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**ALCOHOL DRINKING, SMOKING, CANNABIS USE AND
PHYSICAL AND MENTAL HEALTH AMONG FINNISH
UNIVERSITY STUDENTS: A LONGITUDINAL STUDY**

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ACADEMIC DISSERTATION

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ABBREVIATIONS

ALAT	= Alanine aminotransferase
ASAT	= Aspartate aminotransferase
β-HEX	= β-hexosaminidase
CAGE	= A four-item alcoholism screening test (cut-annoy-guilty-eye-opener)
CDT	= Carbohydrate-deficient transferrin
FSHS	= Finnish Student Health Service
GGT	= Gamma-glutamyltransferase
HDL-chol.	= High-density lipoprotein cholesterol
MAST	= Michigan Alcoholism Screening Test
MCV	= Mean corpuscular volume
M-V	= Mean weekly scale for estimating consumption (Appendix 2)
Q-F	= Quantity-frequency scale for estimating alcohol consumption (Appendix 2)
SEM	= Standard error of mean
SD	= Standard deviation

ABSTRACT

The main purpose of the longitudinal study was to compare the patterns of alcohol consumption, smoking and drug abuse among university students in their first study year to those in their fifth year, in order to see whether there were any significant changes. On the basis of these results, the need for interventions to reduce alcohol problems, smoking and drug abuse was also estimated. The development of university students' mental health parameters and stress experience was likewise studied.

The study started in the academic year of 1989/90 with all the first-year university students within the scope of the Finnish Student Health Service (FSHS) centre in Helsinki. Only foreign students and those 30 years of age or over were excluded. The first part of the study was carried out in connection with the health check-up during which students were given a questionnaire to be filled out. Altogether 3836 students were included, and the participation rate at that time was 66%. The same students were re-examined using the same questionnaire in their fifth year of studies in the academic year of 1993/94. The target group had decreased to 2877, and the participation rate was now 65%. In both inquiries, about two thirds of the respondents were female. The mean age of the first-year students was 22.2 years, and 26.7 years for the fifth-year students.

There was no change in the mean alcohol consumption during the follow-up: in the first year the mean alcohol consumption was 2.9 kg/year of pure ethanol for female students and 6.9 kg/year for male students, and in the fifth year 3.0 kg and 6.9 kg respectively. The proportion of abstainers decreased both among female and male students during the 5 years of studies. The decrease was not statistically significant, however. The percentages of heavy drinkers had remained quite unchanged: 4.7%

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of the female and 11.1% of the male first-year students, and 4.4% of the female and 10.8% of the male fifth-year students could be considered heavy drinkers. On the other hand, over two thirds of the first-year heavy drinkers decreased their alcohol consumption to the level of social drinking. No changes were noted in the frequency of drinking for intoxication between these two time points.

The smoking among university students decreased significantly during the follow-up: the proportion of female non-smokers increased from 80% to 90% and that of male non-smokers from 78% to 84%. About half of the first-year heavy smokers continued similar smoking in their fifth year of studies. However, more than half of the first-year female and male smokers had quit smoking by the time they reached their fifth study year.

Experimenting with cannabis increased significantly during the follow-up: in the first year, 88% of the students reported no experience with cannabis use, while in the fifth year the corresponding percentage was 78%. The maximum use (at least 5 times altogether) was reported by 70 (3%) first-year students and by 88 (5%) fifth-year students. Male students reported significantly more experimenting than female students. Nine percent of the students who expressed no use of cannabis in their first year reported at least some use in their fifth study year. The frequency of cannabis use also increased during the follow-up. The cannabis use was highly associated with both smoking and alcohol consumption.

By and large, the university students' health status was good: over 85% of the students reported excellent or good health in both inquiries. Depression, tension and anxiety nevertheless increased significantly during the follow-up, as did also stress experiences. Alcohol consumption associated significantly with depression.

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In Finland alcohol control was for years based on a system of State Alcohol Monopoly. In broad terms this meant that alcoholic beverages were taxed quite heavily, and that the availability of alcoholic beverages was restricted in order to minimize the harmful consequences of drinking. In addition, economic factors such as income and price level, as well as the rate of unemployment had an influence on total alcohol consumption.

Finland's alcohol consumption figures have quadrupled since World War II. They began to rise in the late 1950s and increased rapidly in the late 1960s and early 1970s. Between 1974 and 1985, alcohol consumption remained stable at just over 6.5 litres per capita, but started to rise again after the mid-1980s (Österberg & Säilä, 1991). Parallel to the economic growth, alcohol consumption increased up until 1990, being 7.7 litres of 100% pure alcohol per capita (Alcohol Statistical Yearbook 1991). The effects of the economic recession were manifested as a lowered level of total alcohol consumption after 1991. The alcohol consumption level went down to 6.6 L per capita in 1994 (Alcohol Statistical Yearbook, 1994). After the recession the consumption figures turned to increase again, being 6.9 L per capita in 1997. According to all recent predictions, alcohol consumption is continuing to increase, leading simultaneously to a growth of detrimental effects.

In the 1990s the consumption trends have been towards beverages with a lower alcohol content. In 1994, the share of light beverages in total alcohol consumption was 73.6%. Medium beer accounted for almost half of all alcohol consumed.

The existence of a special relationship of Finns to alcohol has often been suggested as justification for the country's restrictive alcohol policy. Heroic drinking,

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mythical intoxication, and Finnish drunkenness are expressions that are often used to describe Finnish drinking patterns (Partanen, 1992). The traditional drinking pattern is one of relatively infrequent drinking which, on most occasions, leads to intoxication. Recent studies indicate that the traditional drinking patterns still persist, regardless of changes in beverage preferences (Simpura et al., 1993, Simpura & Partanen, 1997). The most general indicators of drinking patterns show a decline in abstinence among women and an overall rise in drinking frequency. Drinking for intoxication has also remained constant among men and increased among women.

In Finland alcohol drinking is rare among 12-year-olds, but rapidly becomes more common from 12 to 16 years of age. The trend continues thereafter, as most teenagers start to consume alcohol monthly or more often, their drinking frequency increases, and intoxication occurs more often (Ahlström, 1994). It seems that once adolescents begin to use alcohol, they quite rapidly try out all of the more commonly available types of alcoholic beverages. It is alarming that drinking for intoxication among young people has increased during the past decade even though the frequency of drinking has not increased. Drinking patterns seem to be established in early adolescence, years before the legal drinking age of 18 years.

The excessive drinking that occurs in colleges and universities has long been a cause of concern. The existing literature on alcohol use among university students is extensive, especially in the USA. Despite the amount of effort that has been expended in investigating modern-day alcohol use on college campuses, there is a lot of controversy regarding trends (Meilman et al. 1990). University students are within the age range where the heaviest drinking takes place (Schall et al. 1992, Engs & Teijlingen 1997). Binge drinking is associated with diverse negative consequences, including accidents and fatalities, destructive behaviour, such as damaging property and being involved in quarrels or fights, and engaging in

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unplanned sexual activity (Borsari & Carey, 1999). Furthermore, alcohol-related problems often contribute to the discontinuation or considerable delay of university studies.

Finnish university students do not differ from their foreign peers with regard to drinking behaviour. In Nyström's study, the first-year university students drank more, and more frequently and more often for intoxication than other Finns of the same age. He concluded, however, that students' alcohol consumption patterns were mostly established earlier at school (Nyström, 1993b). Parallel drinking habits were also found among first-year university students in Turku (Kunttu, 1997).

Drinking and drug use decrease for most young adults as they mature and assume the responsibilities of adult life (Donovan et al. 1983). Unfortunately, some continue to increase their consumption and develop alcohol dependency. The years at university include many important changes in a young person's life. Growth into adulthood involves assuming new roles and statuses and life situations, such as getting married or having children. Many students go through these stages during their university years.

For the above reasons, and because no reliable information exists about the 'natural history' of problem drinking during the university years, there was a need for this study. One of the purposes of this longitudinal study was to see whether there is a natural process, 'maturation out' of drinking behaviour, which many students have already undergone when entering university. There is some evidence that even a minor intervention could be effective at the early stage of developing alcohol problems. Nyström concluded in his study among first-year students that 3-5% of the female and 5-10% of the male students would benefit from a brief intervention (Nyström, 1993b). However, there is no information available on whether this need increases with the study years. If the drinking patterns remain unchanged throughout the university years, the resources of the Finnish Student Health Service

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(FSHS) could be focused on developing the health check-up applied routinely to first-year students in order to cope with alcohol-related problems. If, on the other hand, the alcohol consumption of students increases, and heavy drinking and drinking for intoxication become more common during the later study years, there is need for a new evaluation of drinking patterns some years later. In that case more attention should be paid to preventive and educational programmes for the students also during their later studies.

Earlier studies have shown that experimenting with most addictive substances occurs in adolescence. There is also substantial evidence of the association between alcohol, drug use and smoking (O'Hare, 1990; Perkins, 1990; Bagnall, 1991; Kandel, 1978). Kandel has conducted several studies on the natural history of drug use, and demonstrated the gateway theory with four stages: legal drugs, alcohol and/or cigarettes, marijuana and other illicit drugs (Raveis & Kandel, 1987; Kandel et al. 1992).

There is considerable controversy concerning the smoking rates in Finland analyzed by age: Having the lowest total smoking prevalence in all the European countries, we simultaneously have almost the highest proportion of young people smoking. University students represent an age group which is somewhere between adolescence and early adulthood. Earlier cross-sectional studies among university students show a decreasing trend in smoking, and university students are known to smoke less than other people of their age (Puska et al. 1972, Helakorpi et al. 1994, Nyström 1993a). Cigarette smoking is considered to be nearly the most addictive of all the substances. This prospective study also tries to find out how persistent this smoking behaviour is among students.

Since the beginning of the 1990s, drug abuse has been on the increase in Finland. Joining the European Union opened the borders and changed the public attitude towards drugs in a more liberal and permissive direction. Although the drug

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problem in Finland often involves mixing drugs and alcohol, cannabis is still the most experimented of all the drugs. The results of several studies indicate that in 1992-1996 the annual relative increase in cannabis use has been 9% for men, 4% for women, and 11% for young adults between 18-29 years of age (Partanen & Metso, 1997). In 1996, two nationwide surveys found the life-time prevalence of cannabis use to be 21% for young men under 30 years. University students are at a risk age as regards drug use. In 1989/1990, 10% of the female and 18% of the male first-year students reported having used cannabis at least once (Nyström, 1993b). These figures are from the years just before the second invasion of drug problems in Finland, and have probably increased with the overall increase in the 1990s. In this study the same students were re-examined in the academic year 1993/1994 to find out about their actual drug involvement and to chart their individual cannabis use during the university years.

REVIEW OF THE LITERATURE

1. ALCOHOL

1.1 Overall history and detrimental effects of alcohol

Alcohol is considered to be the world's oldest narcotic drug. The first mention of wine and beer production goes back to ca. 3000 B.C. in Egypt and Assyria. The medications of that time were produced by utilizing alcohol, but alcohol was certainly drunk also because of its relaxing and inebriating effects. Soon it spread to Greece, Italy and the whole Roman Empire, and in the first millennium A.D. further to Europe. For very long alcohol was obtained only from wine and beer, but in the 12th century distilling was invented and stronger beverages became available. Nowadays, alcohol is the most widely abused drug in the Western world.

The detrimental effects of alcohol can be divided into acute and long-term effects. Acute effects include, among others, being arrested for drunkenness, driving under the influence of alcohol, alcohol-related violent offences, suicidal behaviour, and accidents. The long-term use of large quantities of alcohol causes chronic damage to health, e.g. alcoholism and liver cirrhosis.

Numerous studies have revealed a clear connection between alcohol consumption and its detrimental effects: the higher the consumption level, the more detrimental effects there are (Alcohol Statistical Yearbook, 1994). This correlation is evident from the statistics of alcohol-related mortality. During the economic growth in the 1980s in Finland, alcohol-related deaths increased steadily. The increase was stronger among females and in the 15-29 year age group of males.

Correspondingly, the downturn in alcohol consumption in the 1990s started to decrease alcohol-related mortality (Mäkelä, 1999).

In Finland there are about 2 500 alcohol-related deaths each year, which is about 5% of the total mortality rate. Men are the victims in over 80% of all the cases. Of the fatal illnesses caused by chronic alcohol abuse, the most common is cirrhosis of the liver, and in 1993 there were about 10 deaths per 100 000 persons caused by cirrhosis. In Denmark, where alcohol consumption is the highest in the Nordic countries, 14 deaths were caused by cirrhosis per 100 000 persons. The respective figure for France in 1989 was 21 deaths. In 1993, 337 people died of alcohol poisoning in Finland, 504 were killed in accidents and 555 were killed in a violent incident while under the influence of alcohol.

Hospital statistics provide data on the number of persons treated for alcohol-related diseases and on the number of bed-days. In 1993, hospitals treated over 16 907 cases of alcohol-related diseases, where alcoholism was the most common diagnosis. According to the statistics of the Social Insurance Institute in 1994, alcohol-related illnesses were involved in 3% of all disability pension cases (Alcohol Statistical Yearbook, 1994).

1.2 Alcohol consumption in Finland

1.2.1 Alcohol consumption trends

In 1989, alcohol consumption in Finland was still increasing. The mean annual alcohol consumption was 7.6 liters of pure ethanol per capita. The consumption per capita of Finns legally allowed to purchase alcohol, i.e., of those aged 18 years or over, was 9.9 liters (Alcohol Statistical Yearbook, 1990). In 1990 alcohol consumption reached its peak, 7.7 L of pure ethanol per capita and 10.0 L per

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inhabitant aged 18 years or over. Since then, alcohol consumption started to decline steadily, being 6.6 L per capita, and 8.6 L per inhabitant aged 18 years or over in 1994 (Alcohol Statistical Yearbook, 1994) (Figure 1).

Alcohol consumption is known to be regulated by economic factors. In the 1980s the economic growth in Finland was associated with an increased level of overall consumption, including alcohol consumption. The present prospective study took place specifically during the deep recession (1990-1993) in Finland. The economic slump brought with it decrease overall production, vast unemployment (½ million out of the total population of 5 million), and a decrease in real disposable household income (Alcohol Statistical Yearbook, 1994).

The prices of alcoholic beverages were raised twice in 1991. The consumer prices of alcoholic beverages increased by 8.5%, and when inflation was accounted for, the real prices went up by 4.2% (Alcohol Statistical Yearbook, 1991). Both the recession and the rise in the actual prices of alcoholic beverages brought about a drop in alcohol consumption in 1991 (Figure 1).

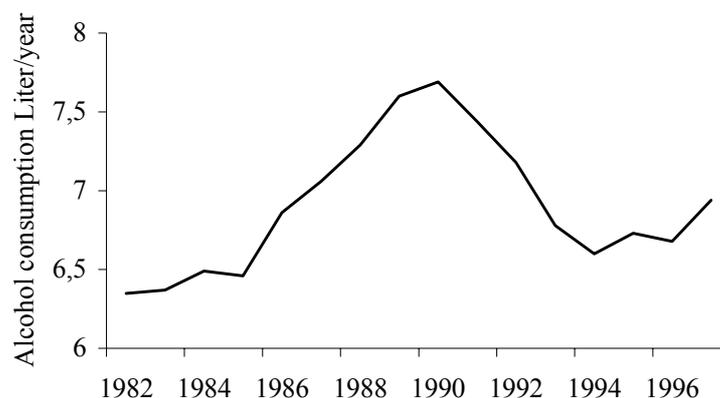


Figure 1. Consumption of alcoholic beverages per capita as liters of pure ethanol 1982-1997 in Finland (Alcohol Statistical Yearbook 1994, Alcohol and drugs 1997)

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Comparing the data of two Finnish Drinking Habit Surveys, in 1984 and 1992, showed changes in drinking patterns since the mid-1980s. The samples represented the Finnish population between the ages of 15 and 69 years. The most general indicators of drinking patterns showed a decline in total abstinence especially among women (from 27% in 1984 to 18% in 1992 among women, and from 12% in 1984 to 10% in 1992 among men), and an overall rise in drinking frequency (Simpura et al. 1993) among both genders and in all age groups.

A somewhat surprising finding, despite the increased consumption of milder beverages, was that drinking for intoxication has remained constant among men and even increased among women. The drinking patterns of women and men have converged over the years, but great differences still remain, for instance in the frequency of alcohol consumption and drunkenness. In 1992, 35% of women and 59% of men drank alcohol at least once a week, and 11% of women and 29% of men got moderately drunk at least once a week (Paakkanen, 1995).

As far as the consequences of alcohol consumption are concerned, gender differences decreased in the case of mild alcohol-related problems, which were rather common (e.g. more boisterous behaviour, regretting something one has done, quarrelling, getting into fights etc.). However, in the case of less common alcohol-related problems (accidents, driving a car under the influence of alcohol) gender differences remained considerable.

Finnish women had also become more tolerant in their attitudes towards alcohol. With the advent of social changes, alcohol has lost its mythical and masculine character in Finland, and alcohol consumption has become part of the life of both sexes. In spite of recent increasing trends in both beer and wine consumption in Finland, alcoholic beverages were typically still not consumed with meals (Simpura et al. 1993). The popular tradition of drinking in connection with sauna had strengthened its position as the most important drinking context.

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Drinking habit surveys from 1968, 1984 and 1992 provided an opportunity to study the advance of supposedly modern drinking patterns in various Finnish socio-economic categories (Simpura & Partanen 1997). The modern drinking pattern was defined as relatively frequent drinking that does not lead to intoxication. In contrast, the traditional drinking pattern was one of relatively infrequent drinking that mostly leads to intoxication. The results showed that traditional drinking, which wasn't very prevalent in the 1960s, has become even more popular than modern drinking in the 1990s. Surprisingly, modern drinking was favoured by the older population, whereas traditional drinking was most prevalent in the younger urban population. Both abstinence and 'intermediate' drinking had declined. The shift towards modern drinking has been very slow, and stereotypical ideas of modern and traditional drinking did not seem to correspond with the changes in empirical drinking patterns.

1.2.2 Alcohol consumption structure

Alcoholic beverages are classified according to the type of product or alcohol concentration: Beer (medium and strong), long drinks, light wines, fortified wines, Eau-de-Vie and other spirits. The favourable development of alcohol consumption from strong beverages to lighter ones continued in Finland in 1989-1994. The consumption of alcoholic beverages by the type of beverage in 1989-94 is shown in Figure 2.

The share of light beverages in the total alcohol consumption grew to 74%, while that of strong beverages went down to 26%. Medium beer accounted for most of the growth in the consumption of alcoholic beverages with a low alcohol content. In 1994, the share of medium beer in the total consumption was almost half of all the alcohol consumed. The consumption of strong beer has continuously decreased:

from 20% to 6% of the total consumption. Light wines have also grown steadily in popularity during the survey.

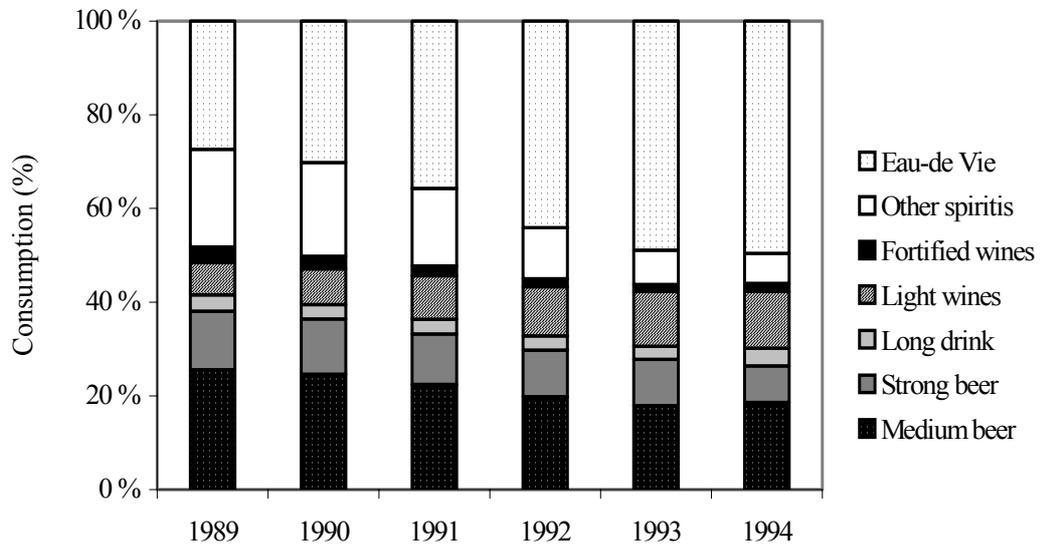


Figure 2 Division of the consumption of alcoholic beverages in Finland by the type of beverage as pure ethanol in 1989-1994 (Alcohol Statistical Yearbook 1994)

1.2.3 Alcohol consumption by region

There has always been considerable geographic variation in the consumption of alcohol per capita in Finland. In 1990 the consumption was lowest in the province of Vaasa (4.6 L/year) and highest in the province of Uusimaa (9.1 L/year). These differences persisted throughout the study period: In 1994 the provinces of Uusimaa and of Lapland had the highest level of alcohol consumption (7.5 L/year) while the province of Vaasa still had the lowest figure (4.3 L/year; Alcohol Statistical Yearbook, 1994).

1.2.4 Undocumented alcohol consumption

The popularity of home-brewed alcohol products increased during the recession, in the latter half of the 1980s. In 1993 21% of women and 31% of men reported that they had drunk home-made beer during the previous 12 months, and home-made wine was reported by 50% of women and 52% of men (Österberg, 1995). It has been estimated that 14 million litres of home-made wine and 12 million litres of home-made beer were produced in 1994. This accounts for about 7% of the overall alcohol consumption. The consumption of 'sahti', i.e. the traditional Finnish home-brewed ale, and illegal spirits 'pontikka', also increased since the mid-1980s. The consumption of home-made beer and wine was more common among younger people (under 35 years of age) and among those with an academic education. The survey in November-December 1995 showed a downward trend in the production and consumption of home-made alcohol, seen most clearly in the production of home-made beer and 'sahti' (Österberg, 1996).

Altogether the undocumented consumption of alcohol, including home-made and illicit products, the alcohol brought into the country by tourists, or drunk by Finnish tourists abroad, and smuggled products, constitutes about 20% of the documented consumption (Alcohol Statistical Yearbook 1994). This consumption is not included in the official consumption figures, which comprise only the consumption through retail outlets and licensed serving. In the 1990s, the opening of the Finnish borders to the east, south and west, and changes in the regulation of tourist imports of alcoholic beverages were the most important factors in the increase of unregistered consumption (Simpura et al. 1997).

