Object Frequency and Predictability Effects on Eye Fixation Durations in Real-World Scene Viewing

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During text reading, the duration of eye fixations was found to decrease with greater frequency and predictability of the currently fixated word (Rayner, 1998). However, it has not been tested whether those results apply to scene viewing studies. We computed object frequency and predictability from both linguistic and visual scene analysis (LabelMe , Russell et al., 2008). Latent Semantic Analysis (Landauer et al., 1998) was applied to estimate predictability. In a scene-viewing experiment, , we found that, for small objects, linguistics-based frequency, but not scene-based frequency, had effects on first fixation duration, gaze duration, and total time. Both linguistic and scene-based predictability affected total time. Similar to reading, eye fixations decreased with higher frequency and predictability. For large objects, we found the direction of effects was the inverse of those found in reading studies. The results suggest that recognizing small objects in scene viewing might be somewhat similar to recognizing words in reading.

Keywords: Scene viewing, word frequency, word predictability, LabelMe, Latent Semantic Analysis