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ABSTRACT

The Influence of Serotonin Transporter on Rule of generalization and Acquired Equivalence.

Leen Jayousi [1]
Al-Quds University [1]

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People vary in their cognitive performance; prior studies have shown that cognition is sub-served by different brain regions. For example, studies have demonstrated the significant and dissociable roles of the basal ganglia and medial temporal lobe in learning, memory and generalization. In particular, it has been suggested that the medial temporal lobe facilitates the formation of rules based on prior learning. These rules can be generalized to novel learning situations. Given the significant serotonergic input to the medial temporal structures, studies have focused on the influence of serotonin on generalization. In this study, we investigated the relation between serotonin and generalization by studying a naturally-occurring genetic haplotype of two single nucleotide polymorphisms in the serotonin transporter gene (SERT). The STPP polymorphism in the SERT regulates the expression of the serotonin transporter mRNA. On the other hand, the 5-HTTLPR polymorphism modulates the transcription of the serotonin transporter. A sample of 400 healthy undergraduates from Al-Quds University completed an acquired equivalence computer-based cognitive task for learning and generalization. Results showed that participants with low serotonin (AA-LL haplotype) of the STPP and 5-HTTLPR polymorphisms exhibit worse performance in the generalization phase than participants with high serotonin (CC-SS haplotype). These results can advance our understanding of the pathophysiology of various neuropsychiatric disorders that are related to serotonin like major depressive disorder where patients show structural deficits in the medial temporal lobe.

Correspondence concerning this article should be addressed to Leen Jayousi at Al-Quds University

E-mail: palstudent@alquds.edu
Palestine, Abu Dis, Al-Quds University