1.3 Young people and alcohol

1.3.1 Young people and alcohol in Finland

Since 1977 there has been a regular nationwide survey, the Adolescent Health Habit and Life-Style Survey, which periodically measures health risk behaviours among youth in Finland. The data are based on questionnaires sent every second year to representative nationwide samples of school children aged 12-18 years. In addition to alcohol consumption, the survey focuses especially on young people's smoking, eating and physical exercise habits and their changes. Salme Ahlström (1994) describes the changes in the young people's drinking habits in 1977-93 as follows. Drinking habits remained unchanged in 1977-93. Drinking alcohol was uncommon at the age of 12 years but increased considerably between the ages of 12 and 16. Three out of four 12-year-olds, almost a half of 14-year-olds, and one out of ten 16-year-olds hadn't drunk any alcohol yet. Thereafter, a growing number of young people began to drink alcohol monthly or more often, the drinking frequency rose and intoxication became more common. There was no significant gender difference in the age of first debut. The development of the trends seen among the adolescents was in accordance with the general developments concerning alcohol consumption and attitudes about alcohol in Finland. The use of alcohol by adolescents increased strongly after the mid-1980s, at a time when the purchasing power of the population increased rapidly relative to the price of alcohol. In 1991-93 the rise in drinking frequency settled and the proportion of those drinking weekly fell slightly. During the economic recession one could nevertheless have expected a greater decrease in the number of those who drink fairly often. The data also showed that young people, once having started drinking, quite soon started to experiment with all the main types of alcoholic beverages. Even though beer seemed to be popular among young people, it didn't replace other alcohol beverages; instead the increase in beer drinking augmented the more frequent

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adolescent use of alcohol. The most important finding of the study was the marked rise in heavy drinking throughout the 1980s, and this trend also continued in 1991-93. The proportion of 14-18-year-old girls who get completely drunk at least once a month was three times greater in 1993 than in the early 1980s. For boys of the same age, the figure was almost two times greater in 1993 than in the early 1980s. Such a remarkable increase in heavy drinking among 18-year-olds and younger people is a serious social problem. After the economic recession, the drinking frequency of young people has turned upwards again: Alcohol consumption on a weekly basis and also drinking for intoxication have increased among young people of both genders between 1993 and 1997 (Rimpelä et al. 1997).

The importance of intoxication for young people was also seen in the 1992 Finnish Drinking Habit Study (Holmila, 1995). Young people drank alcohol mainly to get drunk. This cultural feature has not lost its prominence along with the increase in the annual per capita consumption. 12% of women and 42% of men in the age group of 15-19-year-olds usually drank at least seven units of alcohol on one occasion. Even though some young people drank irregularly, less than once a month, they drank enough to get drunk, i.e. at least 7 units at a time (4% of females and 8% of males). 9% of 15-19-year-old boys got intoxicated at least twice a week, and every fourth boy 2-4 times a month. Getting drunk when drinking was less common among girls than among boys, 1% of 15-19-year-old girls got drunk at least twice a week, and 7% of them 2-4 times a month. Another study among 15-year-old school children didn't show any gender differences in the frequency of intoxication (Ahlström et al. 1996). The importance of intoxication for young people was also documented in a study of Simpura (1993), in which both girls and boys between the ages of 15-19 years drank so much during about half of their drinking occasions that their blood alcohol level exceeded 1 promille.

1.3.2 The drinking habits of young people in Finland compared to those in other European countries

The comparisons of young people's drinking habits are based on the 1995 ESPAD (The European School Survey Project on Alcohol and Other Drugs) report which was successfully carried out in 26 European countries (Hibell et al.1997). The target population of the surveys in each country was composed of students born in 1979, so that they were 15-16 years old when the data collection took place in the spring of 1995. In addition to the data on these 26 countries, some other comparable study results from France, Greece, Spain and USA are also included in this overview.

Table 1 shows that a large majority of the students in all countries had drunk an alcoholic beverage at least once in their lives. In their life-time alcohol use Finnish students (89% of girls and 88% of boys) didn't differ from the others. The highest life-time prevalences were in the Czech Republic, Denmark and the Slovak Republic, with a percentage over 95%, and the lowest in Turkey (61%), Faroe Islands, Iceland, Norway and Portugal with 79% in each. In the proportions of students who had been drinking alcohol 40 times or more Finnish adolescents were close to the average (16%, versus 49% in Denmark and 8% in Norway). However, in Finland the proportions for both genders were equal, while in the other countries they generally were higher among boys.

In most countries a large majority of the students had consumed alcohol during the past 12 months, and Finland didn't differ from the other European countries in this respect. However, while in most countries the proportions were equal for both genders or higher among boys, in Finland the girls were in the majority (85% for girls versus 83% for boys). This phenomenon was also seen in the proportions of the students who said that they had been drinking alcoholic beverages 20 times or more during the past 12 months. These percentages for Finnish girls (14%) and

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boys (10%) as compared to other European countries were nevertheless rather low. The highest values were in Denmark (42%), Ireland and the United Kingdom (32%), and the lowest in Lithuania and Norway (7% in both), Turkey (8%), Ukraine, Estonia and Slovenia (9 in each).

Table 1. Frequency of lifetime use of any alcoholic beverage (The 1995 ESPAD report)

	Number of occasions in lifetime*				Number of occasions used in last 12 months*			
	0	1-5	20-39	40+	0	1-5	20-39	40+
Croatia	18	37	8	14	30	53	5	5
Cyprus	10	22	13	32	15	33	10	14
Czech Republic	3	19	15	32	9	38	11	13
Denmark	4	8	18	49	6	18	19	23
Estonia	7	33	12	13	15	49	6	3
Faroe Islands	21	13	11	26	30	25	11	7
Finland	11	22	18	16	15	37	10	3
Hungary	9	34	10	15	20	46	6	6
Iceland	21	29	11	14	28	34	7	4
Ireland	9	17	16	34	14	12	15	17
Italy	12	24	12	26	17	35	10	10
Lithuania	5	33	11	12	13	54	5	2
Malta	8	18	16	34	11	31	13	14
Norway	21	32	10	8	28	39	5	2
Poland	8	34	10	18	20	45	6	5
Portugal	21	28	9	15	26	43	5	5
Slovak republic	4	30	13	19	15	48	5	6
Slovenia	13	36	9	14	27	43	4	5
Sweden	11	27	15	16	18	39	7	4
Turkey	39	31	5	10	49	30	4	4
Ukraine	13	28	11	14	21	43	5	4
United Kingdom	6	12	18	42	10	24	16	16
Latvia	7	28	14	16	13	47	6	4
France	22	-	-	-	-	-	-	-
Greece	5	17	17	35	9	31	13	11
Spain	18	-	-	-	-	-	-	-
USA	30	24	9	15	37	33	6	5

* Percentages are based on students answering the question

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The most frequent (10 times or more) alcohol consumption during the past 30 days was reported by Malta (16%), Denmark (15%), Italy and the United Kingdom (13% in both). The lowest percentages were in Finland (1%), Sweden, Norway, Iceland, Lithuania and Estonia, all with a percentage of 2% or less.

It is not uncommon among students in this age group to drink alcohol to the point of intoxication. For some this happens once or twice, more or less accidentally. Table 2 shows students' frequency of being drunk in different countries. Finland, with the life-time prevalence of 75% of intoxication, was one of the countries with the highest prevalence. It was even higher in Denmark (84%) and the United Kingdom (78%). The experience of drunkenness was much less frequent in Turkey (29%) and Portugal (36%). The proportion of students who had been drunk 20 times or more in their life-time was also one of the highest in Finland (28%). Only Denmark had a higher percentage (32%). In general, in the Nordic countries (except Norway) more students reported having been drunk this often, while this behaviour was reported less frequently in southern Europe. In most countries more boys than girls have been intoxicated at least 20 times, except in Finland where 30% of the girls and 26% of the boys gave this answer. The results were very similar regarding the proportions of students who had been drunk 10 times or more during the past year. The 30 days' prevalence rates of drunkenness also reflected this drinking behaviour. Finland was one of the top countries for frequent intoxication: 18% of all students had been drunk 3 times or more during the past 30 days. Only Denmark (21%) and the United Kingdom (22%) had higher proportions.

Finnish adolescents also experienced their first intoxication quite early in life. 35% of them reported that they were 13 years or younger at the time of their first intoxication. Only the United Kingdom (40%) and Denmark (39%) had again higher proportions. Countries where this was least common were the Ukraine (5%), Turkey (6%) and Hungary (8%).

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In Finland, the most commonly reported drinking places were someone else's home (41%) and the street, park or beach (30%). Finland got the highest scores for this alternative. 'At home' was most commonly reported in Croatia, Estonia, Italy Poland, Portugal, the Slovak Republic, Slovenia, Sweden, Turkey and the Ukraine. The disco had the top position as a drinking place in Cyprus and the Czech Republic and a bar or pub in Ireland.

Table 2. Frequency of being drunk, both genders (The 1995 ESPAD report)

	Number of occasions in lifetime*			Number of occasions in last 30 days*	
	0	0-1	20+	0	3+
Croatia	55	22	4	87	4
Cyprus	58	27	2	90	2
Czech Republic	35	23	11	69	9
Denmark	16	12	32	42	21
Estonia	42	25	7	80	4
Faroe Islands	43	11	20	66	11
Finland	25	10	28	49	18
Hungary	49	22	8	80	5
Iceland	36	13	19	54	14
Ireland	33	14	19	58	15
Italy	55	22	4	81	8
Lithuania	30	25	9	65	9
Malta	55	23	4	86	4
Norway	47	14	9	70	8
Poland	44	23	9	77	7
Portugal	64	19	2	89	3
Slovak republic	45	24	6	81	4
Slovenia	46	23	7	79	7
Sweden	32	14	19	59	13
Turkey	71	16	3	89	4
Ukraine	55	28	2	87	2
United Kingdom	22	15	28	52	22
Latvia	42	27	5	80	5
France	66	18	-	-	-
Greece	53	20	3	84	6
Spain	-	-	-	-	-
USA	53	17	9	79	7

* Percentages are based on students answering the question

1.4 Drinking habits of university students

There are numerous studies on students' alcohol drinking patterns. Most of them come from North America, especially the USA where studies on alcohol drinking patterns among college students have been carried out quite regularly since the late 1940s. Most of them are cross-sectional; only a few longitudinal studies are available. Throughout the decades, the surveys of drinking behaviour have revealed extensive use of alcohol among college students (Straus & Bacon, 1953; Wechsler & McFadden, 1979). Particularly notable has been the persistent high rate of heavy drinking among this population. In 1977, Wechsler and McFadden, in a study of over 7000 students at 34 New England colleges, found that 30% of the men and 13% of the women were 'frequent heavy' drinkers. When the same postal survey was carried out 12 years later at Massachusetts colleges (Wechsler & Isaac, 1992) the proportion of 'frequent heavy' drinkers remained constant (31% of men and 14% of women). These students got intoxicated more often and were more motivated to drink to get drunk. Among men 25% of the 1977 sample reported getting drunk one to three times per month, whereas in 1989 41% had been drunk one to three times per month. For women the respective percentages were 14% in 1977 and 37% in 1989. The proportion of students who reported 'getting drunk' as a reason for drinking was two to three times higher in 1989 than in 1977. The proportion of abstainers increased in 1989 as compared to 1977 (from 3% to 9% among men, and from 4% to 15% among women). This increase appears to have resulted largely from the disappearance of 'frequent light' drinkers (14% of men and 16% of women in 1977 vs 2% and 1% in 1989, respectively).

Although the existing literature on alcohol use among university students in the USA is extensive, there is considerable controversy regarding trends during the decades. According to some studies (Blane & Hewith, 1977; Wechsler & McFadden, 1979) there has been an upsurge in college drinking during the past

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several decades, but some other studies (Engs, 1977; Lavin, 1980) have not found this to be the case. Meilman (1990) carried out a trend study in which he paid special attention to the methodological problems of research. In his study there was a very high response rate (87%) and it was randomly selected, representing 10% of the enrollment of the undergraduate college in 1987 in New England. The subjects ranged in age from 17 to 22 years. As a model of a trend study he compared his data to those of Wechsler et al. in 1977 and of Stone in 1983. All three surveys used a random sampling procedure and the data were collected from the same college campus. In Meilman's survey 97% of the students had used alcohol in the past year. The majority of students drank once a week or more but less than daily, and just under 5% drank daily or almost daily. A comparison of Meilman's study with the earlier studies conducted on the campus points to a consistent decline in the daily or almost daily use of alcohol over a 10-year period, especially among men.

All three observation time points showed that women drank less often than men, who in 1987 drank on a daily or almost daily basis at a rate more than four times that of women. The gender difference was also confirmed by Perkins (1992) in a 10-year study of the trends of collegiate alcohol abuse. Meilman's study showed no differences by age or class. As compared to the USA population, alcohol consumption appeared to be more evenly distributed in the college sample but, still, most of the drinking was done by one-fifth of both groups. Parallel results were found in a more recent study among the general population, where 20% of the drinkers accounted for 87-89% of the nation's total self-reported alcohol consumption, and where young adults aged 18 to 29 years accounted for 45% of the overall adult drinking (Greenfield & Rogers, 1999). However, the distribution data showed that 25% of the university students drank one drink or less per week, which was contrary to the popular view among students that almost 'everyone' drank to excess.

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The same decreasing trend was found also in a more recent study by Meilman et al (1997): 44 433 students at 105 college campuses reported the average number of drinks they consumed per week. The survey was carried out between October 1994 and June 1996. The majority of students reported that, on an average weekly basis, they consumed little or no alcohol. 48% of the students at 2-year schools and 38% of the students at 4-year schools reported consuming no alcoholic drinks per week. The percentage of students who consumed large amounts of alcohol was relatively small. Approximately 10% of the students reported that they consumed 15 or more drinks on an average weekly basis. This finding did not negate the difficulties associated with the sporadic binge drinking of otherwise light drinkers, nor did it negate the fact that the vast majority of students consume alcohol when the reporting period is extended to include the previous year or month. However, the findings added a new perspective to the overall picture, and demonstrated to the students that the consumption levels were lower than they generally believed them to be.

In 1993 Wechsler et al. carried out a large national survey on 17 592 students at 140 American colleges. The study examined the extent to which background factors, previous experience with alcohol, status in school, attitudes about drinking, involvement in college activities, and participation in other high-risk behaviours other than binge drinking, are related to binge drinking (Wechsler et al. 1994). 45% of the sample was under 21 years of age, 38% 21-23 years, and 17% 24 years or more. This study took into account gender differences in body mass and ethanol metabolism and used a sex-specific definition of heavy or binge drinking: Five or more drinks in a row for men and four or more drinks in a row for women over the past two weeks. 50% of the men and 39% of the women were classified as binge drinkers.

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The same percentages were obtained by Canterbury et al. in their study among first-year college students at the University of Virginia (Canterbury et al. 1991). Time comparisons to the studies in 1977 and 1989 show an increasing rate of heavy drinking (Wechsler et al. 1994). Prior binge drinking in high school was crucial, suggesting that for many students binge drinking begins already before college. The strongest predictors of college binge drinking were residence in a fraternity or sorority, adoption of a party-centered life-style, and engagement in other risky behaviour (marijuana use, cigarette smoking, sexual activity). There was no relationship between year in college, with rates of binge drinking being virtually identical among students across the years of college attendance. Binge drinking was related to age: Students of the predominant college age group (17-23 years) had much higher bingeing rates than older students. However, within the predominant college age group, students who were younger than the legal drinking age of 21 years didn't differ in bingeing rates from students aged 21 to 23 years. According to this study the most important public policy on drinking for the traditional-age college student, i.e. the legal minimum drinking age, appears at present to be largely ineffectual.

These findings point to the difficulty of reducing binge drinking and associated health problems. Among the more serious alcohol-related problems, the frequent binge drinkers were seven to 10 times more likely than the nonbinge drinkers to engage in unplanned sexual activity without protection, to get into trouble with campus police, to damage property, or to get hurt or injured. There was also a positive relationship between binge drinking and driving under the influence of alcohol. Women who typically drank four drinks in a row (definition of female binge drinking) were found to have roughly the same likelihood of experiencing drinking-related problems as the men who typically drank five drinks in a row (Wechsler et al. 1995).

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The same questionnaire included two questions which enabled to determine the students' involvement in athletics. The students were divided into three groups on the basis of their involvement in athletics: involved, partly involved, and not involved (*ibid.*). About one third of the subjects were at least partly involved in athletics. The survey results indicate that the students involved in college athletics engaged in binge drinking more often than the students not involved in athletics: 61% of the men involved in athletics engaged in binge drinking, 55% of those partly involved and 43% of those not involved were binge drinkers. Among women the proportions were 50%, 46% and 36%, respectively.

Schuckit et al. (1994) compared changes in alcohol and drug use and associated problems in young men on the same college campus between 1980 and 1992. Over 90% of both samples had some experience with alcohol within the past 6 months. There was a significant decrease in the consumption frequency among drinkers (from 8.8 days per month in 1980 to 6.1 days per month in 1992). However, the quantity of alcohol consumed per occasion and the prevalence of alcohol-related problems increased significantly during those 12 years.

O'Hare (1990) studied 606 undergraduate students in 1989 and got somewhat different results: 19% of the respondents were abstainers while 19% were considered heavy drinkers (O'Hare 1990). In this sample women constituted half as many heavy drinkers as men, but reported an equal amount of alcohol-related problems. There was no difference in mean alcohol consumption between those who were of legal drinking age (21 years) and those who were not. Male students were much more likely than women to have experienced negative consequences of drinking in a study by Perkins (1992). However, regarding the type of negative consequences which were less public and less prone to evoke legal action (e.g. unintended sexual activity, memory loss, damaged friendship, physical injury to self) there were no gender differences. Negative consequences that were more

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public and might involve legal repercussions or damage, or endanger others, remained a largely male phenomenon (*ibid.*).

Gender and age differences were also analyzed in the study of Gross (1993) on 270 undergraduate students at a large midwestern university in the USA. In his study men reported significantly greater alcohol consumption than did women. Women under legal drinking age (21 years) had higher rates of consumption than women of legal drinking age or older, while the opposite pattern was found for men. These results suggest that the amounts of alcohol consumed by men begin at a high level and increase over time, while the amounts of alcohol consumed by women may begin high (although not as high as for men) but eventually drop to lower levels.

Crowley (1991) analyzed differences in drinking patterns between college students and youth of the same age who were not enrolled in school. In this study, college students were more likely to use alcohol but tended to drink a smaller quantity per drinking day than nonstudents of the same age. Sex differences were smaller among college students than among other groups, especially in the proportions of abstainers. Age had hardly any relationship to alcohol use. Apparently, regardless of legal restrictions, most young people had started drinking before age 19, and there was little or no increase in the prevalence of alcohol use after the age of 21. The quantity of alcohol consumed per occasion declined with age, except among high school dropouts.

Previous studies have shown that there are large differences in alcohol drinking patterns in different cultures. One interesting comparison was made by Nagoshi et al. (1994) in a study analyzing American and Japanese alcohol use, alcohol norms, expectancies, and reasons for drinking among university students. The Japanese are known to have lower levels of alcohol use and alcoholism; this has been thought to be due to the genetic inheritance of a low aldehyde dehydrogenase level, causing facial flushing after alcohol use in afflicted individuals. Among these two different

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student cultures there were no significant differences in the frequencies of abstainers, former drinkers and current drinkers. However, the American students in this study began regular alcohol use at a significantly younger age, currently drank more alcohol, and had higher alcohol expectancies for emotional responses than their Japanese counterparts.

American drinking patterns of college students have also been compared to those of Polish university students (Engs et al. 1991). This study on 3375 American and 1408 Polish university students tested the hypothesis that cultural differences influence drinking patterns. Using the same questionnaire in both samples, the results revealed that significantly more drinks per week were consumed by both Polish male (25) and female (15) students compared to American male (15) and female (8) students. Cultural differences were also seen in beverage preferences: Significantly more wine was consumed by the Polish than the American students. American female students consumed more beer than Polish female students. There was no difference in the consumption of beer and spirits between the American and Polish male students. Polish students also tended to consume more alcohol in their later study years than during the first years at college.

The results of a Canadian study (Swenson et al. 1994) were similar to those of recent studies on college students in the United States: Nearly 90% of the students reported having had at least one drink within the past year. In this study the students didn't seem to consume very large amounts of alcohol. Compared to other Canadians aged 20 to 24 years, slightly fewer students had drunk during the past year and also during the past week. Men and women were almost equally likely to consume alcohol occasionally, but men were more likely to have consumed alcohol during the past week and to be moderate and frequent consumers of alcohol. Older men and women (22 years or older) reported frequent drinking significantly more

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often than their younger peers. Older men were much more likely than older women to consume alcohol frequently (four to six times per week).

It seems that the increasing alcohol consumption among young people is a worldwide problem. This increase has also been noted among university students in the United Kingdom, where Ashton & Kamali (1995) compared the results of alcohol and drug usage in 1983-1984 (Golding & Kornish, 1987) and in 1993-1994. The studies were limited to medical students and the sample sizes were small. Webb et al. (1996) carried out a larger, nationwide study (3075 university students from different faculties) in which alcohol and drug use was studied. 11% of both women and men were non-drinkers. Among drinkers, 61% of the men and 48% of the women exceeded 'sensible' limits of 14 units per week for women and 21 units for men. Hazardous drinking (36 units per week for women) was reported by 10% of the women and (51 units per week for men) 20% of the men. Binge drinking was declared by 31% of the men and 24% of the women. The most prominent reason for drinking was pleasure. Comparison to an earlier study by West et al. (1990) confirmed the increase in alcohol consumption. In their study only 21% of female and 38% of male students exceeded these limits for 'sensible' drinking. The percentages of non-drinkers didn't differ much from those reported by Webb (14% of female and 12% of male students).

Of the Scandinavian countries, Sweden and Finland have many cultural and geographical similarities. They have also had special control policies for alcohol consumption via the state alcohol monopolies. Therefore their alcohol drinking patterns also resemble each other. A study on the drinking patterns of Swedish students was carried out in 1991 at the University of Uppsala (Sundbom 1992). 95% of the students reported at least some alcohol use during the past year. Alcohol use was assessed as mean weekly consumption. The mean weekly consumption as 40% alcohol was 36 cl (47cl for male and 25cl for female students).

