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# MONOGRAPHS

## A cannabis reader: global issues and local experiences

Perspectives on cannabis controversies, treatment and regulation in Europe

### Editors

Sharon Rödner Sznitman, Börje Olsson, Robin Room

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European Monitoring Centre  
for Drugs and Drug Addiction

Rua da Cruz de Santa Apólonia 23–25, P-1149-045 Lisbon  
Tel. (351) 21 811 30 00 • Fax (351) 21 813 17 11  
[info@emcdda.europa.eu](mailto:info@emcdda.europa.eu) • <http://www.emcdda.europa.eu>

# Chapter 16

## Risk factors for cannabis use

**Keywords:** cannabis – prevention – protective factors – risk factors – sociology

### Setting the context

Lists of risk factors and protective factors are common features in the prevention and treatment literature on cannabis and other illicit drugs. Both groups of factors could relate to an individual's genetic make-up and personality, or to their familial, social and physical environment. It is beneficial to understand the range of factors that have been identified for cannabis. Moreover, it is not always easy to judge which factors carry more weight for cannabis, or to exclude factors that may not be relevant to a specific group of users' context. The diagram below (Figure 1), adapted from a UK Home Office report, offers a simplified overview of risk and protective factors.

This chapter explores the risk factors associated with cannabis use. In doing so, a distinction is drawn between cannabis use *per se* and the development of problematic cannabis use. The chapter reveals that many factors are linked with problematic cannabis use, including genetic vulnerability to certain psychological conditions, early use of tobacco and alcohol, dysfunctional family relationships, behavioural problems, peer associations, family substance use and early initiation.

### Further reading

UK Home Office (2007), *Identifying and exploring young people's experiences of risk, protective factors and resilience to drug use*, Home Office Development and Practice Report, Stationery Office, London.

Figure 1: Overview of risk and protective factors

<p style="text-align: center;"><b>Motivations not to use</b></p> <p>Other people's disapproval      Role as a parent          Legal consequences      Fear of addiction          Alternative source of 'buzz'      Financial cost          Personal experiences with drugs          Fear of losing control      Role as a parent          Fear of affect on health      Career aspirations          Alternative sources of support/coping mechanisms      Financial cost</p>	<p style="text-align: center;"><b>Other people's motivations to use</b></p> <p>Following example of others      Peer pressure          'The buzz'      Alleviate boredom          To fit in      'To look hard'          Ease physical pain      Feel more confident          Escape      Curiosity about the effects</p>
<p style="text-align: center;"><b>Factors making it easier/more difficult to refuse</b></p> <p>Reputation as resilient to drug use      With friends who (don't) use when offered          Type of drug offered      Reputation as a smoker/drinker          Being 'drunk'      Age          Offered by a friend/stranger          'Happy to be the odd one out'</p>	<p style="text-align: center;"><b>Contextual risk</b></p> <p>In trouble with the police/school      Familial substance use          Boredom      Alcohol use          Problematic family relationships      Mental health issues          Unemployment      Frequenter of recreational settings where drugs are sold             Member of subgroup/youth 'tribe' (e.g. clubber)</p>

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# Risk factors for cannabis use

Niall Coggans

## Introduction

Much effort has gone into researching the factors that increase the likelihood of using drugs (risk factors) and the factors that decrease the likelihood (protective factors) (e.g. Hawkins et al., 1992; Lloyd, 1998; Rhodes et al., 2003). The factors that influence individuals and groups to use cannabis are numerous and operate at all levels, from the individual to the social. Greater awareness of these various factors should lead to more effective and more precisely targeted educational and health promotion interventions. The purpose of this chapter is to highlight the risk factors for cannabis use.

There are two issues in relation to the title of this chapter, *risk factors for cannabis use*, that require clarification: (i) what is a risk factor and (ii) in what way or to what extent is cannabis use a problem? First, the nature of risk factors. The term risk factor is widely used in public health to identify and describe individual or social predictors of disease or undesirable conditions/behaviour. Of particular interest from a public health perspective are those factors which it is possible to reduce through prevention interventions. This is also true for drug-related health problems, including cannabis-related problems. However, do risk factors *cause* drug use and/or drug-related problems, or are risk factors predictive in that they are statistically *associated* with the behaviour in question?

