



Social Cognition: The Role of Adolescent Methamphetamine Consumption

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DESCRIPTION

Methamphetamine use has repeatedly been linked to clinically significant deficiencies in social cognition with high effect sizes. These deficiencies may have a substantial effect on social behaviours that occur in everyday life, such as hostility and exclusion from social groups, which add to the burden of diseases linked to methamphetamine dependency. However, social cognition varies significantly amongst individuals within methamphetamine addicts, and it is still unknown what causes these variations. Adolescent methamphetamine use has been linked to neuroadaptations that influence brain metabolism and structure as well as changes in higher-order cognitive skills, which suggests that the age of initiation may play a significant role in individual variations in social cognition. Rodent studies have demonstrated that persistent methamphetamine injection throughout adolescence alters social behaviour, lending weight to this hypothesis. Additionally, the use of methamphetamine has been shown to have direct neuroadaptive effects on the striatal dopamine circuits, which are involved in the growth of social cognition. Additionally, in humans, personality consolidation and teenage brain development co-occur. Thus, differences in personality function during development can have an impact on social cognition in addition to drug-related consequences. The deficiencies in emotion detection shown in methamphetamine addicts are specifically highly correlated with the dysfunctional beliefs that are common in antisocial and other adolescent-onset personality disorders. Methamphetamine dependency has been independently connected to hostility and aggressiveness biases, as well as striatal brain lesions, and it appears to be especially associated with decreased perception of rage. The relationship between the age of onset of methamphetamine use and social cognition deficits may be explained by a combination of adolescent-specific personality traits and drug-related effects on the developing adolescent brain. Here, we present findings from two related studies that looked at the relationship between social cognition and the age at which methamphetamine use started (adolescence versus adulthood):

- A human cross-sectional study among people with methamphetamine dependence varying in age of onset of methamphetamine.
- A mice experiment in which we tested the differential impact of methamphetamine administration during adolescence versus young adulthood on social cognition, as well as its putative striatal dopaminergic mechanisms.

The human study intended to demonstrate a relationship between age of onset and social cognitive impairments while controlling for the intensity and duration of methamphetamine use. The two studies were created to offer complimentary findings. However, this study was unable to determine whether pre-morbid social cognitive deficiencies caused early methamphetamine use (unfavourable reinforcement or coping strategies) or if early methamphetamine use caused social cognition deficits (drug-related neuroadaptations). To ascertain if methamphetamine use throughout adolescence (young adulthood) directly impairs social cognition and its neurological foundations, the mice study was included. Although rodent models for measuring social cognition have inherent validity issues, we employed a social interaction paradigm that has been suggested as one of the most effective for translational studies. Given the previously hypothesised connections between social cognition and aggression in methamphetamine use, we also employed a rodent aggression paradigm. In order to maximise translational similarities, we concentrated on the striatum's neurological underpinnings since human research has revealed that striatum lesions affect social cognition in the same way that our mice study wanted to analyse. The striatum also has the benefit that there is a strong homology between humans and mice in this region, although this is more difficult to show in prefrontal anterior cingulate cortex regions, which have been linked to social cognitive deficiencies in human methamphetamine use. At first, we saw that methamphetamine users. We first noticed that methamphetamine addicts who first used the drug during youth had greater antisocial views and less accurate emotion detection than those who first used the drug throughout maturity.

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