

Binocular rivalry perceptual memory in schizophrenia and in acute ayahuasca administration

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Abstract

Background: Working memory impairment is a core cognitive sign of schizophrenia. Acute administration of ayahuasca, a psychedelic agent that partially models psychosis, also impairs working memory. Binocular rivalry switching rate is slower with schizophrenia and slower with ayahuasca administration, but perceptual memory for binocular rivalry has not yet been investigated in these contexts. In 2000-2002, we studied binocular rivalry switching in patients with schizophrenia ($n=23$, taking maintenance doses of anti-psychotics), in healthy controls ($n=18$, matched for age, gender, and parental education), and in other healthy volunteers who ingested ayahuasca ($n=10$), tested on-drug and retested post-washout. **Objective:** Reanalyze these 2000-2002 data for whether recent binocular rivalry response history influences response duration probabilities, indicating perceptual memory. Binocular rivalry and working memory tasks are so cognitively dissimilar that eliciting recalled content, as is done to index working memory, may be insensitive for indexing rivalry memory. **Methods:** Sampling distribution variances of response duration subsample means, as a function of subsample size, were compared in participant-produced order (preserving history) or in shuffled order (scrambling history, response distributions unchanged). This tests whether participants produce non-random duration sequences that shuffling disrupts. **Results:** On-drug, order shuffling had no effect (paired samples Wilcoxin Signed-Rank $Z=0.55$, $p=ns$), thus not indicating perceptual memory. Post-washout, the same individuals showed perceptual memory via variances calculated using different orders differing significantly ($Z=1.82$, $p<.04$). Perceptual memory was likewise found for schizophrenia ($Z=2.61$, $p<.01$) and for controls ($Z=3.40$, $p<.001$). **Discussion:** Response history had no detectable influence on response durations while affected by ayahuasca

but the influence of binocular rivalry perceptual memory returned post-washout. Patients with schizophrenia had significant perceptual memory but with 0.79 smaller effect size (Cohen's d) than that found for controls. How ayahuasca and schizophrenia degrade both perceptual memory and working memory performances is not presently known. Further investigation appears warranted.

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