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Right Frontal Gamma and Beta bands Enhancement While Solving a Spatial Puzzle with Insight

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**Right Frontal Gamma and Beta bands Enhancement While Solving a Spatial  
Puzzle with Insight**

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**Abstract**

Solving a problem with an "a-ha" effect is known as insight. Unlike incremental problem solving, insight is sudden and unique, and the question about its distinct brain activity, intrigues many researchers. In this study, electroencephalogram signals were recorded from 12 right handed, human participants before (baseline) and while they solved a spatial puzzle known as the '10 coin puzzle' that could be solved incrementally or by insight. Participants responded as soon as they reached a solution and reported whether the process was incremental or by sudden insight. EEG activity was recorded from 19 scalp locations. We found significant differences between insight and incremental solvers in the Gamma and Beta 2 bands in frontal areas (F8) and in the alpha band in right temporal areas (T6). The right-frontal gamma indicates a process of restructuring which leads to an insight solution, in spatial problems, further suggesting a universal role of gamma in restructuring.

These results further suggest that solving a spatial puzzle via insight requires exclusive brain areas and neurological - cognitive processes which may be important for meta-cognitive components of insight solutions, including attention and monitoring of the solution.

Key Words:

EEG, Problem Solving, Insight, Incremental, Spatial Puzzle, Cognition Neural Oscillations, Gamma Band, Beta Band, Alpha Band, Attention.

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