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**Overview:**

This is a design draft for a replication of Cohen et al. 2011. Past research has shown that because natural scenes can be perceived during difficult attention tasks there is therefore evidence of “awareness” without “attention”. Cohen et al. show evidence that this is not true—and that inattentional blindness can occur for natural scenes. Specifically: during dual task conditions inattentional blindness occurs when the main task is sufficiently difficult. They extend this to say that attention needs to be “fully engaged” to impair awareness of scenes.

In a current project we are exploring whether attention and awareness can be quantified as functions of neural activity in stimulus specific regions. Our goal is to show that the results in past research can be reconciled with the results of Cohen et al. Attention and awareness are unlikely to be consistent and dissociable processes, but rather interact depending on several factors including task difficulty and neural overlap between stimuli.

This project will replicate, in an affordable, easy to repeat, and large-scale manner the results of Cohen et al. without diluting their experiment.

**Experiment:**

The main dependent measurement is the visibility and awareness of a scene presented for 67 ms in the background of a demanding attention task. Cohen et al. use a motion tracking task and an RSVP task for the attention task, due to the ease of adjusting the difficulty of each task. For our initial replication we will focus on motion tracking. Participants will perform the motion-tracking task for four trials during which mask images are shown in the background. On the fifth key trial the background is replaced near the end of the trial with a natural scene including either a vehicle or animal. Participants are probed for awareness of the scene and its contents immediately. Following the main task, participants will perform several trials attending either to the motion tracking task or the background task separately, as a within-subject control for performance in the absence of extra stimuli.

Controls:

Some participants could be identified as controls, in which case they would perform the identical experiment as above. On the trial of interest they would not be questioned about the background change, as a test for whether a surprising background stimuli affects performance in the main task.

We need to control for participant screen resolution, brightness, and contrast settings. Enforcing the stimulus size on the webpage to a specific pixel size can ensure that screen resolution does not impact the experiment. A low-contrast test image can be used to equalize brightness and contrast across participants. The test image will include a number, which participants must identify before proceeding with the experiment.

Video buffering is a common problem online. To avoid this we will use small video file sizes and we will pay out to participants even if they identify that a video had a buffering problem.

**Stimuli:**

Each stimulus will be a video clip including several parts:

1. A blank start screen with a 3-2-1 countdown, to ensure that the video doesn’t jitter at the start.
2. A 3 s screen highlighting the balls that will be tracked.
3. The balls will begin moving as the background mask is added/changed.
4. On the second to last frame, either a natural scene or a mask will appear.
5. A number will identify each of the balls.
6. Participants will identify which balls were moving using their numbers OR respond the Q&A for the natural scene task.

The experiment will consist of several parts:

1. A practice trial in which the participants tracks two of eight balls as they move, with a mask background.
2. Four real trials, tracking 3, 4, or 5 balls (between-subject factor) as they move, with a mask background.
3. Fifth trial, where the second to last frame displays a natural scene.
4. Q&A to determine awareness of the natural scene.
5. Blocked: Five test trials performing only the real task.
6. Blocked: Five test trials performing only the background task.

Total time estimate is ~ 5 minutes for the complete experiment.

Cohen, Michael a, George a Alvarez, and Ken Nakayama. “Natural-Scene Perception Requires Attention.” *Psychological Science* 22, no. 9 (September 2011): 1165–72. doi:10.1177/0956797611419168.