Attentional capture by reward-distractors under perceptual load

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INTRODUCTION

Value-Driven Attentional Capture (Anderson, 2013)

➢ Recent research revealed that visual distractors associated with or signaling **reward** outcomes **capture attention** in spite of being **neither salient nor relevant** for the ongoing task.

Automatic attentional capture ?
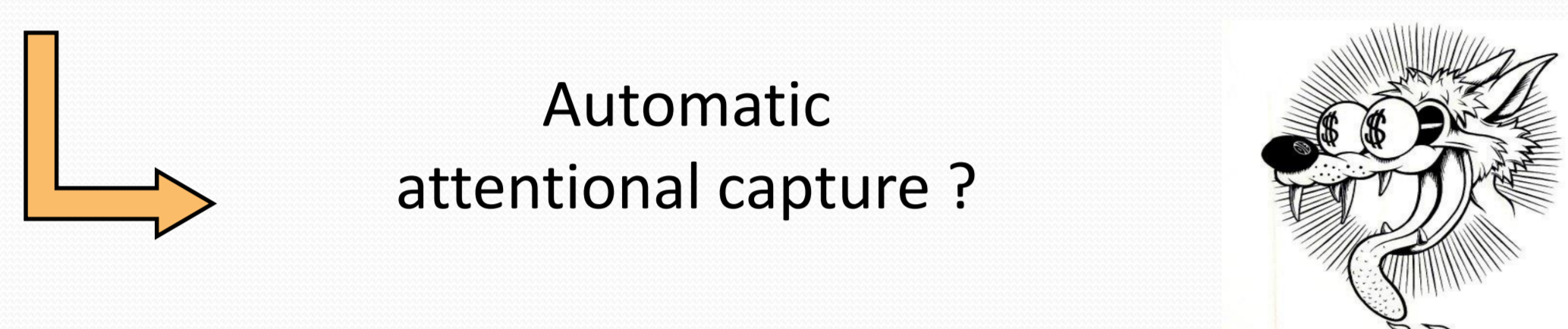
Perceptual Load Theory (Lavie, 2010)

➢ In situation of **low perceptual load** spare capacities from relevant processing "spills over" to the irrelevant items, resulting in distractor interference.

Relevant item
ATTENTIONAL RESOURCES
Distractor
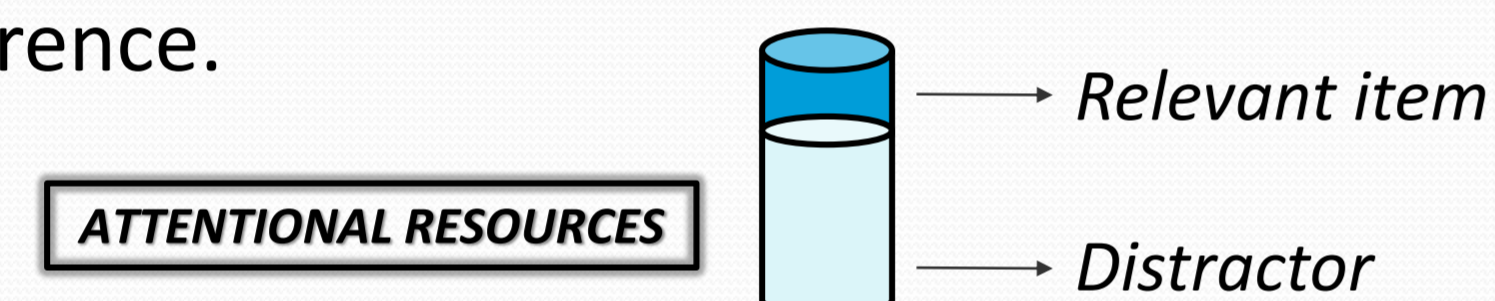
➢ Attentional capture by irrelevant distractors can be prevented in situations of **high perceptual load** that exhaust all available capacities in the perception of relevant stimuli.

