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Original article

## Early Initiation of Cannabis Use: A Cross-national European Perspective

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### Abstract

**Purpose:** To examine the relationship of the early initiation of cannabis use with other high risk behaviors and with psychosocial and health-related correlates in 15-year-old adolescents in six European countries.

**Methods:** This study reports on nationwide cross-sectional surveys in six European countries in 2001–2002, within the framework of the World Health Organization's collaborative study, Health Behaviour in School-aged Children (HBSC). Data were collected through anonymous questionnaires self-completed in classrooms. Descriptive and multivariate analyses were used to assess differences between countries in age of first cannabis use and associations with health and related psychosocial variables.

**Results:** The prevalences of lifetime and last-year cannabis use ranged from 30.7% and 27.5%, respectively, in the Czech Republic, to 5.4% and 4.1%, respectively, in Greece. Age at first use was lower in the high prevalence countries than in countries with lower prevalence. For 15-year-olds, frequent use of tobacco and alcohol and other risk behaviors were correlated with early (13–15 years old) and especially very early ( $\leq 13$  years old) cannabis initiation.

**Conclusions:** Although different patterns of prevalence and age of initiation were observed between participating countries, early cannabis use was almost uniformly associated with higher odds of more frequent use of cannabis and other substances, and with a common set of other problems. Our findings suggest that prevention of drug abuse must commence in preadolescence. © 2006 Society for Adolescent Medicine. All rights reserved.

### Keywords:

Cannabis use; Adolescence; Early initiation; Cross-national data; HBSC

In Europe, cannabis has been and remains the most commonly used illegal substance in all 25 Member States. The availability of cannabis across Europe increased remarkably during the 1990s as both imports and local production grew in most European countries. Europe remains the world's biggest market for cannabis resin. The majority of drug seizures and drug law offenses in that decade were

related to cannabis. Thus, the availability of cannabis was very high. The use of cannabis showed a striking increase through the 1990s and seemed to stabilize thereafter in some countries, although it remains at historically high levels. Regarding the newer member states of the European Union (E.U.) from Central and East Europe, the opening of their borders during the 1990s, and the gradual diffusion into their societies of Western European cultures has led, among other things, to the convergence of their drug-related situations within a relatively short time period.

There are clear indications in the recent literature from both the United States (U.S.) and Europe that cannabis use

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increases the risk for cannabis-related problems. The negative impact of the expansion among the population of cannabis use has been reflected in recent years in the increase of clients attending treatment for cannabis-related problems in the majority of the E.U. countries [1]. Rates of marijuana use disorders (abuse and dependence) in the U.S. have increased from 1.2% to 1.5% of respondents in the last decade, whereas the prevalence of use remained relatively stable [2]. Thus, the importance of further studies on cannabis use and the related factors that increase the risks of negative implications for health is underlined.

Early initiation of cannabis use in adolescence is among the major factors found to increase the risk for health and psychological adjustment problems. It is suggested that cannabis or other illicit drug use increases risks of drug abuse and dependence [3], mental health problems [4–6], and problems of adjustment in later adolescence and early adulthood [3,7–13]. However, findings are not unanimous. Labouvie et al [14] support the view that both illicit drug use and heavy alcohol use are behaviors primarily limited to the adolescent period, regardless of the timing of their onset.

The relationships between the early onset of drug use and problem behaviors have been attributed to *individual factors* such as personality, drug-related attitudes, psychopathology and genetic or hereditary predisposition [9,15,16]; *social factors* such as peer affiliation, availability and accessibility of drugs, and family [15,17,18]; and to the *interaction of genetic and environmental factors* [17,19].

There is some lack of agreement regarding the nature of any cause and effect relationship between cannabis use and behavioral or psychosocial problems. It has been reported that linkages between cannabis use and later adjustment problems might co-occur within the framework of a constellation of problem behaviors [20], whereas early regular use of any drug might be an indicator of a syndrome of problems existing from childhood [21]. Alternatively, genetic, social, environmental, family and individual factors may constitute common antecedents both for drug use and other problem behaviors [11,22].

