Synchronous contextual irregularities affect early scene processing: replication and extension.

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Abstract:

Whether contextual regularities facilitate perceptual stages of scene processing is widely debated, and empirical evidence is still inconclusive. Specifically, it was recently suggested that contextual violations affect early processing of a scene only when the incongruent object and the scene are presented asynchronously, creating expectations. We compared event-related potentials (ERPs) evoked by scenes that depicted a person performing an action using either a congruent or an incongruent object (e.g., a man shaving with a razor or with a fork) when scene and object were presented simultaneously. We also explored the role of attention in contextual processing by using a pre-cue to direct subjects’ attention towards or away from the congruent/incongruent object. Subjects’ task was to determine how many hands the person in the picture used in order to perform the action. We replicated our previous findings of frontocentral negativity for incongruent scenes that started ~ 210 ms post stimulus presentation, even earlier than previously found. Surprisingly, this incongruency ERP effect was negatively correlated with the reaction times cost on incongruent scenes. The results did not allow us to draw conclusions about the role of attention in detecting the regularity, due to a weak attention manipulation. By replicating the 200-300 ms incongruity effect with a new group of subjects at even earlier latencies than previously reported, the results strengthen the evidence for contextual processing during this time window even when simultaneous presentation of the scene and object prevent the formation of prior expectations. We discuss possible methodological limitations that may account for previous failures to find this an effect, and conclude that contextual information affects object model selection processes prior to full object identification, with semantic knowledge activation stages unfolding only later on.

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