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The consumption was highest among the youngest male students (25 years or under) and the oldest female students (31 years or over). The mean weekly consumption of female students was biased because of a few female heavy drinkers. The younger students (18-29 years) consumed more alcohol per week (38cl) than the non-student population of the same age (31cl). In the age group of 30-49 years there was no difference in alcohol consumption level (28cl per week), but the students preferred wine whereas the others preferred spirits. Heavy drinking was defined as at least 75cl of 40% alcohol for men and 50cl for women during the previous week. Totally 18% of all the students were heavy drinkers (21% of the male and 15% of the female students). Heavy drinking was most prevalent among the youngest age group (25 years or under) in both genders. The percentages of heavy drinkers in all student age groups were higher than those of the non-student population. Binge drinking 2-4 times per week was reported by 2.5%, once a week by 12%, 2-3 times per month by 17%, once a month by 16%, 2-6 times a year by 23% and never by 29%. Binge drinking was more prevalent among male and younger students.

A Norwegian study on hazardous drinking among medical school students (Tyssen et al. 1998) showed somewhat lower rates for binge drinking. The study was carried out in 1993 and included both junior and senior students (N=901). Binge drinking once a month was reported by 13%, 2-3 times per month by 9%, once a week or more often by 5% of all students. The percentage of those who never drank to intoxication was 31%, about the same as in the Swedish study.

When the junior and the senior groups were analyzed separately, significant gender differences were found within both groups, but no significant differences between juniors and seniors. In 1997 a study on the alcohol and drug use of Norwegian students was carried out in Oslo on 3000 university students aged 20-35 years (Mogård 1999, Amundsen & Fekjaer, 1998). In this study the mean alcohol

consumption of female students, as pure ethanol, was 4.0 L/year and of male students 7.4 L/year. 4% of both genders were abstainers. Relative to their body mass, female students drank as much as their fellow male students. After their mid-twenties female students drank less than the younger ones. The oldest male students consumed the most alcohol.

1.4.1 Longitudinal studies

Despite the increasing concern about alcohol use among youth, little is actually known about the continuity of problem drinking through adolescence and young adulthood. Do most adolescent problem drinkers 'mature out' from this pattern of behaviour as they grow up or do they continue to misuse alcohol as young adults? Such knowledge would be useful for planning prevention programs targeted at those adolescents with the highest risk for drinking problems later on in young adulthood.

Although there have been many longitudinal studies on problem drinking (Fillmore 1974 and 1988, Robins 1978, Vaillant 1980) most of them either had no data or only incomplete data on the adolescent drinking and problem drinking of the participants, or else they followed up the adolescents only when they were well beyond their mid-twenties or later. None of these studies dealt directly with the question of the stability-instability of problem drinking between adolescence and young adulthood. Donovan et al. (1983) were the first to carry out a follow-up study examining involvement in problem drinking at two time periods in the lives of young persons, first in adolescence or at college-age, and second, in young adulthood. They sought to identify those psychosocial and behavioural factors in adolescence that may be predictive of the later drinking pattern during the late twenties. This study was based on two parallel prospective longitudinal studies, one

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initiated in 1969 in cohorts of 7th-, 8th-, and 9th-grade adolescents at school, and one initiated in 1970 in a sample of college freshmen. The data included numerous psychosocial and behavioural measures designed to test a social-psychological theory of adolescent problem behaviour. In 1979, after a 7-year interval for the high-school sample and a 6-year interval for the college sample, a further follow-up of the participants was initiated. This involved the location and testing of the former participants in the high-school sample, now aged 23-25 years, and the former participants in the college sample, now aged around 28 years. The follow-up questionnaire assessed most of the variables that had been assessed earlier. Problem drinking was operationally defined in terms of both frequency of drunkenness and frequency of negative personal and interpersonal consequences due to drinking.

With regard to the stability of adolescent problem drinking over time, the modal tendency was in the direction of noncontinuity: a majority of the 1972/73 problem drinkers were classified as nonproblem drinkers in 1979 as young adults. Of the adolescent problem drinkers 53% of the high-school-sample boys and 70% of the high-school-sample girls were nonproblem drinkers in 1979. Of the college sample 50% of the male former problem drinkers and 80% of the female former problem drinkers were nonproblem drinkers in 1979. Most of the high-school adolescents and the college youth appeared to have 'matured out' from their earlier problem drinking by their middle or late twenties. The data suggested, however, that there was an important gender difference in the continuity of problem drinking; the young men had a greater risk for later problem drinking than the young women.

The findings for the adolescent problem drinkers were in contrast to the findings for the adolescent nonproblem drinkers. Nonproblem drinking was by and large a more stable behavior pattern than problem drinking between adolescence and young adulthood: Of the high-school sample 59% of the boys and 76% of the girls, and 78% of the male and 90% of the female college students, who were adolescent

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nonproblem drinkers exhibited a similar drinking pattern in 1979. There were also both gender and sample differences in the stability of nonproblem drinking over time. In the high-school sample, 38% of the male nonproblem drinkers, in contrast to 15% of the female nonproblem drinkers, had become problem drinkers by young adulthood; in the college sample, 21% of the male non-problem drinkers and 8% of the female nonproblem drinkers had become problem drinkers by 1979. The men were thus 2.5 times more likely than the women to have shifted from a nonproblem drinking status in 1972/73 to a problem-prone style of drinking in 1979. The high-school-sample nonproblem drinkers were more likely than the college-sample nonproblem drinkers to be problem drinkers in 1979. The difference between the younger high-school and older college samples may be a developmental one: In 1979 the high-school cohorts, aged 23-25 years, were still in the midst of a high-risk period for drinking-related problems, whereas by 1979 the college sample had already developed beyond the high-risk period to the age of 28, at which 'maturing out' may already have taken place.

Chen and Kandel (1995) followed their target population even further, up to the age of 34-35 years. Their study also confirmed that the major risk period for initiation into alcohol is mostly over by age 20. Following a sharp increase during adolescence, alcohol use stabilized in the late teens and declined slightly in the late twenties. The periods of highest alcohol use peaked in early adulthood, from ages 19 to 21. About 12% of all drinkers drank at least four times a week, and this proportion remained essentially the same from the age of 19 onward through the mid-30s. By contrast, the proportion of heavy users declined by about 50% during the 10-year interval. Among alcohol drinkers, the proportion of those drinking five or more drinks at a sitting fell from 34% to 22%.

Perkins (1997) used a cross-sectional and longitudinal database in 1982-1991 to study alcohol consumption and drinking motivation in college and subsequent

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postcollege contexts. Moving from college to the stages of postcollege young adulthood was associated with a substantial decrease in alcohol consumption and related problems. There were no meaningful gender differences in the proportion of persons who drank alcohol, but also in this study men drank more frequently and in greater quantities. Drinking for stress reduction became increasingly prominent as the primary motivation for the drinking in postcollege life.

A British longitudinal study provided data on alcohol drinking in early adulthood (at age 23 years) and examined the relationship between drinking at this age and drinking in teenage years (16 years) (Ghodsian & Power 1987). A comparison of drinking behaviour at the two ages showed that those who drank most and more frequently at the age of 16 were the most likely to drink heavily at 23 years. This association was evident among both men and women. At age 23, a greater percentage of women (28%) compared with men (9%) didn't drink at all or drank only on special occasions. 12% of the men consumed more than 50 units of alcohol per week at the age of 23, and 2% of the women more than 35 units; the levels of intake were defined as heavy consumption.

This association between the frequency of drinking at ages 15-16 and 24-25 years was not, however, found in another study in the United Kingdom. In this longitudinal study among Scottish adolescents and young people the majority of 24-25-year-olds consumed alcohol at least once a month, whatever their reported frequency of consumption was at age 15-16 (Bagnall 1991). This was true for both females and males. For both males and females approximately 90% of the heaviest drinkers at age 15-16 were light or moderate drinkers at the age of 24-25 years. None of the female heavy drinkers and only 8% of the male heavy drinkers at age 15-16 were still heavy drinkers at age 24-25. The proportions of respondents in each of the drinking categories were similar in these two studies. At age 24-25, about one fourth of the male and female respondents were light drinkers. A higher

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percentage of male respondents were 'medium' (49% versus 45%) and 'heavy' (8% versus 3%) drinkers. The Scottish study found no association in the experience of alcohol-related consequences at these two time points.

One of the very few longitudinal studies of university students' drinking behaviour was conducted by Wechsler et al. (1994). This study surveyed a cohort of 611 college students during their first and second year of college in order to examine the development of alcohol use behaviours in college. Almost every student who used alcohol during the first year continued to do so during the second year. Similarly, most of the first year binge drinkers (78.4 % of men and 63.5% of women) continued binge drinking in the second year. One-third of the male freshmen who had not binged during the first year started this behaviour in the second year, although relatively few female freshmen did so. Compared to continued users, the students who started alcohol use during their second year were light users. The continuation of heavy drinking from the first to the second year of college builds up a pattern that began in high-school or earlier: 76% of the male and 59% of the female first-year binge drinkers reported usually drinking four or more drinks in high school. These results showed that heavy alcohol use is not predominantly a behavior that is learned in college.

1.4.2 Alcohol consumption of Finnish university students

There are a few cross-sectional studies on the alcohol drinking patterns of Finnish university students, but no longitudinal studies so far. The consumption of alcoholic beverages among university students in Finland at different time periods is presented in Tables 3 and 4.

Table 3. Annual frequency of drinking beer and wine, female and male university students in Finland (Annual report of the FSHS)

Female students	1969*	1979a	1979b	1983**	1987**
Never	15,7	15,7	9,5	14,4	9,9
Seldom	17,3	42,8	35,6	48,5	51,1
A few times a month	54,4	34,9	42,7	31,5	33,6
A few times a week	12,6	6,6	12,2	6,0	5,4
<hr/>					
Male students					
Never	6,9	10,4	9,4	13,4	10,4
Seldom	6,9	29,3	24,8	31,3	35,7
A few times a month	58,8	42,4	39,2	40,5	42,9
A few times a week	27,4	18,0	26,6	14,8	11,0

Table 4. Annual frequency of drinking strong alcoholic beverages, female and male university students in Finland (Annual report of the FSHS)

Female students	1969*	1979a	1979b	1983**
Never	29,9	21,4	15,4	20,2
Seldom	61,4	64,1	65,9	64,2
A few times a month	7,1	13,7	18,1	15
A few times a week	1,6	0,6	0,6	0,8
<hr/>				
Male students				
Never	13,7	14,2	13,0	13,4
Seldom	63,8	58,5	54,3	55,0
A few times a month	17,6	25,8	29,6	27,2
A few times a week	4,9	1,5	3,1	1,6

* only beer, 231 students from the University of Turku (Puska et al. 1972)

a) 8124 Finnish University freshmen (Tuori & Peräsalo, 1984)

b) 1321 Finnish students in their third year of studies (Tuori & Peräsalo, 1984)

** 6251 university freshmen from Helsinki, Turku, Tampere and Espoo

In 1969, Puska et al. (1972) studied the alcohol consumption of a matched control group of non-students but found no clear difference in the total alcohol consumption between the two groups. Male students seemed to drink more frequently than female students, but the sex difference was smaller among the students than in the control group. Tuori & Peräsalo (1984) compared the drinking patterns of first-year students (1979/1980) to those of third-year students (1976/1977 and 1978/1979). The consumption of light beverages increased during the first three years of studies. The percentage of female abstainers fell from 16%

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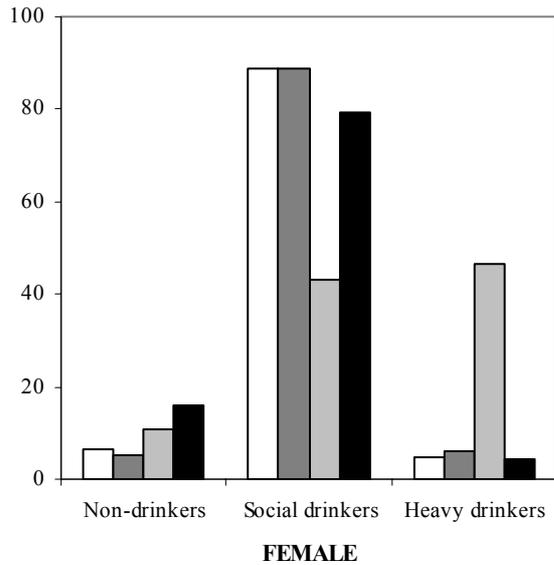
to 10%, and the proportion of male abstainers stayed unchanged, around 10%. Also binge drinking increased slightly. The gender differences in bingeing were greater than in drinking frequencies; 1% of the first year female students and 7% of the male students, and 2% of the third year female students and 11% of the male students bingeed at least once week.

Even though these figures have been collected in different ways, some conclusions can be drawn of the trends in alcohol consumption. Between 1969 and 1987 there has been a slight increase in the percentage of male abstainers, some decrease in the percentage of female abstainers and in drinking frequencies. The drinking patterns of university students have nevertheless remained consistent.

Nyström's (1992a) study among first-year students showed an increasing tendency in binge drinking: 6% of female and 21% of male students in 1989/1990 reported that they had bingeed at least once a week. The percentage of abstainers had decreased to 6.5% among female and to 5.1% among male students.

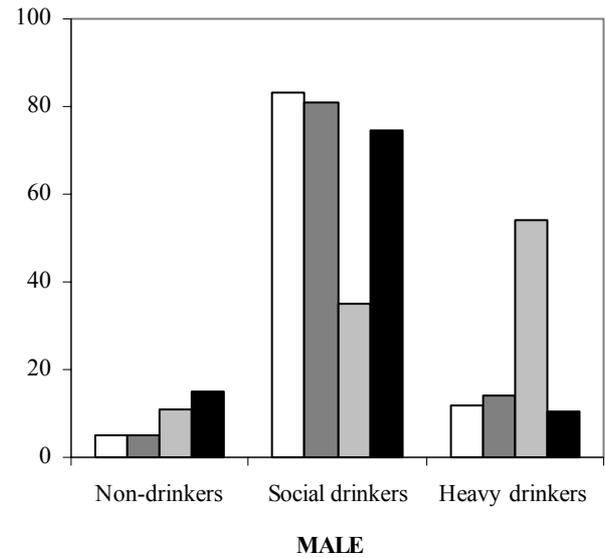
The proportions of abstainers were low in all countries (Figures 3 and 4). Heavy drinking was classified according to the same criteria in all countries; it was defined as exceeding 14 units of alcohol per week for women and 21 units for men. The Finnish and Swedish consumption levels were almost identical, and the American results were also very similar. The only exception was the United Kingdom, having a very high percentage of heavy drinkers among both genders. This result may partly be due to a lower alcohol unit size in England, but on the other hand, the unit size in Scotland was closer to that of the other studies in the comparison. It is to be noted that 10% of the women and 20% of the men in the British study exceeded the limit for hazardous drinking (36 or more units per week for women and 51 or more for men).

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- Finnish first-year university students (Nyström 1993)
- Swedish university students (Sundbom 1992)
- British college students (Webb et al. 1996)
- American college students (Meilman et al. 1997)

Figure 3. Proportions of female students falling into various categories of alcohol consumption in Finland, Sweden, the United Kingdom and the USA.



- Finnish first-year university students (Nyström 1993)
- Swedish university students (Sundbom 1992)
- British college students (Webb et al. 1996)
- American college students (Meilman et al. 1997)

Figure 4. Proportions of male students falling into various categories of alcohol consumption in Finland, Sweden, the United Kingdom and the USA.

Binge drinking among university students seems to be a common phenomenon in most of the countries (Figure 5). The British study showed only a percentage for overall binge drinking (as demonstrated by the proportion of occasional binge drinking), without any classification of the frequency. In this study 'binge drinking', defined as drinking over half of the 'sensible' number of units per week (1-14 units per week for women and 1-21 for men) in one session differed from that in the other countries, where it was defined as drinking at least 5 drinks in a row for men and 4 drinks for women. The Finnish and Swedish results were very similar, showing very high percentages of binge drinking. In the USA, more than half of the college students never binged. On the other hand, frequent binge drinking was in the USA as common as in Finland and Sweden.

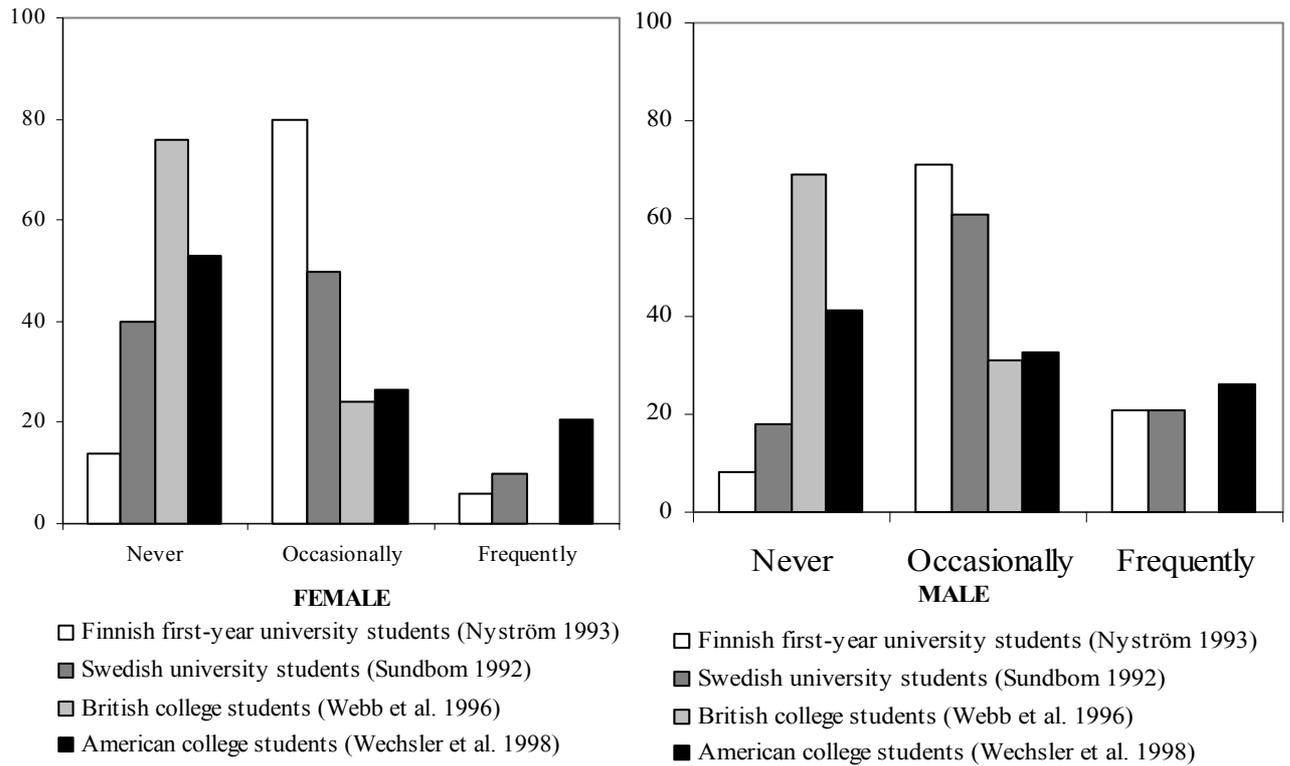


Figure 5. Binge drinking among students by gender in Finland, Sweden, the United Kingdom and the USA.

2. SMOKING

2.1 World-wide smoking patterns

Tobacco is the leading cause of preventable death in the developed world. About half of all regular smokers will be killed by the effects of smoking (Doll et al. 1994).

The first paper on the association of smoking and lung cancer was published by Sir Richard Doll and Austin Bradford Hill in England over 40 years ago. Since then hundreds of studies have been published on the role of smoking in the etiology of various diseases. In 1990 tobacco was estimated to cause, in the developed countries, about 30% of all deaths at 35-69 years of age, and to be the largest single

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cause of premature death (Peto et al. 1992). Those now being killed by tobacco in their middle age are therefore losing about 23 years of non-smoking life expectancy.

In the USA the overall prevalence of smoking among adults declined substantially during the 1980s (Remington et al. 1985), but the decline either was not evident or was less pronounced among adolescents (Mc Ginnis, 1987). Data on smoking prevalence trends among adolescents and young adults aged 12-24 years can be obtained from four cross-sectional surveys in 1979-1990 (Winkleby et al. 1993). Youth of 20-24 years of age were significantly more likely to smoke than those aged 12-15 or 16-19 years, at all time periods. Over the 12-year study period, the prevalence of daily smoking declined by approximately 50% among 16- to 19- and 20- to 24-year-olds, but showed only a little change among those aged 12-15 years. At the end point, the smoking prevalence in the age group 20-24 years ranged from 9-35%, depending on the city of the survey. The initiation of daily smoking occurred most frequently in young adolescence, especially during the period between junior high and high school. The mean age of initial use of cigarettes was 10.7 years for boys and 11.4 years for girls in a study of children in grades 5, 8, and 12 (Brownson et al. 1990). Smoking habits become established in general by the age of 14, with a two-year gap between initiation and maintenance (Baugh et al. 1982). The sharpest decline in smoking occurred in the mid-1980s, and the rates levelled off in the late 1980s. Since then, smoking prevalence declined at a slightly faster rate among older female adolescents (17-19 years) than older male adolescents (Nelson et al. 1995). However, no significant decline occurred from 1985 to 1991.

Other studies of young Americans have shown an even earlier decline in smoking rates, between 1977 and 1981, and an earlier levelling off from 1982 to 1990 (Remington et al. 1989, Brownson et al. 1990). These differences are probably due

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to the regional variation in smoking prevalence between the states: in 1986 state-specific rates of smoking prevalence among study cohorts varied almost twofold, from a low of 18% to a high of 35% (Centers for Disease Control 1987). Previous studies suggest an increasing trend in smoking prevalence among American adolescents. Current cigarette smoking among high school students aged under 17 years in grades 9-12 increased from 28% in 1991 to 31% in 1993, and to 35% in 1995 (Office on Smoking and Health, Division of Adolescent and School Health, National Center for Chronic Disease Prevention and Health Promotion, 1996). Their latest survey from 1997 shows that the increase in smoking prevalence continues, 36% of the high school students were current cigarette smokers in 1997.