Nevertheless, a longitudinal twin study from Australia provides evidence that it is the early use of cannabis rather than any genetic predisposition that leads to later increased use of illicit drugs or to drug abuse. Individuals with early onset of cannabis (< 17 years old) had odds of drug use, alcohol dependence and drug abuse or dependence that were 2.1 to 5.2 times higher than those of their co-twins who had not used cannabis before the age of 17 years, even after controlling for other known risk factors [17].

Irrespective of the antecedents of early drug use and its impact on psychosocial adjustment, the preventive implications of early drug use justify further investigation. Understanding these relationships could benefit initiatives targeting prevention and early intervention. The large majority of the studies relevant to early cannabis use have been conducted in the U.S. and Oceania. In Europe, studies on the

early onset of cannabis use are rather scarce. The prevalence, nature and correlates of early or very early initiation remain unclear.

The present study is based on European data from the cross-sectional World Health Organization (WHO) collaborative study on Health Behaviour in School-aged Children (HBSC) conducted in a four-year cycle among countries in the European region of the WHO and in North America [23]. The HBSC follows a standardized survey protocol [24] and collects data on a broad range of health-related behaviors, determinants, and attitudes from nationally representative samples of 11-, 13- and 15-year-old school students. Only 15-year-olds answer the questions relevant to this study.

The aims of this study are:

- To provide cross-national comparative data on early and very early initiation of cannabis use in six European countries with different history and prevalence of cannabis use and sociocultural backgrounds.
- To investigate psychosocial correlates and the eventual associated outcomes of early, as compared with very early, cannabis use.
- To examine how the correlates vary across countries.

## Methods

### Population

Data were drawn from the 2001–2002 HBSC survey of 15-year-old students from six countries that had included in their national questionnaire an optional question on age of initiation into cannabis use: Belgium (French speaking Community) (n = 1381), Czech Republic (n = 1660), France (n = 2614), Ireland (n = 919), Greece (n = 1324) and Poland (n = 2152). Samples in each country were probability samples and representative at the national level.

### Questionnaire and Procedures of Data Collection

The HBSC survey uses a self-administered questionnaire composed of core and optional sections [24]. It is administered in the classroom and is completely anonymous. In all participating countries, permission to implement the survey was obtained from the educational authorities. Students were told explicitly that they could refuse to participate in the study or to respond to questions that they preferred not to answer.

### Statistical Analysis

Statistical analysis was based on the division of the sample into three groups (age of initiation into cannabis use ≤ 13 years, age of initiation between 13–15 years, never used cannabis). SPSS (version 13; SPSS Inc., Chicago, IL) was employed for all analyses.

In the first stage of analysis, chi-squared tests were used to examine, within each country, the associations between early cannabis use and variables from four main domains—

**Table 1**  
Lifetime and last year prevalence of cannabis use and age of onset among 15-year-old students in six countries (HBSC survey 2001–2002)

Countries	Lifetime prevalence			Last year prevalence			Age of onset (years)					
	Boys (%)	Girls (%)	Total (%)	Boys (%)	Girls (%)	Total (%)	≤13			13-15		
							Boys (%)	Girls (%)	Total (%)	Boys (%)	Girls (%)	Total (%)
Belgium	30.9	21.9 <sup>a</sup>	26.0	28.4	19.7 <sup>a</sup>	23.7	10.9	6.4 <sup>b</sup>	8.4	19.0	15.1	16.9
Czech Republic	35.0	26.7 <sup>a</sup>	30.7	30.7	23.2 <sup>b</sup>	26.8	8.0	7.1	7.5	25.2	18.5 <sup>b</sup>	21.7
France	34.3	26.0 <sup>a</sup>	30.1	31.2	23.8 <sup>a</sup>	27.5	11.1	6.1 <sup>a</sup>	8.5	18.9	17.2	18.0
Ireland	27.6	15.4 <sup>a</sup>	19.9	25.4	14.1 <sup>a</sup>	18.3	7.9	2.5 <sup>a</sup>	4.5	18.8	12.4 <sup>b</sup>	14.8
Greece	8.0	3.0 <sup>a</sup>	5.4	6.3	2.1 <sup>a</sup>	4.1	1.4	0.3 <sup>c</sup>	0.8	5.6	2.4 <sup>b</sup>	3.9
Poland	25.0	11.6 <sup>a</sup>	18.0	20.8	9.2 <sup>a</sup>	14.8	4.1	2.2 <sup>c</sup>	3.1	19.6	9.4 <sup>a</sup>	14.3

