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Disentangling the role of perceptual priors, metacognitive beliefs and attention functioning in auditory hallucinations of schizophrenia patients

Auditory hallucinations, so hearing sounds and voices without corresponding stimuli in the environment, are a quite common phenomenon in the general population. Approximately 40% of the population had such experiences, and about 7% experience them continuously. In most cases, hallucinations are not associated with stress or anxiety. At the same time, over 70% of people with a diagnosis of schizophrenia experience auditory hallucinations, and in these cases, it is a source of psychological suffering. They have negative content, are perceived as uncontrollable, have prolonged duration and are impacting everyday functioning. How come that a relatively common phenomenon can be a source of psychological suffering in schizophrenia patients?

Recent scientific reports are trying to explain mechanisms of hallucinations and answer the question of how they can be a source of psychological suffering. Our study wants to bring these two perspectives together. Proposed mechanism of hallucinations in a cognitive model of predictive coding is inbalance between priors and processing of sensory stimuli. An example illustrating this mechanism may be “phantom phone vibration” phenomenon, where a person expecting a phone-call experience a hallucination – feels vibrating phone despite that no one is calling. Such an experience can be interpreted in various ways by different people. Way of interpreting may be dependant on metacognitive beliefs, so beliefs about one's thoughts and cognitive processes. A person with negative metacognitive beliefs (e.g. “Such experience is a sign that I’m losing my mind”) will experience elevated stress during hallucinations. Also, metacognitive beliefs can affect how a person manages their attentional resources and whether they allocate them in repetitive negative thinking about experienced hallucinations. So, in the predictive coding account metacognitive beliefs may be understood as a “set” of priors.

From previous research, we know that people with schizophrenia have a stronger tendency to rely on strong priors in predictive coding. We also know that they have greater levels of negative metacognitive beliefs and lower level of attentional functioning. From our own studies, we know that in general population negative metacognitive beliefs are related to hallucinatory experiences. In the planned study we want to understand better how these factors relate to each other and impact one another in people with a diagnosis of schizophrenia with and without auditory hallucinations. We also plan to compare people with schizophrenia with healthy controls. Another aim is to subject participants to attention training, as from previous studies we may assume that it impacts auditory hallucinations and negative metacognitive beliefs alike. We plan on using structured interviews, questionnaires and experimental tasks measuring auditory perception. We assume that in people with a diagnosis of schizophrenia effects of perceptual priors are modulated by metacognitive beliefs and attention functioning. We also hypothesize that we can affect hallucinations with attention training. Knowledge obtained in this studies will contribute to our understanding of mechanisms of auditory perception in people with schizophrenia and mechanisms of pathologic hallucinations. It will also impact the development of therapy and treatment methods.