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Pathways to ecstasy use in young adults: Anxiety, depression or behavioural deviance?

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Abstract

Aims: To investigate pathways to ecstasy use disorders from pre-birth to early adulthood with particular attention to the relationship between early depressive and anxiety symptoms and later ecstasy use disorders.
Design: Prospective, longitudinal, population-based study started in Brisbane, South East Queensland (Australia) in 1981. Participants were 2143 young adults, followed up from pre-birth to young adulthood.
Measurements: Ecstasy use disorders were assessed with the composite international diagnostic interview (CIDI-Auto). Maternal socio-economic position and mental health status were assessed at baseline (antenatal visit); maternal substance use was measured at the 5-year follow-up, adolescents' behaviour at the 5- and 14-year follow-up and tobacco and alcohol use were assessed at the 14-year follow-up.
Findings: Eight syndrome scales of childhood behaviour were examined. After adjustment for important confounders, delinquent and aggressive behaviour in early adolescence remained significantly associated with ecstasy use disorders in early adulthood. The associations became statistically non-significant when adolescent tobacco and alcohol use were included in the model [OR = 1.50 (95%CI = 0.75, 3.01) for delinquency and OR = 1.69 (95%CI = 0.92, 3.12) for aggression]. Formal mediation tests were statistically significant ($p = 0.001$ for delinquent behaviour and $p = 0.05$ for aggressive behaviour).
Conclusions: Our findings suggest a pathway from early deviant behaviour to ecstasy use disorders, possibly mediated through licit drug experimentation in early adolescence.
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Keywords: Ecstasy (drug); Adolescent behaviours; Drug usage; Deviant behaviour; Longitudinal study

1. Introduction

Since its introduction in the late 1980s, the use of ecstasy has increased exponentially and become one of the most commonly used recreational drugs among youth in the United States, Europe and Australia (Degenhardt et al., 2004; Degenhardt et al., 2005; United Nations Office on Drugs and Crime, 2006). In Australia, ecstasy was the second most popular illicit drug amongst young people in 2004, with 12% of those aged 20–29 years reporting use in the last year (Australian Institute of Health and Welfare, 2005).

The psychoactive ingredient in ecstasy is MDMA (3,4-methylenedioxymethamphetamine), an indirect monoaminergic agonist that both stimulates release and inhibits reuptake of serotonin (5-HT). However, in Australia a significant proportion of drugs sold as ecstasy contain other psychoactive substances as well as or instead of MDMA; most often methylamphetamine and ketamine (Australian Crime Commission, 2007; Fowler et al., in press). Uncertainty regarding the contents of tablets sold as ecstasy complicates interpretation of the sequalae of ecstasy use, however a number of authors have pointed to seritonergic alterations to explain associations between ecstasy use and both cognition and

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affect (Parrott, 2001; Parrott et al., 2000; Thomasius et al., 2003).

Indeed, although ecstasy is increasingly perceived as a relatively innocuous drug in some youth sub-cultures (Duff, 2005), there is cross-sectional evidence of an association between regular ecstasy use and long-term cognitive impairment, particularly impaired memory (Parrott, 2001, 2002; Thomasius et al., 2003). Ecstasy use has also been associated with alternations in mood both during and in the days immediately following use (Parrott and Lasky, 1998), however the evidence for longer-term mental health impacts of ecstasy use remains weak. Most studies of the link between ecstasy use and mental health have been cross-sectional in nature, and based on self-report by convenience samples of polydrug users (Parrott, 2001, 2002), making interpretation of any associations difficult. Indeed, a recent cross-sectional study of current and past ecstasy users found that although ecstasy use was associated with seritonergic alterations and impaired verbal memory, self-reported psychopathology was associated with polydrug use in general, rather than ecstasy use in particular (Thomasius et al., 2003). More recently, a meta-analysis of 25 cross-sectional studies identified an association between ecstasy use and depressive symptomatology, however the authors noted that the clinical significance of the association was debatable, and that many of the studies included in the analysis had failed to adequately control for other drug use (Sumnell and Cole, 2005).

Even if one does accept an association between ecstasy use and impaired mental health, cross-sectional studies cannot establish the causal direction of this association. The few longitudinal studies that have assessed the nature of the relationship between common mental health disorders and ecstasy use have yielded inconsistent results (de Win et al., 2006; Huizink et al., 2006; Lieb et al., 2002b). Two small sample size studies found no relationship (de Win et al., 2006, 2007), whereas two larger scale longitudinal studies found that anxiety and depression preceded ecstasy use disorders in early adulthood (Huizink et al., 2006; Lieb et al., 2002b).