Note: because of missing data, totals over the categories of age of onset may not match the lifetime prevalence.

<sup>a</sup>  $p < .001$ ;

<sup>b</sup>  $p < .01$ ;

<sup>c</sup>  $p < .05$  for comparisons by gender, separately within each country ( $\chi^2$  test).

substance use related, other risk behaviors, environmental, and affect related. Tests were carried out between those who reported very early initiation into cannabis use ( $\leq 13$  years old) and those who reported early cannabis use (between 13 and 15 years), and separately between the early users and never users. The variables examined were related to *substance use* (smoking daily, age of first cigarette  $\leq 13$  years, use of alcohol at least every week, having been drunk at least four times, age of first alcoholic drink  $\leq 13$  years, used cannabis 10 or more times in the last 12 months); *other risk-behavior-related variables* (involved in physical fight three or more times, have bullied others at least twice in the last month, have had sexual intercourse, age of first sexual intercourse  $\leq 13$  years); *environmental* (going out in the evening with friends four or more days during the last week, do not like school at all); and *affect* (reported at least two psychosomatic symptoms every day in the past week). Questions on sexual intercourse, which are not core items, were not included in the Irish questionnaire because of ethical concerns.

Backward logistic regression analysis with the likelihood ratio test for removal was subsequently carried out among cannabis users for very early vs. early age of initiation into cannabis use, including as independent variables all the above except those related to sexual intercourse, which were not available for Ireland. A second analysis including these two variables was carried out among the other five countries. The variables gender, country, and the interaction of all variables with the country were included in the regressions. Poland (the last country in alphabetical order) was used as the reference country.

## Results

### Age of Initiation into Cannabis Use

Differences between countries in lifetime and last-year prevalence of cannabis use (highest in the Czech Republic,

France and Belgium; intermediate in Ireland and Poland; lowest in Greece) were reflected in the percentages of students who first used cannabis at 13 years old or less (Table 1). Rates of very early initiation of cannabis use were higher in countries with higher cannabis use prevalence as compared to those with lower prevalence.

Gender differences were significant in all countries with a higher prevalence of cannabis use among boys compared with girls. A significantly higher percentage of boys than girls were also very early starters of cannabis use in all countries except in the Czech Republic, where no significant difference was identified.

### Risk Behaviors, Environment and Affect Related to Early Versus Very Early Cannabis Use

As shown in Table 2, large differences in the variables under consideration are noted in almost all countries between the early and very early initiation of cannabis use groups and both of the latter groups and adolescents who had never used cannabis. Very early alcohol and tobacco initiation, daily smoking, frequent alcohol drinking and drunkenness, repetitive cannabis use, risk behaviors other than substance use such as aggressiveness and premature sexual behavior, frequent presence of psychosomatic symptoms, going out with friends in the evening and disliking school show generally highly significant differences in the countries with higher prevalence of cannabis use, whereas in countries with lower prevalence such as Ireland, Poland and Greece, patterns are similar to those of high prevalence countries, but differences in most cases reach significant levels only between users and nonusers of cannabis.

