



2016 BACN

Annual Scientific Meeting

12th-14th September



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Poster 19: Prediction mechanism in the visual modality: An ERP study

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The ability to feel agency has been associated with internal forward modeling [1]. This phenomenon is considered to rely primarily on sensory predictions. Our aim was to examine prediction-related modification of visual processing by analyzing event-related potentials (ERPs) elicited by abstract (checkerboard) or ecologically relevant (hand) stimuli in two experiments. Stimuli either appeared after the participants pressed a button (movement-induced) or randomly without any keypresses (passive viewing). All the above conditions were performed in two different versions, with stimuli of either 100% or 50% predictability. Internal prediction mechanism marked by ERP amplitude decrease was detected in a very early stage of processing: visual N70 suppression was found both for checkerboard and hand stimuli. To the best of our knowledge, no ERP study reported such an early effect. However N70 suppression for abstract stimuli was present only for predictable stimuli, and restricted to movements by the dominant hand, suggesting that prediction mechanisms at this early stage are less general for non-ecological stimuli. In contrast to previous study results [2,3], an amplitude increase was found regarding the P100 component, independent of stimulus type, predictability or the laterality of hand movement, pointing to a more general and stable effect. Considering that these effects appear very early, it can be assumed that the modulation of activity of the striate/extrastriate visual cortex contributes to the feeling of agency related to the movement-related appearance of abstract and ecologically relevant stimuli.

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