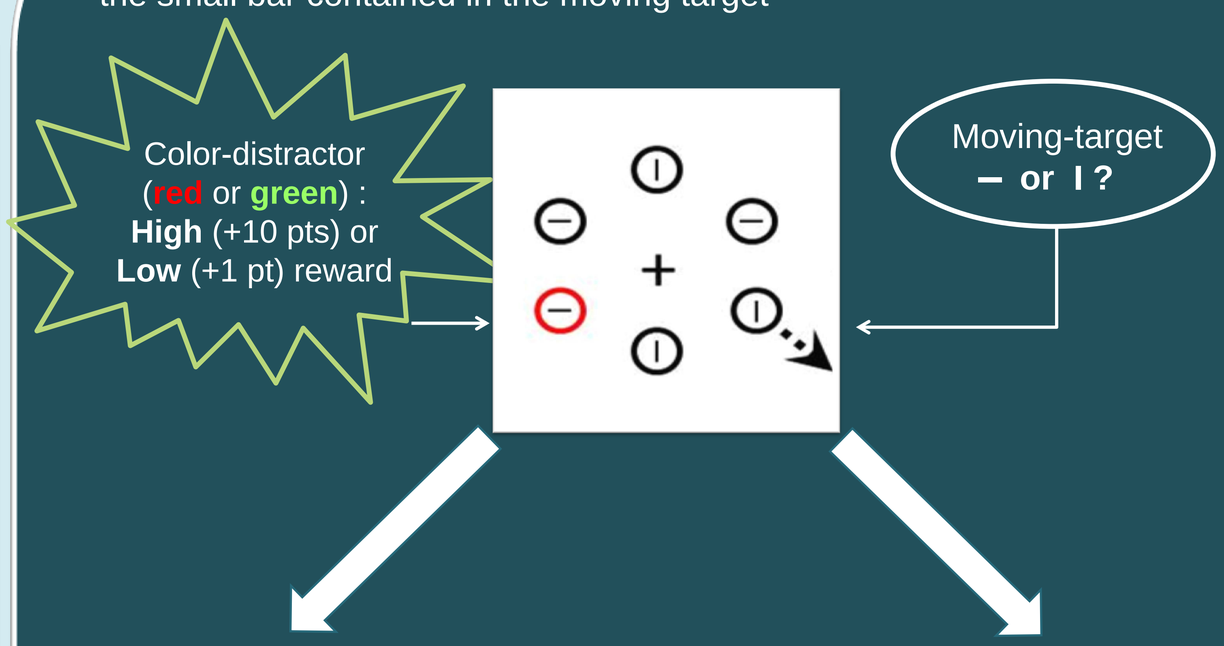
AIM 1 To replicate the **temporal demands** effect on distraction (i.e., less distraction under high temporal demands)

AIM 2 To investigate whether a **reward-distractor** would survive to this effect in virtue of its attentional priority.

AIM 3 To investigate whether distraction is modulated by the relative magnitude of **reward-distractors** under high **temporal demands**.

METHOD

- Additional singleton paradigm (Theeuwes, 1992): give the orientation of the small bar contained in the moving target



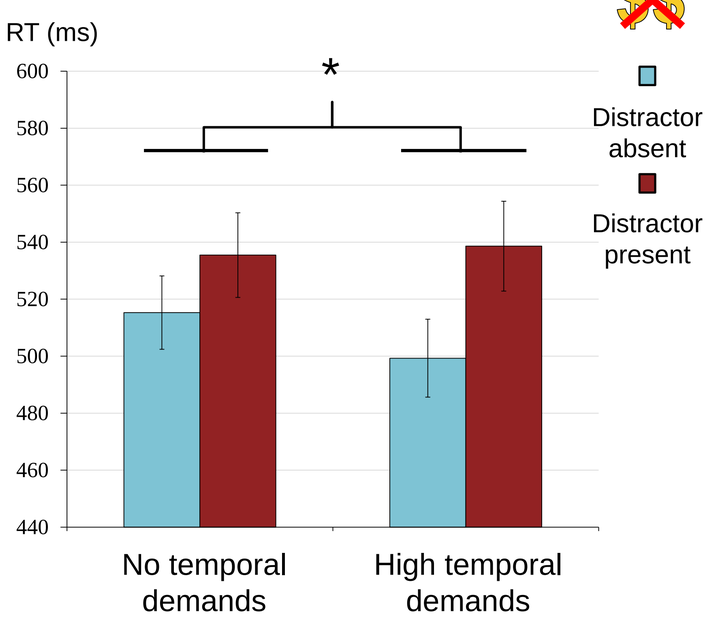
Group 1 (n=30)	Group 2 (n=30)
No temporal demands: Display visible until response	**High temporal demands:** Display visible only for 200 ms

- VD: Distraction (RTs distractor absent vs RTs distractor present)

