Ruprecht-Karls-Universität Heidelberg
Medizinische Fakultät Mannheim
Dissertations-Kurzfassung

Metacognition in at risk mental states for psychosis – Exploring metamemory and a bias against disconfirmatory evidence

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Metacognitive deficits in schizophrenia are discussed to play important roles in the development and maintenance of delusions. Crucial metacognitive deteriorations concern biases in the memory monitoring and in evidence integration, especially in the integration of disconfirmatory evidence. The relation of these biases to delusions is a topic of current research and as yet incompletely understood. Furthermore, findings about mutual interrelations between neuro- and metacognitive functioning are still controversial and need further clarification. The aim of the present dissertation was to investigate these metacognitive biases in patients in different stages of psychosis to investigate whether they contribute to the pathogenesis of delusions.

Study 1: 32 SCZ-patients were compared to 25 matched HCs on a verbal metamemory task. Associations of metamemory performance with neuropsychological performance and psychopathological measures were analysed. Results replicated a significantly smaller discrepancy between confidence ratings for correct and incorrect recognitions in the patient group. SCZ showed significantly lower recognition accuracy in the metamemory task and marked neuropsychological deficits. Across all participants, metamemory performance significantly correlated with executive functioning and working memory. No associations with delusions were found.

Study 2: 34 ARMS-patients were compared to 21 FEP-patients and 38 matched HCs regarding performance on the same verbal metamemory task (see study 1). All patients were antipsychotic-naïve. Psychometric rating scales and a neuropsychological test battery were applied. FEP-patients showed the significant smallest difference between correct and incorrect recognitions in terms of confidence, followed by ARMS-patients. FEP-patients also showed a significantly higher proportion of high-confident incorrect answers compared to HC. Metamemory performance correlated significantly with measures of positive symptoms and working memory performance.

Study 3: 31 SCZ-patients and 29 matched HCs completed a standard evidence integration task, comprised of written scenarios which were disambiguated over time by consecutive sentences. Participants were asked to rate the plausibility of four possible interpretations and adjust their ratings in response to the consecutively provided sentences. Psychometric rating scales and a neuropsychological test battery were applied. SCZ displayed a bias in the integration of confirmatory, but not disconfirmatory evidence and a liberal acceptance of belief formation. Correlation analyses revealed no associations of evidence integration with the severity of positive symptoms. However, correlations with processing speed, executive functioning, vigilance and working memory were found.

Study 4: Evidence integration performance was evaluated in 44 ARMS-patients, 28 FEP-patients, and 38 matched HCs. The introduced evidence integration task (see study 2) was applied in addition to a battery of neurocognitive tests and psychometric rating scales. FEP-patients showed a significant bias against disconfirmatory evidence compared to the other groups. ARMS-patients exhibited intermediate performance between HC and FEP-patients. A trend towards significance became evident for a bias against confirmatory evidence in FEP-patients. Correlations with delusions and social cognition reached medium effect sizes but failed significance after Bonferroni-corrections.

The results of this dissertation confirm biases in metamemory as well as biases in evidence integration in chronic patients with schizophrenia and show the same biases in FEP-patients and for the first time in ARMS-patients. The hypothesis is supported that metacognitive biases already play a role in early stages of the illness and contribute to the pathogenesis of psychosis. They might represent early cognitive markers of the beginning psychotic state. Selective neuropsychological abilities seemed to be modulating factors. Associations between metacognitive performance and delusional measures differed between groups, possibly due to the influence of antidopaminergic medication or state of illness. This knowledge can be used

for (meta-) cognitive interventions already at very early stages of illness. Longitudinal studies are needed to unravel whether metacognitive deficits predict the transition to psychosis. In perspective, one might hope to ameliorate the general course of illness by help of well-designed cognitive interventions.