Relevant item
ATTENTIONAL RESOURCES
Distractor
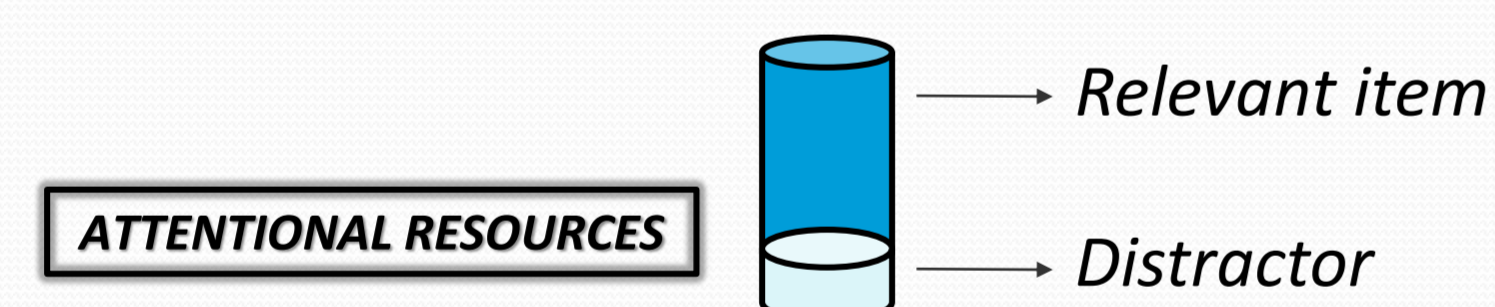
Perceptual Load and Emotion (e.g., Silvert et al., 2007)

➢ Distraction by irrelevant **fearful faces** is reduced under high load.
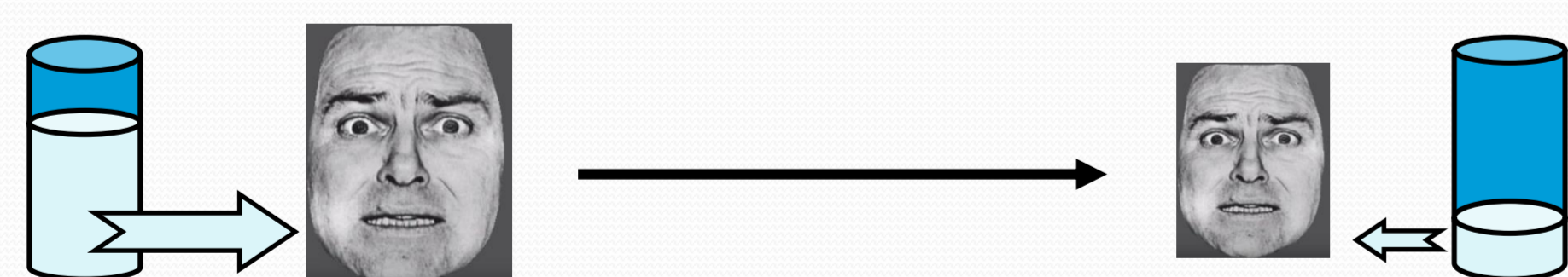
➢ Processing of irrelevant **negative** emotional stimuli depends on available attentional resources.
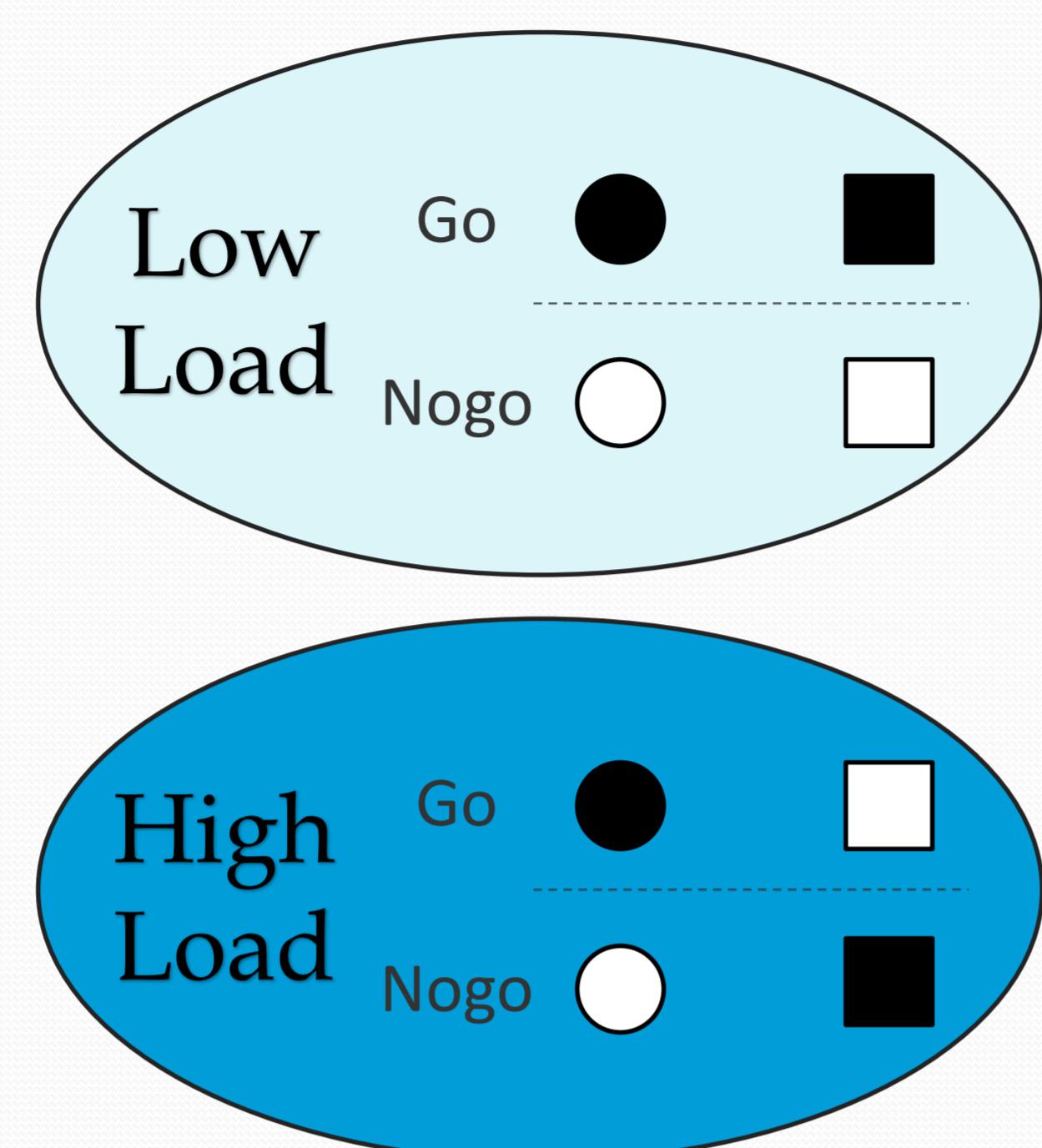
Perceptual Load and Reward ?

