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Generation of Electro-Encephalography Readiness Potentials by Intention

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Abstract : The readiness potential in brain waves is a brain activity related with an intention whose potential arises even before its conscious intention. This study was carried out in order to understand the generation and mechanism of the readiness potential more. The experiment with two subjects was conducted in two ways following the Oddball task protocol. Firstly, auditory stimuli were randomly presented to the subjects. The subject was allowed to press the keyboard with the right index finger only when the subject heard the target stimulus but not the standard stimulus. Secondly, unlike the first one, the auditory stimuli were randomly presented, and the subjects pressed the keyboard in the same manner, but at the same time with grasping action of the left hand. The readiness potential showed up for both of these experiments. In the first Oddball experiment, the readiness potential was detected only when the target stimulus was presented. However, in the second Oddball experiment with the left hand action of grasping something, the readiness potential was detected at the presentation of for both standard and target stimuli. However, detected readiness potentials with the target stimuli were larger than those of the standard stimuli. We found an interesting phenomenon that the readiness potential was able to be detected even the standard stimulus. This indicates that motor-related readiness potentials can be generated only by the intention to move. These results present a new perspective in psychology and brain engineering since subconscious brain action may be prior to conscious recognition of the intention.

Keywords : readiness potential, auditory stimuli, event-related potential, electroencephalography, oddball task
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