+ Control study: same experiment without reward-outcomes $\not\$$

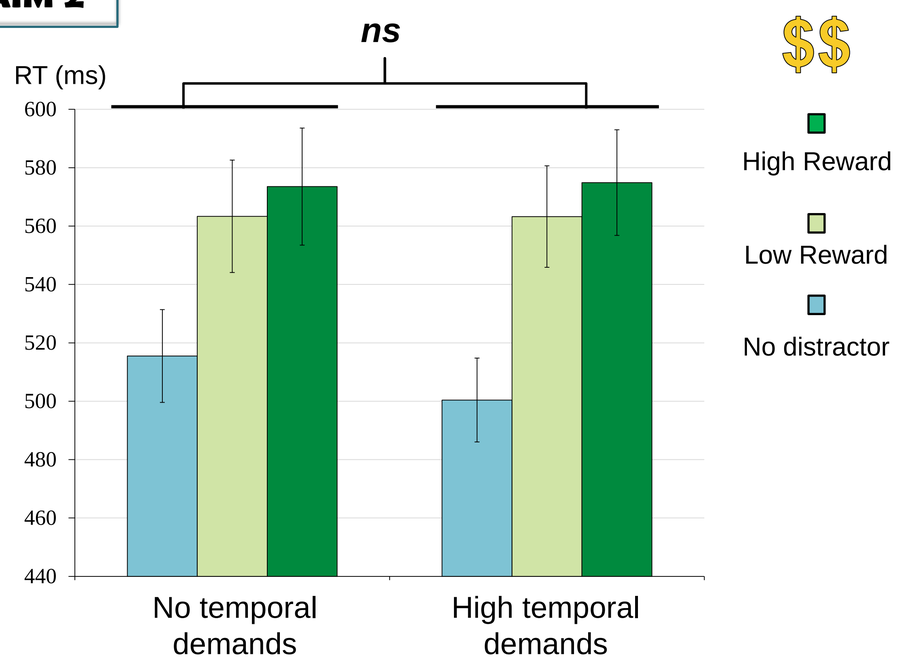
RESULTS

AIM 1



Temporal demands *increased* distraction

AIM 2



No interaction between temporal demands and distraction

AIM 3

High vs Low reward	p-values
No temporal demands	< .01
High temporal demands	< .01

Distraction was also modulated by reward magnitude under high temporal demands

DISCUSSION

AIM 1

- Contrary to our first hypothesis, distraction was **increased** under **high temporal demands**.
- **High temporal demands**, as sensory degradation (i.e., reduced time presentation), would increase task difficulty which in turn would increase probability of distractor intrusion (Lavie & de Fockert, 2003).
  - Error rates: No temporal demands (8.3%) vs High temporal demands (10.5%), $t(49) = 1.8$, $p = .066$

AIM 2

- **Temporal demands** did not increased distraction by **reward-distractors** (as it was observed with threatening faces – Yao et al., 2013)
  - "Ceiling effect" due to large distraction by reward distractor?
  - Error rates: $\not\$$ (9.4%) vs $\$$ (11.1%), $t(98) = 1.9$, $p = .0.56$

AIM 3

- Even when task was performed under **high temporal demands**, **high-reward distractors** produced stronger distraction than **low-reward distractors**.
- The learning of distractor-values was not impaired under time constraints.
- Value-driven attentional capture: automatic capture impervious to top-down control ? (Anderson, 2013; Hickey & van Zoest, 2013; Pearson et al., 2015)

- Anderson, B. A. (2013). A value-driven mechanism of attentional selection. *Journal of Vision*, *13*, 1–16.
- Hickey, C., & van Zoest, W. (2013). Reward-associated stimuli capture the eyes in spite of strategic attentional set. *Vision Research*, *92*, 67–74.
- Kiss, M., Grubert, A., Petersen, A., & Eimer, M. (2012). Attentional Capture by Salient Distractors during Visual Search Is Determined by Temporal Task Demands. *Journal of Cognitive Neuroscience*, *24*(3), 749–759.
- Lavie, N., & de Fockert, J. W. (2003). Contrasting effects of sensory limits and capacity limits in visual selective attention. *Perception & Psychophysics*, *65*(2), 202–212.
- Le Pelley, M. E., Mitchell, C. J., Beesley, T., George, D. N., & Wills, A. J. (2016). Attention and associative learning in humans: An integrative review. *Psychological Bulletin*, *142*(10), 1111–1140.
- Pearson, D., Donkin, C., Tran, S. C., Most, S. B., & Le Pelley, M. E. (2015). Cognitive control and counterproductive oculomotor capture by reward-related stimuli. *Visual Cognition*, *6285*(May 2015), 1–26.
- Theeuwes, J. (1992). Perceptual selectivity for color and form. *Perception & Psychophysics*, *51*(6), 599–606.
- Yao, S., Ding, C., Qi, S., & Yang, D. (2013). The "anger superiority effect" in the discrimination task is independent of temporal task demands. *Neuroscience Letters*, *548*, 275–279.