Dan Birman                                                                                                                 Psych 254

**Overview:**

This is a design draft for a replication of Cohen et al. 2011 (Cohen, Alvarez, & Nakayama, 2011). Past research claimed to show that natural scenes are always perceived despite focused attention on a difficult task. Researchers considered this as evidence of “awareness” without “attention”. Cohen et al. show evidence to the contrary—that inattentional blindness occurs for natural scenes. Inattentional blindness occurred in their experiments when task demands exceeded a certain difficulty and were dependent on the task type and peripheral stimulus type. These findings suggest that attentional resources exist for secondary tasks even at “ceiling” for some main tasks, but that sufficient complexity will eventually erode awareness. 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. We are using 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: (1) “attention” is feature and task specific; (2) attention is not all-or-none, but graded according to current demands; (3) neural capacity is locally limited, not globally.

**Experiment Procedure**

        The main dependent measurement is 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 difficulty. For this replication we will focus on motion tracking. Participants will perform motion tracking while mask images are shown in the background. On a critical trial the background will be replaced, on the second to last frame, with a natural scene containing an object (vehicle or animal) or not (urban and rural respectively).

During the experiment participants will perform four trials in which a page opens with a video (3s countdown, 5s screen showing which objects need to be tracked (3-5/8), movement tracking for 4-8s) followed by a still image showing the final position of the tracked objects and a number identifying each object. Participants will select which object numbers 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.

        There are several difficulties that I anticipate, including generating the necessary video files and displaying them on webpages. Generating video files with the necessary variability should be possible in MATLAB or Python, given access to either the corresponding author’s original code or their experiment parameters (motion speed, number of objects, background images). An additional and possibly more difficult to surmount issue will be asking participants to control their screen brightness, resolution, and viewing distance to ensure that there is consistency in the display size.

**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

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 dual- task 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.