A cause of a drug-related problem is something that exists prior to the drug-related problem (the effect) and the occurrence of a prior event or state of affairs would ensure, or increase the likelihood, of the drug-related problem happening. An association, on the other hand, is where there is a relationship between a drug-related problem and some other event or state of affairs. The key distinction between cause and association is that an association does not imply causation. It may be that there is a causal relationship between two associated phenomena or that the association is due to a third factor. Where an association between a risk factor and a drug-related problem has been found, a number of issues need to be investigated to assess the relationship for causality, including consistency with other studies, plausibility, temporal sequence, dose–response and strength of association (Campbell and Machin, 1999).

Taken individually, risk factors are unlikely to be causal in a direct ‘if A then B’ manner. Moreover, individual risk factors for drug use are unlikely to be either necessary or sufficient for the emergence of drug use and/or drug-related problems. Many of the risk factors for drug problems are mediated through individual development and social interaction. Problematic drug use is therefore the result of a complex of different risk

factors which cumulatively increase the likelihood of drug use and/or problems. In other words, risk factors do not cause, but are associated with problematic cannabis use.

Second, to what extent is cannabis use a problem? In this discussion of risk factors related to cannabis use a distinction is made between experimental or recreational use of cannabis and cannabis use that is problematic. Problematic cannabis use is usually defined in terms of diagnosed cannabis dependence or substance use disorders using standard diagnostic criteria (for more detail see Beck and Legleye, this monograph), and often includes people in treatment programmes for their cannabis-related problems. Experimental or recreational cannabis use, on the other hand, is often understood as use which is not bound up in adverse social, mental or physical health effects for the user (Coggans et al., 2004).

The extent to which drug use is actually or potentially harmful to individuals will depend on the nature and purity of the drug concerned, mode of ingestion, and the pattern of its use by the individual. Cannabis use will not necessarily continue once started, as many will stop after a period of recreational use. For example, in a longitudinal study of a sample of German cannabis users, half stopped of their own accord in their 20s (von Sydow et al., 2001). Moreover, the majority of young people who smoke cannabis do not experience cannabis-related problems (see Witton, this monograph, vol. 2). It could be argued that the term 'risk factor' is inappropriate in relation to this apparently non-problematic form of cannabis use. While it might devalue the concept of risk factors by referring to risk factors in relation to behaviour that is seen as undesirable by some people, rather than behaviour with clearly manifested problems, there remains the need to recognise that those who do develop cannabis-related problems will emerge from the wider population of cannabis users. From a prevention perspective, there is, therefore, a need to work with existing cannabis users who may not have developed cannabis-related problems in order to reduce the likelihood of their doing so. It is important to distinguish between predictive factors related to cannabis use that is non-problematic and factors that predict cannabis-related problems.

Those who use cannabis heavily and for a substantial period of their lives are considerably fewer than those who have ever used cannabis (House of Lords Select Committee on Science and Technology, 1998). While those who do use cannabis heavily over long periods of time in adulthood may develop cannabis-related problems, such as dependence, it is not the case that such use will necessarily be perceived as problematic by the users concerned (Coggans et al., 2004). Although it is a truism that there is no such thing as a safe drug, occasional 'light' use of cannabis will carry little risk for large numbers of people. Nonetheless, some people do experience problems with cannabis. Moreover, there is also concern over the potential for cannabis use among young people to compromise healthy development.

This chapter is not intended to be an exhaustive review of the field, but to provide an overview of the nature and scope of the risk factors that predispose people to problematic cannabis use, including routes to cannabis use, early initiation, social environment (family and peers), psychological risk factors, and the growing evidence of genetic risk factors. When reviewing the relevant literature, however, a problem arises, as much research on risk factors shows little concern for distinguishing harmful drug use from drug use in its own right. Moreover, it is argued here that there is a need for a coherent view of the difference between risky or non-risky cannabis use, or what constitutes problematic or non-problematic cannabis use. Thus, this chapter includes risk factors for different types of cannabis use, and this is a limitation to which more attention should be paid in future research.

The term 'problematic cannabis use' is employed here to mean cannabis use that gives rise to psychological, physiological or behavioural problems. It is not meant here to reflect only specific diagnostic criteria such as ICD-10 or DSM-IV. Nor is the term used here to reflect frequency and intensity of use beyond arbitrary cut-off points. Here, problematic cannabis use refers to cannabis use which results in health problems with substantive impacts on the individual's functioning. Potential problems include, for example, early school leaving (Lynskey et al., 2003a), mental health (Henquet et al., 2004), depression (Bovasso, 2001), dependence (Swift et al., 1998), impairment of memory and attention (Solowij et al., 2002), and respiratory functioning (Taylor et al., 2000).

