

The left hemisphere will tell if you got it right: evidence from visual statistical learning

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Extracting statistical regularities from sensory input is vital to perception, memory and language processing. This ability, known as statistical learning (SL), is a useful capacity which has been demonstrated by a range of studies across modalities and stimulus types. To deepen the understanding of the underlying mechanism of SL, this study investigated the possible psychophysiological signatures sensitive to the extraction of temporal regularities and the hemispheric asymmetry in visual SL. Event-related potentials (ERPs) were recorded on a group of young adults (n=28) during the visual SL task. After being exposed to a continuous stream of abstract shapes, participants performed a judgement task containing adjacent and nonadjacent dependency, with visual half-field manipulation on the final shape of the triplet. Behavioral results showed higher response accuracy of target triplets than foil triplets. Grand-averaged ERPs showed that with the right visual field (RVF) presentation, the final shape that responded correctly elicited larger N100 (110 - 170 ms) and also larger N400 (300 - 500 ms) than those responded incorrectly. These results indicate the left hemisphere advantages in visual SL; the early frontal brain activity reflects the selective attention to learned items and predicts the learning outcome of individuals; mid-latency brain waves at central-to-parietal regions are possibly compatible with matched or mismatched information. In addition, the N400 effect also showed a tendency that the right hemisphere might be responsible for processing items with low statistical regularities. Our findings provide new insights into the neurocognitive mechanisms associated with extracting patterns of regularity under visual SL.

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