

Abstract

Repetition suppression (RS) is a widely studied neural phenomenon referring to the reduction in neural response due to the repeated presentation of a stimulus. The manipulation of repetition probability in recent studies supported an explanation of its underlying mechanism using the predictive coding model. Despite substantial evidence showing an interaction effect between repetition and expectation conditions with a reduction in BOLD signals, its temporal dynamics remains debatable. Furthermore, whether the expectation modulation effect is affected by the processing of configural information was unknown. In the present EEG study, the repetition and expectation effects of Chinese characters were examined for N170 using a factorial design and the repetition probabilities were signalled by the colours of the characters which were counterbalanced across participants. Our results indicated that there were only repetition main effects for upright characters but not for inverted characters at N170, and expectation main effects were absent for both conditions. These results implied that the identification of individual Chinese characters at the early stages of processing might not involve neuronal interactions between higher-level predictions driven by category membership and bottom-up signals, thus the predictive mechanism possibly operates in more distant areas. Another possibility might be that the processing of configural information for Chinese characters involving expectation modulation occurs only at the later stages, but this is yet to be examined in future work.

Keywords: Repetition suppression, predictive coding, Chinese characters