## Routes to cannabis use and cannabis dependence

Cannabis is often described as a 'gateway' drug to the use of other, more harmful drugs such as heroin and cocaine. While there is considerable debate over the nature of this gateway effect, if any (e.g. Morral et al., 2002), there are discernible associations between early use of tobacco, alcohol and cannabis.

### Patterns of drug use progression

Kandel's stage theory of drug use — that substance use initiation and progression, in those cases where progression occurs, follows predictable stages — has informed prevention efforts (Kandel and Faust, 1975; Kandel et al., 1992). However, such predictable progression, and with it the possibility of preventive interventions, may not be the case for those more at risk of developing problematic patterns of drug use. Contrary to the Kandel model, in some cases those at risk of developing problematic drug use are more likely to have used cannabis before using alcohol and more likely to have used other illicit drugs before using cannabis (Mackesy-Amiti et al., 1997). The

point here is that the typical pattern of progression described by Kandel and others may relate more to those for whom progression to problematic use is less likely. Moreover, routes into drug use may not be as one-way as per Kandel's stage theory. For example, there is evidence that cannabis can lead to nicotine dependence (Patton et al., 2005; Amos et al., 2004).

The nature of the relationships between use of alcohol, tobacco and cannabis is the subject of ongoing debate. The Kandel stage model can be interpreted as implying a sequence of causal relationships, such that use of a prior substance is (somehow) causally related to the next substance in the sequence. More plausibly, the model is more of a description than an explanation of stages of drug use, with no implication of causality intended in its original formulation. What is less in doubt is that there are correlations between the use of cannabis and drug use progression (e.g. Blaze-Temple and Lo, 1992; Fergusson and Horwood, 2000; Lynskey et al., 2003b), and between the use of alcohol, tobacco and cannabis in adolescent populations (see also Monshouwer, Smit and Verdurmen, this monograph). Nonetheless, Lynskey et al. (2003b) noted that while there were associations between cannabis use and progression to other drugs and drug dependence, it was not possible to draw strong causal inferences about the role of cannabis.

What might explain these associations between cannabis use and use of other drugs? Lynskey et al. (1998) reported that the correlations between alcohol, tobacco and cannabis use could be explained by a general 'vulnerability to substance use' factor, based on connections with delinquent or substance-user peers, novelty seeking and parents' drug use. More recently, Morral et al. (2002) concluded that users of any drug have a greater inclination to use other drugs and argued that this general propensity theory could adequately explain apparent gateway effects.

## Alcohol and tobacco

In addition to correlations between use of cannabis and more harmful drugs, there are also associations between adolescent alcohol and tobacco use, on the one hand, and cannabis use on the other. In a sample of 11- to 16-year-olds, illicit drug use (primarily cannabis for the majority of regular users of drugs) and cigarette smoking were related to alcohol use. Those who had been drunk more often were more likely to smoke cigarettes and to use other drugs (Sutherland and Willner, 1998). The associations between number of episodes of drunkenness and either cigarette use or other drug use were not age dependent. Of those who had been drunk less often, from one to five times, 13% reported other drug use, while of those who had been drunk more than 20 times 58% reported other drug use. Adolescents who drank more than three times in the previous week and who drank five or more units of alcohol were more likely to begin

cannabis use (Coffey et al., 2000). But another study found that there was no statistically significant relationship between drinking in adolescence and cannabis dependence in early adulthood, after possible confounding factors had been taken into account (Wells et al., 2004).

Adolescents who smoke tobacco are at greater risk of developing cannabis dependence by their mid-20s (Lewinsohn et al., 1999; Coffey et al., 2000). A recent longitudinal study in which data were gathered from participants at 11 years and 20 years of age reported that 'persistent' tobacco smokers were more likely to use cannabis and to develop dependence on cannabis, as well as to use other drugs and develop dependence on other drugs (Vega and Gil, 2005). Coffey et al. (2000) also demonstrated that tobacco smoking and not alcohol was a risk factor for the transition from experimental cannabis use to a more established cannabis habit, with greater degree of tobacco smoking being predictive of subsequent greater cannabis use.

