Title

The time course of natural scene processing revisited: A critical test of affordance-based classifications.

Abstract

A recent study by Greene & Oliva (doi: 10.1111/j.1467-9280.2009.02316.x Psychological Science April 2009 vol. 20 no. 4 464-472) evinced that a global-property categorization can be accomplished with significantly less presentation time than a basic-level categorization, implying that there exists a time during which a scene may be classified, for example, as built or natural but not yet as a forest or an ocean. Based on these results they concluded "…rapid categorization of natural scenes may not be mediated primarily though objects and parts, but also through global properties of structure and affordance." Such results suggest that the perception of action-properties latent in the environment at an architectural or ecological scale may be privileged during early visual processing. However compelling, such data do not unequivocally demonstrate that the brain accomplishes such global-level categorization in either less time or with less effort, only that they can be accomplished with inchoate presentations. To address this issue directly we used the identical set of stimuli used by Greene & Oliva and employed a response-signal paradigm, a paradigm that allows unrestricted viewing time yet unexpectedly varies the processing time allowed for decision making. Ten subjects individually completed two experimental sessions of 1400 trials each on separate days, having previously completed 8 1.5 hour lexical categorization (i.e., word vs nonword) practice sessions across multiple days to ensure routine reaction times of approximately 200ms or less to the response-signal. Preliminary results revealed that compared to basic-level categorizations, global-level categorizations actually required longer amounts of processing time to reach equivalent levels of accuracy, although both were completed accurately with equivalent or shorter amounts of processing time when compared to lexical categorizations. This suggests, when interpreted in the context of earlier results, that affordance-based judgments may need less information yet paradoxically require more processing, thus laying the groundwork for additional studies involving direct measures of brain activity (e.g., fMRI, EEG). Such results demonstrate that complex real-world stimuli used in conjunction with quantitative experimental paradigms may simultaneously inform cognitive neuroscience, environmental psychology and architectural theory.

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Biographical Narrative

Dr. Tassinary joined the Texas A&M University faculty in the Department of Urban Planning as an assistant professor in 1990. In that same year his first book appeared, co-authored and co-edited (Principles of Psychophysiology). In 1991 he was appointed the Director of the Environmental Psychophysiology Laboratory, a position he still holds today. In 1993 he was the first faculty member at Texas A&M University to receive a 5-year Presidential Faculty Fellowship from the National Science Foundation, one of only 15 scientists nationwide to be so honored. In 1994 he was promoted to associate professor with tenure in the Department of Architecture. In 1997 he received the Kadel Medal for Career Achievement from his undergraduate alma matter (Eckerd College). In 1998 a seminal publication appeared in the Journal of Environmental Psychology. In 2000 his second book appeared, also co-authored and co-edited (The Handbook of Psychophysiology - 2nd Ed.) and he was promoted to full professor in the Department of Architecture. From 2000 to 2003 he attended law school at Boston College. While matriculating he was selected to serve on the editorial board of the prestigious Environmental Law Review. He returned to TAMU in the fall of 2003 and in the spring of 2004 was chosen to be the Associate Dean for Research. From 2005-7 he successfully chaired a task force charged with the creation of a new department within the College of Architecture (i.e. Visualization) and he joined this new department in the fall of 2007. In 2007 he had a paper appear in the Proceedings of the National Academy of Sciences (co-authored with a former student) and the 3rd edition of The Handbook of Psychophysiology was published. In the fall of 2009 he was chosen to be the Executive Associate Dean in the College of Architecture and the Director of the Architecture Digital Fabrication Facility at the Riverside Campus.