### Multivariate Analysis

The logistic regression analyses (Table 3) including adolescents from all six countries showed that those who used cannabis at age 13 years or younger are four times (odds ratio [OR] = 4.1, 2.8–6.0,  $p < .001$ ) more likely to have

Table 2  
 Very early ( $\leq 13$  years) and early (13–15 years) age of onset of cannabis use and associated variables in the six participating countries

	Belgium			Czech Republic			France			Ireland			Greece			Poland		
	$\leq 13$ n = 114	13–15 n = 229 <sup>a</sup>	Never n = 1013 <sup>b</sup>	$\leq 13$ n = 120	13–15 n = 346*	Never n = 1129 <sup>f</sup>	$\leq 13$ n = 206	13–15 n = 435	Never n = 1770 <sup>f</sup>	$\leq 13$ n = 40	13–15 n = 131 <sup>a</sup>	Never n = 715 <sup>b</sup>	$\leq 13$ n = 11	13–15 n = 51 <sup>a</sup>	Never n = 1233 <sup>b</sup>	$\leq 13$ n = 65	13–15 n = 302 <sup>a</sup>	Never n = 1752 <sup>b</sup>
<b>Substance use</b>																		
Very early onset of alcohol drinking	89.4	72.4 <sup>c</sup>	48.4 <sup>c</sup>	95.7	78.7 <sup>a</sup>	71.5 <sup>b</sup>	82.0	51.5 <sup>a</sup>	31.3 <sup>a</sup>	82.5	58.9 <sup>d</sup>	33.9 <sup>c</sup>	72.7	74.5	40.7 <sup>c</sup>	93.8	72.1 <sup>c</sup>	46.8 <sup>a</sup>
Very early onset of smoking	93.8	69.5 <sup>c</sup>	29.2 <sup>c</sup>	99.2	79.4 <sup>a</sup>	45.7 <sup>a</sup>	94.6	74.8 <sup>a</sup>	30.1 <sup>a</sup>	90.0	72.1 <sup>c</sup>	30.5 <sup>c</sup>	60.0	47.1	9.8 <sup>c</sup>	87.5	67.9 <sup>d</sup>	33.4 <sup>c</sup>
Daily smoking	61.9	48.0 <sup>e</sup>	6.9 <sup>c</sup>	63.3	52.2 <sup>c</sup>	7.5 <sup>a</sup>	56.8	53.8	6.1 <sup>a</sup>	45.0	45.0	7.5 <sup>c</sup>	45.5	56.9	7.5 <sup>c</sup>	50.8	48.0	9.3 <sup>c</sup>
Weekly alcohol drinking	55.9	42.9 <sup>e</sup>	17.2 <sup>c</sup>	60.0	58.3	23.9 <sup>a</sup>	46.8	27.6 <sup>a</sup>	7.6 <sup>a</sup>	44.7	31.0	6.8 <sup>c</sup>	72.7	66.7	27.9 <sup>c</sup>	33.8	35.4	8.4 <sup>c</sup>
Been drunk 4+ times	50.0	31.9 <sup>d</sup>	4.0 <sup>c</sup>	58.3	34.1 <sup>a</sup>	4.3 <sup>a</sup>	34.0	16.8 <sup>a</sup>	1.5 <sup>a</sup>	65.0	53.4	8.1 <sup>c</sup>	54.5	39.2	4.1 <sup>c</sup>	52.3	44.9	7.6 <sup>c</sup>
Last year use of cannabis (10+ times)	56.6	29.1 <sup>c</sup>	0.0 <sup>c</sup>	35.8	21.1 <sup>b</sup>	0.0 <sup>a</sup>	55.1	31.3 <sup>a</sup>	0.0 <sup>a</sup>	57.9	20.9 <sup>c</sup>	0.0 <sup>c</sup>	72.7	14.3 <sup>c</sup>	0.0 <sup>c</sup>	32.3	13.3 <sup>c</sup>	0.0 <sup>c</sup>
<b>Emotional</b>																		
Frequent psychosomatic symptoms (at least 2 almost every day)	28.9	22.7	13.6 <sup>d</sup>	13.3	9.2	5.6 <sup>c</sup>	24.3	15.6 <sup>b</sup>	9.2 <sup>a</sup>	20.0	16.0	9.2 <sup>a</sup>	45.5	37.3	25.8	23.1	24.5	15.5 <sup>c</sup>
<b>Other risk behaviors</b>																		
Been involved in physical fight 3+ times last year	30.1	22.0	10.7 <sup>c</sup>	21.7	20.9	8.8 <sup>a</sup>	35.3	18.0 <sup>a</sup>	7.3 <sup>a</sup>	20.0	24.6	6.6 <sup>c</sup>	36.4	29.4	9.2 <sup>c</sup>	34.4	28.6	10.8 <sup>c</sup>
Bullied others (2+ times/month) in the last two months	31.9	17.5 <sup>d</sup>	9.0 <sup>c</sup>	12.5	7.2	3.0 <sup>a</sup>	29.9	20.0 <sup>b</sup>	9.7 <sup>a</sup>	17.5	7.8	3.3 <sup>c</sup>	45.5	27.5	9.7 <sup>c</sup>	29.7	25.8	12.8 <sup>c</sup>
Any sexual intercourse	69.4	62.3	17.7 <sup>c</sup>	55.3	39.1 <sup>b</sup>	7.6 <sup>a</sup>	61.2	39.6 <sup>a</sup>	12.3 <sup>a</sup>	-	-	-	90.9	60.8	18.5 <sup>c</sup>	46.2	34.2	9.8 <sup>c</sup>
Very early sexual intercourse ( $\leq 13$ years)	28.6	19.4	4.5 <sup>c</sup>	15.8	4.7	0.7 <sup>a</sup>	31.1	7.0	4.3 <sup>c</sup>	-	-	-	63.6	5.9	2.7	16.9	5.3	2.0 <sup>d</sup>
<b>Environmental</b>																		
Go out with friends (4+ evenings/week)	19.5	11.0 <sup>e</sup>	8.7	48.3	46.2	21.6 <sup>a</sup>	28.1	19.1 <sup>c</sup>	9.3 <sup>a</sup>	60.0	51.9	28.1 <sup>c</sup>	72.7	47.1	13.8 <sup>c</sup>	46.2	46.0	19.1 <sup>c</sup>
Do not like school at all	39.3	29.1	15.0 <sup>c</sup>	31.9	15.3 <sup>a</sup>	9.4 <sup>b</sup>	39.0	25.4 <sup>a</sup>	10.5 <sup>a</sup>	23.1	23.3	11.5 <sup>c</sup>	36.4	15.7	7.0 <sup>c</sup>	32.3	22.6	12.4 <sup>c</sup>