A fundamental issue with cannabis, alcohol and tobacco is whether the gateway theory is anything other than an artefact of patterns of typical drug use initiation and progression. It has been argued that the overriding trend in drug use over time is for young people to reduce their illicit drug use and that problematic drug use is best predicted by family, social and psychological deficits (Peele and Brodsky, 1997).

In many ways the numerous studies of drug initiation and progression provide descriptions of routes to drug use. For the more fundamental issue of explanation there is a need to consider the individual and social context in which these routes are recorded.

## Age of initiation

Social, childhood and behavioural problems are associated with early onset of cannabis use, which in turn can lead to later association with substance users and educational disengagement. In turn, these latter risk factors can lead to development of a range of psychosocial risk factors that increase the likelihood of substance-related problems (Fergusson and Horwood, 1997). Comparison of recent-cannabis-onset adolescents and adults found that those who start to use cannabis in adolescence are more likely to develop cannabis dependence than adults who initiate cannabis use (Chen and Anthony, 2003). Children who manifest behavioural disinhibition are at elevated risk of starting to drink alcohol at an early age (King et al., 2004). Moreover, early initiation of alcohol use is associated with increased risk of substance use disorders (McGue et al., 2001). Cannabis users who began using cannabis before late adolescence, and had used three or more other drugs before starting cannabis, were at higher risk of developing cannabis dependence within 2 years of onset (Chen et al., 2005).

An investigation of the early onset cannabis users, who started using before they were 17 years old, revealed an association with reduced measures of verbal IQ. One possible explanation for this is that cannabis adversely, and durably, affects cognitive faculties in younger people whose brains are still developing (Pope et al., 2003). It is also possible, however, that poorer verbal IQ is a consequence of disengagement from mainstream education, which is a risk factor for early cannabis use. Such disengagement from the educational mainstream may be reinforced by cannabis use. Indeed, Pope et al. (2003) speculate that the early onset users in this study had lower verbal IQs because they were less motivated to engage with education. Although far from conclusive, these data are consistent with other studies that show an association between poor educational status and early onset of cannabis use (Lynskey et al., 2003b).

Adolescents with substance use disorders and adults with substance use disorders who had initiated cannabis use in adolescence were quicker to develop dependence, have behavioural problems and major depression, than comparison groups who started cannabis use in early or later adulthood (Clark et al., 1998b).

Young people who are exposed to drug use may be more likely to initiate drug use themselves, at least on the basis of the argument that exposure provides both drug-using models (parents, siblings, peers) and availability of drugs. The younger children are when they experience such models and availability, the greater the risk of initiation at an early age, with a consequent elevated risk of developing problematic use in later years. One study of Scottish pre-adolescents (10–12 years of age) found that over a third had been exposed to drug use and one in seven had been offered drugs (McIntosh et al., 2003). McKeganey et al. (2004) found that those 10- to 12-year-olds who had initiated drug use (in most cases cannabis) were more likely to use tobacco and alcohol, and have problem behaviour and family difficulties. Pre-adolescents (defined as 10–12 years of age) who used tobacco and had behavioural problems were at risk of early adolescent cannabis use (Clark et al., 1998a).

Evident from the research findings, which show an association between early onset and later problematic cannabis use, is that the association may not be causative. Indeed, as highlighted by Lloyd (1998), early onset use may only be an indicator of other risk factors that predict later problematic drug use. Thus, age itself might be less the issue than the interplay of other risk factors.

Other risk factors that have to be taken into account are the influences of family and peers, psychological risk factors and genetic factors.

## Social environment: family

The family and peer networks have received great attention in risk factor research (Rhodes et al., 2003). A study of 14- to 15-year-olds across five European cities concluded that 'attachment to mothers' inhibited drug use, an aspect of family relationships that appears to be more important for boys than girls. This protective factor was more important than living with both parents. However, this protective factor does not extend to antisocial young people (McArdle et al., 2002).

Kosterman et al. (2000) studied initiation of alcohol and cannabis use among adolescents and found that exposure to others who use drugs increases the risk of early initiation of cannabis use; as do parents who are not 'proactive' and/or parents who fail to set clear 'family standards'. Chen et al. (2004) make the point that initiation to tobacco use is more likely to occur in a social environment that is tolerant of smoking.

