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Familial analysis of MMN in cannabis users: A case study

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Abstract

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Keywords

mmn, familial, cannabis, study, users, analysis, case

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Familial analysis of MMN in cannabis users: A case study

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Aims: The Mismatch Negativity (MMN) is a brain event-related potential marker of sensory memory and prediction error, and is thought to index N-methyl-D-aspartate receptor-mediated glutamate neurotransmission functionality. MMN is reduced in patients with schizophrenia and in their unaffected first degree relatives. MMN is also reduced in chronic cannabis users and in ex-cannabis users (33-month abstinent). Reduced MMN in ex-users suggests that cannabis-related deficits may persist after cessation of use, or alternatively this may reflect a pre-existing condition. One way of potentially elucidating this issue, is to conduct a familial analysis of the MMN in cannabis users and their non-user first degree relatives: attenuated MMN in relatives might indicate a familial vulnerability to cannabis use or to glutamatergic dysfunction. **Method:** One sibling pair (one cannabis user, one non-user sibling) and three non-user, unrelated, matched controls completed a multi-feature MMN paradigm with duration (100 ms), frequency (1200 Hz) and intensity (90 dB) deviants (deviants 6%; standards 82%, 50 ms, 1000Hz, 80 dB). **Results:** Visual inspection of MMN waveforms and patterns of means suggests that non-user siblings have MMN amplitudes intermediate to their user-siblings (whose MMN is most attenuated) and controls. Examination of confidence intervals for controls (reflecting MMN amplitude variability across conditions) indicated that the user-sibling had smaller MMN amplitudes for all deviant conditions, and the non-user sibling had reduced duration MMN amplitude, compared to controls. **Conclusions:** These preliminary data provide early evidence that MMN might reflect a pre-existing vulnerability that is antecedent to cannabis use, but exacerbated by subsequent cannabis use, and may inform current conceptualisations of cannabis as a component cause of schizophrenia. However future research should attempt to replicate these findings in a larger sample.

Keywords: mismatch negativity, sibling, Cannabis, familial, Glutamate

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