Value-driven attentional capture in a continuous performance task with real-time triggering

Shivang Shelat & Barry Giesbrecht

Department of Psychological & Brain Sciences, University of California, Santa Barbara
Institute for Collaborative Biotechnologies, University of California, Santa Barbara

1010

Background

When we attempt to sustain our attention, we fluctuate between good and bad states.

Recent research uses a sustained attention task with real-time triggering to insert events during these states.

Here, we investigated whether experience-dependent capture (value-, selection-, or novelty-driven) by a distractor enhances or impairs response inhibition accuracy across attentional states in the sustained attention task.

Distractor suppression hypothesis:

Suppressing distractors requires attentional resources/control.

∴ Distractor capture should impair accuracy during lapses

Perceptual recoupling hypothesis:

Capture, even by a distractor, may pierce through a lapsing state.

∴ Distractor capture should enhance accuracy during lapses

Method

Participants: n = 50 (38 female), M_{age} = 19.5 ± 1.2 years

Procedure:

- Session 1: change detection task → training task
- Delay: same day (n = 25) or week later (n = 25)
- Session 2: test task → questionnaires

Training task:

- 10 blocks of 72 trials
- Participants indicate line orientation in a colored target
- One color is rewarded 75% of the time, other is unrewarded

Test task:

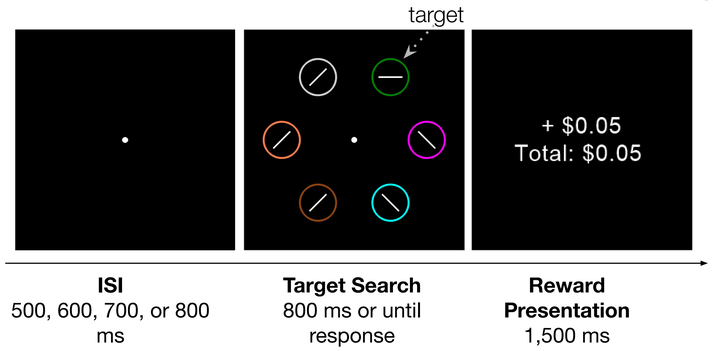
- 4 blocks of 600 trials
- Participants indicate line orientation in a shape singleton
- One orientation is far more common than the other
- Rare orientation trial is inserted when RT is fast or slow

Analysis:

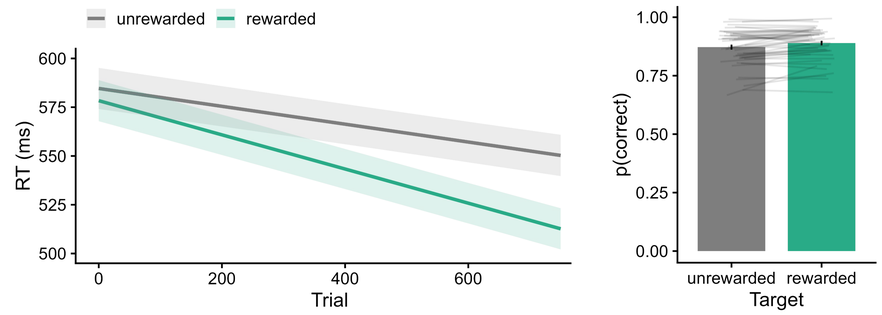
- Linear / logistic mixed effect regression
- Subject ID modeled as a random effect

Contact: sshelat@ucsb.edu, giesbrecht@ucsb.edu

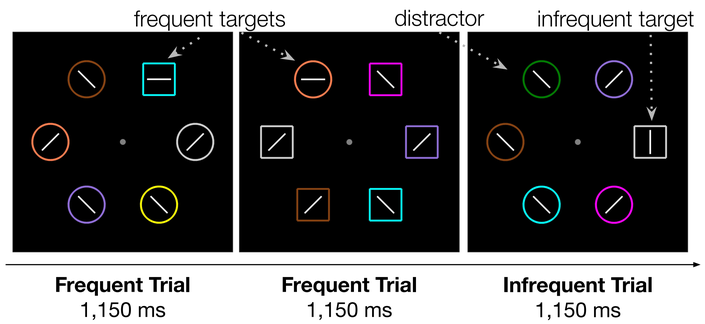
Results

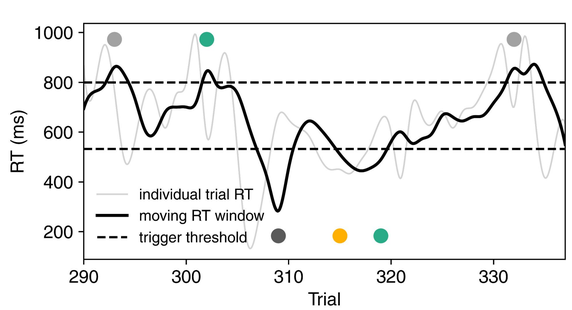


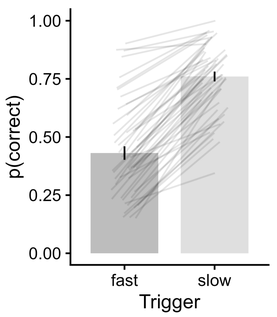
SESSION 1

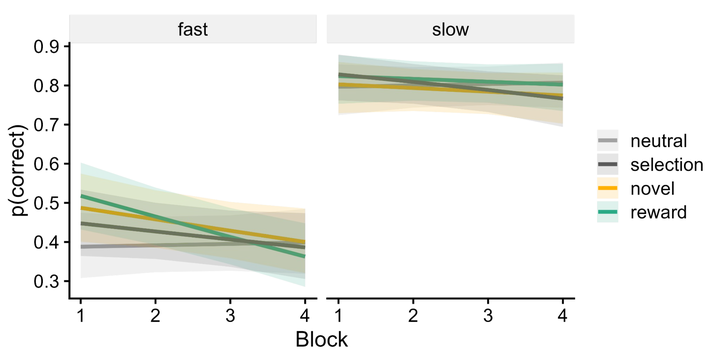


SESSION 2

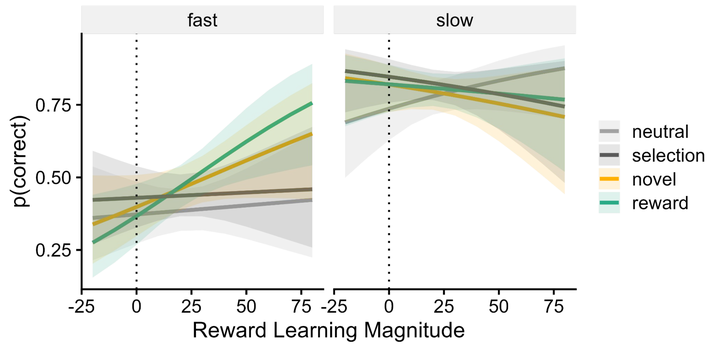








Value- and novelty-driven capture enhances accuracy across attentional states. Value-driven enhancement decreases over time.



Value-driven enhancement is present for those with a strong reward-color association, and is more pronounced during their attentional lapses.

Funding: This work is supported by a NSF GRF awarded to S.S. under grant 2139319 and by contract W911NF-19-2-0026 to B.G. from the US Army Research Office.

Open Science: The study was preregistered at osf.io/58hyw.