Foxcroft and Lowe (1995) found relationships between adolescents' perceptions of parent-centred authoritarian or neglectful family life and use of alcohol, tobacco and some illicit drugs. However, this was not observed for cannabis use. In other words, cannabis use per se was not related to pathological family relations in the way that other drug use was. In light of what is known about the risks of dysfunctional family relationships for elevation of risk for problematic use, it may be that cannabis use in this sample was non-problematic.

Young people exposed to stressors in the family, such as disrupted family structure and poor quality of family relationships, are more likely to use cannabis and to develop problematic patterns of cannabis use (Butters, 2002). Moreover, a compounding effect in terms of school problems was found in this study: family disruption elevated the likelihood of school problems, which in turn increased the chances of developing problematic cannabis use. The confounding nature of the risk factors delinquency and school problems with cannabis use was also highlighted in an American study of nearly 14 000 11- to 21-year-olds (van den Bree and Pickworth, 2005). Children with social disadvantage, dysfunctional family life and behavioural problems are more likely to become adolescents who associate with delinquent or drug-using peers (Fergusson and Horwood, 2000). A recent study of a sample of adolescents in Turkey noted the significant statistical association between cannabis use and cannabis-using peers (Tot et al., 2004).

The extent of parental monitoring of children's activities may influence likelihood of substance use, such that lower levels of monitoring increased the risk of initiation of drug use (Chilcoat et al., 1995; Bukstein, 1995; Kandel, 1996). Lack of closeness in parents' relationships with their children, and inadequate time spent by parents with their children are risk factors (Bukstein, 1995; Hawkins et al., 1992; Kandel, 1996). To

some extent, this implies that the causal direction is one-way. It is likely that the process is more complex, with some degree of influence of children's behaviour on their parents or carers.

There is much about the precise nature of the relationships within high-risk families that is not known, such as the characteristics of the parents and the ways in which they interact with their children. A study of the comorbidity of drug misuse and anxiety disorders in families found that young adolescents' drug use was more strongly associated with parental drug misuse (diagnosed as having alcohol or drug disorders) than with diagnosed parental anxiety disorders. Children of drug misusers were, along with controls, less likely to manifest anxiety disorders than children of parents with anxiety disorders. Children of drug misusers were more likely to have behavioural problems, itself a risk factor for drug use and drug problems (Merikangas et al., 1998).

It is evident that the quality of relationships within the family is important in terms of emotional support, parenting style, control and family disruption. However, the relationship between these factors and cannabis use or problematic cannabis use is probably indirect in the sense that the presence of such factors increase the likelihood of young people developing emotional and behavioural problems in general. And it is the development of these problems that increase the chances of developing problematic patterns of drugs use.

As young people grow and develop, the influence of the family wanes in many cases as the influence of peers increases.

## **Social environment: peers**

That cannabis users' peers are more likely to smoke cannabis than the peers of non-users is a commonplace of the literature. There is a need for considerable caution in going beyond the data when interpreting statistical associations between cannabis users and their peers' cannabis use. In many cases it is not possible to specify the nature of the association: that is, does A cause B, vice versa, or neither? Yet, on the basis of such data it has often been asserted that drug-using peers somehow pressure or encourage drug use in their non-drug-using peers. Peer preference is a more plausible interpretation, such that those inclined to the use of cannabis deliberately associate with others who do so (Coggans and McKellar, 1994). For example, peers may in some instances encourage or even coerce others to take drugs, but there is a need to recognise that peer influences can take different forms, ranging from tolerance of drug use, through support of drug use to active encouragement of drug use. Often young people actively assort themselves to form groups which share similar interests and aspirations, which do not fit with (bad) pusher and (innocent) victim stereotypes.

Changes of frequency in adolescent drug use have been found to precede changes in peer variables (Farrell and Danish, 1993). These researchers also analysed their data in different ways in order to compare three different hypothetical models, namely, a) drug use was a consequence of emotional restraint (ability to deal with negative affect) and peer variables (drug using peers and peer pressure); b) drug use was a cause of changes in emotional restraint and peer variables; and c) a reciprocal model that included both causes and consequences of drug use. While all three models 'fit the data fairly well', the reciprocal model was the best fit. Of particular note was their conclusion that 'peer drug models and peer pressure were not related to subsequent changes in gateway drug use' and 'changes in peer drug models were ... predicted by previous levels of gateway drug use' (Farrell and Danish, 1993: 327). The authors also drew attention to the need for caution with data of this kind and emphasised the importance of studying dynamic models that address both the causes and the consequences of drug use.

