Review on the relationship between mindfulness and feedback-related negativity in terms of the predictive coding model of mindfulness

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Background and objectives: Farb et al. (2015) proposed that mindfulness leads to perceptual inference, which is a strategy minimizing prediction error by weighting sensory input over prior expectation and then increasing the accuracy of simulation, in the predictive coding model. It leads to wider distribution of prior, which in turn leads to smaller prediction error, because the simulation gets close to the actual current sensation. However, the empirical data evidencing the model were still few. It is possible that feedback-related negativity, which is also called error-related negativity that peaks approximately 250ms after feedback, represents the degree of prediction error. Therefore, we hypothesized that the low degree of prediction error, that is, small feedback-related negativity, is related to high mindfulness and examined the hypothesis by reviewing past researches.
Methods: We searched Web of Science by terms, "mindfulness" and ("feedback-related negativity" or "error-related negativity").
Results: 17 articles were found, and then only 1 article (Teper & Inzlicht, 2014) which is related to mindfulness and feedback-related negativity was extracted. 8 articles dealt with error-related negativity related to performance monitoring and error detection, observed in approximately 50-100ms after an error. Teper & Inzlicht (2014) showed that individuals high in trait mindfulness showed less differentiation of rewarding from neutral feedback, although no differentiation of aversive from neutral feedback, compared to individuals low in trait mindfulness.
Discussion and conclusion: Unexpectedly, only 1 study which focused on feedback-related negativity was found, while there were relatively many studies which dealt with error-related negativity related to performance monitoring and error detection. Teper & Inzlicht's (2014) result is partly consistent with the hypothesis that the low degree of prediction error is related to high mindfulness, although it cannot be explained why the difference was not shown in aversive stimuli. It is considered that the individual difference of trait mindfulness was insufficient to show that difference, and so more studies are needed to investigate the relationship between feedback-related negativity and mindfulness by experimental design.