Cigarette smoking appeared to be the most stable of the drug behaviours in the longitudinal study of Chen and Kandel (1995) who followed the target population from adolescence to the mid-thirties. The major risk period for initiation into cigarettes is mostly over by age 20, with a peak at the age of 16. The proportion of daily smokers (among all smokers) remained essentially unchanged from age 19 onward through the mid-30s. Among smokers, about the same proportions of daily users (27-30%) reported smoking at least one and a half packs of cigarettes a day at ages 24-25 and 34-35 years.

In Canada, the rate of cigarette smoking among adolescents has also been on the rise in the 1990s. Among 7th-12th graders (ages 12-17 years) in Nova Scotia, the smoking prevalence rose from 26% in 1991 to 35% in 1996 (Poulin et al. 1997). A similar trend was seen in a drug survey of students in Ontario, in which the smoking prevalence in the past 12 months increased from 22% in 1991 to more than 27% in 1995 (Adlaf & Ivis, 1998).

In Australia, between 1984-1990 there was seen a downward trend in smoking prevalence among adolescents aged 12-15 years, but not among 16 to 17-year-olds (Hill et al. 1993). The prevalence of current smoking was found to increase with

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age, reaching a peak of 29% among girls aged 15 years and 25% among 16-year-old boys.

In 1994 there were more than 96 million smokers in the 15 countries of the European Union (Confederation of European Community Cigarette Manufacturers Ltd. Estimates from data of 1995). 42% of the men and 28% of the women were smokers in the European Union. Between 1987 and 1994 there seems to have been a slight decline in the percentage of men who are smokers, whereas the percentage of women smoking has remained relatively stable during this period. There are also great differences in smoking prevalence between European countries. In southern and eastern Europe there has been a continuous increase in smoking. The highest smoking prevalence in most European countries is in the age group of 25-39-year-olds. At the end of the 1980s the proportion of smoking young people (15-24 years) has been quite large especially in southern Europe: e.g. boys in Greece 53%, in Portugal 52%, in Spain and France 51%, while the mean percentage in the EU was 34% (Data of the European Commission). The mean percentage of smoking girls was 34% in the EU. Spain headed the statistics with a percentage of 49%, followed by France (46%), while Portugal, Italy and Greece were similar to or lower than the European average (Mendoza, 1996).

Also in Germany the smoking rates have exceeded those of the EU. In 1988, 50% of the men and 47% of the women aged 25 to 29 years were smokers, and 54% of the 30-39-year-old men and 37% of the women were smokers (Hoffmeister et al. 1994). By 1990, the smoking rates had declined somewhat, except for women aged 30-39 years, whose smoking rates actually increased from 37% to 41% (Nicolaidis-Bouman et al. 1993). On the other hand, 80% of the youth between the ages 14 and 19 years were non-smokers. This finding suggests that in Germany smoking initiation occurs at about the age of 20, differing from that observed in the USA, where smoking initiation is considered to be a 'pediatric' disease (American

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Public Health Association, 1995). In a study of university students in 1995, 34% of German female and 41% of the male students were current smokers (Apel et al. 1997).

Parallel results were seen in a Scottish study, where trends in cigarette smoking were analyzed by gender, age and occupational status in 1984-1991 (Uitenbroek et al. 1993). From 1984 to 1991 there was a downward trend in smoking for men, and a slightly upward trend for women. In 1991 the smoking prevalence for men was about 34% and 37% for women, but the difference was not statistically significant. Smoking by age groups showed an upward trend among the youngest age groups, being quite pronounced among the youngest female group.

Table 5 shows the smoking prevalence in most European countries. The data were collected in 1994-1999. When making comparisons, one has to bear in mind that the percentages have been calculated from different age groups.

The countries differed a lot from each other in smoking prevalence. In eastern Europe, for instance, smoking seems to be much more prevalent. In Russia (63%), Slovakia, Latvia, Turkey, the Ukraine, Bulgaria and Estonia a half or more of the males were smokers. The lowest smoking prevalences for men were seen in the Scandinavian countries: Sweden (17%), Finland and Iceland.

The highest smoking prevalence for women was found in Turkey, where almost half of the women were smokers. The percentage was considerably higher than in any other country, where the percentages were less than one third. The lowest smoking prevalences for women were found in Portugal (7%), Cyprus and Lithuania. It was also interesting that in these countries the gender difference was great (in Lithuania 9% versus 41%). The same phenomenon was found in Russia (14% versus 63%) and in Latvia. Although in most of the countries the smoking prevalence of women was significantly lower than that of men, there were some

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countries, i.e. Belgium, Denmark, Iceland, Ireland, the Netherlands, Norway, Sweden, Turkey and the United Kingdom, where this could not be found. Three of these countries (Denmark, Iceland and Sweden) had even a higher smoking prevalence for women than for men. All these countries, except for Turkey, were in Scandinavia or in western Europe. Europe seemed to be divided geographically into different parts according to smoking prevalence and smoking policy.

In these statistics Finland was among the countries with low smoking prevalences (20% for females and 27% for males) and slight gender differences. The percentages in Finland were similar to the other Scandinavian countries, and after Sweden, Finland had the lowest smoking prevalences (Corrao et al. 2000).

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Table 5. Smoking prevalence in European countries (Corrao et al. Tobacco control country profiles. Atlanta: American Cancer Society, 2000. Published for the 11th World Conference on Tobacco OR Health.)

	Year	Female	Male	All adults
		%	%	%
Albania***	1995			31
Austria*	1997	19	30	
Belgium*	1999	26	31	
Bosnia Herzegovina*	1995			48
Bulgaria*	1996	24	49	
Croatia***	1995			31
Cyprus*	1997	8	39	
Czech Republic**	1998	12	28	
Denmark*	1998	30	29	
Estonia*	1996	22	48	
Finland****	1999	20	27	
France**	1997	27	39	
Germany***	1997	30	43	
Greece**	1994	28	46	
Hungary**	1999	27	44	
Iceland**	1998	28	27	
Ireland**	1998	31	32	
Italy*	1998	17	32	
Latvia****	1998	18	53	
Lithuania**	1997	9	41	
Luxembourg**	1998	27	39	
Malta**	1995	15	33	
Netherlands*	1998	30	37	
Norway*****	1998	32	34	
Poland**	1998	19	39	
Portugal**	1996	7	30	
Romania*	1994	15	43	
Russia**	1996	14	63	
Slovakia**	1996	30	55	
Slovenia**	1999	20	30	
Spain*****	1997	25	42	
Sweden*****	1998	22	17	
Switzerland*	1997	27	38	
Turkey*	1997	49	51	
Ukraine	1997	21	49	
United Kingdom**	1996	28	29	

* Percentages of age group 15 years +

** Percentages of age group 18 years +

*** Percentages of age group 18-64 years

**** Percentages of age group 15-64 years

***** Percentages of age group 16 years +

***** Percentages of age group 16-74 years

2.2 Smoking in Finland

When the Finnish Tobacco Act came into force in 1977, smoking decreased sharply in the latter half of the 1970s, and stayed steady until 1985, when smoking among young people and women started to increase again (Figure 6). Smoking declined among the male population, while among women a slight increase was seen up until the late 1980s, whereafter it levelled off (Valtonen & Rimpelä, 1984; Rimpelä et al. 1990). In the 1990s male smoking continued to decrease steadily, and female smoking decreased also in 1991-1993, and then levelled off again. In 1995 27% of the men and 19% of the women in the age group of 15-64-year-olds were daily smokers; this level being almost the lowest in Europe (Puska 1996; Rimpelä et al. 1990). In 1996 the decrease was still continuing among women (18%), but only among those older than 25 years. Neither the youngest male nor female (15-24 years) group decreased their smoking any more in 1996 (Huttunen, 1996). In a study among Finnish military conscripts, 36% of them were regular and 17% occasional smokers (Jormanainen et al. 1997). Among both men and women the highest prevalence of daily smokers is in the age group of 35-44 years (Huttunen, 1996).

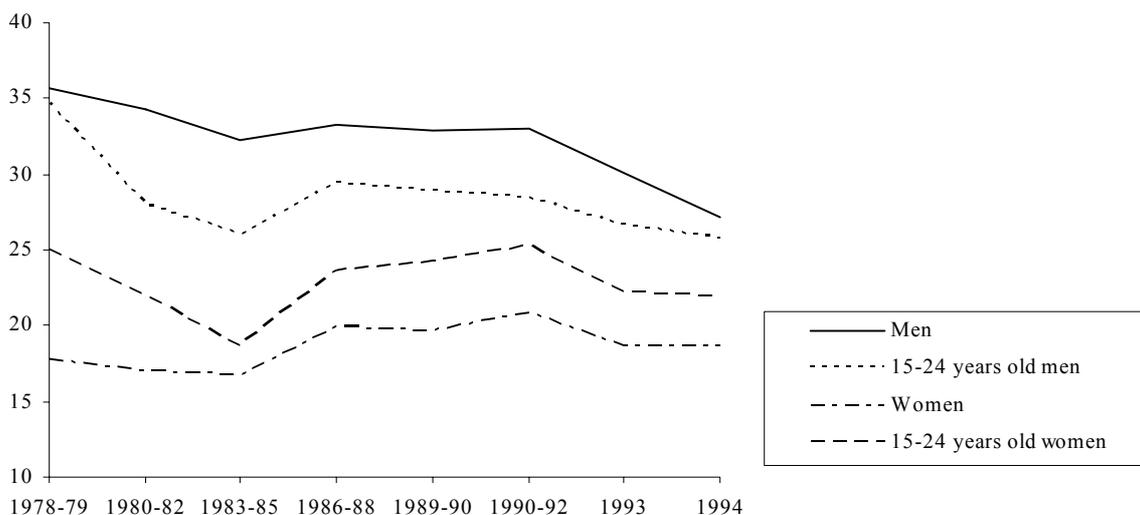


Figure 6 Proportions of daily smokers among 15-64 years old and among 15-24 years old by sex in years 1978-1994 (Helakorpi et al. 1994).

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A negative correlation between male smoking and educational status has been noted since the 1950s: Highly educated men smoked less than those with a lower education. These differences have persisted among men, and even increased in the 1960s, when men with a higher education decreased their smoking more than the others. At that time female smoking was more common in the group of highly educated women (Rimpelä, 1978). In the mid-1970s the share of female daily smokers declined mostly among those with a higher education. The increase in female smoking prevalence in the mid-1980s was seen only among women with a lower education (less than 12 educational years); 26-27% of them were smokers, while the respective figure for the higher educational group was 15-17% (Rahkonen et al. 1993). Among men the differences have stayed unchanged through the 1980s: about 40% of the men in the lower educational group and less than 30% of the higher educational group have been smokers. Among young adults and among both genders these differences have been even more marked, over 20% (Rahkonen et al. 1994). Smoking has also been more prevalent in the lower social classes: in 1988-1990 40% of the male and 29% of the female factory workers were smokers, and among the unemployed the corresponding percentages were 53% and 42% (Puska et al. 1991)

A continuous decrease in smoking habit can be found also among Finnish university students (Figure 7). During the past 25 years the percentage of non smoking female students has risen from 61% to 91% and that of non-smoking male students from 47% to 86% (Puska et al. 1972; Helakorpi et al. 1994) It is known from previous studies that people with a higher education usually smoke less than those with a lower education (Uitenbroek et al. 1993, Puska et al. 1991) Students are also known to smoke less than the general population of the same age (Nyström 1993a). According to earlier studies, young people usually start smoking at the age of 13-15 years (Pulkkinen 1982, Ahlström et al. 1996). In a recent survey among adolescents, one fourth of the girls and one third of the boys aged 12 years had

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experimented with cigarettes in 1997, and among 14-year-olds 17% of the girls and 14% of the boys were already daily smokers (Rimpelä et al. 1997).

There is some evidence that the tendency to continue of smoking is very high until 20 years of age. A Finnish survey (Paavola et al. 1996), shows that 30% of those smoking at 13 years of age had quit smoking before the age of 28 years.

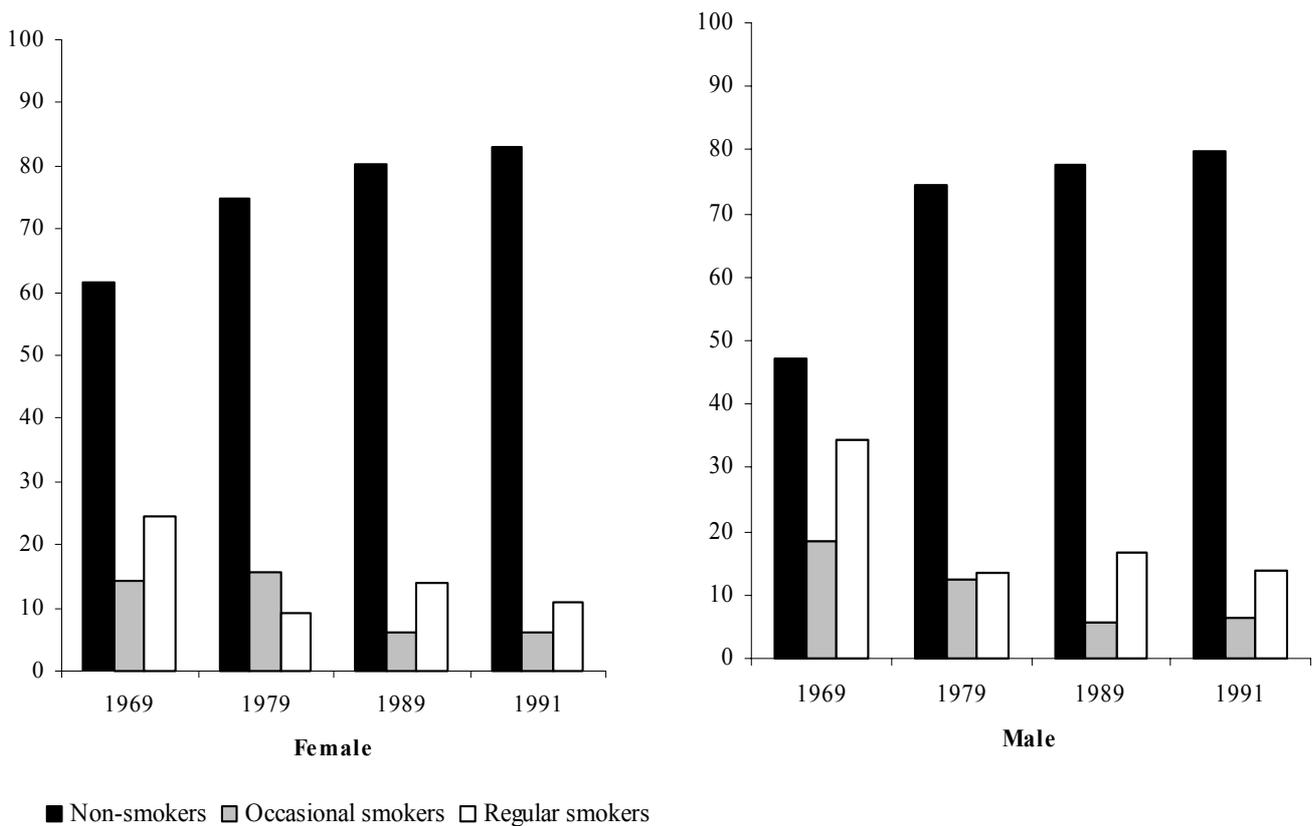


Figure 7. Smoking among university students in Finland 1969-1991 (Nyström 1993a)

2.3 The smoking habits of young people in Finland compared to those in other European countries

These comparisons are based on the 1995 ESPAD report (Hibell et al. 1997), in which the target group were European adolescents aged 15-16 years. The majority of students in this age group had tried smoking cigarettes at least once (Table 6). In no country was the life-time use of cigarettes lower than 50%. The highest life-time smoking prevalence rate was found in the Faroe Islands (87%), then came Finland (77%), the Czech Republic, Ireland (74% both), Estonia (72%) and Sweden (71%). The lowest life-time figures were found in Cyprus (53%), Malta (55%), Portugal (56%) and Slovenia (59%). Finland was also among the countries with the highest proportions of students who had smoked 40 times or more.

The highest percentages for cigarette smoking during the past 30 days were found in the Faroe Islands (42%), Ireland (41%), the Ukraine (38%), Finland (37%), Turkey (37%) and the United Kingdom (36%). The gender differences in most of the countries were small, but in the Ukraine, Cyprus, Estonia, the Slovak Republic and Lithuania the differences were fairly big (more boys than girls). However, in all northern European countries girls were in a majority of the 30 days smokers.

The Faroe Islands (71%) had the highest percentage of early onset of smoking (13 years or younger when first starting to smoke), followed by Finland (59%), Sweden (54%), Estonia (53%) Ireland (51%) and the United Kingdom (50%). The proportions of students who started smoking on a daily basis at 13 years of age were highest in the Faroe Islands and the United Kingdom (19% both), Ireland (18%) and Finland (17%), and the lowest in Cyprus (3%), Italy and Slovenia (5% both) and Poland (6%). In Finland, as in most countries, more boys than girls had started regular smoking at this age (16% of girls vs. 18% of boys).

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Table 6. Smoking habits of European youth, both genders (The 1995 ESPAD report)

	Age at first use of cigarettes*		Frequency of lifetime use of cigarettes**			Cigarette smoking in last 30 days**
	First cigarette	Daily smoking	Number of occasions			At least one occasion
			0	1-2	40+	
Croatia	41	11	31	17	23	32
Cyprus	21	3	47	19	18	23
Czech Republic	46	8	26	21	26	34
Denmark	45	9	32	18	23	28
Estonia	53	9	28	19	25	28
Faroe Islands	71	19	13	10	42	42
Finland	59	17	23	12	35	37
Hungary	38	7	31	17	28	34
Iceland	37	12	39	12	27	32
Ireland	51	18	26	12	37	41
Italy	29	5	36	15	25	35
Lithuania	44	8	35	16	20	25
Malta	34	8	45	12	19	31
Norway	42	10	35	15	25	36
Poland	36	6	34	18	20	28
Portugal	42	8	44	19	13	24
Slovak republic	46	7	34	20	20	27
Slovenia	39	5	41	20	16	19
Sweden	54	12	29	13	28	30
Turkey	29	-	32	17	22	37
Ukraine	37	9	34	14	29	38
United Kingdom	50	19	32	15	27	36
Latvia	45	6	30	19	24	30
France	62	25	46	-	-	-
Greece	19	6	53	17	-	23
Spain	-	-	42	-	-	25
USA	32	5	42	23	-	28

* Percentage answering 13 years or younger

** Percentages are based on students answering the

In Scandinavia the trend in smoking prevalence has been decreasing, especially in Sweden, where the percentage of young male smokers aged 16-24 years has fallen from 51% in 1963 to 14% in 1995, and the respective female percentage has declined from 36% to 21% (National Institute of Public Health in Sweden. Smoke-Free Europe Conference, Finland 1996).

3. CANNABIS USE

Cannabis is known to be the most widely used narcotic, and several studies have shown that cannabis serves as a stepping stone to other drug use (Kandel et al. 1984; Yamaguchi et al. 1984; Kandel et al. 1992; Kandel et al. 1993; Byqvist, 1996). On the other hand, there are also studies indicating that especially in the Nordic countries cannabis is a typical substance that people experiment with (Hakkarainen, 1996). Most people who have sometimes tried cannabis have rarely gone beyond that. But, in spite of the increasing number of people who have reported having used cannabis, there is still a small proportion who use it regularly. Cannabis use is also known to have a high association with other forms of addiction, such as smoking and drinking alcohol.

3.1 Finnish studies

In Finland the prevalence of drug abuse has been regularly surveyed only among school adolescents (14-18 years old) (Rimpelä et al. 1995), and among military conscripts (Jormanainen et al. 1994). The first wave of drug abuse occurred in the beginning of the 1970s and was limited to the greater Helsinki area. At that time

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23% of the school adolescents in the Helsinki area and 16% of the conscripts had used narcotics, usually hash but also LSD, amphetamine, tranquillizers, paint thinner, and sometimes heroin (Hemminki et al. 1971; Hernesniemi, 1972). Due to the aggressive policy in several fields (prevention campaigns in schools, treatment units for users, and legislative measures) cannabis use had practically disappeared by 1975 (Turpeinen, 1995). There was a period of almost two decades without any signs of severe drug abuse until the early 1990s, which saw a steep increase again. Joining the European Union has opened the borders and changed public attitudes towards drugs in a more liberal and permissive direction. At the same time the eastern border to Russia has opened, too, and this has increased the transit of illegal drugs especially from Russia and Estonia.

Two studies were carried out on the prevalence of drug abuse among adults in 1992 in Finland. Similar results were obtained in both: 6% of the adults had used some narcotics during their life-time and 1.2% in the past 12 months (Kontula & Koskela, 1994; Partanen, 1994).

Kontula and Koskela carried out their first analysis on data from the entire adult population in 1992. They combined three data sets: a postal survey of 3464 people, aged 18-74 years; 3318 school adolescents aged 13-18 years, and 732 Finnish military conscripts. The questionnaire to the randomly selected adult population included a question on whether one had ever used or tried any drug. A positive answer was given by 5.9% of all the respondents. There were only few people over the age of 50 years who answered 'yes'; for people under 50 years, drugs were much more familiar (Figure 8). Drug use was most prevalent in the age group of 18-35 years: 11% had used some drug (14% of the male and 9% of the female respondents). Within this age group, no age differences could be found in the prevalence.