Dobkin et al. (1995) examined the antecedents of early onset substance use in male adolescents and reported that individual characteristics were better predictors than association with deviant friends. They concluded that the argument that deviant youth seek out like-minded friends was plausible. Kandel (1996) suggested that the influence of peers on adolescent substance use has generally been overestimated, that this overestimate has tended to be at least double the actual effect, and that selection is at least as important as influence, if not more. Other researchers concluded from their review of the literature that selection 'may make a substantial contribution to the association between drug behaviors of friends, and that failure to control for selection may overestimate the contribution of influence' (Bauman and Ennett, 1996: 188). All of which emphasises the need to understand the factors that predispose young people to select drug-using associates.

A risk factor for cannabis users' transition to problematic cannabis use is having more friends who use drugs and less perceived parental disapproval of cannabis, with the effects found to be greater for adolescent females than males (Butters, 2004). Not all cannabis users with cannabis-using peers will progress to problematic cannabis use. Progression to problematic cannabis use will depend on other risk factors and how these interact with the risks associated with cannabis-using peers.

Interactions within the school environment have been identified as important, although it can be difficult to disentangle the relative contribution of social relationships and educational experience as potential risk factors. For example, poor academic performance and classroom behaviour were found to be important risk factors for boys in particular (Hops et al., 1999). Lower attachment to school has been associated with higher levels of substance use (Ennett et al., 1997) and academic performance linked with subsequent academic and home self-esteem (Filozof et al., 1998). However, others

have cautioned against too great an emphasis on self-esteem in prevention initiatives, due to uncertainty over the relationship between (low) self-esteem and substance use (Schroeder et al., 1993). Nonetheless, academic failure is a risk factor for adolescent drug use, as is low commitment to school (Hawkins et al., 1992).

The influence of peer pressure, especially when perceived as some form of coercion, has been overstated. More subtle forms of peer influence, such as attractive role models, are likely to have an influence. When young people with emotional or behavioural problems perceive cannabis-using others as attractive role models then they may be more likely to adopt similar behaviours. The difference between a young person who, with cannabis-using role models, becomes a cannabis user, on the one hand, and a problematic cannabis user, on the other hand, is explicable by presence of other risk factors described in earlier sections.

## Psychological risk factors

Rhodes et al. (2003) point out that within the European literature, there is considerable agreement that there are correlations between problematic drug use and a variety of problematic behaviours. Conduct problems precede and influence early initiation of cannabis, the onset of which is greater where there is also early tobacco use (Pederson et al., 2001). There are also gender-specific influences of different aspects of problem behaviour prior to cannabis initiation. More serious conduct problems were an important predictor of cannabis initiation in boys, while aggressive and covert conduct problems predicted cannabis initiation in girls.

In a study of 15- to 16-year-olds, the heavier users of cannabis were characterised in three groups, according to a range of behavioural, relationship and psychological measures: namely, 'antisocial', 'unhappy' or 'ordinary' (Miller and Plant, 2002). While the antisocial and unhappy groups of young heavy cannabis users had already exhibited negative behaviours, including other substance use, the ordinary group were less likely to be heavy users of other substances. All of which is a reminder that cannabis use and even heavy cannabis use is not in itself sufficient to lead to problematic use of other drugs.

In a sample of 12- to 18-year-olds in treatment for cannabis abuse or dependence, most had a range of psychological and behavioural problems (Tims et al., 2002). Those with higher levels of drug misuse had problems with relationships, and with their psychological and physical health. The extent to which cannabis use, on the one hand, and individual and social circumstance (historical or present) on the other, are causal is difficult to specify. There is every likelihood that those with personal difficulties who subsequently use cannabis will exacerbate these problems.

In a study of French 15- to 22-year-olds, 'borderline symptomatology' for a range of personality problems appeared to influence motivations for cannabis use, in particular expansion of awareness. However, mood enhancement for boys and expansion of awareness for girls were better predictors of cannabis use than psychological problems. While cannabis dependence in boys was related to psychological problems, it was related to motivation for expanded awareness in girls (Chabrol et al., 2005). 'Permissive' beliefs about the nature and utility of cannabis is associated with cannabis use but not dependence, while beliefs that cannabis would ameliorate anxiety, boredom and 'suffering', and improve mood, were the only predictors of cannabis dependence (Chabrol et al., 2004).