<sup>a</sup>  $\chi^2$  tests are carried out between the categories of age of onset ( $\leq 13$  and  $> 13$ ).

<sup>b</sup>  $\chi^2$  tests are carried out between never users and users who started at  $> 13$  years.

<sup>c</sup>  $p < .001$ ;

<sup>d</sup>  $p < .01$ ;

<sup>e</sup>  $p < .05$ .

**Table 3**  
Logistic regression analyses of factors associated with the very early onset of cannabis use ( $\leq 13$  years, versus onset at 13–15 years)<sup>a</sup>

	All countries	All countries except Ireland
Very early onset of smoking	4.1 <sup>c</sup> (2.8–6.0)	4.0 <sup>c</sup> (2.5–6.2)
Been drunk (4+ times)	1.4 <sup>e</sup> (1.1–1.7)	-
Very early onset of alcohol drinking	2.9 <sup>c</sup> (2.1–4.0)	3.2 <sup>c</sup> (2.3–4.6)
Last year use of cannabis (10+ times)	2.5 <sup>c</sup> (2.0–3.2)	2.2 <sup>c</sup> (1.7–2.9)
Not liking school at all	1.5 <sup>d</sup> (1.2–2.0)	1.4 <sup>e</sup> (1.1–1.9)
Very early onset of sexual intercourse	-	3.5 <sup>c</sup> (2.4–5.1)
Country (reference: Poland) <sup>b</sup>		
Belgium	1.9 (1.3–2.9)	1.6 (.9–3.0)
Czech Republic	1.4 (1.0–2.0)	1.4 (1.0–2.1)
France	2.2 (1.5–3.1)	2.0 (1.4–2.8)
Ireland	1.3 (.8–2.2)	-
Greece	1.3 (.6–2.9)	1.1 (.5–2.4)

<sup>a</sup> Only significant factors are presented.

