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Author
Levin, Daniel T.

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Attention as a Pecking Chicken: The Consequences of Change Blindness for Our Understanding of Real-World Vision

Daniel T. Levin (daniel.t.levin@vanderbilt.edu)
Department of Psychology and Human Development, Vanderbilt University
230 Appleton Place, Nashville, TN 37203-5701

Visual cognition has been studied using a wide variety of approaches, some of which emphasize the amount of information the visual system can process and retain, or the rate at which the system can process information. This tradition emphasizes the maximum performance of a capacity-stressed system, and usually focuses on hard-wired "mechanisms" to account for domain-general upper limits on performance using artificial stimuli and tasks carefully designed to avoid the deployment of specific knowledge, or idiosyncratic strategies. However, other research emphasizes the specific factors that lead the system to select some information at the expense of other information. This approach focuses more on the specific cognitive, and contextual factors that specify what people attend to, elaborate upon, compare across views, and retain. Instead of taking a domain-general approach, this tradition takes a more domain-specific approach, and often focuses on how people navigate dynamic real-world visual environments. In this talk, I discuss how recent research on change blindness, inattention blindness, and interactions between working memory and attention suggest the need to increase emphasis on nonautomatic, knowledge-driven processes. This emphasis gives a picture of visual attention that incorporates voluntary, spatiotemporally limited selection that can be embodied in a new metaphor – that of a pecking chicken (Levin & Saylor, in press).

The presentation will start by detailing recent research exploring change detection in our lab. This research represents an effort to understand the implications of change blindness for visual processing. By now a large number of studies have demonstrated that people can be very poor at detecting visual changes, both in objects that are not the current focus of attention, and in objects that are the focus of attention. People miss changes in alternate stills of natural scenes, in object arrays, in motion pictures, and even when the changes occur right in front of them in the real world. We have recently been exploring the sources of this failure for naturalistic events both in motion pictures and the real world. The primary conclusion of these studies is that change blindness sometimes occurs because people fail to represent the changing features, and sometimes it occurs because people fail to compare the representations they have created (e.g. Levin, Simons, Angelone, & Chabris, 2002; Varakin, Levin, & Collins, in press). Other research exploring people's ability to detect unexpected disruptions during visual events further suggest that even a basic awareness of the presence of an entire channel of visual information may sometimes be nonobligatory (Levin & Varakin, 2004). These different failures occur in very similar task settings, and their presence suggests that even an on-line visual process such as change detection depends on a series of visual functions (or "routines"), many of which are nonobligatory (Varakin & Levin, in prep).

Based on findings like these, I will propose a new metaphor for vision: that of a pecking chicken (Levin & Saylor, in press). Just as a peck represents a time-limited moment of contact with the ground, visual attention sometimes results in a time-limited sample of visual properties. I will discuss several consequences of the pecking chicken metaphor for a variety of specific domains including event perception, motion picture perception (Levin & Simons, 2000), and human-computer interaction (Varakin, Levin, & Fidler, 2004).

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