In a similar vein, a study that related perceived functions of cannabis to cannabis use and to amount of use found that those who used for respite from negative moods were at risk of developing problems with cannabis. This contrasts with those who used cannabis for social functions, which was not related to degree of cannabis use (Boys and Marsden, 2003).

There is much current debate about the potential for cannabis to exacerbate or precipitate psychosis (see Witton, this monograph, vol. 2). However, psychotic symptoms can also precede cannabis use. While the debate over common vulnerability versus bidirectional causal pathways between cannabis and psychosis continues, psychotic symptoms were found to be a risk factor for subsequent cannabis use in a recent 14-year follow-up study in the Netherlands (Ferdinand et al., 2005).

A recent study in Germany found that, in a sample of mid- to late adolescents, use of cannabis was predicted by a personality construct defined as 'addiction'. However, cannabis use was more likely among young people who scored low on a measure of anxiety–depression and that those who had a positive self-image were more likely to use cannabis (Kirkcaldy et al., 2004). The cannabis use measure in these analyses was lifetime use.

Investigation of 13- to 19-year-olds with diagnosed major depression, conduct disorder and substance dependence found that adolescents with major depression were more likely to develop cannabis dependence than adolescents whose depression manifested at the same time as substance dependence or whose depression developed subsequent to cannabis substance use disorder (Libby et al., 2005).

There are associations between various psychological and behavioural problems and problematic drug use including problematic cannabis use. In such cases, problematic cannabis use is in part symptomatic of psychological and behavioural problems and in part likely to exacerbate psychological and behavioural problems.

## Genetic factors

The epidemiology of drug use is increasingly informed by research into genetic influences and it appears that the role of genetic influences is greater for drug problems than for drug use (Kendler et al., 2003). But this is a complex issue and the specific genes involved and the nature of their interactions with environmental factors are issues for further research. Nonetheless, the distinction between drug use and escalation to drug problems appears to be in terms of the relative influence of genetic and environmental factors. Genetic risk factors are vulnerabilities for conditions that in turn increase the likelihood of developing drug problems (Moss et al., 2002). Both genetic and environmental influences are non-specific in their influence in terms of drugs that are used or with which users develop problems (Kendler et al., 2003).

Genetic factors interacted with family environmental factors in the origins of disruptive behaviour in a study of sons of substance and non-substance misusing families (Majumder et al., 1998). In substance-misusing families, sons with disruptive behaviour were influenced by parental dysfunction and family environment, while in non-substance-misusing families sons with disruptive behaviour were influenced by family environment. Family and social factors were related to cannabis initiation, while genetic factors influenced progression to problematic cannabis use in a study of twin girls (Kendler and Prescott, 1998).

Genetic influences account more for cannabis dependence than they do for cannabis use, while common environmental influences explained more cannabis use than cannabis dependence, supporting an individual vulnerability perspective on development of cannabis problems (van den Bree et al., 1998). Miles et al. (2001) found broadly equivalent genetic and environmental influences on cannabis use.

The genetic influence on cannabis use may be in terms of a genetic basis for sensation-seeking or problem behaviour, while genetic influence on problematic cannabis use may be in terms of a genetic basis for drug sensitivity and/or subjective reactions to cannabis (Agrawal and Lynskey, 2006). Genetic factors may explain in part why many cannabis users develop problematic cannabis use or escalation to drug problems of other kinds. While there will also be people with problematic cannabis use who are not at elevated genetic risk of substance-related problems, better understanding of how genetic factors are expressed and how they interact with environmental factors is a potentially valuable area of future research.

## Implications for prevention

In order to be successful, prevention interventions should address risk factors, taking into account the distinctions between cannabis use and problematic cannabis use, with

recognition that different kinds of prevention interventions will be required depending on the risk factors being tackled. Universal (primary prevention) programmes will in all likelihood not work with young people whose risk factor load is greater. Such young people, whose backgrounds include family strife, behavioural difficulties, and so on, will not only be less likely to gain from universal programmes due to their nature, they will be less likely to participate in them by, for example, being less likely to attend school.

