Cross-modal integration of value-driven attentional capture

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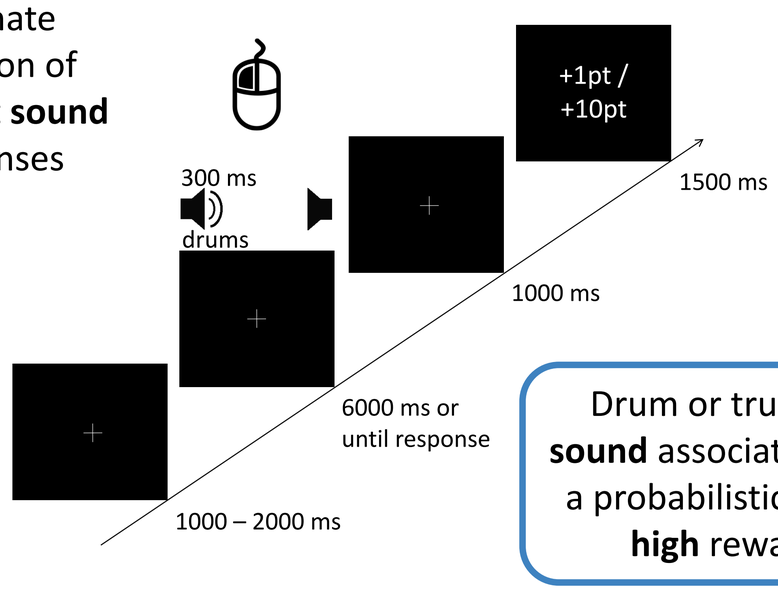
Introduction

- Recent evidence suggests that stimuli with **motivational value** can strongly modulate attentional capture [1,2].
- However, research on value-based attentional capture has been mainly focused on the **visual modality**.
- This study aims to investigate the interference produced by **auditory reward-associated distractors** when **a visual target** is concurrently presented.
- **Manual and saccadic response times** towards the image of either a drum or a trumpet were recorded, while an irrelevant sound played by one of these two instruments was heard.

Methods

1. Association phase

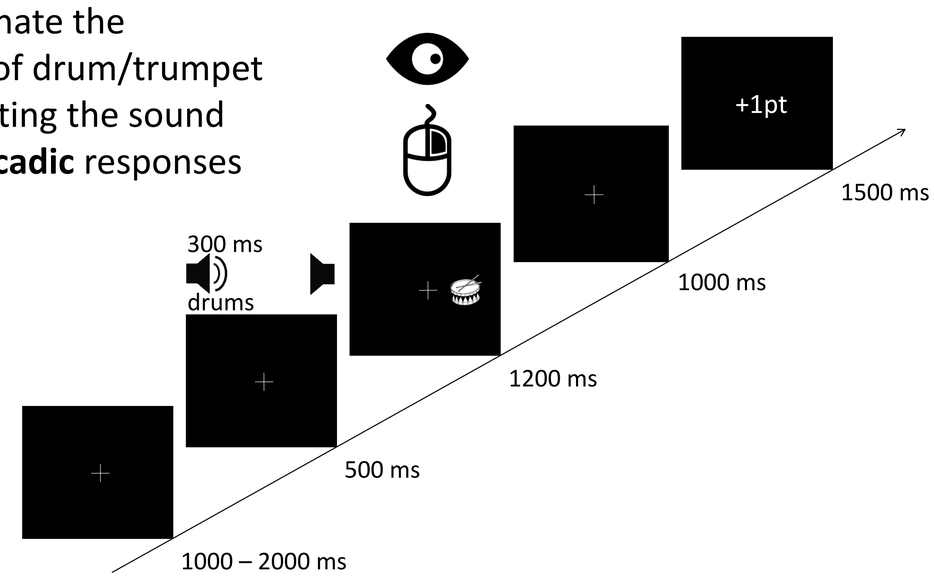
- **Task**: discriminate the lateralization of drum/trumpet **sound**
- **Manual** responses



