SUBCONSCIOUS INFORMATION ELICITS DISTINCT METACOGNITION FOLLOWING ACTIVE DECISION-MAKING

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Background: Metacognition is often regarded as a sophisticated cognitive process that relies on consciousness. While both conscious and subconscious information impact decision-making, it remains unclear whether subconscious information can elicit post-decision metacognition to the same extent as conscious information.

Aims: To clarify the post-decision metacognitive process under conscious and subconscious conditions and how they differ between active and passive decisions.

Methods: 35 volunteers were recruited to participate in an actively making or passively watching decision task under conscious (Con), subconscious (SubCon), and no stimuli (None) conditions that utilized the continuous-flash-suppression paradigm. Brain activities were recorded from all participants using a 64-channel EEG system. In addition to analyzing ERPs, multivariate pattern analysis (MVPA) was employed to perform time-series decoding using the area under the receiver operating characteristic curve (AUC) as an indicator.

Results: While ERPs failed to reveal any difference, MVPA indicated that the metacognitive processing for SubCon and None differed from Con in the decoding AUCs. Further characterization of decoding metrics validated that SubCon was also different from None, demonstrating distinct metacognitive processing for subconscious information. Additionally, temporal generalization analysis illustrated the diverse neural dynamics among Con, SubCon, and None conditions, as well as between active and passive decisions. Finally, source localization analysis suggested the crucial role of the frontal-parietal lobe in discerning post-decision metacognition.

Conclusions: These findings demonstrate that subconscious information elicits distinct metacognitive processes post-decision-making, making a significant contribution to our understanding of metacognition.

Keywords: Metacognition, Subconscious, Conscious, Decision-making, Multivariate pattern analysis

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