Prevention of cannabis initiation has been attempted for many years in the context of universal drug education programmes with little or no success. These universal prevention interventions typically target entire populations of school pupils of specific ages, usually in early adolescence and more recently in pre-adolescence. Evaluation of the success of such programmes is usually defined as prevention of onset (primary prevention). Even the most successful of universal primary prevention drug education programmes have notably poor outcomes, with, at best, small-scale success (Coggans and Watson, 1995; Coggans et al., 2002; Tobler and Stratton, 1997; Advisory Council on the Misuse of Drugs, 2006). The more successful of these interventions attempt to influence aspects of social competence and self-esteem as well as drug-related knowledge and attitudes. Such attempts to promote social competence (life skills) could, in theory, ameliorate the risks of cannabis and other drug use by equipping young people with the skills to cope with a social environment that facilitates drug use. However, this type of primary prevention may work best with those young people who are less likely to escalate cannabis use to problematic levels. Moreover, at least one such programme does not impact on mediating life skills as expected (Coggans et al., 2002).

Given that the risk factors for experimental and recreational cannabis use are in many ways qualitatively different from the risk factors for problematic cannabis use, this lack of impact on cannabis initiation and on putative mediating factors is perhaps to be expected. However, those at risk of progression to problematic use may well benefit from interventions that aim to prevent escalation by addressing the psychological and behavioural factors that are risk factors for problematic use. However, such interventions require approaches targeted precisely at the individuals and groups at risk.

The recent report from the Advisory Council on the Misuse of Drugs (ACMD) (2006) concluded that the risk factors for hazardous drug use are early life experiences, family relationships and circumstances, and parental attitudes and behaviour. The ACMD also noted that it is not easy to predict who will develop serious problems. The role of parents is important, and many will not realise the extent of their potential role in the prevention of drug use problems and, most importantly, how to relate to their children in ways that maximise the influence of this central protective factor. While there is a growing awareness of the need for parent-oriented interventions, there have been few evaluations of drug education interventions aimed at parents. Positive impact

on mediating variables such as parent–child communication, normative beliefs and intentions to use has been reported, but there are also problems of low uptake and potential stigmatisation of higher-risk parents (Allot et al., 1999).

## Summary and conclusions

There is a complex of potential risk factors that interact with each other to compound and increase the risk of cannabis- and other drug-related problems. The weight of evidence is that risk factors for problematic cannabis use are, in large part, to be found in the interactions between genetic factors, the early nurturing of people and their circumstances. In many ways these are risk factors for substance-related problems generally. The evidence is accumulating for individual vulnerability to drug-related problems. While most cannabis users restrict their preferred drug use and can do so presumably on the basis of the absence of risk factors/presence of protective factors, others develop problematic relationships with drugs. Such problematic relationships with drugs include drug effects as risk factors for intensifying or precipitating psychological or social problems in turn.

The influence of risk factors is cumulative, both in terms of interaction with each other and in terms of time. The more that multiple risk factors accumulate over time the more likely that developmental and behavioural problems will become evident (Loxley et al., 2004). Behavioural problems, association with delinquent or deviant drug-using peers, dysfunctional family relationships, exposure to family substance misuse and genetic vulnerability to psychological conditions that increase the likelihood of drug problems all contribute to this complex of risk factors for problematic cannabis use. In the light of the varied, interactive and potentially confounding nature of risk factors for cannabis-related problems, prevention efforts need to be diverse. Universal programmes have a role to play in communicating key information and raising awareness of risks, but are unlikely to have any substantial impact on problematic cannabis users. Vulnerable groups and individuals require more precise targeting and delivery of programmes that will address their specific needs (see Burkhart, this monograph).

This chapter has drawn on a wide range of research literature assessing the role of various factors from the genetic to the social. Full justice will not have been done to the social and cultural differences across all the different settings in which the data were gathered for these research reports. To what extent are the conclusions justified without exploring these social and cultural contexts further? This is an empirical question. However, given the need to distinguish between recreational and problematic cannabis use in relation to the utility of the risk factors approach, it may be that there is a need to make the same distinction for other drugs as well. The potential for the risk factors approach to inform prevention efforts will depend in many respects on greater

understanding of the social norms and cultural factors related to recreational and problematic patterns of drug use.

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