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From speech to meaning: Abnormal predictive processing in schizophrenia

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Patients with schizophrenia exhibit language processing abnormalities with respect to both high-level semantic and contextual processing and low-level speech perception. However, the literatures characterizing these abnormalities have been largely separate and have sometimes supported contradictory accounts of aberrant language processing in schizophrenia. We propose that both high- and low-level language processing abnormalities in schizophrenia may arise from dysfunctional *predictive* and *belief-updating* processes. In healthy adults, converging neural and cognitive evidence suggests that real-time language processing involves internal generative models that predict the form of incoming input based on multiple sources of contextual information and language knowledge. These probabilistic expectations link comprehenders' prior knowledge with the interpretation of incoming stimuli, and are continuously updated based on perceptual error signals. Disruptions in these processes in schizophrenia may considerably reduce the efficiency and robustness of language processing at multiple levels of representation, accounting for a wide range of observed effects. This perspective suggests a number of productive avenues for future research that may elucidate not only the mechanisms of language processing abnormalities in schizophrenia, but also the basis of false perceptual inferences in the language system (i.e., auditory verbal hallucinations). We outline three studies in progress that use behavioral methods and event-related potentials (ERPs) to probe the interfaces between sentence processing and speech perception in schizophrenia, by examining: (a) effects of lexical and semantic context on phoneme adaptation; (b) interactions between sentence processing and click detection; and (c) neural adaptation to relations between speech sounds vs. word meanings.