➢ If attentional capture by reward distractors is automatic, therefore, interference by reward distractors should be immune to perceptual load manipulations.
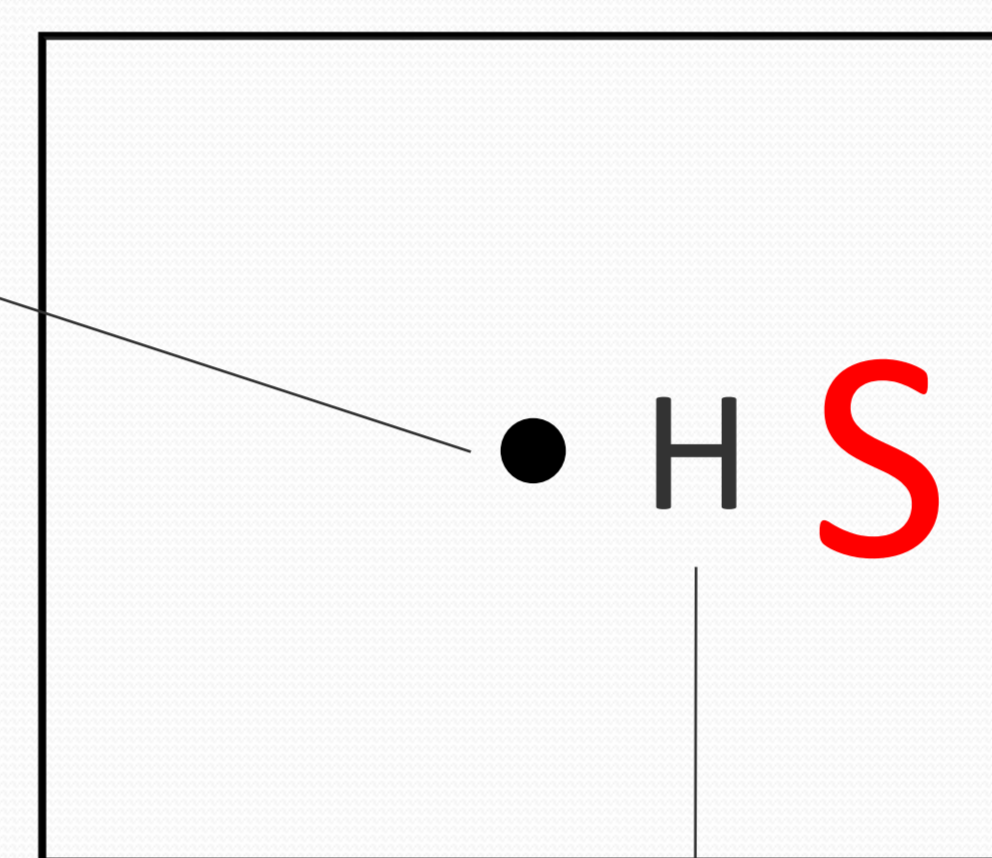
$$$ → $$$?

