Contents lists available at ScienceDirect

Drug and Alcohol Dependence

Full length article

Onset of opportunity to use cannabis and progression from opportunity to dependence: Are influences consistent across transitions?

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ARTICLE INFO

ABSTRACT

Background: There is a developing body of research looking at cannabis use opportunity, but little research examining timing of opportunity to use cannabis.
Aims: Identify factors associated with (1) earlier opportunity to use cannabis and (2) faster progression from opportunity to cannabis dependence.
Method: Cross-sectional study of 3824 Australian twins and siblings, measuring age of onset of cannabis use opportunity and DSM-IV cannabis dependence. Survival analysis identified factors associated with faster progression to opportunity or dependence.
Results: Factors associated with both speed of progression to opportunity and dependence were conduct disorder (opportunity HR 5.57, 95%CI 1.52–20.47; dependence HR 2.49, 95%CI 1.91–3.25), parental drug problems (opportunity HR 7.29, 95%CI 1.74–30.62; dependence HR 3.30, 95%CI 1.63–6.69), weekly tobacco use (opportunity HR 8.57, 95%CI 3.93–18.68; dependence HR 2.76, 95% CI 2.10–3.64), and female gender (opportunity HR 0.69, 95%CI 0.64–0.75; dependence HR 0.44, 95%CI 0.34–0.55). Frequent childhood religious attendance (HR 0.74, 95%CI 0.68–0.80), parental conflict (HR 1.09, 95%CI 1.00–1.18), parental alcohol problems (HR 1.19, 95%CI 1.08–1.30) and childhood sexual abuse (HR 1.17, 95%CI 1.01–1.34) were uniquely associated with transition to opportunity. Depressive episode (HR 1.44, 95%CI 1.12–1.85), tobacco dependence (HR 1.36, 95%CI 1.04–1.78), alcohol dependence (HR 2.64, 95%CI 1.53–4.58), other drug use (HR 2.10, 95%CI 1.64–2.69) and other drug dependence (HR 2.75, 95%CI 1.70–4.43) were uniquely associated with progression to dependence.
Conclusion: The profile of factors associated with opportunity to use cannabis and dependence only partially overlaps, suggesting targeting of interventions may benefit from being tailored to the stages of drug use.

1. Introduction

Cannabis is widely used, with cumulative lifetime incidence of use estimated to range from 6%-20% in Europe, 3–11% in the Middle East and Africa, and to exceed 40% in the US and New Zealand (Degenhardt et al., 2008). Lifetime prevalence of cannabis use in Australian adolescents has been estimated at 60% (Patton et al., 2002). Although many individuals use cannabis infrequently and

without experiencing problems, globally an estimated 13.1 million individuals meet criteria for cannabis dependence, contributing 10.3% of the illicit drug use global burden of disease (Degenhardt et al., 2014). It is estimated 10–16% of cannabis users develop dependence (Anthony, 2006), but before progressing to dependence individuals must pass through a number of preceding stages. Examining the multiple stages of drug use before dependence develops is necessary for gaining a comprehensive understanding of factors involved in drug use, and for identifying opportunities for early intervention (Hines et al., 2015a).

The first stage of drug involvement is having the opportunity to use (regardless of whether the individual uses the drug or not),

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which forms the "exposure opportunity" in the epidemiology of drug use (Wagner and Anthony, 2002). Opportunity is required for use to occur, and forms an individual's earliest necessary condition from which they are at risk of developing cannabis dependence. Recent research indicates the majority of adolescents who have an opportunity to use cannabis progress to initiation of use (Caris et al., 2009; Lopez-Quintero and Neumark, 2015; Pinchevsky et al., 2011), making the opportunity to use an important target for intervention (Neumark et al., 2012).

There is a developing body of research looking at the opportunity to use. Factors associated with opportunity to use cannabis include using alcohol, using tobacco and the combination of alcohol and tobacco use (Caris et al., 2009; Neumark et al., 2012; Wagner and Anthony, 2002). In Chile and the US, males have been found to be slightly more likely than females to have a chance to use cannabis (Caris et al., 2009; Van Etten and Anthony, 1999), but these gender differences have not been consistently observed (Wells et al., 2011). Childhood religious practices are associated with decreased likelihood of cannabis use opportunity (Chen et al., 2004), and those with externalising behaviour problems have been found to be more likely to have a cannabis use opportunity (Neumark et al., 2012; Reboussin et al., 2015). Perhaps unsurprisingly given that first cannabis use opportunity typically occurs in late childhood or early adolescence, lower parental involvement and higher levels of coercive discipline have been found to be associated with increased likelihood of cannabis use opportunity (Chen et al., 2005). The effect of parenting continues throughout adolescence, with those who reported low parental monitoring in high school more likely to have cannabis use opportunity once they started college (Pinchevsky et al., 2011).