<sup>b</sup> Dummy variables representing countries.

<sup>c</sup>  $p < .001$ ;

<sup>d</sup>  $p < .01$ ;

<sup>e</sup>  $p < .05$ .

also smoked their first cigarette and almost three (OR = 2.9, 2.1–4.0,  $p < .001$ ) times more likely to have drunk their first alcohol drink at that early age, in comparison with those who first used cannabis between the ages of 13 and 15 years. Very early cannabis users have 2.5 (OR = 2.5, 2.0–3.2,  $p < .001$ ) times the odds of having used cannabis at least 10 times at the age of 15 years, and 1.4 (OR = 1.4, 1.1–1.7,  $p < .005$ ) times the odds of having been drunk four or more times. Additionally, they were more likely to report that they do not like school at all (OR = 1.5, 1.2–2.0,  $p < .001$ ).

Differences between countries were statistically significant at  $p < .001$ . The major difference was that the odds of an adolescent from Belgium or France being a very early rather than early cannabis user was about twice as high as in the reference country, Poland (Belgium OR = 1.9, 1.3–2.9,  $p < .001$ ) (France OR = 2.2, 1.5–3.1,  $p < .001$ ). We also examined interactions among other variables and country. The results (not shown in the Table) did not reach high levels of significance, bearing in mind the large sample size and the large number of tests being carried out. The only interactions significant at  $p < .05$  were with being involved in fights (strongest association with very early onset in France, weakest in Ireland) and with disliking school (strongest in Greece, weakest in Ireland).

In the second logistic regression analysis (Table 3) where Ireland was omitted so that the variables concerning sexual intercourse could be included, a similar pattern of associations was found as in the first analysis, and in addition, the age at first sexual intercourse was also revealed to be a significant correlate, with an odds ratio of 3.5 (OR = 3.5, 2.4–5.1,  $p < .001$ ). In this analysis, the interaction between

disliking school and country reached  $p < .01$  with the weakest association now being found in Belgium. Weaker interactions ( $p < .05$ ) were found for early first sexual intercourse (stronger association in Greece, weakest in Belgium) and for gender (strongest in Greece, weakest in Poland). Results for interactions are not shown in the Table.

## Discussion

The data presented here show that the rates of early and very early initiation of cannabis use vary considerably between countries and are related to the levels of prevalence of use of this substance. Prevalence, on the other hand, is influenced in each country by macro-level factors such as the sociocultural context, the existing legislation, the socioeconomic situation, the general public climate—opinion and attitudes—regarding use, the accessibility of drugs (incorporating availability and cost), policy and other contextual factors [25]. Typical family structure in each country could be such a contextual factor. In our study, countries with lower prevalences of drug consumption, such as Greece, Poland and Ireland, are among the countries with the highest percentages of intact families, whereas in contrast, Belgium, the Czech Republic and, to a lesser extent, France, are among those with single-parent and blended family structures [26].

A study by ter Bogt et al [27] has indicated that economic factors, national policy, and the existence of ‘drug cultures’ at country level are predictive of current substance use rates among children in mid-adolescence. The perceived availability of drugs, perceived use by friend, and perceived dangers from use are among the additional contextual factors that influence use by young people.

The association found by ter Bogt et al [27] led the authors to the conclusion that illicit drug use would rise in the economically developing countries. This has indeed been the case in those countries participating in our study that showed a significant growth in their economies within the last two decades, such as Ireland and, to a lesser degree, Greece or, in the last decade, Poland and the Czech Republic. Illicit drug use has grown so rapidly in the Czech Republic in the last decade that it has attained even higher levels than in the western European countries where the epidemic preceded it by many years [25,28]. On the other hand, France and Belgium are traditionally among the wealthier European countries, and the level of cannabis use in these countries is among the highest in Europe.