METHOD

Load manipulation:
Feature vs. Conjunction search
(Chen & Cave 2016)

Low Load — Go ● ■ / Nogo ○ □

High Load — Go ● □ / Nogo ○ ■

Cue

Target (H or S)

Distractor (H or S)

The color of the distractor signaled

high-reward (+10 pts) $$$
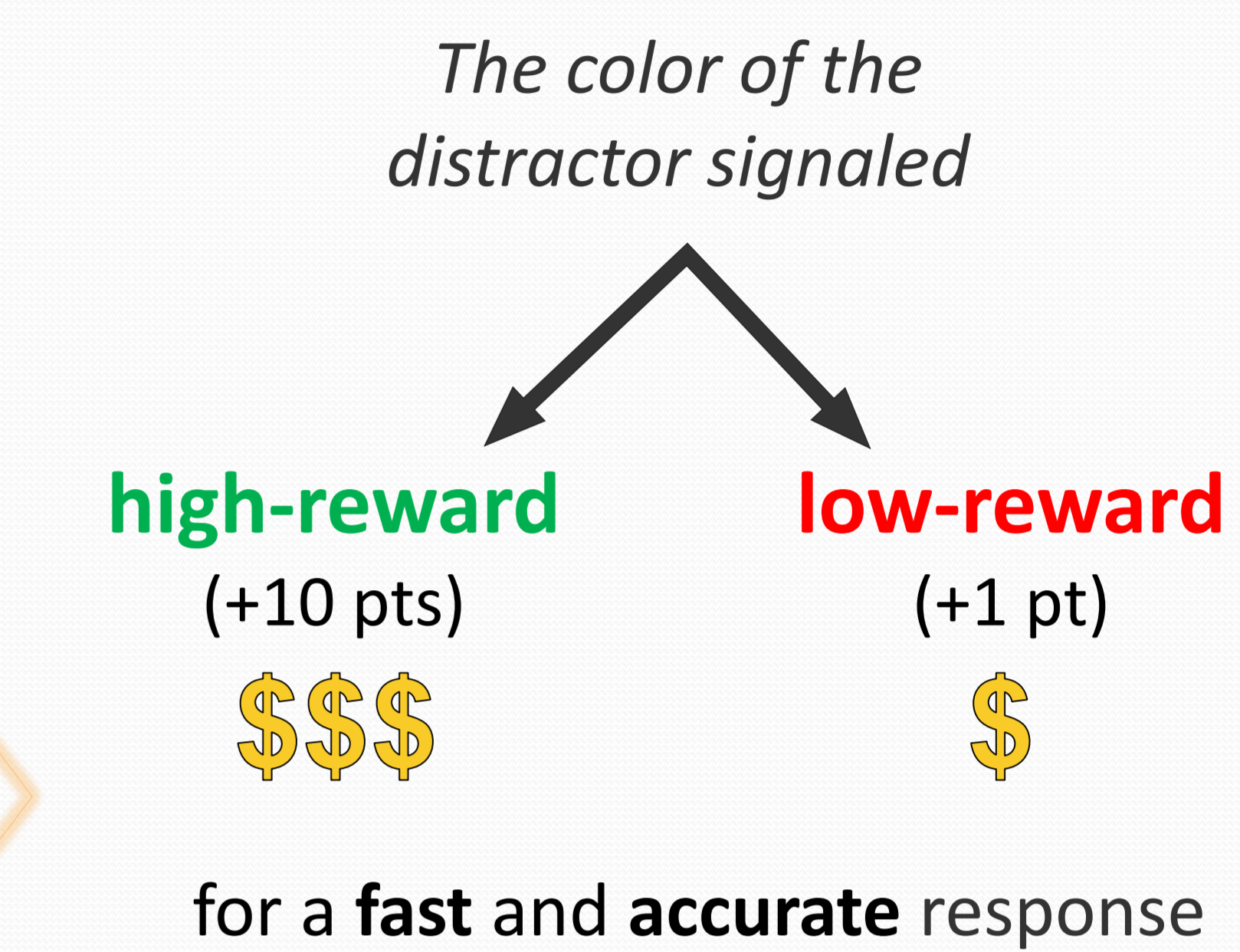
low-reward (+1 pt) $