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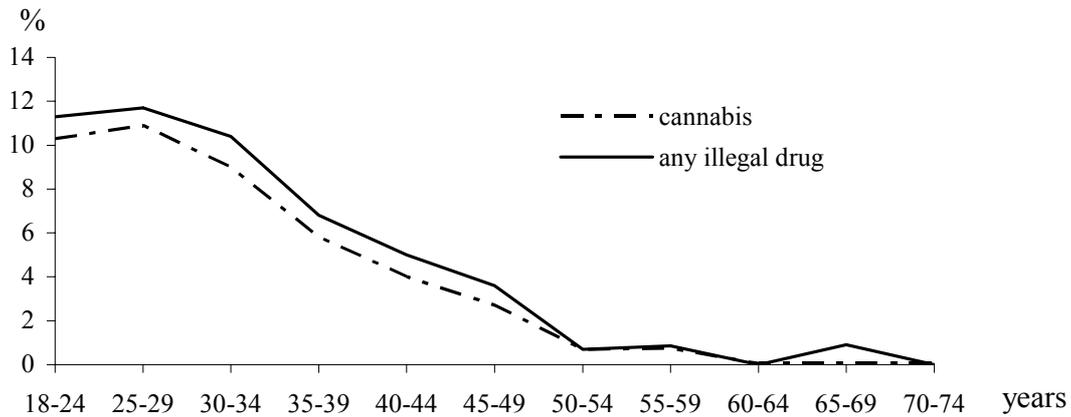


Figure 8. Lifetime prevalence of experimenting or use of any illegal drug or cannabis by age in Finnish population (Kontula and Koskela 1992)

Geographical differences were found: in the southern part of the country, drug use was most common, and every fifth person in the age group of 18-35 years had experimented with some drug. Drug use was also more prevalent in the larger urban centres. In the Helsinki area 16% of all the men reported some experimenting whereas in the countryside only 3% of the men and 1% of the women reported some use.

The first drug experimenting occurred mostly at the age of 16-20 years. Of those who had 'ever used' drugs, the first experimenting took place before the age of 15 only in 8%, under 18 years in 26% and after the age of 25 years in 13% of the cases (Figure 9). 30% of the first experimenting happened abroad. The drug use of 11% of all those who had experimented continued for at least 6 months. Only one third of the men and 14% of the women who continued to use drugs did so regularly for at least 3 years. Cannabis was by far the most commonly used drug. 87% of all the people who ever used any drug had used cannabis. However, cannabis use was usually very occasional and transient experimenting. Half of the users used it only 1-2 times, 26% more than five times, and 17% more than 10 times. Only a few had tried other drugs. Only 0,6% of all the respondents had experimented with so-called

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heavy drugs (amphetamine, opiates, cocaine, crack, LSD), and half of them had tried only once, and one fourth more than 10 times. Intravenous drugs had been tried by 0.1% of the whole sample, and 15% of those who had ever tried heavy drugs. These were all men younger than 35 years of age. 23 of those who had ever tried any drug had used it during the past year. In most cases earlier drug use had already terminated and no addiction of any kind had developed.

This study also confirmed the 'gateway theory', according to which drug experimenting and use tends to lead to other drug use as well. In this study only 1% of the non-smoking teetotallers had ever experimented with any drug. Moreover, in this study smoking turned out to be the most addictive of all the substances. Of those who ever tried out smoking, about 75% continued to smoke on a daily basis. Many smokers continued smoking for several decades. Only 5% of the regular smokers under 35 years of age, 30% in the age group of 35-54 years, and 55% of the regular smokers over 55 years had given up smoking. Smoking typically continues throughout one's whole life, while other drug abuse is usually limited to the age of 18-35 years.

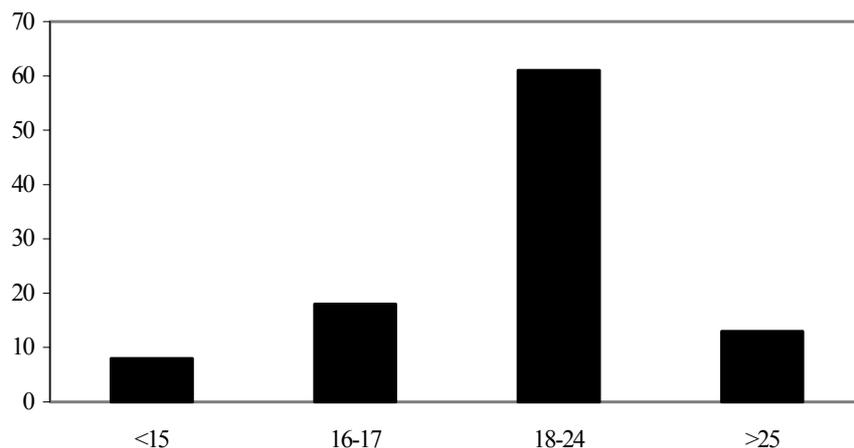


Figure 9. The age of first experimenting of any illegal drug (Kontula and Koskela 1992)

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Like smoking, also alcohol use becomes common very early: In the younger age groups four out of five had been drunk when under than 19 years, and half of them had started to drink regularly. Of those who experimented with smoking, 75% started to smoke regularly, and for alcohol the corresponding percentage was 50%. Only 11% of those who experimented with other drugs started regular use. Kontula and Koskela (1992) analyzed also the data on school children aged 13-18 years, which was collected in 1992. The survey had been repeated in 1986, 1988 and 1992 (KISS study) and it demonstrates well the changes in the adolescents' alcohol and drug usage behaviour. In 1992, 20% of the school children aged 13 years knew at least one in their peer group who had experimented with drugs, and 4% in this age group had experimented with some drug. Most often mixed drugs were used. Among the 15- year-old adolescents already 40% knew somebody who had experimented with drugs, usually pills or cannabis. 10% of them had already some experience with drugs, and this percentage was somewhat larger in 1992 than in 1986. More than half of them had tried drugs only 1-2 times. However, in 1992 among boys the experimenting with drugs had decreased, while among girls there was a clear increase in experimenting with pills (11%). Experimenting with sniffed substances had decreased and hard drugs were still very rare. In this age group smoking was very regular; about a half had experimented and one fourth were regular smokers.

In the age group of 17-18 years, the data from 1986,1988 and 1992 were collected in the Helsinki area. In 1992 already 2/3 knew someone who had experimented with drugs, and 23% of the boys and 16% of the girls had some experience with cannabis use. In this age group there was a clear increase in experimenting with drugs from 1988 to 1992; among boys with cannabis use and among girls with the use of both cannabis and pills. A positive finding was that the prevalence of hard drugs had not changed at all. Experimenting with cannabis had started a couple of

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years earlier than in the 1980s, but the prevalence had not increased. In the age group of 18-34 years, 20% of those living in Helsinki had tried or used cannabis.

In 1992 another survey on the use of drugs and minor tranquillizers was carried out in connection with the Finnish Drinking Habit Survey. The target population consisted of 15-69-year-old Finns (Partanen, 1994). Altogether 4.6% of the respondents admitted that they had sometimes tried or used drugs, while 1.1% had done so within the past year. The highest rates were among 20-30-year-olds who were living alone in metropolitan Helsinki; they were also heavy drinkers. Elsewhere in the country, especially among older people, it was rare to know someone who had tried drugs. Cannabis was by far the most commonly used drug, and the life-time prevalence for cannabis was very much the same as for all illegal drugs (Figure 8). 73% of those who had ever experimented with any drug had used only cannabis. The use of minor tranquillizers was even more common, but a different phenomenon. While drug users were mostly men, the use of minor tranquillizers was more prevalent among women (Figure 10). In addition, the problem increased with the years. In the age group of 45-49-year-old men, there was a peak in the life-time prevalence of drug use and the use of minor tranquillizers.

Regular surveys among military conscripts have been carried out since 1968. Also these studies show that the prevalence of drug use was smaller in the 1980s (8.5%-11.0%) than in the 1970s (11.6%-16.2%). In the 1992 survey, 17.2% had used drugs sometimes, and about a half of them knew somebody who used drugs (Jormanainen et al.1994). The usual substance was cannabis (60%) but also mixed drugs (17%) were quite common. Experimenting with drugs correlated with other substance use: 72.7% of those who had tried drugs had also consumed alcohol and smoked.

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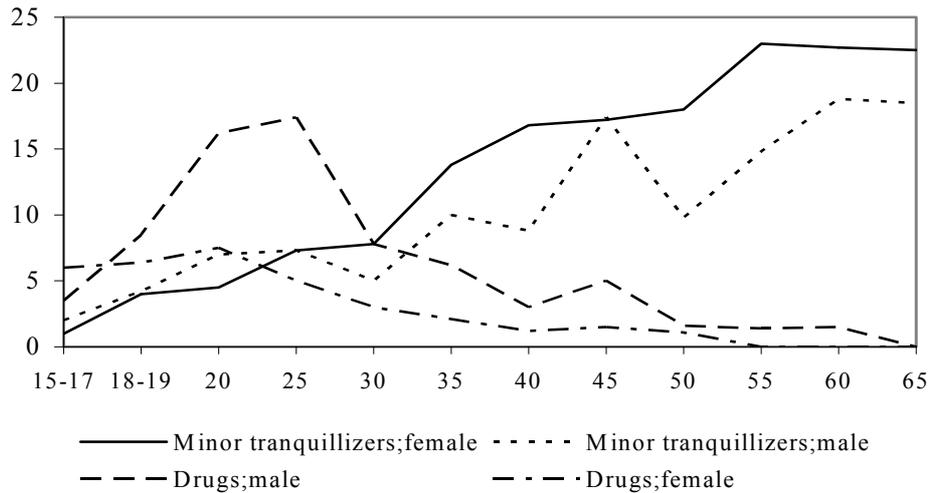


Figure 10. The use of drugs (mostly cannabis) or minor tranquillizers, by age and gender (Partanen 1994)

Since 1992, six surveys have been carried out in Finland on the use of drugs among the general adult population. The earlier mentioned two studies (Kontula & Koskela, 1994; Partanen, 1994) are covered in a recent review of these studies (Partanen & Metso, 1997). The results are not directly comparable, however, due to the differences in data collection methods and response rates. The analysis nevertheless indicates that in 1992-1996 the annual relative increase in the prevalence of cannabis use has been 9% for men, 4% for women and 11% for young adults between 18-29 years of age (Partanen et Metso 1997).

The social predisposition to drugs among school adolescents has been investigated in a study, in which the proportions of young people who knew someone who had used drugs or who had been offered drugs in 1991 and 1993 were compared (Rimpelä et al. 1994). The comparison showed that in two years the percentage of 16-year-olds who knew someone who had experimented with drugs had increased by 4%, and in the age group of 18-year-olds by 9%. Regarding the proportions of those who had been offered drugs, there were no significant differences between 1991 and 1993. The social predisposition to drugs was 5 times more prevalent in

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the Helsinki metropolitan area than in the countryside. The risk groups for the social predisposition to drugs were the same as those for smoking and alcohol.

In 1995, the School Health Survey showed that 23% of the pupils in urban areas and 14% of those in rural areas (elementary school 8-9 grades, 13-15 years) had experimented at least once with some of the drugs (Table 7). 6% and 2%, respectively, had used drugs at least 4 times (Rimpelä et al. 1995). Mixed use and the mixing of drugs with alcohol were typical for school children. In 1995, every third 14-year-old and almost a half of the 18-year-olds knew at least one person among their friends or acquaintances who had used drugs during the past year. A similar School Health Survey in 1997 showed that the social predisposition to drugs had further increased: Over half of the girls and almost 40% of the boys aged 14-18 years knew at least one person who had used drugs (Rimpelä et al. 1997).

Table 7. Lifetime use of any drugs among school adolescents (grades 8 and 9) in a rural and an urban sample, by gender (Rimpelä et al. 1995)

Frequency	Rural area (1)		Urban area (2)	
	Female(%)	Male(%)	Female(%)	Male(%)
Never	81,1	92,0	71,7	83,0
Once	9,0	4,5	12,0	7,5
2-3 times	6,4	2,0	9,5	5,0
4 times or more	3,5	1,5	6,8	4,5

(1) Province of Middle-Finland

(2) Turku

A high level of cannabis misuse is known to associate with psychosocial maladjustment. The parents' divorce, father's drinking, and social group III, as background factors have been shown to predict later cannabis misuse among Swedish military conscripts (Andreasson, 1990). In a Finnish study among conscripts, living with both parents during childhood seems to protect against later drug use (Jormanainen et al. 1994). Similar results were obtained in a study on Finnish school children aged 15 and 16 years (Ahlström et al. 1996). Heavy

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drinking and drug use were most prevalent among those who had poor relationships with their parents, or the relationship between the parents was poor.

Compared to the other Nordic countries, the situation in Finland is still good. In a Scandinavian study in 1993-1995, the life-time prevalence of cannabis use was 30.1% in Denmark, 11.4% in Sweden, 8.3% in Norway and 7.3% in Finland (Hakkarainen, 1996). The same study also indicates that the use of cannabis in the Nordic countries consists primarily of experimenting, and only rarely of regular use. As compared to the prevalence of cannabis use in Europe and the USA, the situation in Scandinavia (except in Denmark) is much better. In the USA, where cannabis use has been more common for a longer time than in any other country, one third of the population has ever used cannabis, and one tenth during the past year (U.S. Department of Health and Human Services, 1991). The percentages of young users, however, started to decline in the mid-1980s (Kandel, 1991), continuing up to the 1990s, when the trend started to rise again (Johnston et al. 1995). After the USA, cannabis use has been most common in Canada, England, Denmark, the Netherlands and Spain. In these countries over 20% of the population has tried cannabis, and 5% are regular users (Kontula & Koskela, 1992). In the United Kingdom in 1989-1994 the young people's exposure to illicit drugs increased dramatically. The proportion of school children who knew anyone taking drugs, increased from 31% in 1989 to 65% in 1994, and the proportion of those who had been offered drugs rose from 19% in 1989 to 45% in 1994 (Wright & Pearl, 1995). Canadian studies in the 1990s demonstrate an increasing trend in cannabis use among adolescents, from 13% in 1993 to 23% in 1995 (Adlaf & Ivis, 1998).

Kandel has carried out several studies on the natural history of drug use from adolescence to adulthood (Yamaguchi et al. 1984; Kandel et al. 1992, 1993; Chen et al. 1995). According to his 19-year follow-up, the major risk period for the

initiation of cigarette smoking, alcohol and marijuana is mostly over by the age of 20 years, with peaks occurring at ages 16 for cigarettes and 18 for alcohol and marijuana (Chen and Kandel, 1995). For marijuana, there was a continuous increase through age 19 and a stabilization period of 4 to 5 years, whereafter its usage began a continuous decline at about the ages of 23-24. By the age of 34-35 years, only 14.3% of female and 25.3% of male users still reported using marijuana within the past year, compared with 35.2% of female and 51.0% of male users during the period of highest usage at ages 19 to 24. There is not much information on whether university students differ from the general population of the same age in drug abuse, or on the changes in drug behaviour during the university years.

3.2 Illicit drug use among Finnish youth compared to that in other European countries

The 1995 ESPAD report provided also comparable data on illicit drug use in European countries (Hibell et al. 1997). In some countries drugs have been available and used for a long time, whereas drug usage is a more recent phenomenon in other countries. On average, the most reliable information on different drug names was found in Denmark, Sweden and the United Kingdom. Drugs were least known in Lithuania, Turkey, the Ukraine and Estonia.

The highest life-time prevalences for any illicit drug (cannabis, amphetamines, LSD or other hallucinogens, crack, cocaine, ecstasy and heroin) were found in the United Kingdom, Ireland, the Czech Republic, Italy and Denmark (Table 8). The smallest figures were found in Malta, Lithuania, Hungary, Turkey and Finland.

The most frequently used drug was cannabis. The highest proportions among the ESPAD countries were found in the United Kingdom, Ireland, the Czech Republic, Italy and Denmark. The lowest figures for lifetime use of cannabis were in

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Lithuania, Greece, Hungary and Turkey and Finland and Cyprus. The countries with the most frequent use of cannabis (20 times or more) were the United Kingdom, Ireland and Italy. In Finland (among Hungary, Lithuania, Sweden and Turkey) there were no students reporting life-time cannabis use 20 times or more.

The prevalences of the use of cannabis during the past 12 months were highest in the United Kingdom (35%), Ireland (33%), Italy (18%), the Czech Republic (16%) and Denmark (14%). The smallest figures were found in Lithuania (1%), Cyprus, Hungary and Turkey (3% each), In Finland and Sweden (4% both). The 30 days' prevalence followed the same pattern. In the United Kingdom 24%, Ireland 19% and Italy 13% had taken cannabis in the past 30 days. The lowest 30 days' prevalence figures were in Lithuania (< 0.5%), Finland, Hungary and Sweden (1% each).

The highest proportions of children who were 13 years or younger at the time of their first drug experience were again found in the United Kingdom (14% for cannabis and 4% for LSD) and Ireland (7% for cannabis and 9% for inhalants). In Finland 1% of the children aged 13 years or younger had experimented with cannabis, and 2% with inhalants. The use of other drugs than cannabis was spread over the same countries as the use of cannabis, but in smaller proportions (the United Kingdom 22%, Ireland 16% and Italy 8%). In Finland the corresponding percentage was only 1%. Most children who had used other drugs than cannabis, had done so only a couple of times. However, more frequent consumption was reported in the United Kingdom where 4% had used any of these substances 20 times or more.

Finland was one of the countries with least experience (5%) in the use of tranquillizers or sedatives prescribed by a doctor. Other countries with low proportions were Estonia (3%) and Denmark (6%). The highest proportions were in

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the Czech Republic (26%), the United Kingdom (17%), Lithuania (16%) and Portugal (15%).

Table 8. Illicit drug use among European youth (The 1995 ESPAD report)

	Any illicit drug	Cannabis use	
	at least once in lifetime	at least once in lifetime	20+ in lifetime
Cyprus	6	5	1
Czech Republic	23	22	2
Denmark	18	17	3
Estonia	8	7	1
Faroe Islands	12	11	2
Finland	5	5	0
Hungary	5	4	0
Iceland	10	10	2
Ireland	37	37	10
Italy	21	19	6
Lithuania	3	1	0
Malta	2	8	1
Norway	6	6	1
Portugal	8	7	2
Slovak republic	10	9	1
Slovenia	13	13	1
Sweden	6	6	0
Turkey	5	4	0
Ukraine	14	14	2
United Kingdom	42	41	15
Latvia	6	5	0
France	-	12	-
Greece	-	2	0
Spain	-	5	-
USA	41	34	13

Percentages are based on students answering the question

Alcohol is known to be used also together with pills in order to produce a stronger intoxicating effect. The use of this combination was most prevalent in the United Kingdom (20%), Sweden (18%), Finland (17%), Denmark and Malta (13% each). This behaviour was observed predominantly among girls; one fourth of the girls in Finland, Sweden and United Kingdom reported this.

3.3 Developmental patterns of drug involvement

Prior research has identified clear developmental stages in drug use (Kandel 1975; O'Donnell et al. 1982; Yamaguchi et al. 1984). The use of substances that are legal for adults (alcohol and cigarettes) tends to precede and to increase the risk of starting to use illicit drugs. Adolescents are very unlikely to experiment with marijuana if they have not experimented previously with alcoholic beverages or with cigarettes. Also very few try illicit drugs other than marijuana without prior use of marijuana. Donovan and Jessor (1983) have also suggested that problem drinking intervenes between the use of marijuana and other illicit drugs.

Crack (cocaine alkaloid), which appeared suddenly in urban centres in the 1980s, has been thought to represent a completely new pathway for the entry into drug usage. It seems to disrupt the normal social processes associating with drug initiation and progression to various other forms of drug use (Fagan et al 1991). It is generally believed that young people begin to use crack directly. In order to examine this hypothesis Kandel et al. (1993) carried out a statewide study in the USA on 1108 senior high school students in 1988. The age at first use was asked with regard to five classes of drugs: three alcoholic beverages (beer, wine, hard liquor), cigarettes, marijuana, cocaine (excluding crack), and crack. Among the total study sample, 95.7% of the students reported using at least one of these drugs. The data provided strong evidence for a sequential pattern of drug involvement

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during adolescence. The earliest stage involved the use of at least one licit drug - alcohol and/or cigarettes. Subsequent stages involved marijuana and other illicit drugs, such as cocaine. In the overwhelming majority of cases, crack was initiated after experience with marijuana. The results confirmed also the more important role of alcohol among boys and cigarettes among girls in the progression into various drug classes. The age at first drug use at the lower stage was also a strong predictor of further progression.

These results were confirmed by Aas and Pedersen (1993) in their longitudinal study of 857 Norwegian adolescents who were followed up for three years. The study covered the following drugs that were 'ever used': alcohol, cigarettes, inhalants, cannabis and other narcotics. Those who were younger (12-13 years of age) started with cigarettes, while those who were older before they used any drugs, tended to start with alcohol. However, all of them used both cigarettes and alcohol before moving on to illegal drugs. About 7% did not use any inhalants and went directly to the use of cannabis after using alcohol and cigarettes. Less than 1% followed this path to the use of other narcotics. Nearly 3% of those who followed the main route through both inhalants and cannabis used also other narcotics. This suggested that the path to more serious drug abuse was more common when inhalants were used between the use of legal drugs and cannabis.

Most of the prior studies on the progression of drug involvement have been carried out among adolescents. Chen and Kandel went a little further and conducted a 19-year follow-up study of adolescents through to the age of 34-35 years. The cohort of former adolescents had provided the basis for Yamaguchi and Kandel's earlier report in 1984 which based on a follow-up of the cohort up to the age of 25 (Kandel et al. 1992). This additional follow-up permitted detailed monitoring of drug behavior past the period of risk for initiation into the relevant licit and illicit drugs. Four stages were identified: 1) legal drugs, alcohol or cigarettes; 2) marijuana; 3)

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illicit drugs other than marijuana (psychedelics, cocaine, heroin); and 4) medically prescribed psychoactive drugs (methadone, sedatives, minor and major tranquillizers, stimulants, antidepressants and opiates other than heroin). Also in this study progression to illicit drugs among men was dependent on prior use of alcohol, and among women on either cigarettes or alcohol. Age at the onset and the frequency of use at a lower stage of drug use were strong predictors for further progression.

This follow-up study also allowed the analysis of the natural history of drug use among individuals identifying maturational processes. The major risk periods for initiation of alcohol, cigarette and marijuana use were mostly over by the age of 20, with peaks occurring at ages 16 for cigarettes and 18 for alcohol and marijuana (Figure 11). The risk for cocaine initiation appeared to peak at the ages of 21 to 24 and to taper off by the age of 30 years. The overall patterns of risk are very similar for men and women. From the late 20s to the mid-30s, a much higher proportion of users stopped than started to use drugs. Of all the drugs, alcohol and cigarettes showed the most persistence (Figure 12). Among the illicit drugs, persistence was highest for marijuana, followed by cocaine and non-prescribed minor tranquillizers.