Regarding legislation, all 25 E.U. member states have ratified the United Nations Conventions on Narcotic Drugs of 1961 and 1998, which prohibit both use and possession for use, and have instituted laws on cannabis consumption. These laws are, however, adapted to the local or regional situation of the countries and to their constitutional principles. As a consequence, a relatively wide variety of specific regulations exists within jurisdictions. Some countries tol-

erate certain forms of possession and consumption, others foresee administrative sanctions, whereas others impose relatively severe penal sanctions. Among countries participating in the present study, the laws in Belgium, France, Czech Republic and Ireland could be considered up to 2002 (the year of the survey) as less punitive (for example, fines, police cautions or other administrative measures are foreseen) than those in Greece and Poland, where any illicit drug use and possession of even small quantities of illicit substance is highly sanctioned and punished with imprisonment [29].

Further to the legal situation, actual practice in relationship to law enforcement is often guided by the implicit norms (public opinion and attitudes) that define the more general climate toward the use of “soft” drugs. The spread of drug use among the population exerts a normative impact on attitudes toward drug use. The shift in public opinion regarding drug use toward greater tolerance, especially among the young, is probably due to the fact that young people encounter drug use in their environment more frequently and that drugs are offered to them more frequently. The highest rate of tolerance is seen for occasional consumers of “soft” drugs (especially marijuana) along with the increase in the popularity and commercialization of leisure-time activities associated with drug use.

The widespread use of cannabis among young people in Europe has had an impact on practices within the police and the judicial system, whereby practices appear more tolerant than the legislation itself may suggest. Although public opinion often provides grounds for changes in legislative measures, “decriminalization” and “depenalization” of use and possession for personal use remain a controversial issue in Europe. However, in countries where both legislation and public opinion are more lenient toward cannabis use (social acceptability), as is the case in France and Belgium, levels of use are higher among young people.

Other European cross-national datasets aid our interpretation of the findings presented here. According to the most recent data from the European School Project on Alcohol and Drugs (ESPAD) Survey [30] of 16-year-old school students, lifetime cannabis use in 2003 ranged from 45% in the Czech Republic and Ireland, followed closely by the U.K., France, Spain and Belgium, to below 10% in Greece and Romania, which rank with Cyprus and Turkey as four countries with lower prevalence in the ESPAD countries. In comparison to earlier ESPAD studies, it is to be noted that in the Czech Republic the number of students who had tried cannabis before the age of 13 years increased by 5%, whereas much lower increases, no increase, or even a tendency toward an increase in the age of initiation was noted in the other countries [30]. Findings from the 2002 HBSC survey data on 15-year-old students, presented here, are in line with the ESPAD findings. In addition, the ESPAD data indicate that for countries where prevalence of cannabis use is higher, perceived availability is higher (e.g., 58% in the

Czech Republic vs. 20% in Greece), as is perceived use by friends (e.g., 35% in Ireland vs. 13% in Poland) and the perceived dangerousness of cannabis use is lower (e.g., 14% in Belgium vs. 48% in Greece).

The bivariate associations presented by country illustrate that very early substance use ( $\leq 13$  years of age) is associated with the initiation of other substance use behaviors before the age of 13 years (tobacco and alcohol use), and to frequent use of tobacco, alcohol and cannabis at age 15. The initiation of cannabis use between age 13 and 15 years is also related with early initiation of other substances and current substance use at 15 years old, but to a lesser extent. For all six countries included here, early and very early initiation into cannabis use has been demonstrated to be associated with current levels of substance use. Despite the inter-country differences outlined above, these findings provide evidence of the cross-national similarities of patterns related to initiation. Our finding that early and very early initiation predict current levels of substance use for 15-year-olds extends the work of Wilson et al [31] to six socio-culturally and legally distinct European countries and confirm that early initiation is associated with elevated levels and frequency of substance use as well as with any substance use.

