LEARNING TO DISCRIMINATE THE EYE-OF-ORIGIN DURING CONTINUOUS FLASH SUPPRESSION

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Résumé

Helmholtz asked whether one could discriminate which eye is the origin of one's perception merely based on the retinal signals (von Helmholtz, 1962). Studies to date showed that the ability to discriminate the eye-of-origin most likely depends on contextual cues (Smith, 1945; Ono and Barbeito, 1985). Nevertheless, exogenous attention can enhance performance for monocularly presented stimuli (Zhaoping, 2008; Zhang et al., 2012; Kim and Chong, 2022). Here we investigate whether an attention-based training can facilitate the access to the eye-of-origin information, either by modulating visual information at the level or the monocular channels or by enhancing contextual cues. We used the breaking continuous flash suppression (b-CFS) paradigm to stimulate the two eyes separately and to estimate the signal strength of the monocular targets. At each trial, participants (N = 34) reported the localization of the target grating as soon as it emerged from CFS, and then made an eye of origin judgment and gave confidence ratings. Following a baseline block (100 trials), participants performed a training block (100 trials), during which, at the beginning of each trial, a binocular cue (75% valid) informed them about the eye of origin of the upcoming target, and they were asked to orient their attention accordingly. Training was followed by a post-training session (100 trials), identical to the baseline. We found a significant improvement in the accuracy eye-of-origin discrimination after the training ($\chi 2(1)=191.5$, $p< 0.001$) and an effect of metacognition ($\chi 2(2)=47.7$, $p< 0.001$). There was no difference in the suppression times for the trials following valid vs invalid cues during the training ($\chi 2(1)=0.905$, $p=0.34$). Our results show that even though the strength of the monocular channels is not altered with voluntary attention, a short training improves eye-of-origin discrimination performance. The metacognitive abilities of the participants closely relate to their performance, suggesting that a high-level decisional mechanism is responsible for the eye-of-origin judgment. We propose, nevertheless, that this high-level process is informed by subtle sensory cues such as the differences in luminance or contrast in the two monocular channels.

Mots-Clés: Continuous flash, suppression, eye, of, origin, learning, attention

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