for a **fast** and **accurate** response
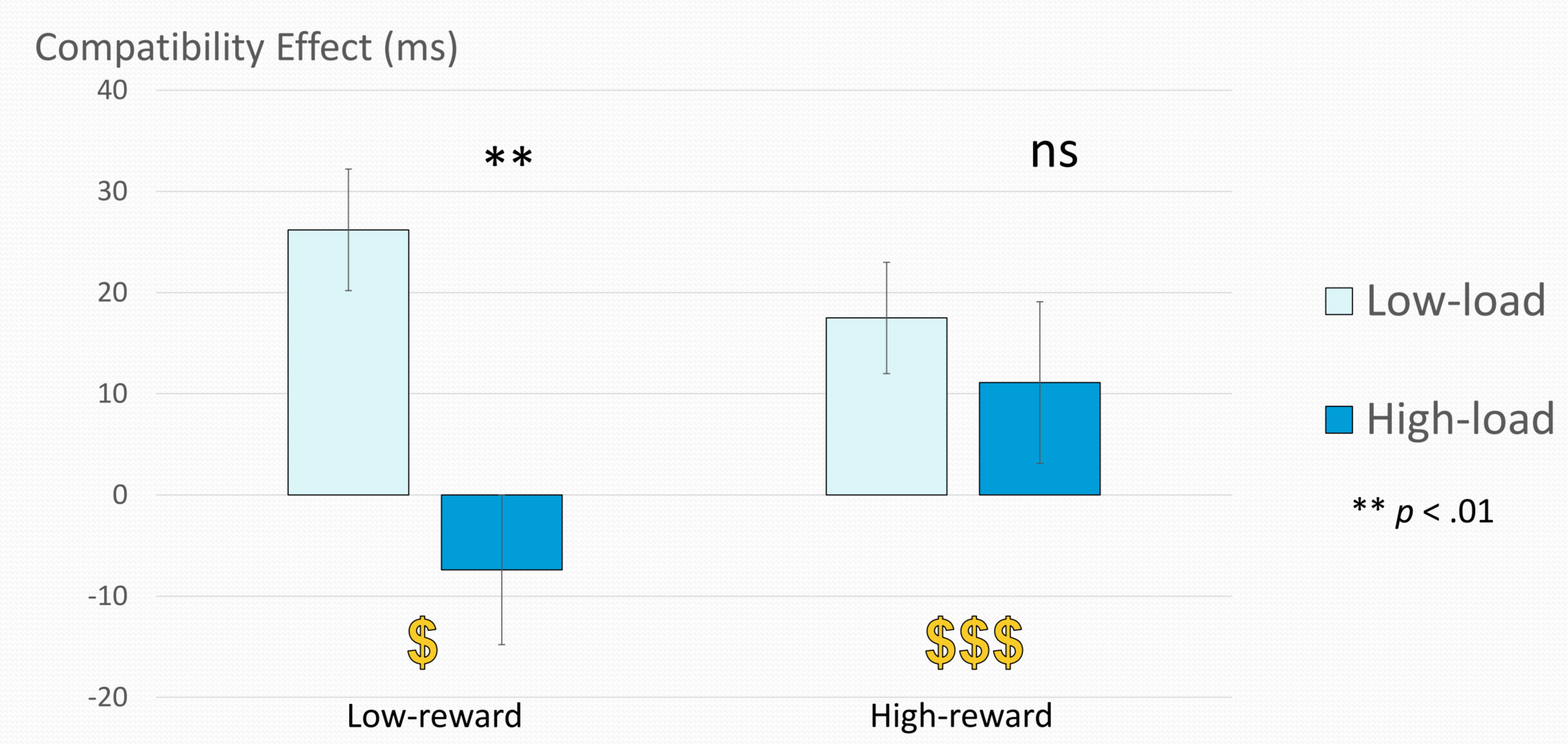
In an adaptation of a go/nogo task, participants had to identify the target letter (H or S) depending on the cue displayed, while ignoring the presence of a distractor color letter that could be either identical to (compatible) or different from (incompatible) the target.