Drum or trumpet **sound** associated with a probabilistic (80%) **high** reward

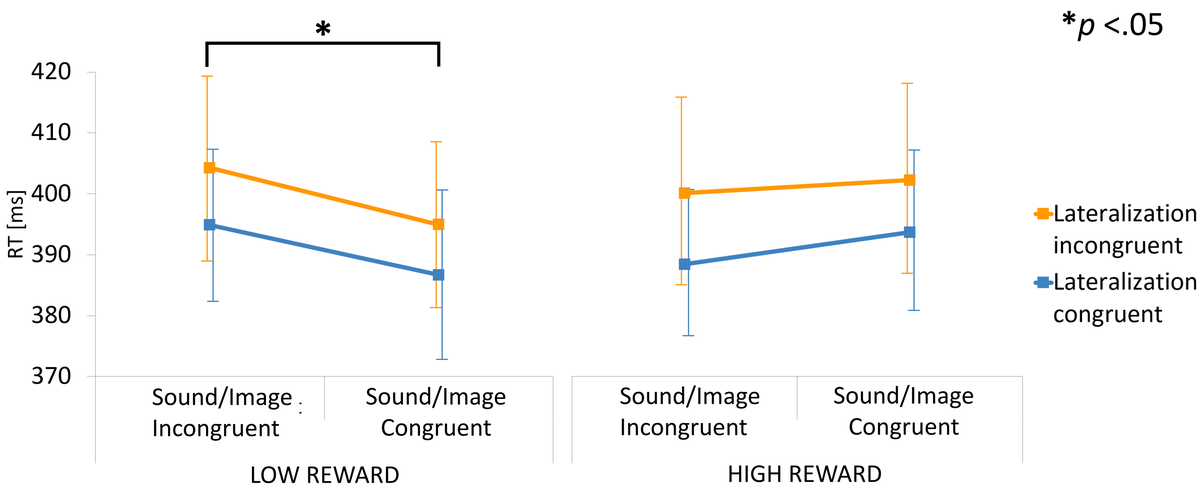
2. Testing phase

- **Task**: discriminate the lateralization of drum/trumpet **image**, neglecting the sound
- **Manual + saccadic** responses



Results

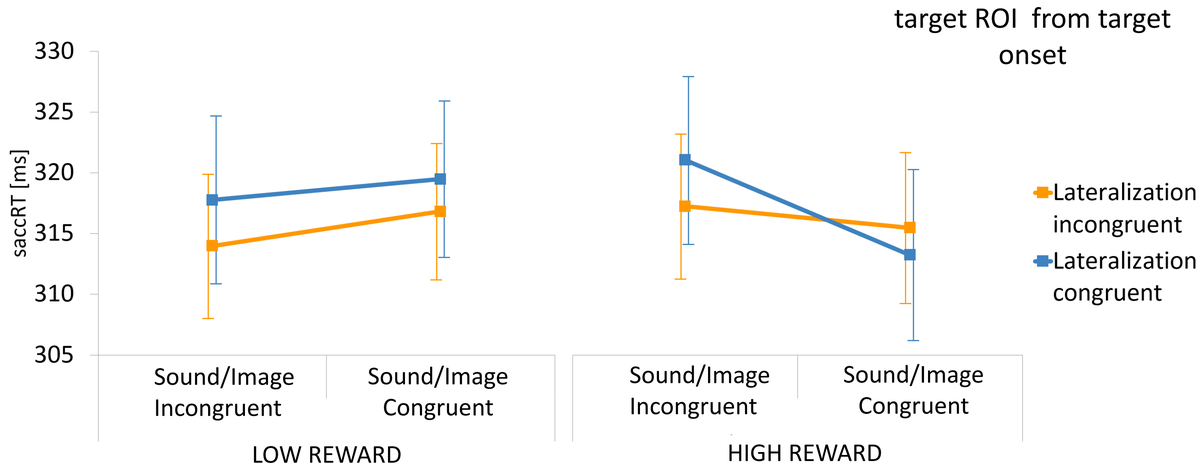
Manual response times



*p <.05

Saccadic response times

saccRT = response time of saccades ending inside target ROI from target onset



Discussion

- **Manual response times** were faster when the **sound** and the **image** were **congruent**, if the sound was previously associated with a **low** reward. However, **high-reward associated** stimuli seemed to abolish this congruency effect.

  → **Auditory** events associated with **rewards** were capable of **involuntarily capturing attention** away from **visual modality**.
- On the contrary, **saccadic response times** were not influenced by reward manipulation.
- Together, our results suggest that **reward** association could produce a **value-driven attentional bias** through **cross-modal interactions**. However, this bias may impact different effector-systems (manual or saccadic response) selectively.

References

[1] Anderson, B. A., Laurent, P. A., & Yantis, S. (2011). Value-driven attentional capture. *Proc Natl Acad Sci U S A, 108*(25), 10367-10371

[2] Bourgeois, A., Neveu, R., Bayle, D. J., & Vuilleumier, P. (2015). How does reward compete with goal-directed and stimulus-driven shifts of attention? *Cogn Emot*, 1-10

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