Figure 11. Hazard rates (initiation) by age for alcohol, cigarettes, marijuana and cocaine (Kandel and Logan 1984)

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Following sharp increases during adolescence, the usage of alcohol and cigarettes stabilizes in the late teens and declines slightly in the late 20s (Figure 12). By contrast, following the continuous increase through the age of 19 and a stabilization period of 4 to 5 years later, the use of marijuana begins a continuous decline at about the age of 23-24. By the age of 34-35 years, only 19.8% of previous users were still using marijuana within the past year. The usage pattern for other illicit drugs was similar to that for marijuana. Following the initiation, there was less persistence in the use of illicit drugs than in the use of alcohol and cigarettes.

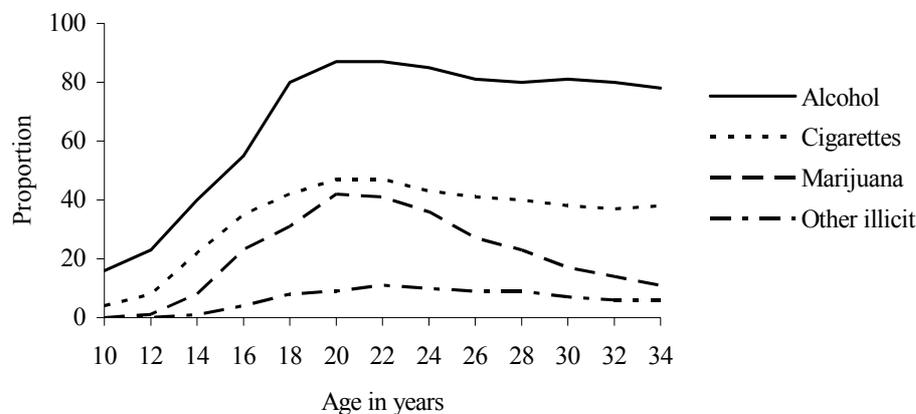


Figure 12. Current monthly use of cigarettes, alcohol, marijuana and other illicit, by age (Chen and Kandel 1995)

The maturational trend in the use of marijuana and alcohol appeared more clearly from the period of highest use than from the use per se (Kandel & Logan, 1984) (Figures 12 and 13). For alcohol and marijuana, the periods of relative highest usage peak in late adolescence and early adulthood, from ages 19 to 21 for alcohol, and 19 to 22 for marijuana (Figure 13). The subsequent decline, sharper for marijuana than for alcohol, continued until the end of the observation period. Earlier studies (Raveis & Kandel, 1987) indicate that the proportions reporting highest periods of smoking increase sharply through the early 20s and appear to stabilize by the age of 22. The longer term follow-up indicates only a slight decline in these proportions by the age of 34-35 years (Figure 13). Cigarette smoking appears to be the most stable of all the drug behaviours with respect to quantities

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consumed. Cigarette smoking manifests in regular and persistent usage patterns throughout adulthood, and probably constitutes one of the most serious drug-related health problems.

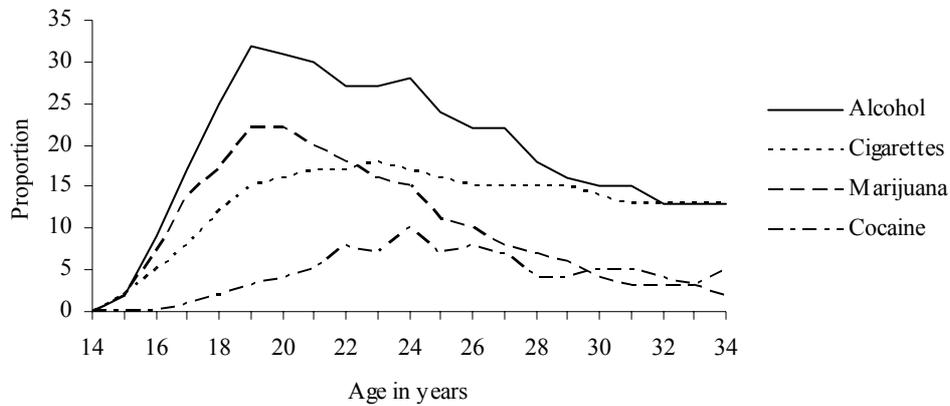


Figure 13. Period of highest use for alcohol, cigarettes, marijuana and cocaine, by age, as a proportion of those who had used each drug class at least 10 times by ages 34-35 (Chen and Kandel 1995)

4. UNIVERSITY STUDENTS' MENTAL HEALTH AND STRESS EXPERIENCE IN FINLAND

This part of the review concentrates on the studies among Finnish university students. The first psychiatrist started his work in the Finnish Student Health Service (FSHS) in 1951, and since then regular surveys have been conducted to evaluate the need for psychiatric treatment and mental health counselling among Finnish students (Alanen et al. 1968).

The changeover to university studies is a major life change for young people (Lu, 1994). Although it typically affects young people in their late adolescence, it has many features in common with other major life events affecting the general

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population. The transition to university may well appear on standard life event checklists as a discrete, major and acute life change. Daily hassles, such as residence problems, academic demands, social disruptions and initiations are actually the underlying stressors of student life. In a prospective analysis, the perceived social demands of university life alone accounted for 11% of the variance in psychological distress (Lu, 1991).

According to studies on the whole Finnish population in the 1970s, people with a lower education and those belonging to the lowest social group experienced more psychic symptoms than persons with a higher education and white-collar employees. At that time the least symptoms were experienced by university students (Pahkinen, 1998). Subsequently the situation has changed, and already a decade later university students, especially female students, displayed the most psychic symptoms among all occupational categories. During these decades the atmosphere in the universities underwent change. The customs of student life changed from a free academic orientation before the sixties to an achievement orientation in the eighties (Silvonen, 1991). Admittance to university became more difficult and many students tried several times before they were admitted to university. The threat of unemployment during the study years as well as after graduation became real in the 1980s, and along with it the economic situation of the university students worsened.

One of the very first follow-up studies among Finnish university students was done by Alanen et al. (1968) and Vauhkonen et al. (1969), who evaluated the need for psychiatric treatment and mental health counselling among students. In 1965, a random sample of 284 university freshmen were interviewed by six psychiatrists. Signs of mental disturbance were found in 23% of the students (Alanen et al. 1968). In most cases, mild neurotic disturbances were involved. When the same students were re-evaluated in their third and fourth study year, the prevalence of psychic

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disturbances had risen to 29%. The increase was marked especially in the severe categories V and VI (Vauhkonen et al. 1969).

Tuori and Peräsalo (1984) investigated first-year students in 1976-1977, comparing them to those in 1979-1980s. Among female first-year students, depression increased from 13% in 1976/1977 to 20% in 1979/1980, and among male first-year students from 6% in 1976/1977 to 14% in 1979/1980. Tension increased from 12% to 15% among female students, and from 9% to 12% among male students during these three years. In this study the first-year students in 1976/1977 were also re-evaluated in their third study year. The results showed that insomnia, depression and tension had increased during the progress of the studies.

Parallel frequencies of insomnia, depression and tension among university students were also found in a study a few years later (Suomalainen et al. 1984). This study consisted of a random sample of 2200 university students, who were in their fifth year of studies on average. Depression (some or much) was reported by 18%, tension by 13% and anxiety by 11% of these students. Saari (1981) also found in her study that the stress experience and psychic symptoms of university students increased during the first three years of studies.

In the study of Nyström (1993a) the above-mentioned increase in female students' mental symptoms was also seen: 25.5% of female students reported some or much depression. Among male students the respective figure continued to be 13%, i.e. on the level of 1979/1980. Tension among female students increased from 15% in 1978/1980 to 18% in 1989/1990 and among male students from 12% to 14%, respectively. Anxiety was reported by 14% of female and 9% of male students.

Depression was by far the most common reason for a student to contact the mental health services at FSHS in 1987-1997, 20% of students who visited the FSHS for mental health care suffered from depression (Pahkinen, 1998). The number of

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depressive students in mental health care almost doubled between periods 1987-1990 and 1995-1997.

AIMS OF THE STUDY

The main aims of this prospective study on Finnish university students during their five years of studies were:

1. To obtain descriptive data on the patterns of alcohol use and the factors associated with it.
2. To compare the patterns of alcohol consumption, smoking, drug abuse and other health risk factors among the fifth-year students to those among the first-year students to see whether there are significant changes.
3. To determine the need for intervention of alcohol problems, smoking and drug abuse among the fifth-year university students.
4. To obtain descriptive data on the first-year and fifth-year university students' mental health parameters and stress experiences.

SUBJECTS AND METHODS

1. Finnish Student Health Service (FSHS)

Health services for university students in Finland are provided by the Finnish Student Health Service (FSHS), a foundation established in 1954 by the National Union of Finnish Students. Having 16 health care centres all over the country, FSHS provides preventive health care, medical care, mental health care and dental care for all the university students in Finland. In the academic year 1989/90 there were 97 362 university students within the area of operation of the FSHS. In 1993/94 the number of students had risen to 107 473. The largest health care centre is located in Helsinki, with the largest number of university students, 36 353 in 1993/94.

Every first-year student is sent a written request to attend a health check-up, together with a questionnaire to be filled out before the appointment. In addition to the questionnaire, the health check-up normally consists of an interview by a nurse, sight screening, blood pressure measurement, dental check-up by a dentist and, if needed, examination by a physician, laboratory tests or X-ray.

Health promotion is integrated into these check-ups and in the students' visits for treatment. Health education programmes and activities promoting environmental health and safety in the universities have also been developed in co-operation with student organizations. Annually more than 50% of the students visit a physician, slightly under 50% a dentist, and 5% a psychiatrist or psychologist at the FSHS. Visits to general practitioners constitute about 2/3 of all the visits to a physician.

2. Subjects

The longitudinal study started in the academic year of 1989/90 with all the first-year university students within the scope of the FSHS health care centre in Helsinki. Only foreign students and those 30 years of age or over were excluded. Altogether 3836 students were included. The first part of the study was carried out in connection with the health check-up. The first-year university students received the normal invitation letter with a traditional questionnaire, and an additional questionnaire with 48 questions about alcohol and drug use patterns. Questions inquiring personal data, screening for symptoms of diseases, health problems, and screening for behavioural risks were also included. Both questionnaires were to be completed before the check-up. A second request was sent to those who didn't come to the health check-up. Both the traditional health check-up questionnaire and the study questionnaire included questions on alcohol use patterns, some of the questions being the same. In this study these two questionnaires have been combined, so from now on only one questionnaire will be referred to. The participation rate was 66% (2520 students), of whom 70% were female and 30% male students.

Following the prospective nature of the study, the same students were re-examined in their fifth year of studies. The target group had diminished to 2877 students; The same questionnaire was sent to them. The mailing started in January 1994 and continued until September 1994. A reminder was sent with the questionnaire to those who had not returned the questionnaire in four weeks, and another reminder after two more months. 1675 university students returned the questionnaire with their name. 161 identified students were not reached at all; many of them had unknown, unlisted addresses, or lived abroad. One student was confirmed to have died. Some students belonging to the target group returned unfilled questionnaires with a note that they didn't want to take part in the study because they had finished

SUBJECTS AND METHODS

their studies. These two groups were excluded from the study. After these exclusions the participation rate was 65%.

Also 85 questionnaires were returned without any name or social security number. Most of them, however, revealed their sex. By utilizing all the possible information from the questionnaires, 600 male and 1129 female fifth-year students returned the questionnaire. About two thirds of the respondents were female (65.2%). The mean age of the fifth-year students was 26.7 (range 23 to 34) years.

24 of the 85 unidentified students mentioned their faculty or the school in which they were enrolled. 77.0% of the participating students came from the University of Helsinki, 15.1% from the schools of economics, business and administration, and 7.4% from the academies of art or industrial art. Some of the students returned only a partly completed questionnaire, and their data were also included in the study.

Enclosed with the questionnaires the students also got a referral to the FSHS laboratory for blood tests, but only 644 students, 447 female and 197 male students went to the laboratory tests. The laboratory was open only in the morning from 8 am to 10 am, and most of the students reported not being able to go there during office hours.

3. Methods

3.1 Questionnaire

The questionnaires to the first-year students were sent in the academic year 1989/1990 together with an invitation to the health check-up. They were precompleted and brought in by the students to the health check-up. Identical questionnaires were sent to the fifth-year students starting in January 1994.

SUBJECTS AND METHODS

The questionnaires included questions on personal data, screening for symptoms of diseases, health problems, and screening for behavioural risks. Alcohol consumption was estimated by a quantity-frequency scale (10 fixed frequency alternatives for 6 different beverages) and as a mean-weekly estimate of five different beverages (Appendix 2).

Those students with no alcohol intake during the previous year were considered abstainers (Appendix 1, question 78). The questions about reasons for not using alcohol at all and about the positive and negative consequences of alcohol drinking were the same as in the Finnish drinking habit survey (Simpura, 1987). Smoking was inquired by 2 questions: Have you ever smoked regularly every day? How many cigarettes, pipefuls or cigars do you smoke every day?

One question inquired about drug abuse: Have you used or tried a) cannabis or marijuana, b) i.v. drugs, c) other drugs, d) medicines to get dizzy and e) medicines and alcohol together for intoxication? The alternatives for the answer were no, once, 2-4 times, and more often.

A mental health screen developed at the FSHS by Saari (1979) was used for the determination of stress and competence (Appendix 1, question 55). Depression, tension and anxiety were asked on a 4-point scale: much, some, a little, and not at all (Appendix 1, question 54). Questions about the students' personality and self-esteem were asked on a 3-point scale (the statement applies to you: very well, to some extent, not at all; Appendix 1, question 113).

Subjective health status was inquired on a 5-point scale (poor to excellent). The students' activity in physical exercise was asked by 2 questions: Are you active in sports for physical fitness, swimming, jogging, skiing, ball games, etc: 1) every day, 2) 3-4 times a week, 3) 1-2 times a week, 4) less frequently, 5) not at all. Do

you participate in competitive sports? Yes, type....(Appendix 1, questions 15 and 16).

There were also questions from the most widely used screening tests for the detection of alcohol-related problems and alcoholism, CAGE (Eving, 1984), Mm-MAST (Kristenson & Trelle, 1982) and trauma score (Skinner et al. 1984). In the first-year analyses only the Mm-Mast questionnaire proved suitable in this population for the detection of heavy drinking or alcohol-related problems (Nyström, 1993a). Therefore they are not analyzed further in this study.

3.2 Blood samples and analyses

Fasting blood samples were obtained and serum was separated at the FSHS laboratory. The sera were analyzed at the National Public Health Institute for GGT, ASAT, ALAT, cholesterol and HDL-cholesterol. GGT and amino transaminases were analyzed according to the Scandinavian recommendations (The Committee on Enzymes 1974 and 1976). Cholesterol concentrations were determined from the serum samples using an enzymatic method (CHOD-PAP, Monotest, Boering Mannheim). The concentrations of HDL-cholesterol were measured from serum by the same method after precipitation of VLDL and LDL with dextran sulphate-magnesium chloride (Kostner, 1976). MCV was analyzed by the auto-analyzer Sedyn 1600 at the FSHS laboratory on the same day, and reference values were 76-96 fl. The serum samples were stored at -80° C for possible future analysis.

The students with abnormal laboratory test results were sent to a physician in order to confirm the reason for the abnormality.

4. Statistical analysis

Statistical analyses were carried out with the BMDP statistical programs, version 1988 (Dixon 1988), in a VAX/VMS minicomputer and the Confidence Interval Analysis (CIA), version 1.0, for microcomputer (Gardner et al.1989). The input data manager and data base, ObsMan version 2.1, was used for the handling of data.

The descriptive results are expressed as means with 95% confidence intervals (abbreviated CI in results), and they were calculated using a BMDP program 2D. Medians and ranges are also used for data description. Comparison of different time points and associations between variables were mainly carried out using Pearson's Chi-square test with the BMDP program 4F. If not specified, $p < 0.05$ is considered the limit for significance in the results, and p values greater than 0.05 are marked as not significant. Significances of the differences in proportions were also calculated by using 95% confidence intervals, so that if 0 was included in the confidence intervals, the difference was not significant.

Even though some students didn't answer all the questions, their responses were included in the statistical analyses.

RESULTS

In the first inquiry, in 1989/90, 2520 students (70.5% women and 29.5% men) took part in the study. In the academic year 1993/94 there were 1675 fifth-year students who answered the questionnaire with their personal data. In addition to this, 85 students completed the questionnaire anonymously. Many of these students filled in either their sex or faculty, however. Totally 1129 female and 600 male students returned the questionnaire (65.3% and 34.7% respectively).

The marital status of the students had predictably changed during the survey (Table 9). Of the female students 52.4% were unmarried, 19.1% married, 27.5% cohabiting and 1.1% divorced or widowed. For the male students the percentages were 58.3%, 16.2%, 24.7% and 0.8% respectively. In the beginning of the survey 82% of the students (all students taken together) were still unmarried.

Table 9. Marital status of university students, by gender in their first and fifth year of studies

	Female		Male	
	First year	Fifth year	First year	Fifth year
	% (n)	% (n)	% (n)	% (n)
Unmarried	81,1 (1403)	52,4 (589)	84,3 (606)	58,3 (350)
Married	4,4 (76)	19,1 (215)	3,1 (22)	16,2 (97)
Cohabiting	14,0 (242)	27,5 (309)	12,5 (90)	24,7 (148)
Divorced/widowed	0,5 (8)	1,1 (12)	0,1 (1)	0,8 (5)
Total	100,0 (1729)	100,0 (1125)	100,0 (719)	100,0 (600)

There had been considerable changes also in the students' income sources: In the fifth year of their studies 54.6% of the female and 54.1% of the male students were still mainly financed by a study loan. However, the share of the support from the students' parents had decreased to 3.6% for female students and 2.7% for male

RESULTS

students from 16.4% for female and 16.1% for male students in their first study year. The share of employment had increased from 9.5% to 31.1% for female, and from 14.5% to 35.3% for male students. This means that about one third of the fifth-year students were working at least part-time in addition to their university studies.

1. Alcohol use patterns of students

1.1 Alcohol consumption

Altogether 2520 first-year university students and 1725 fifth-year students answered questions concerning their alcohol consumption in the questionnaire.

Alcohol consumption was estimated by calculating the weekly alcohol consumption as grams of pure ethanol. Students with no alcohol intake during the previous year were classified as abstainers. 5.4% (CI 4.2% to 6.9%) of the fifth-year female students and 4.7% (CI 3.1% to 6.7%) of the male students were abstainers (Table 10). In their first year of studies the percentages had been 6.5% and 5.1%, respectively. The proportion of abstainers had decreased among both female and male students during the 4 years of studies, but the differences were not significant for either gender.

Alcohol consumption was estimated on the Q-F scale (Appendix 2), or if this value was missing or smaller, on the M-W scale. For users only, the mean alcohol consumption of fifth-year female students was 3.0 kg/year in pure ethanol (95% confidence interval 2.8 to 3.2, median 1.8, range 0-54.0 kg/year) and of male students 6.9 kg/year (95% confidence interval 6.2 to 7.5, median 4.2, range 0-81.3 kg/year). In the beginning of university studies, the corresponding values were 2.9

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kg/year for female and 6.9 kg/year for male students. The differences were not statistically significant.

Table 10. Proportions of Finnish university students falling into various categories of alcohol consumption, by gender and study year

	Female		Male	
	%		%	
	First year	Fifth year	First year	Fifth year
Abstainers	6,5	5,4	5,1	4,7
Social drinkers	88,6	90,2	83,2	84,5
Heavy drinkers 1)	4,9	4,4	11,7	10,8
Total %(n)	100,0 (1776)	100,0 (1125)	100,0 (744)	100,0 (600)

1) Cut point values of heavy drinking were 190g for female and 280g for male as pure ethanol per week.

Differences in alcohol consumption categories between the first and the fifth study year were not significant for $p < 0.05$

Female students reporting an alcohol intake of at least 10 kg and male students of at least 15 kg of pure ethanol per year were considered as heavy drinkers in the study of first-year university students. According to these criteria, there were 4.9% heavy drinkers among female students and 11.7% among male students. Using the same criteria, 4.6% (CI 3.4% to 6.0%) of female and 9.9% (CI 7.6% to 12.7%) of male fifth-year students were considered to be heavy drinkers.

After the start of this longitudinal study, the new lower limits for heavy drinking have been set based on the mean weekly alcohol consumption: For women, drinking more than 190 g and for men drinking more than 280 g of pure ethanol per week is considered to be heavy drinking (Sillanaukee et al. 1992). This corresponds to about 9.9 kg/year for female and 14.6 kg/year for male students. Accordingly, the students reporting at least some drinking during the previous year but not exceeding the cut-off point of heavy drinking, were classified as social drinkers. According to these criteria and using the whole material (abstainers included) 4.4% (CI 3.3% to 5.8%) of female and 10.8% (CI 8.4% to 13.3%) of male fifth-year

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students could be considered as heavy drinkers. The respective percentages analyzed from the first-year students were 4.7% (CI 3.8% to 5.9%) for female and 11.1% (CI 8.8% to 13.4%) for male students.

1.2 Drinking for intoxication

Drinking for intoxication was inquired by a question giving 10 alternatives for frequency (Appendix 1). The answers were integrated into 3 groups: drinking for intoxication at least once a week, sometimes, never. (See Table 11). Drinking for intoxication at least once a week was reported by 6.7% (CI 5.3% to 8.4%) of female and 19.9% (CI 16.7% to 23.2%) of male fifth-year students, and occasionally by 78.6% (CI 76.2% to 81.1%) of female and 73.1% (CI 69.4% to 76.7%) of male students, and never by 14.6% (CI 12.5% to 16.7%) of female and 7.0% (CI 5.0% to 9.4%) of male fifth-year students. There was thus hardly any change in the frequency of drinking for intoxication between the first and the fifth year. Also the gender difference in the frequency of drinking for intoxication remained unchanged; male students drank significantly more often for intoxication than female students ($p < 0.01$) at both time points.

Table 11. Frequency of drinking for intoxication among Finnish university students, by gender and study year

	Female		Male	
	%		%	
	First year	Fifth year	First year	Fifth year
Never	13,7	14,6	8,3	7,0
Sometimes	80,1	78,6	71,1	73,1
At least once a week	6,2	6,7	20,6	19,9
Total%(n)	100,0 (1611)	100,0 (1067)	100,0 (678)	100,0 (572)

Differences between the first and fifth study year were not significant for $p < 0.05$ among either of genders.

