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Behavioral and electrophysiological signatures of Perceptual Bias in line length estimation

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The Landmark task constitutes one of the most effective behavioral tasks in visuospatial perception, detecting a distortion of space perception known as Perceptual Bias (PB). This study intended to highlight the behavioral and neural basis of PB by administering the Landmark task while concurrently recording EEG.
A computerized Landmark task was administered to thirty-seven healthy participants. They had to report the longest or the shortest of the two segments of pre-bisected horizontal lines that could be symmetrically (i.e., Critical stimuli) or asymmetrically (i.e., Control stimuli) bisected. EEG signal was recorded throughout the experiment.
Three possible PB values could be extracted from Critical trials: 50% ± 5 (i.e., no bias), higher than 55% (i.e., "neglect-like"bias), and lower than 45% (i.e., "pseudoneglect"bias).
Despite high inter-individual variability, participants behaviorally manifested a "pseudoneglect"bias (mean 43.93%), in accordance with the current literature. From the electrophysiological standpoint, pairwise comparisons between Critical vs. Control trials showed a significant difference in the N2 and P3 components'time windows (i.e., higher in Control than in Critical trials). The N2 result could represent content-specific awareness due to the perceptual difference provided by Control trials only. Consequently, the P3 finding could be related to a stronger post-perceptual decision-making process performed on Control trials.
Finally, a positive correlation between PB and the P2 peak amplitude was found, suggesting that PB takes place at this stage of visual processing, prodromic to the generation of a feature-integrated content of perceptual awareness.

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