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MDMA and brain activity during neurocognitive performance: an overview of neuroimaging studies with abstinent 'Ecstasy' users.

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Highlights:

- MDMA/Ecstasy has had a resurgence in popularity and MDMA content is high
- Review of all neurocognitive studies using fNIRS, fMRI and EEG in ecstasy/polydrug users
- Chronic repeated use of recreational ecstasy can result in haemodynamic and electrophysiological changes
- Findings consistent with serotonergic system changes
- Whether ecstasy use leads to neurotoxicity or neuroadaptation, cannot be answered from functional neuroimaging data, application of additional research methods suggested.

Abstract

MDMA/Ecstasy has had a resurgence in popularity, with recent supplies comprising higher strength MDMA, potentially leading to increased drug-related harm. Neurocognitive problems have been widely reported in ecstasy users, equally some studies report null findings, and it remains unclear which factors underlie the development of neurocognitive impairments. This review covers the empirical research into brain activity during neurocognitive performance, using fMRI, fNIRS, and EEG. Our main conclusion is that chronic repeated use of recreational ecstasy can result in haemodynamic and electrophysiological changes that reflect recruitment of additional resources to perform cognitive tasks. Findings are consistent with serotonergic system changes, although whether this reflects neurotoxicity or