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1.3 Continuity of drinking patterns

Only 768 female students answered all the questions concerning alcohol consumption in both their first-year and fifth-year of studies. 67.4% of the fifth-year female students had answered also the questions on alcohol consumption in their first year of studies. Of this group 6.4% reported being abstainers, 89.2% social drinkers and 4.4% heavy drinkers (more than 190 g of pure ethanol per week) in their first year of studies, whereas in their fifth year of studies the percentages were 4.8%, 90.6% and 4.6% respectively. The proportions stayed very much the same throughout the survey.

No striking changes could be found within these 3 groups (abstainers, social drinkers, heavy drinkers) during the survey (Table 12). Half of the first-year abstainers continued to be abstainers, and 94.9% (CI 93.0% to 96.4%) of the social drinkers remained social drinkers throughout the study. Of the first-year students, only one female abstainer and 26 social drinkers had increased their drinking to the level of heavy drinking. On the other hand, over two thirds of the first-year heavy drinkers had lessened their alcohol consumption to the level of social drinking. 3.4% (CI 2.2% to 4.9%) of the female students remained abstainers throughout the study.

Table 12. Continuity of drinking patterns among female university students, as percentages of different drinking categories

	Fifth year			Total	(n)
	Abstainer	Social drinker	Heavy drinker		
First year	%	%	%	%	(n)
Abstainer	53,1	44,9	2,0	100,0	(49)
Social	1,3	94,9	3,8	100,0	(685)
Heavy drinker 1)	0,0	70,6	29,4	100,0	(34)
Total(n)	(35)	(696)	(37)	(768)	

1) Cut point values of heavy drinking were 190g for female students as pure ethanol per week

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361 male students answered the question on alcohol use in both inquiries. So 59.2% of the fifth-year male students answered the questions on alcohol consumption also in their first-year study. 4.7% of them were abstainers, 86.1% social drinkers and 9.1% heavy drinkers in their first year of studies, and the corresponding figures in their fifth year of studies were 3.9%, 87.8% and 8.3%, so the changes were not significant

64.7% (CI 8.3 to 85.8%) of the first-year male abstainers were still abstainers in their fifth-year of studies, and the rest, 35.3%, were now social drinkers (Table 13). No one had increased his drinking to the level of heavy drinking. 92.3% (CI 88.7 to 95.0%) of the first-year social drinkers had not changed their drinking habits during the survey, 6.8% of them had increased their alcohol consumption to the level of heavy drinking, and 1% had become abstainers. Most of the first-year heavy drinkers had decreased their alcohol use to the level of social drinking. 3.0% (CI 1.5% to 5.3%) of these male students stayed abstainers throughout the study.

Table 13. Continuity of drinking patterns among male university students, as percentages of different drinking categories

	Fifth year			Total	(n)
	Abstainer	Social drinker	Heavy		
First year	%	%	%	%	
Abstainer	64,7	35,3	0,0	100,0	(17)
Social drinker	1,0	92,3	6,8	100,0	(311)
Heavy drinker 1)	0,0	72,7	27,3	100,0	(33)
Total(n)	(14)	(317)	(30)		(361)

1) Cut point values of heavy drinking were 280g for male students as pure ethanol per week

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1.4 Conventional laboratory tests

A Total of 644 fifth-year students, 447 female and 197 male students, went to the laboratory tests. This was only 39.6% of the female and 32.8% of the male participants. Many students told that they were not able to go there during office hours (8 am-10 am). The participation rate of the first-year students was much higher, 64.2% (1619 students).

The laboratory test results were mostly normal. The mean GGT for female students was 12.7 ± 0.29 U/l (\pm SEM) and for male students 17.9 ± 0.65 U/l. Only 7 female students had a GGT value ≥ 30 U/l, and neither of them exceeded 50 U/l. Three male students had a GGT value ≥ 50 U/l, but none of them exceeded 80 U/l.

The total cholesterol level for female students was 4.7 ± 0.04 mmol/l (mean \pm SEM) and for male students 4.7 ± 0.06 mmol/l. Only in a few cases did the cholesterol level exceed 6 mmol/l.

2. Smoking

Students who reported smoking no cigarettes, cigars or pipefuls per day, were defined as non-smokers. Those smoking 0-1 cigarettes per day were considered as occasional smokers. Regular smokers were those smoking daily at least some cigarettes, and heavy smokers those smoking 15 cigarettes or more per day. Most of the students, in other words, 2430 (96.4%) first-year students and 1717 (97.6%) fifth-year students reported their smoking habits. 79.5% of them (CI 77.9% to 81.1%) and 87.9% (CI 86.3% to 89.4%) were non-smokers, respectively.

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Table 14 shows the changes in smoking frequency in the first and fifth study year. In the first year the number of cigarettes per day was 35 at its highest, and in the fifth year it was 40. Of the first-year students, 80.3% of the female and 77.9% of male students were non-smokers. The corresponding figures in the fifth year were 89.7% and 84.2%. The increase in the proportion of non-smokers among both genders is statistically significant. Heavy smoking (at least 15 cigarettes per day) was reported by 3.0% of the female and 5.4% of the male first-year students, and by 2.1% of the female and 5.9% of the male fifth-year students. These differences are not statistically significant.

The same decreasing trend in smoking was also seen when the proportions of current smoking and life-time prevalence were analyzed. Previously 10.4% (CI 9.0% to 11.7%) of the first-year non-smokers had smoked regularly, but had quit before starting university. In the fifth study year 17.7% (CI 15.8% to 19.6%) of the current non-smokers had also smoked regularly but had quit before their fifth year.

Table 14. Smoking frequencies among Finnish university students, by gender and study year

	Female		Male	
	%		%	
	First year	Fifth year	First year	Fifth year
Non-smokers	80,3	89,7	77,8	84,2
Occasional smokers	6,0	0,4	5,5	0,3
Regular smokers	10,7	7,8	11,3	9,5
Heavy smokers	3,0	2,1	5,4	5,9
Total	100,0 (1705)	100,0 (1120)	100,0 (709)	100,0 (589)

Differences for non-smokers between the first and the fifth study year were significant for $p < 0.05$

For heavy smokers differences were not significant.

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1092.1 Continuity of smoking patterns

There were 746 female and 344 male students who reported about their smoking in both inquiries; this is 65.1% of the fifth-year respondents. They form the data base which could possibly show the changes in smoking patterns throughout the study. Tables 15 and 16 show the continuity of smoking habits throughout the study years.

97.3% (CI 95.7% to 98.4%) of the women and 94.4% (CI 91.0% to 96.8%) of the men remained non-smokers throughout the study. There were only 18 female and 15 male students who started smoking during the follow-up. Of those who were heavy smokers in the first year, 47.1% (CI 23.0% to 72.2%) of the female and 54.5% (CI 23.4% to 83.2%) of the male students continued smoking as before in their fifth year of studies. However, more than a half of the first-year female and male smokers had quit smoking by their fifth study year.

Table 15. Continuity of smoking habits among Finnish university students, female students in their first and fifth year of studies

First year	Fifth year				Total(%)	(n)
	Non-smoker	Moderate	Regular	Heavy smoker		
Non-smoker	97,3	1,7	0,9	0,0	100,0	(635)
Moderate 1)	64,7	25,0	7,4	2,9	100,0	(68)
Regular 2)	38,5	11,5	26,9	23,1	100,0	(26)
Heavy smoker 3)	23,5	11,8	17,6	47,1	100,0	(17)
Total(n)						(746)

1) Students smoking 1-4 cigarettes per day

2) Students smoking 5-14 cigarettes per day

3) Students smoking 15 cigarettes or more per day

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Table 16. Continuity of smoking habits among Finnish university students, male students in their first and fifth year of studies

First year	Fifth year				Total(% (n))
	Non-smoker	Moderate	Regular	Heavy smoker	
Non-smoker	94,4	3,0	1,9	0,7	100,0 (269)
Moderate 1)	72,7	12,1	6,1	9,1	100,0 (33)
Regular 2)	38,7	9,7	41,9	9,7	100,0 (31)
Heavy smoker 3)	36,4	0,0	9,1	54,5	100,0 (11)
Total(n)					(344)

1) Students smoking 1-4 cigarettes per day
 2) Students smoking 5-14 cigarettes per day
 3) Students smoking 15 cigarettes or more per day

2.2 Smoking and cannabis, alcohol and some health parameters

The students reported rather well about their smoking and cannabis use: 2326 students in the first inquiry and 1690 students in the fifth-year inquiry answered both sections of the questionnaire.

Table 17. Smoking and cannabis use among Finnish university students, in their first year of studies

Cigarettes per day	Cannabis use				Total (%)	(n)
	Never	Once	2-4 times	More often		
Non-smoking	92,9	3,1	2,5	1,5	100,0	(1860)
1-4	74,4	12,8	6,8	6,0	100,0	(250)
5-14	63,4	9,9	13,7	13,0	100,0	(131)
>15	56,5	14,1	21,2	8,2	100,0	(85)
Total(n)						(2326)

Association between smoking and cannabis use is significant (Pearson Chisquare, $p < 0.01$).

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Of those who smoked a lot during their first university year (at least 15 cigarettes per day), 43.5% (CI 32.8% to 54.7%) reported at least some experimenting with cannabis (Table 17), and in their fifth studying year the corresponding percentage was 56.1% (CI 42.4% to 69.3%) (Table 18).

Among non-smoking students, the percentages were 7.1% (CI 5.9% 8.3%) and 17.2% (CI 15.2% to 19.1%) respectively. 11.1% (CI 6.9% to 15.3%) of the first-year regular smokers (at least 5 cigarettes per day) and 20.3% (CI 13.6% to 27.0%) of the fifth year regular smokers had used cannabis at least 5 times in their lifetime. The association between smoking and cannabis use was significant at both time points ($p < .01$).

Table 18. Smoking and cannabis use among Finnish university students, in their fifth year of studies

Cigarettes per day	Cannabis use				Total %	(n)
	Never %	Once %	2-4 times %	More often %		
Non-smoking	82,8	6,9	7,3	3,0	100,0	(1486)
1-4	54,6	12,1	13,6	19,7	100,0	(66)
5-14	39,5	13,6	24,7	22,2	100,0	(81)
>15	43,9	14,0	24,6	17,5	100,0	(57)
Total(n)						(1690)

Association between smoking and cannabis use is significant (Pearson Chisquare, $p < 0.01$).

Altogether 2414 first-year and 1709 fifth-year students answered the questions concerning both their smoking and alcohol consumption. The majority of the non-smokers were either abstainers or social drinkers (Tables 19 and 20).

Only 3.1% (CI 2.3% to 4.2%) of the first-year and 3.5% (CI 2.4% to 4.8%) of the fifth-year female non-smokers were heavy drinkers. Among male students these proportions were somewhat higher, 9.1% (CI 6.8% to 11.8%) and 7.7% (CI 5.5% to 10.4%) respectively.

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Table 19. Smoking and alcohol consumption among first-year university students, by gender

Alcohol consumption		Smoking frequency				(n)
		Non-smoking	1-4	5-14	>14	
Abstainer	Female	8,4	2,1	0,0	2,0	(120)
	Male	6,2	1,4	0,0	5,3	(37)
Social drinker	Female	88,5	89,6	91,4	76,5	(1507)
	Male	84,8	90,1	75,0	65,8	(593)
Heavy drinker	Female	3,1	8,3	8,6	21,6	(78)
	Male	9,1	8,5	25,0	28,9	(79)
Total%(n)		100,0	100,0	100,0	100,0	(2414)

Association between smoking and alcohol consumption is significant for both genders (Pearson Chi-square, $p < 0.01$).

Heavy drinking was much more prevalent among heavy smokers. This was true for both genders and in both study years. 21.6% of the first-year and 17.4% of the fifth-year female heavy smokers, and 28.9% of the first-year and 31.4% of the fifth-year male heavy smokers were also heavy drinkers.

Table 20. Smoking and alcohol consumption among fifth-year university students, by gender

Alcohol consumption		Smoking frequency				(n)
		Non-smoking	1-4	5-14	>14	
Abstainer	Female	5,8	4,2	2,2	0,0	(61)
	Male	5,4	0,0	0,0	2,9	(28)
Social drinker	Female	90,7	89,4	80,0	82,5	(1009)
	Male	86,9	85,0	68,4	65,7	(497)
Heavy drinker	Female	3,5	6,4	17,8	17,4	(50)
	Male	7,7	15,0	31,6	31,4	(64)
Total%(n)		100,0	100,0	100,0	100,0	(1709)

Association between smoking and alcohol consumption is significant for both genders (Pearson Chi-square, $p < 0.01$).

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Table 21. Smoking and physical exercise among Finnish university students in their first year of studies

Cigarettes per day	Physical exercise				Total	(n)
	<once a week	1-2 times/week	4-5 times/week	Daily		
	%	%	%	%	%	
Non-smoker	31,1	39,5	22,3	7,1	100,0	(1927)
1-4	30,7	43,6	21,2	4,5	100,0	(264)
5-14	49,6	30,8	13,3	6,3	100,0	(143)
>14	61,5	24,2	11,0	3,3	100,0	(91)
Total(n)						(2425)

Association between smoking and physical exercise is significant (Pearson Chisquare, $p < 0.01$)

A total of 2425 first-year and 1714 fifth year students answered the questions about both their smoking habits and physical exercise. In five years there were no remarkable changes in physical exercise: only a slight increase in the students' physical activity was noted.

Table 22. Smoking and physical exercise among Finnish university students in their fifth year of studies

Cigarettes per day	Physical exercise				Total	(n)
	<once a week	1-2 times/week	4-5 times/week	Daily		
	%	%	%	%	%	
Non-smoker	27,9	35,6	26,2	10,3	100,0	(1507)
1-4	27,3	43,9	24,2	4,6	100,0	(66)
5-14	33,7	33,7	22,9	9,7	100,0	(83)
>14	53,5	27,6	17,2	1,7	100,0	(58)
Total(n)						(1714)

Association between smoking and physical exercise is significant (Pearson Chisquare, $p < 0.02$)

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33.3% of the first-year students engaged in physical exercise less than once a week (Table 21) and 29.0% of the fifth-year students (Table 22). Physical exercise at least 4-5 times a week in the first study year was reported by 29.4% of non-smokers and 14.3% of heavy smokers; in the fifth year the figures were 36.5% and 18.9%, respectively. There was a strong negative correlation between smoking and physical activity at both time points (p values less than 0.01 and 0.02, respectively).

3. Cannabis use

In their first study year 87.8% (CI 86.5% to 89.1%) of the students reported no experience with cannabis use (Table 23); the corresponding figure in their fifth year was 78.4% (CI 76.5% to 80.4%). The increase in experimenting with cannabis during the follow-up was statistically significant ($p < 0.05$). Only one trial in their life-time was reported by 5.0% of the first-year and 7.6% of the fifth-year students. 70 first-year students (2.9%) and 88 fifth-year students (5.1%) reported the maximum use, at least 5 times in their life-time. The increase in maximum use was also significant. The gender difference was obvious in both surveys as regards both the prevalence and the frequency. In the first year 9.9% of the female and 17.7% of the male students reported at least some cannabis use, whereas the figures in their fifth study year were 18.5% and 27.7%, respectively. In the first year 2.0% of the female and 4.9% of the male students reported having used cannabis at least 5 times, and in the fifth year the figures were 4.0% and 7.3%, respectively.

There were 1086 students who answered the questions on cannabis use in both surveys (Table 24). Totally 80.5% (CI 78.1% to 82.8%) reported no cannabis use in both questionnaires. 8.7% (83) of the students who reported no cannabis use in

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their first year, reported at least some use in their fifth year. Most of them (50 students), however, reported only one trial, and only 5 students reported the maximum frequency in their fifth year. Even though the question on cannabis use included life-time use, seven students who had reported some use in the first year, did not report this in the fifth year survey.

Table 23. Lifetime use of cannabis among Finnish university students in their first and fifth year of studies

Cannabis use frequency	First year		Fifth year	
	%	(n)	%	(n)
Never	87,8	(2110)	78,4	(1344)
once	5,0	(121)	7,6	(130)
2-4 times	4,3	(103)	8,9	(152)
5 times or more	2,9	(70)	5,1	(88)
Total%	100,0	(2404)	100,0	(1714)

Differences for cannabis use between the first and the fifth study year were significant for $p < 0.05$.

The frequency of cannabis use had also increased during the five-year follow-up: of the 45 students who reported cannabis use at least five times in their fifth year, five had reported only one use occasion, and 11 students the use of 2-4 times in the beginning of their university studies. 24 students (2.2%) reported the maximum frequency in both questionnaires.

Table 24. Continuity of cannabis use among Finnish university students throughout the study years

First year	Fifth year				Total(%)	(n)
	Never	Once	2-4 times	5 times or more		
Never	91,4	5,2	2,9	0,5	100,0	(957)
Once	10,2	46,9	32,7	10,2	100,0	(49)
2-4 times	2,0	8,2	67,3	22,4	100,0	(49)
5 times or more	3,2	0,0	19,4	77,4	100,0	(31)
Total(n)						(1086)

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Altogether 2326 first-year students answered to the questions on both cannabis use and smoking (Table 17). 1860 of them were non-smokers (80.0%) and 135 occasional smokers (less than 1 cigarette per day). 85 students were heavy smokers (more than 14 cigarettes per day). Of the 281 students who reported at least some cannabis use, only one use occasion was reported by 115 students and 5 times or more by 66 students. 3.1% of the non-smoking students had used cannabis only once, 2.5% had tried it 2-4 times, and 1.5% 5 times or more. Among the heavy smokers, the percentages were 14.1%, 21.2% and 8.2%, respectively. Cannabis use was more prevalent among those who also were heavy smokers.

In the fifth year survey, 1690 students responded to both the cannabis use and smoking questions (Table 18). Of these, 1486 were non-smokers (87.9%), seven were occasional smokers, and 57 students heavy smokers. Among the non-smoking students, 6.9% had one trial with cannabis, 7.3% had tried it 2-4 times, and 3.0% 5 times or more. Among the heavy smokers, the corresponding percentages were 14.0%, 24.6% and 17.5%. The proportions of those experimenting with cannabis were again higher among heavy smokers than non-smokers.

Altogether 1690 female and 701 male students answered the questions on both cannabis use and alcohol consumption in the first-year inquiry (Table 25). There were 119 female (7%) and 38 male (5.4%) teetotallers among them, while 80 female (4.7%) and 77 (11%) male students were classified as heavy drinkers. Only one female (0.8%) and one male (2.6%) abstainer reported cannabis use at least two times. Among the heavy drinkers the corresponding figures were 28.8% and 23.4%.

In the fifth-year inquiry 1112 female and 593 male students reported both cannabis use and alcohol consumption (Table 26). Of these, 60 female (5.4%) and 27 male (4.6%) students were teetotallers, while 49 female (4.4%) and 65 male (11.0%) students were heavy drinkers. Of the abstainers, two female and one male student

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reported cannabis use at least two times, while among the heavy drinkers the percentages were 32.6% and 38.4%, respectively.

Table 25. Lifetime cannabis use and alcohol drinking patterns among first year university students, by gender

Alcohol consumption		Cannabis use				Total	(n)
		Never	Once	2-4 times	5 times or more		
Abstainer	Female	99,2	0,0	0,8	0,0	100,0	(119)
	Male	97,4	0,0	0,0	2,6	100,0	(38)
Social	Female	90,7	4,8	3,0	1,5	100,0	(1491)
	Male	84,0	5,8	6,1	4,1	100,0	(586)
Heavy	Female	66,3	5,0	15,0	13,8	100,0	(80)
	Male	62,3	14,3	11,7	11,7	100,0	(77)
Total(n)							(2391)

Association between smoking and alcohol consumption is significant for both genders (Pearson Chisquare, $p < 0.01$).

Table 26. Lifetime cannabis use and alcohol drinking patterns among fifth year university students, by gender

Alcohol consumption		Cannabis use				Total	(n)
		Never	Once	2-4 times	5 times or more		
Abstainer	Female	96,7	0,0	3,3	0,0	100,0	(60)
	Male	92,6	3,7	0,0	3,7	100,0	(27)
Social drinker	Female	81,9	7,2	7,3	3,7	100,0	(1003)
	Male	74,6	8,2	11,6	5,6	100,0	(501)
Heavy drinker	Female	55,1	12,2	16,3	16,3	100,0	(49)
	Male	46,2	15,4	16,9	21,5	100,0	(65)
Total(n)							(1705)

Association between smoking and alcohol consumption is significant for both genders (Pearson Chisquare, $p < 0.01$).

4. Physical and mental health parameters and stress experience

The health status of the university students was inquired with a question on a 5-point scale (excellent to poor). In the first year, 1713 female and 706 male students reported on their health status (Table 27). By and large, the students' health status was good. 21.8% (CI 19.8% to 23.7%) of the female and 31.0% (CI 27.6% to 34.4%) of the male students considered their health excellent, and 64.9% and 54.5% good, respectively. Fairly good, satisfactory, or poor health was reported by 13.3% (CI 11.7% to 14.9%) of the female and 14.6% (CI 12.0% to 17.2%) of the male students. The number of students reporting satisfactory or poor health was so small that these two classes were combined. Male students, significantly more often than female students, reported that their health was excellent.

Table 27. Finnish university students' health status, by gender and study year

	Female		Male	
	%		%	
	First year	Fifth year	First year	Fifth year
Excellent	21,8	28,8	31,0	35,1
Good	64,9	59,6	54,4	51,5
Fairly good	12,3	10,3	12,3	12,4
Satisfactory, poor	1,0	1,3	2,3	1,0
Total%(n)	100,0 (1713)	100,0 (1116)	100,0 (706)	100,0 (587)

In the fifth year, 1116 female and 587 male students reported on their health status. The subjective health status of the students seemed to have improved, but not significantly. 28.8% (CI 26.1% to 31.4%) of the female and 35.1% (CI 31.2% to 39.0%) of the male students perceived their health as excellent, and 59.6% and

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51.5% as good, respectively. Only 11.6% (CI 9.7% to 13.4%) and 13.4% (CI 10.7% to 16.2%) found it fairly good, satisfactory or poor, respectively. Male students still reported significantly more often that their health was excellent.

There was a higher percentage of heavy drinkers among the first-year female students who reported satisfactory or poor health than among those with excellent health (Table 28).

