

Abstract

We evaluated the use of visual clutter as a surrogate measure of set size effects in visual search by comparing the effects of subjective clutter (determined by independent raters) and objective clutter (as quantified by edge count and feature congestion) using “evolving” scenes, ones that varied incrementally in clutter while maintaining their semantic continuity. Observers searched for a target building in rural, suburban, and urban city scenes created using the game SimCity. Stimuli were 30 screenshots obtained for each scene type as the city evolved over time. Reaction times and search guidance (measured by scanpath ratio) were fastest/strongest for sparsely cluttered rural scenes, slower/weaker for more cluttered suburban scenes, and slowest/weakest for highly cluttered urban scenes. Subjective within-city clutter estimates also increased as each city matured, and correlated highly with RT and search guidance. However, multiple regression modeling revealed that adding objective estimates failed to better predict search performance over the subjective estimates alone. This suggests that within-city clutter may not be explained exclusively by low-level feature congestion; conceptual congestion (e.g., the number of different types of buildings in a scene), part of the subjective clutter measure, may also be important in determining the effects of clutter on search.