Psilocybin causes a functional dissociation between attention and working memory tasks

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**Introduction**

Psilocybin is found in hallucinogenic psilocybe mushrooms. Psilocin, the active metabolite of psilocybin, is an agonist at 5-HT$_{2A}$ receptors, and has a similar chemical structure to serotonin.

Psilocybin causes a functional dissociation between attention and working memory tasks.

**Attention & Working memory**

It is an advantage to be able to selectively direct & maintain attention while ignoring events or objects deemed to be less relevant. Multiple object tracking is a task that measures sustained attention on a selected subset of targets amongst distractions.

**Working memory** is a form of short-term memory enabling the storage & manipulation of information over short time periods (Baddeley, 1986). Attention & working memory are believed to be mutually dependent processes, subserved by similar regions of the frontal cortex (Culham & Kanwisher, 2001).

**Psychosis** - A number of clinical conditions (i.e., attention deficit disorder, autism, obsessive compulsive disorder & schizophrenia) are associated with abnormalities in attention and working memory. Future drug development depends on a comprehensive understanding of the pharmacology underlying these processes.

**Methods**

**Multiple object tracking**

- 20 randomly moving dots - subjects track subset of 2-8 target dots

**Spatial working memory**

- Subjects have to reproduce a sequence of 2-9 spatial locations

**Experimental design**

8 Healthy human subjects - 4 conditions: placebo; psilocybin (215 µg/kg); ketanserin (50µg/kg); psilocybin + ketanserin.

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**Results**

- Psilocybin produced subjective changes in conscious state.
- Ketanserin blocked most effects, except those relevant to attention & arousal.

**Subjective effects**

- Placebo
- Psilocybin
- Ketanserin
- Placebo + Ketanserin

**Future Directions**

- Confirm the speculated involvement of the 5-HT$_{2A}$ receptor with a selective 5-HT$_{2A}$ agonist such as Buspirone.
- Investigate influence of impaired attention vs increased distractibility &/or impulsivity.

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**References**


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