A Dutch study in particular argued for a temporal pathway from impaired mental health to ecstasy use, since depressive and anxiety symptoms were assessed in the sample before MDMA appeared as a recreational drug in the Netherlands (Huizink et al., 2006). The authors also found an 81% increase in risk of ecstasy use among those reporting delinquent behaviour in childhood, raising the possibility that another pathway, common to the development of use of other drugs, may also be at play in the development of ecstasy use disorders (King et al., 2004). This may involve an indirect pathway from parental anxiety and depression (Lieb et al., 2002a), to exposure to parental use of tobacco and alcohol (Alati et al., 2005), to children's behavioural problems and early use of licit substances (King et al., 2004). These life course factors are known to predict substance use in youth (Alati et al., 2005), but their influence on regular ecstasy use in particular awaits investigation. In this study, we examine prospectively the relationship between behavioural problems in early adolescence and ecstasy abuse in early adulthood. The study represents an important advance over existing evidence in that it uses a longitudinal design and takes into account a wide range of important confounders ranging from pre-birth to adolescence, which previous studies have not been able to account for.

2. Methods

2.1. Participants

We used data from the Mater University study of pregnancy and its outcomes (MUSP), a birth cohort study of women enrolled in the study at the Mater Misericordiae Hospital in Brisbane, Australia, between 1981 and 1983. Baseline data were collected at the first antenatal visit from 7223 consecutive women who gave birth to live singleton babies and were followed up 3–5 days, 6 months, 5, 14 and 21 years after birth. At 14 and 21 years both mothers and children were interviewed. This study uses the baseline, birth, 14- and 21-year follow-up data.

2.2. Instruments

2.2.1. Outcomes: ecstasy use disorders (CIDI-Auto). During the 21-year follow-up, a subsample of 2551 offspring completed the Composite International Diagnostic Interview—computerised version (CIDI-Auto) (World Health Organization, 1992). Those who reported using a drug at least 'five times ever' completed the corresponding drug use section of the CIDI to assess the presence of drug-related disorders according to DSM-IV criteria. We extracted those items from the CIDI indicative of use of ecstasy.

2.2.2. Main predictors: child behaviour at age 5 and 14. Since no self-reports of child behaviour were available at the 5-year follow-up, two modified subscales of the child behaviour checklist (CBCL) were used at age 5 (Achenbach, 1991b; Achenbach and Edelbrock, 1983). The Checklist includes subscales assessing symptoms of externalising, internalising and other problem behaviours (Achenbach, 1991b; Achenbach and Edelbrock, 1983). We used a modified form of the internalising and externalising scales, which at age 5 were completed by the mother only.

At the 14-year follow-up, child behaviour was assessed using the eight syndrome subscales of the youth self-report (YSR) version of the CBCL (Achenbach, 1991a). These include the withdrawn, somatic complaints and anxious/depressed symptoms subscales (typically referred to as 'internalising' symptoms), the social, thought and attention problems subscales, and the delinquent and aggressive behaviour subscales ('externalising' symptoms). Achenbach identified scores in the top 10% as more likely to reflect symptoms of child psychopathology (Achenbach, 1991a,b). Accordingly, scale scores were dichotomised with those in the top 10% considered to exhibit clinically significant internalising or externalising symptoms. The use of the YSR in the MUSP study has been described extensively in previous papers, which also report on the good validity and internal consistency of the scales (Alati et al., 2004).

2.2.3. Confounders and mediators. Maternal socio-economic position (SEP) was obtained at baseline and included maternal age (13–19; 20–34, 35 years or more) and education (did not complete secondary school, completed secondary school, completed further education). Sex of the child was obtained from obstetric data at birth.

We used the Delusions-Symptoms-States Inventory (DSSI) (Bedford and Foulds, 1978) to assess maternal anxiety and depression at baseline. The DSSI was developed by clinicians and validated against a clinical sample (Bedford and Foulds, 1977). It contains two 7-item subscales measuring depression and anxiety, which have been found to correlate strongly with other scales of depression including the Beck Depression Inventory (Najman et al., 2000). Bedford and Foulds and others found that a cut-off of 4 or more symptoms produced the optimum combination of false positives and false negatives, based on Bedford and Foulds' validation studies (Bedford and Foulds, 1977; Rubino et al., 1997). Consistent with the scale authors, symptoms of depression and anxiety were defined in this study as reporting 4 or more of the 7 symptoms in the DSSI depression and anxiety subscales.

Maternal alcohol and tobacco consumption were assessed at the 5-year follow-up. We obtained information on how often mothers drank (from never to

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