Amongst this existing evidence, there is little research examining the timing of opportunity to use cannabis. The study of transitions, and the timing of these transitions, can provide unique insights into influences on substance use (Behrendt et al., 2012; Hines et al., 2015b; Sartor et al., 2009, 2008), but only a limited number of factors have been studied in relation to speed of transition to cannabis use opportunity (with earlier opportunity representing a faster transition) These have focussed on early childhood behaviours, with disruptive behaviour early in school in males and better reading scores in females associated with earlier cannabis use opportunity (Storr et al., 2011). Similarly, no research to date has explored whether there is overlap between factors associated with earlier opportunity and those associated with the speed of progression to dependence. These include other substance use (Behrendt et al., 2009), some mental health factors (Behrendt et al., 2011) and gender (Ridenour et al., 2006; Wittchen et al., 2008). Exploring speed of transition to cannabis opportunity will determine whether risk factors for dependence are already exerting influence on drug use behaviours at the start of an individual's cannabis involvement, which has utility for improving understanding of how dependence develops (Hines et al., 2015a). Applying survival analysis methodology to this area allows for quantification of time to cannabis use opportunity and from opportunity to dependence, and identification of what factors may impact upon the speed of these transitions.

This paper aims to:

1. Identify factors associated with earlier opportunity to use cannabis.
2. Identify factors associated with progression from cannabis use opportunity to cannabis dependence.
3. Determine whether factors associated with opportunity to use cannabis are also associated with more rapid progression from first opportunity to dependence.

2. Methods

2.1. Sample

The sample was drawn from the Australian Twin Registry. From a pool of twin pairs born between 1972 and 1979, 3348 MZ and DZ twins and 476 of their siblings (mean age at time of interview = 32.1, SD 3.04, range 21–46) completed the interview component of a study of cannabis and other drug misuse. A full description of the study methodology and of the characteristics of participants has been published previously (Lynskey et al., 2012).

2.2. Assessment

Participants were assessed through computer-assisted telephone interviews which collected information on socio-demographics, childhood experiences, drug use and common mental health disorders, including conduct disorder and major depressive disorder, assessed using the SSAGA-OZ interview (Bucholz et al., 1994; Heath et al., 1997). The SSAGA-OZ is a validated measure of mental health using DSM-IV criteria, and includes assessment of cannabis and other drug abuse and dependence. Specific measures used in the current analyses are described below.

2.3. Measures

2.3.1. Outcome measures.

2.3.1.1. Opportunity to use cannabis. Participants were asked "have you ever been offered, or had the opportunity to use cannabis, even if you did not use it at the time? How old were you the first time?" Of 3,824 individuals interviewed, 3,798 provided information on whether or not they had ever had the opportunity to use cannabis. Of these, 85% (N = 3399) reported they had an opportunity to use cannabis. A continuous measure of age of first opportunity was used for both survival analysis models.

2.3.1.2. Cannabis dependence. Participants were classified as meeting lifetime criteria for DSM-IV cannabis dependence (American Psychiatric Association, 2000) if they reported three or more of the following symptoms occurring within the same 12 month period: using cannabis a greater number of times/greater amount than was intended, tolerance, wanting to cut down/stop use, spending so much time obtaining/using/recovering from the effects of cannabis the participant had little time for anything else, reducing important activities as a result of cannabis use, continuing use despite it worsening health/emotional problems. Withdrawal was not included as it was not part of DSM-IV criteria for cannabis dependence. Participants were also asked the age at which they first experienced three or more of these symptoms occurring within a 12 month period.

Of those reporting lifetime opportunity to use cannabis, 10.9% (N = 371) met criteria for cannabis dependence, and a continuous measure of age at onset of cannabis dependence was used in survival analysis.

2.3.2. Covariates.

2.3.2.1. Gender. Gender was determined through self-report.

2.3.2.2. Parental alcohol problems. Parental alcohol problems were determined through participant self-report of their mother or father experiencing problems with health/family/job/police/other as a result of drinking, or their mother or father drinking excessively.