Von Sydow et al [18], Chen et al [32], and Sung et al [33] have provided evidence of the predictive power of early cannabis use for later dependence. Given the low levels of cannabis dependence found in mid-adolescence [33], ongoing debates regarding measurement and diagnostic criteria [34] and estimates that four to seven years of sustained use are required to identify cannabis dependence [10,33], it would not have been appropriate to attempt to assess dependence within our samples. Although our data do not include such an assessment, the fact that the pattern of substance use intensity is more severe at the age of 15 years for those who started very early compared with those who started cannabis use between 13 and 15 years, indicates a greater progression toward more intensive use for very early starters, thus increasing the risk for abuse and dependence.

Early cannabis use is also associated with adjustment at age 15 in other ways. Early cannabis use is associated in each country with higher levels of other risk behaviors and negative health-related outcomes, including having been injured, experiencing psychosomatic symptoms, fighting and bullying, and having had early sexual experience. These findings are consistent with Jessor and Jessor’s [35] theory of problem behaviors and more recent findings showing the co-occurrence of multiple risk behaviors [36]. They are also in line with the findings of Brook et al [9], which show that early adolescent marijuana use increases the risk of deviant or problem behaviors in late adolescence, including licit and illicit drugs, sexual behavior, academic failure and delinquency. Although not identical, the patterns of risk factors associated with early and very early use are similar across European countries. This is somewhat analogous to the

findings for different ethnic groups reported by investigations of this topic in the U.S. [3,31,37].

Our findings therefore suggest a wider public health importance of early cannabis use and could have important implications for prevention. On the basis of the escalation hypothesis, targeting the early use of marijuana may prevent the use of other illicit drugs [38]. Whether or not the progression from marijuana to other drugs is due to a general propensity to use drugs caused by common predisposing factors [22], prevention efforts aimed at the underlying risk, and protective factors related to the onset or initiation of marijuana use could decrease the risk of progression and other drug-taking. For young people who have already used marijuana, intervention programs should be developed to target this group at high risk of progressing to more serious involvement with drug use. Efforts to delay the onset of illicit drug use may lead to reduced incidence and associated prevalence of drug dependence and related problems [39].

Among the strengths of this study are that it presents comparable data across six European countries: all data were collected from samples designed to be representative of the population, and an identical research protocol [24] was employed by country research teams. This permits the comparative analysis of the data and supports the generalizability of our findings. In addition, we have been able to separate early from very early cannabis users and to investigate the relationship between such early use and later use of other substances and risk behavior.

The limitations of the study include that these data are based entirely on self-reports and may thus be subject to recall bias. Although there is some evidence to suggest that reporting of current substance use is generally reliable [40], it has been suggested that heavier substance users may report earlier initiation in part as an explanation of current use, although this has been disputed [14]. It is important to bear in mind that, although these data having been collected retrospectively, the time lag between age of initiation and reporting is relatively short. Recall biases may be less likely over such a short period.

Given the study design, there is no evidence presented here that these relationships are causal in nature. Chen et al [32] rehearse arguments related to cause and effect regarding the early onset of cannabis use and later dependence. Nevertheless, independent effects of age of initiation on later dependence and problem drug use, irrespective of other risk factors and duration of use, have been demonstrated both for adolescents [33] and adults [10].

These debates are important for their relevance to the appropriateness of adopting a goal of delaying initiation within school- or youth-based health promotion and public health. Chen et al [32] contend that the prevention of cannabis initiation in early adolescence may reduce the risk of adult cannabis dependence and thus that early detection and intervention may be fruitful. Consequently, they reason that the delay of initiation is an appropriate goal. Our data

clearly indicate that efforts to delay initiation must commence with children in primary level educational settings, or of similar age, if they are to reach those most at risk. Irrespective of the mechanisms linking early substance use and difficulties in adulthood, early cannabis use (in preadolescence, early, or mid-adolescence) has health and legal implications for the young people involved, their families and communities. In addition, it is clear that there is a need for more detailed examination of the experience of cannabis and other drug use among preadolescent populations.

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