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**Probabilistic reasoning in „At Risk Mental State“-patients**

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The core topic of this thesis was to elucidate if „Jumping to Conclusion“ (JTC) and altered activations during probabilistic decision-making represent an early cognitive marker of psychotic disorders. We evaluated a functional magnetic resonance imaging (fMRI)-task regarding probabilistic reasoning in schizophrenia patients and later applied this task to „at risk mental state“(ARMS)-patients. The early identification of the ARMS is a crucial demand in schizophrenia research. Currently used diagnostic instruments mainly focus on either attenuated psychotic symptoms (APS) and brief limited intermittent psychotic symptoms (BLIPS) or solely cognitive basic symptoms (BS). The “Early Recognition Inventory based on IRAOS” (ERlraos) has been developed as a comprehensive assessment of both symptom groups within one scale.

We compared ERlraos and the “Comprehensive Assessment of At Risk Mental States” (CAARMS), applying both scales in a sample of 121 outpatients (STUDY 1). Subsamples were classified as first episode of psychosis (FEP), late ARMS with prevalent APS and/or BLIPS, early ARMS presenting cognitive BS and a vulnerability group. Our results point to a higher sensitivity of ERlraos compared to scales mainly assessing APS and BLIPS. A detailed assessment of cognitive BS seems to be important for therapeutic interventions in ARMS-patients and might sustain the alleviation of cognitive dysfunction in schizophrenia. Schizophrenia patients suffer from deficits in monitoring and controlling their own thoughts. Within these so-called metacognitive impairments, changes in probabilistic reasoning might be one cognitive phenomenon disposing to delusions. In STUDY 2, an fMRI-modification of the beads task, which requires a probabilistic decision after a variable amount of stimuli, was applied to 23 schizophrenia patients and 28 healthy controls, matched for age, gender and educational levels. Activation patterns during decision-making under conditions of certainty versus uncertainty were compared and the process of final decision-making in ventral striatum (VS) and ventral tegmental area (VTA) was evaluated. During final decision-making, activations in several fronto- and parietocortical areas, as well as in VS and VTA became apparent. In both of these regions schizophrenia patients showed a significant hypo-activation. These results further define the network underlying probabilistic decision-making. The observed hypo-activation in dopamine-associated regions fits into concepts of disrupted prediction error signalling in schizophrenia and suggests functional links to reward anticipation. It is unclear, whether JTC and functional alterations during probabilistic decision-making might already occur in the ARMS. In STUDY 3, we applied the classical beads task and the fMRI-version to 24 ARMS-patients and 24 healthy controls, matched for age, gender and education. In the classical beads task ARMS-patients tended to draw less beads than controls and showed JTC significantly more often. Regarding fMRI, during final decision-making, activations in VS and VTA became evident in both groups. As ARMS-patients displayed a significant hypo-activation in right VS, this corresponds with findings in schizophrenia without confounding effects of duration of illness and antipsychotic medication.

In conclusion, these findings suggest JTC and striatal dysfunctions during probabilistic reasoning as a possible marker of psychosis. Longitudinal studies with ARMS- and drug-naive FEP-patients are necessary to elucidate the development of these findings over time and the interplay with clinical symptoms. Furthermore, it should be assessed, if combining ARMS-criteria and JTC might define a subgroup with specific sensitivity to CBT-interventions or increased risk for transitions to psychosis. A general focus on cognitive BS and cognitive and metacognitive impairments occurring in early ARMS-stages will hopefully lead to well-tolerable early treatment interventions.