Top-down prediction and semantic facilitation in schizophrenia

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It is well established that schizophrenia is characterized by impairments in controlled semantic processing. Here, we used ERPs together with a relatedness proportion semantic priming paradigm to ask whether people with schizophrenia show specific impairments in top-down predictive semantic mechanisms. We covertly varied the proportion of semantically related prime-target pairs across two blocks, thereby manipulating the probability of encountering the same set of targets following the same set of primes. Replicating previous findings, control participants showed a significantly larger N400 semantic priming effect in the blocks with a higher (versus lower) proportion of related prime-target pairs. This suggests that they adapted to the higher predictive validity of the broader contextual environment by enhancing top-down semantic prediction. In contrast, people with schizophrenia showed no difference in the N400 priming effect between the higher and lower predictive validity blocks. This suggests that patients were unable to use the prime to predictively pre-activate the target, even under conditions of high predictive validity. In a previous ERP study carried out in young healthy adults using the same paradigm, we used a single trial approach to showed that trial-by-trial adaptation across the higher predictive validity block could be explained by a model of rational (Bayesian) updating. In the present study, we aim to use a similar approach to test whether, in schizophrenia, reduced semantic prediction results from a slower rate of trial-by-trial adaptation in comparison to controls, or from a failure to rationally adapt altogether.