Distraction in a visual multi-deviant paradigm: Behavioral and event-related potential effects

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Abstract:

The present study aimed at investigating visual distraction in a serial, multi-deviant oddball paradigm with deviant stimuli occurring regularly (every third trial), having a larger overall probability (1/3), and low dimension-specific probability (1/9). Participants performed a categorization task (odd/even) on centrally presented digits. Task-irrelevant geometrical forms were presented concurrently in the left and right periphery of the target. These forms were green triangles that, in every third trial, contained a deviancy either in location, color, or shape at the left or right peripheral position. Behavioral performance and event-related potentials (ERPs) were measured during the multi-deviant blocks and during corresponding control blocks to compensate for physical differences. Results revealed prolonged reaction times for the categorization task in trials containing a deviant feature relative to the respective control condition. Furthermore, two negative shifts were observed in the ERPs for deviant compared to control stimuli, the early one at the ascending part of the N1 component, and the later one at the onset latency of the N2 component. Deviant displays violating a sequential regularity on one of the dimensions thus elicit respective posterior ERP components of change detection and a deterioration in task performance even when they occur as frequently as in every third trial of a sequence. In analogy to findings in audition, these results reveal the importance of regularity processing and its immediate consequences for adaptive behavior also in vision. (C) 2009 Elsevier B.V. All rights reserved.

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