VD: **Compatibility Effect =**
RT incompatible (different) − RT compatible (same) distractor letter

RESULTS

Compatibility Effect (ms)

** (Low-reward)   ns (High-reward)

** *p* < .01

☐ Low-load   ■ High-load

Compatibility Effect: *Reward* (Low; High) x *Load* (Low-load; High-load)
- Reward: $F(1, 29) = 1.23$, p = .28
- Load: $F(1, 29) = 5.09$, p < .05
 ➢ **Reward x Load: $F(1, 29) = 4.37$, p < .05**

High perceptual load only eliminated low-reward distractor interference whereas high-reward distractor interference seems « immune » to load manipulation.

Errors: *Reward (2) x Load (2)*
- Reward p < .01
- **Load p < .001** → confirming load manipulation
  ➢ Reward x Load p < .05

DISCUSSION

➢ High perceptual load reduces low but not high-reward peripheral distractor interference.

$ → $
$$$ ✗ $$$
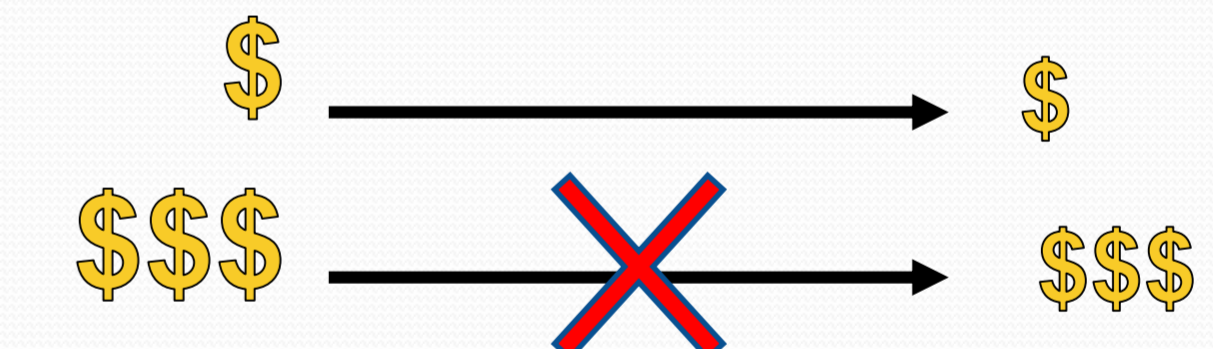
➢ High-reward distractor interference was observed despite low level of free residual attentional resources (i.e., high perceptual load)

↳ **Automatic** attentional capture

➢ At odds with what is observed for fearful faces distractors.

➢ **Valence effect** (with reward as positive events and fearful faces as negative events) might explain those discrepant results.

- Interference by centrally presented distractor of *negative* but not *positive* valence is reduced under high perceptual load (Gupta et al., 2016).

- Growing body of studies demonstrating an advantage for positive over negative emotional information in attracting and capturing attention (e.g., Srivastava & Srinivasan, 2010).

➢ However, the persistence of the interference effect for high reward distractors may be due to the ability of those stimuli to *capture* attention, but also to *hold* attention once it has been captured, or both.

EEG study in progress…

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