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Attention to Fire: search, normal vs. reverse (#80073)

Created: 11/15/2021 02:18 PM (PT)

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1) Have any data been collected for this study already?
No, no data have been collected for this study yet.

2) What's the main question being asked or hypothesis being tested in this study?
The present study aims to test whether and how burning fire selectively captures and guides attention in a visual search task.

We will compare performance in a visual search paradigm in which observers are tasked with searching for a unique visual target among distractors. The key manipulation is whether the unique target is a flame burning normally or in reverse. We predict that the reverse-burning flame will be easier to find among normally burning flames than vice versa - a classic "search asymmetry" that may suggest specialized visual processing for the physical properties of fire.

3) Describe the key dependent variable(s) specifying how they will be measured.
Our primary dependent variable is reaction time (the time it takes subjects to correctly identify whether the visual search target was present or absent on each trial.) Accuracy will be recorded as a secondary variable to ensure any reported differences are not the result of a speed-accuracy tradeoff.

4) How many and which conditions will participants be assigned to?
This is a fully within-subjects factorial 2x5x2 design, with target fire type (burn normally/burn in reverse) x Set size (4/5/6/7/8 fires displayed) x target condition (target present/target absent) as variables.

On each trial, subjects will view a display containing either 4, 5, 6, 7, or 8 fires placed randomly along an imaginary circle, and report whether the target, described as a fire burning "differently" from the others, is present or absent using their keyboard.

Stimuli (target and distractors) will be created from high-resolution GIFs of a burning fire presented as either burning (a) normally or (b) in reverse (achieved by playing the GIF backward). On target-present trials, one fire will be burning "differently" than the others, such that if all of the distractors on that trial are burning in reverse, the target will be a fire burning normally, and if all of the distractors are burning normally, the target will be a fire burning in reverse. On target-absent trials, all stimuli will be identical, either all burning normally or all burning in reverse. On all trials, subjects will be instructed to press the D key if one of the fires is burning differently (target present), and the S key if all of the fires are burning the same (target absent). Subjects will be instructed to respond as quickly and accurately as possible.

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.
A paired samples t-test will be conducted to compare median reaction times on correct target-present trials across the within-subject condition of fire burning direction. We predict that subjects will be faster to detect the presence of a target on trials when the target is a fire burning in reverse among normally-burning distractor fires, relative to trials in which the target fire is burning normally among distractor fires burning in reverse.

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.
At the level of entire subjects, we will exclude anyone from whom we receive incomplete data or who answers less than 80% of trials correctly.

At the level of individual trials, we will exclude trials where the response time is shorter than 200 ms.

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.
We will collect data from 50 subjects, before exclusions.

8) Anything else you would like to pre-register? (e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses planned?)
We will also conduct secondary t-tests to compare accuracy across fire burning direction conditions to ensure that our results are not due to a speed-accuracy tradeoff.
We will conduct a two-way repeated-measures ANOVA to compare the within-subjects factors of target condition (target burning normally/in reverse) and set size (size (4/5/6/7/8) on the primary dependent measure of reaction time.