Dan Birman

Psych 254: Michael Frank

**Overview:**

This is a design draft for a replication of Cohen et al. 2011 (Cohen, Alvarez, & Nakayama, 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. Inattentional blindness occurred in their experiments when task demands exceeded a certain difficulty, suggesting that attentional resources exist for secondary tasks even at “ceiling” for some main tasks. They extend this to say that attention needs to be “fully engaged” to impair awareness of scenes. Their interpretation is consistent with a model of “attention” and “awareness” as neural processes that depend on stimulus and task-specific neural resources. My current research program is investigating this line by investigating dual task experiments in which the neural resources necessary for the main and secondary tasks interfere. The Cohen et al. result is important for this theory since it shows two important findings: (1) “attention” is feature and task specific; (2) attention is not all-or-none, but graded according to current demands.

**Experiment Procedure**

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 this replication we will focus on motion tracking. Participants will perform a motion tracking during which mask images will be shown in the background. On a critical trial the background will be replaced, on the second to last frame, with a natural scene including either a vehicle or animal. Participants will be probed for awareness of the scene and its contents.

For a single participant the overall experiment will follow a rough script similar to what I outline here: First, participants will be asked to check that their screen brightness and resolution allow them to see the movie. Then they will perform four trials in which a page opens with the video (3s countdown, 5s screen showing which objects need to be tracked (3-5/8), movement tracking for 4-8s). Following the video an image will appear (or on the next page) showing the final position of the objects and identifying each with a number. Participants will then select which object numbers were the objects that they were asked to track. On the critical fifth trial a natural scene will replace the last frame of the video background. The page following the video will ask a series of questions designed to probe whether or not the participant was “aware” of the natural scene in the background. This will be followed by ten control trials either attending to motion or the background alone. Because the webpage design has only two elements (video and multiple choice response) I don’t expect it to be too difficult to design. The videos will be generated in MATLAB following the precise timing and images used (available via personal communication).

**References**

Cohen, M. a, Alvarez, G. a, & Nakayama, K. (2011). Natural-scene perception requires attention. *Psychological Science*, *22*(9), 1165–72. doi:10.1177/0956797611419168

**Natural-Scene Perception Requires**

**Attention**

**Michael A. Cohen, George A. Alvarez, and Ken Nakayama**

Harvard University

**Abstract**

Is visual attention required for visual consciousness? In the past decade, many researchers have claimed that awareness can arise in the absence of attention. This claim is largely based on the notion that natural scene (or “gist”) perception occurs without attention. This article presents evidence against this idea. We show that when observers perform a variety of demanding, sustained-attention tasks, inattentional blindness occurs for natural scenes. In addition, scene perception is impaired under dualtask conditions, but only when the primary task is sufficiently demanding. This finding suggests that previous studies that have been interpreted as demonstrating scene perception without attention failed to fully engage attention and that natural-scene perception does indeed require attention. Thus, natural-scene perception is not a preattentive process and cannot be used to support the idea of awareness without attention.