ABSTRACT

Aliyeva, A. (2026). Electroencephalographic Investigation of Target Stimulus Saliency in Implicit Contextual Learning. İstanbul University, Institute of Health Science, Neuroscience. Master's Thesis. İstanbul.

Implicit contextual learning enables attentional guidance toward target locations through the unconscious acquisition of spatial regularities. This study examined how reduced target salience affects this learning capacity and its electrophysiological correlates.

Thirty-six healthy participants were randomly assigned to "Easy" (standard target-distractor discrimination) or "Hard" (low salience, increased target-distractor similarity) conditions. They completed a 20-block visual search task under EEG recording, followed by a recognition memory test.

Behavioral results revealed that the Hard condition was associated with longer overall reaction times, yet contextual learning emerged earlier and reached a magnitude approximately 3 times greater observed in the Easy condition. Recognition performance remained at chance (25%) in both groups, confirming that learning was driven entirely by implicit mechanisms.

EEG analyses revealed two distinct mechanisms. In the Easy condition, spatial regularities elicited enhanced N1pc amplitude (100–150 ms) over posterior regions, reflecting early sensory orienting. In the Hard condition, this early modulation was absent; instead, a prominent P2 component (140–240 ms) emerged over frontal and frontocentral regions, indicative of proactive top-down control.

Together, these findings demonstrate that reduced target salience does not hinder implicit learning but instead amplifies it. When sensory information is insufficient, the visual system shifts from reactive sensory processing toward strategic, anticipatory allocation of neural resources, drawing more heavily on environmental regularities. This suggests that contextual cueing becomes increasingly critical and is more effectively exploited under conditions of heightened perceptual demand.

Key Words: Implicit Learning, Contextual Cueing, Target Salience, EEG, N1pc, P2