Table 28. Reported subjective health and alcohol consumption among first year university students, by gender

Alcohol consumption		Health status				Total%	(n)
		Excellent	Good	Fairly good	Satisfactory,poor		
Abstainer	Female	22,5	60,8	15,0	1,7	100,0	(120)
	Male	32,4	62,2	5,4	0,0	100,0	(37)
Social drinker	Female	22,0	65,6	11,6	0,9	100,0	(1515)
	Male	31,4	54,1	11,9	2,6	100,0	(590)
Heavy drinker	Female	16,7	57,6	23,1	2,6	100,0	(78)
	Male	27,8	51,9	19,0	1,3	100,0	(79)
Total(n)							(2419)

Association between reported subjective health and alcohol consumption is significant for female (Pearson Chisquare, $p=0.03$) but not for male ($p=0.55$).

Among the male first-year students who reported excellent health, the percentage of heavy drinkers was higher than among those with satisfactory or poor health. The association between reported subjective health and alcohol consumption was significant for female students (Pearson Chi-square $p = 0.03$) but not for male students ($p = 0.56$). In the fifth year of studies the percentages of those with poorer health were somewhat higher (but not significantly) than of those with excellent health (Table 29).

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Table 29. Reported subjective health and alcohol consumption among fifth year university students, by gender

Alcohol consumption		Health status				Total%	(n)
		Excellent	Good	Fairly good	Satisfactory,poor		
Abstainer	Female	30,0	61,6	5,0	3,4	100,0	(60)
	Male	25,0	53,6	17,9	3,6	100,0	(28)
Social drinker	Female	28,3	60,1	10,5	1,1	100,0	(1006)
	Male	36,5	51,4	11,3	0,8	100,0	(496)
Heavy drinker	Female	36,0	50,0	12,0	2,0	100,0	(50)
	Male	28,6	50,8	19,0	1,6	100,0	(63)
Total(n)							(1703)

Association between reported subjective health and alcohol consumption is not significant for either gender (Pearson Chisquare, $p=0.43$ and $p=0.24$).

Depression, tension and anxiety were inquired with a 4-point scale (much, some, a little and not at all). The prevalence of depression had increased during the five years at university (Table 30), and the increase was significant in both genders. In the first year, 31.3% (CI 29.1% to 33.5%) of the female and 45.5% (CI 41.7% to 49.1%) of the male students reported no depression at all, whereas in the fifth year the corresponding percentages were 26.8% (CI 24.2% to 29.4%) and 37.0% (CI 33.1% to 40.9%). During the follow-up, the proportion of those reporting a high level of depression rose from 4.5% (CI 3.6% to 5.6%) to 7.3% (CI 5.8% to 9.0%) among female students, and from 2.5% (CI 1.5% to 4.0%) to 5.0% (CI 3.4% to 7.1%) among male students.

In the fifth year of studies, alcohol consumption seemed to associate with depression among female students but not among male students. 16.0% of the heavy drinking female students felt much depression, while among the other female students the percentage was 6.9%. Among those with no depression, only 3.4% were heavy drinkers, 88.2% were social drinkers, and 8.4% abstainers.

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Table 30. Depression among university students, by gender and study year

Depression	Female		Male	
	First year	Fifth year	First year	Fifth year
Not at all	31,3	26,8	45,5	37,0
A little	43,3	39,0	41,3	37,3
Some	20,9	26,9	10,7	20,7
Much	4,5	7,3	2,5	5,0
Total%(n)	100,0 (1721)	100,0 (1109)	100,0 (707)	100,0 (584)

Differences for depression between the first and the fifth study year are significant for $p < 0.05$ among both genders.

9.4% of the heavy drinking male students had a great deal of depression, while among the others this percentage was 4.4%. The proportion of heavy-drinking male students who felt no depression was 8.8%, versus 11.0% for the total male population.

There was no association between smoking and depression in the fifth year ($p=0.09$). 30.4% of the non-smokers felt no depression, 39.4% felt only a little, 24.2% some, and 6.0% much depression. Among the heavy smokers the corresponding figures were 25.9%, 29.3%, 36.2% and 8.6%.

During the follow-up, also tension seemed to increase among the students. The increase, however, was significant only among female students. In the first-year, 41.0% (CI 38.6% to 43.3%) of the female and 43.3% (CI 39.7% to 47.0%) of the male students felt no tension, whereas in the fifth year the corresponding percentages were 36.9% (CI 34.0% to 39.7%) and 39.0% (CI 35.0% to 43.0%) (Table 31). Some or much tension in the first study year was reported by 18% (CI 16.2% to 19.8%) of the female and 13.7% (CI 11.1% to 16.2%) of the male students, and in the fifth year by 24.4% (CI 21.9% to 26.9%) of the female and 20.3% (CI 17.0% to 23.5%) of the male students.

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Table 31. Tension among university students, by gender and study year

Tension	Female		Male	
	First year	Fifth year	First year	Fifth year
Not at all	41,0 *	36,9 *	43,3	39,0
A little	41,0	38,7	43,0	40,7
Some 1)	15,0	20,5	11,1	17,0
Much 1)	3,0	3,9	2,6	3,3
Total%(n)	100,0 (1721)	100,0 (1107)	100,0 (704)	100,0 (582)

* Difference is significant for $p < 0.05$.

1) Differences for (Some + Much) between the first and the fifth study year are significant for $p < 0.05$ among both genders.

In the fifth year, 30.0% of the heavy-drinking female students didn't feel any tension, 34.0% felt only a little, 28.0% some, and 8.0% much. Among the other female students the corresponding figures were 37.2%, 39.0%, 20.2% and 3.7%. For heavy-drinking male students the corresponding percentages were 31.3%, 42.2%, 18.8% and 7.8%, and for the other male students 40.0%, 40.5%, 16.8% and 2.7%. These differences were not significant for $p < 0.01$ in either gender. Neither was there any association between smoking and tension.

In the first year, 58.8% (CI 56.5% to 61.2%) of the female and 69.2% (CI 65.8% to 72.6%) of the male students didn't feel any anxiety, whereas in the fifth year the respective figures were 46.6% (CI 43.7% to 49.6%) and 53.6% (CI 49.6% to 57.7%) (Table 32). The increase in anxiety was significant in both genders. Some or much anxiety was reported by 13.9% (CI 12.2% to 15.5%) of the female and 9.2% (CI 7.2% to 11.6%) of the male first-year students, and by 22.1% (CI 19.6% to 24.5%) of the female and 16.1% (CI 13.1% to 19.1%) of the male fifth-year students.

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Table 32. Anxiety among university students, by gender and study year

	Female		Male	
	%		%	
Anxiety	First year	Fifth year	First year	Fifth year
Not at all	58,8	46,6	69,2	53,6
A little	27,3	31,3	21,6	30,3
Some	10,5	17,1	7,1	12,8
Much	3,4	5,0	2,1	3,3
Total%(n)	100,0 (1721)	100,0 (1107)	100,0 (704)	100,0 (582)

Differences for anxiety are significant for $p < 0.05$ among both genders.

In the fifth year, 34.0% of the female heavy drinkers felt no anxiety, 26.0% felt a little, 28.0% some, and 12% much. Among the other female students the corresponding figures were 47.3%, 31.9%, 16.6% and 4.6%. For male heavy drinkers the figures were 45.2%, 29.0%, 16.2% and 21.1%, and for the other male students 54.7%, 30.4%, 12.0% and 2.9%. The differences were not significant for either gender.

A mental health screen developed at the FSHS by Saari was used for the determination of stress and competence (Saari, 1979). Stress was calculated from the answers to the questions as a sum of negative answers. The cut-off point for stress was 3, so that stress was present if the sum of the negative answers was 4 or more. In the first year, stress was reported by 8.6% (CI 7.3% to 10.0%) of the female and 7.6% (CI 5.7% to 9.8%) of the male students; in the fifth year the corresponding percentages were 13.8% (CI 11.8% to 15.8%) and 15.7% (CI 12.8% to 18.7%) (Table 33). The differences between the genders were not significant in either of the surveys. However, stress had increased significantly among both genders during the follow-up.

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In the first year, stress was felt by 17.1% of the heavy-drinking female students versus 8.2% of the others, the difference being significant ($p = 0.002$). The difference was smaller (12.7% vs. 7.3%) and not significant among the male students. In the fifth year, on the contrary, the difference in the stress experience between heavy-drinking students and others was significant among males (25.8% vs. 14.5%) but not among females (18.4% vs. 12.4%).

A significant correlation was found between smoking and stress in the fifth year of studies ($p < 0.01$). 14.5% of all the students were stressed, while 24.1% of the heavy smokers and 13.2% of the non-smokers were stressed.

Table 33. Stress experience among university students, by gender and study year

Stress	Female		Male	
	%		%	
	First year	Fifth year	First year	Fifth year
Absent	91,4	86,2	92,4	84,3
Present	8,6	13,8	7,6	15,7
Total%(n)	100,0 (1719)	100,0 (1108)	100,0 (699)	100,0 (579)

Differences in stress experience between the first and the fifth study year are significant for $p < 0.05$ among both genders

Sports activities were inquired with a 5-point question (activity every day, 3-4 times a week, 1-2 times a week, less frequently, not at all). In the first year, 24.3% (CI 22.2% to 26.3%) of the female students and 35.8% (CI 2.2% to 39.3%) of the male students participated in sports and physical activity at least 3 times a week, and the corresponding figures in the fifth year had risen to 34.3% (CI 31.5% to 37.0%) and 37.6% (CI 33.8% to 41.6%). The increase in activity was significant among the female students but not among the male students. Less frequent or no activity at all was reported by 34.9% (CI 32.7% to 37.2%) of female and 29.2% (CI

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25.9% to 32.6%) of male first-year students and 29.3% (CI 26.7% to 32.0%) of female and 28.1% (CI 24.4% to 31.6%) of male fifth-year students.

Most of the physically active students were social drinkers. In their fifth year of studies, 88.8% of the female students and 84.7% of the male students who engaged in some physical activity at least 3 times a week were social drinkers, 4.4% and 5.0% were abstainers, and 6.8% and 10.4% were heavy drinkers, respectively. The association between physical activity and alcohol consumption was positive among female, but negative among male students. More than a half (53,1%) of the heavy-drinking female students were active in some form of physical activity at least 3 times a week. Among male students the corresponding percentage was 20.7%.

Smoking correlated negatively with physical activity ($p= 0.02$). More than a half (53.4%) of the students who smoked more than 15 cigarettes per day were active in sports only occasionally or not at all. Among non-smokers the respective percentage was 27.9%. On the other hand, 36.5% of the non-smokers engaged in some physical activity at least 3 times a week, while the corresponding percentage among heavy smokers was 18.9%.

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University students are in general considered to be very liberal with respect to alcohol use. This phenomenon has been found globally. On the other hand, in Finland young people have grown up in an alcohol culture which is characterized by drinking with the intention of reaching a state of intoxication. These students therefore these students have little need to hide or underrate even heavier alcohol consumption.

The present prospective study had some limitations. Firstly, the questionnaire included two forms with questions, the traditional first-year health check-up form and the primary study form. Some of the questions were more suitable for first-year students and didn't function so well in the fifth-year inquiry (first-year health check-up questions). Secondly, in order to be an actual follow-up study, the questionnaires should have been identical at both times. For the sake of comparison, we should have been able to combine the data on the first-year and the fifth-year students. This, however, prevented the questionnaires from being anonymous; they should contain at least the respondent's social security number. This aroused a lot of criticism among the students and may have led to the under-reporting of alcohol consumption, smoking or drug abuse, or may have lowered the participation rate. We don't know how many students refused to take part in the study simply for this reason. Many students also answered anonymously, and consequently their fifth-year results could not be compared to those of the first-year, and no follow-up concerning them could be done. This lowered considerably the number of students whose fifth-year data could be compared to those of the first-year.

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There were also numerous students who did not answer all the questions. In many cases they inadvertently failed or forgot to fill out the health check-up questionnaire. In these cases the results were, nevertheless, included in the study. This explains the variation in the sample sizes in the different analyses.

There were also some problems of tracing the students in their fifth year. The universities have their student registers, but they are usually lag behind in time. Numerous students had already graduated and therefore didn't consider themselves to be students, and refused to answer the fifth-year questionnaire. Many of them had also moved abroad and couldn't be reached. In the fifth year, the mailing of the questionnaires couldn't be started until the first quarter of 1994, and it lasted till the summer, when many students had already moved away from their student residences. This was true especially for the students of the College for Veterinary Medicine, where the participation rate was very low (17.1%). The students had scattered all over the country for their clinical practice already during the spring term.

Despite the all above-mentioned problems, the participation rate rose to 65.5%, which was nearly the same as in the first year (66.0%). The gender distribution was also similar; one third of the respondents were male students.

The response rate was of about the same magnitude as in other recent studies among Finnish university students (Lempinen, 1997; Kunttu, 1997), and in the majority of postal studies abroad (O'Hare, 1990; Perkins, 1992; Sundbom, 1992; Wechsler et al. 1992; Schuckit et al. 1994; Wechsler et al. 1995).

As this prospective assessment of students' drinking habits relies on self-reports of alcohol use, the reporting bias may influence the results. Students are, however, known to report rather accurately about their alcohol and drug use (Reinisch et al. 1991; Gilkinson et al. 1992). In addition, there is evidence that self-reports do

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remain consistent over time (Bailey, 1992; Reinisch et al. 1991). Therefore the results of this prospective study can be considered to be reliable. Nonresponders may be another source of bias. It is possible that there is more heavy drinking and more drug abuse among nonresponding students, but the same phenomenon would be present in both inquiries. It is very likely that the students with drug abuse problems (alcohol, cannabis, smoking) who didn't take part in the first-year inquiry, wouldn't have done so in the fifth-year either.

Many important changes occurred in the students' lives during the follow-up. Many got married or lived in cohabitation, moved away from their parents' home or from a student residence to their own dwelling, many had already completed their studies and started regular work. Marital status is known to be related to the levels of alcohol consumption and alcohol problems (Miller-Tutzauer et al. 1991). Life course changes associated with assuming adult role responsibilities such as marriage and parenting have been associated with a lowered incidence of alcohol abuse (Chilcoat & Breslau, 1996). In the first-year 24% of the female and 16% of the male students were married or cohabiting, whereas in the fifth year the proportions were 47% and 41%, respectively. In the first year 10% of the female and 15% of the male first-year students financed their studies by working, while in the fifth year the percentages were 31% and 35%, respectively. These changes in life-style and social settings, and maturation which occurred during the 5 years of follow-up have probably some influence on the students' drinking and smoking habits. Several studies on college students in the USA have shown a high correlation between heavy drinking and typical characteristics of student life: e.g. residence in a fraternity or sorority, a party life-style, and an involvement in college athletics (Wechsler et al. 1995; Wechsler et al. 1997). In a Finnish study (Nyström, 1993b) the correlations were not so significant among the first-year university students.

1. Alcohol consumption

Alcohol consumption was estimated in two ways, either with the Q-F scale (Quantity-Frequency scale for estimating alcohol consumption) or the M-W scale (Mean weekly scale for estimating alcohol consumption). If the value of the mean alcohol consumption on the Q-F scale was missing, or smaller than on the M-W scale, the latter estimation was chosen. Abstainers were students with no alcohol intake during the previous year.

In the analysis of the first-year students' alcohol consumption (Nyström, 1993b) heavy drinking was defined as alcohol intake of at least 10 kg of pure ethanol per year for female and 15 kg for male students. On a weekly basis, the limits for heavy drinking were 192 g/week and 288 g/week, respectively. After that, based on epidemiologic studies on alcohol-induced diseases, new limits have been suggested for heavy drinking (Sillanaukee et al. 1992). Alcohol consumption of 190 g/week, as pure ethanol, for women, and 280 g/week for men were defined as limits for heavy drinking. These new values have been used also in this study. In the comparison of drinking patterns in different countries, it has to be noted that the definition of alcohol unit size differs somewhat by country. On the other hand, there is some variation in determining the level of alcohol consumption ('sensible' drinking vs. heavy or hazardous drinking).

Most of the studies on the students' alcohol drinking patterns have been carried out in the USA, and they have revealed the extensive use of alcohol among college students. The persistent high rate of heavy drinking among these populations is particularly notable (O'Hare, 1990; Meilman et al. 1990). Recent research has revealed a drinking style that is characterized by more frequent and heavier alcohol use, intoxication and drinking in order to get drunk (Wechsler et al. 1994).

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However, there are also studies reporting a more moderate drinking style. In Meilman's study (Meilman et al. 1990) over 25% of the campus drank one drink or less per week, which was contrary to the popular view among students that 'almost everyone' drinks to excess. In Crowley's study (1991) college students were more likely to use alcohol, but tended to drink quantitatively less per drinking day than nonstudents of the same age. Students generally perceive campus use as greater than it really is (Berkowitz & Perkins, 1987), and try to emulate, in their own drinking, the campus norms they perceive (Perkins & Wechsler, 1996). Correcting the students' misperceptions could have a potential positive impact on their drinking (Haines & Spear, 1996).

The proportion of abstainers decreased to some extent both among female and male students during the 5-year follow-up. This tendency had started already in 1979/1980 when 16% of the female and 10% of the male students were abstainers (Tuori & Peräsalo, 1984). Parallel results were found in a later study among first-year university students in Turku, where 5% of the female and 3% of the male students were abstainers (Kunttu, 1997). The percentage of abstainers among Finnish students is about the same as among Swedish students, i.e. 5% (Sundbom, 1992; Näslund & Fredrikson, 1993; Borschos et al. 1999). In Norway, the percentages of abstainers were 6% for female and 5% for male students in the age group of 27-28 years (Amundsen & Fekjaer, 1998). However, compared to other countries the number of abstainers in Finland was low; among British students their proportion has varied from 14-17% (Wardle & Steptoe, 1991) to 11% (Webb et al. 1996). A study among Scottish postsecondary helping-profession students in 1994 also gave higher percentages of abstainers: 8% of the female and 11% of the male students older than 25 years were abstaining (Engs & van Teijlingen, 1996). In Canada 11-13% of the students over 21 years of age (Svenson et al. 1994), and in the USA 15-16% of the college students (Wechsler et al. 1998) were abstainers. In Finland there has been a decreasing tendency in abstaining prevalence, whereas in

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the USA the tendency has been the opposite, with an increase from 3-4% in 1977 to 19% in 1997. The gender difference in drinking prevalence, seen in the age group of the 25-34-year-old Finnish general population, was not found among university students. There were twice as many female abstainers in the normal population as among students (Helakorpi et al. 1994). This resemblance of both genders in the drinking prevalence of university students has been seen in many other studies as well (O'Hare, 1990; Webb et al. 1996). Could it indicate the equality between men and women which prevails in the academic world? If we examine the general statistics on alcohol consumption, the decrease in the proportion of abstainers is nevertheless a common phenomenon.

There was no change in the mean alcohol consumption during the follow-up: in the first year, for the users only, the mean alcohol consumption was 2.9 kg/year of pure ethanol for female and 6.9 kg/year for male students, and in the fifth year 3.0 kg and 6.9 kg, respectively. In the same academic year (1993/1994) the mean alcohol consumption of first-year students in Turku was found to be significantly lower, 1.8 kg/year for female and 4.2 kg/year for male students (Kunttu, 1997). These figures were for all the respondents and were estimated on the M-W scale, but the difference was still obvious. In a Norwegian cross-sectional study, the alcohol consumption of female students decreased during their university years: the mean annual alcohol consumption went down from 4.6 liters of pure ethanol in the age group of 20-22 years to 3.7 liters in the age group of 27-28 years. This decrease was not seen among male students (Amundsen & Fekjaer 1998). In a Swedish study of students at Uppsala University, the mean alcohol consumption per year was close to that found in our study: 3.3 kg/year for female and 6.1 kg/year for male students (Sundbom, 1992). Much higher amounts of alcohol were consumed by Scottish postsecondary helping-profession students: female students over 25 years of age consumed about 6.8 kg/year and male students 13.5 kg/year (Engs & van Teijlingen 1996).

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During the follow-up period of 1990-1994 (economic recession in Finland) there was a continuous decrease in the consumption of alcohol per capita in Finland. Within this time period the consumption per capita went down by 1.1 liters, i.e. 14% of the consumption level in 1990. This decrease, however, was not found among the students. This is in parallel with the results of contemporary studies among adolescents, in which the proportion of those who used alcohol frequently remained at the high level of the 1980s, despite the economic recession (Ahlström, 1994). Why was a decrease not seen in the alcohol consumption of university students? The major consequence of the recession was unemployment, which did not have a great impact on the daily life of university students. In 1993-94, more than a half of the students were still mainly financed by loans, and only one third were working at least part-time. University students may thus have maintained their earlier income level in spite of the national economic recession.

The proportions of heavy drinkers remained almost unchanged throughout the study, i.e. less than 5% of the female and about 10% of the male students exceeded the limit of social drinking. In the study among first-year university students in Turku, the corresponding percentages were significantly lower, only 1% and 2% (Kunttu, 1997). In that study the cut-off points were 10 kg/year and 15 kg/year, but this does not explain the difference. In a Swedish study on university students in Uppsala, the percentages of heavy alcohol consumers were somewhat higher, 6% of the female and 14% of the male students (Sundbom, 1992).

As compared to the British university students, heavy drinking does not seem to be such a big problem among Finnish students. Among British drinkers, the 'sensible' levels (14 units/week for women and 21 units/week for men) were exceeded by 48% of the female and 61% of the male students. Hazardous drinking (over 35 units/week for women and 50 units/week for men) was reported by 10% of the female and 20% of the male drinkers (Webb et al. 1996). These figures show a

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higher prevalence of heavy drinking among British students, even if the lower alcohol unit size were taken into consideration. The British students were nevertheless younger (mean age 21 years) than the students in the present study. The effect of age has been demonstrated among Scottish students: About 50% of the sample, without any gender difference, consumed over the limits of sensible drinking, but among the older students, over 25 years, 26% of the female and 42% of the male students exceeded that limit (Engs & van Teijlingen, 1996).

Drinking with the intention of reaching a high state of intoxication has been considered a hallmark of the Finnish alcohol culture (Simpura, 1987 and 1993; Partanen, 1992; Paakkanen, 1994; Keryell, 1997). This type of drinking was common also among the university students in the present study, and no change was seen during the follow-up. In 1989/1990, the frequency of drinking to intoxication 'at least once a week' was 6% for the female and 21% for the male first-year students, and 'never' 14% for the female and 8% for the male students (Nyström, 1993b). Among the fifth-year students, 7% of the female and 20% of the male students drank to intoxication at least once a week, 79% and 73% sometimes, 15% and 7% never, respectively. This type of drinking was found also among students in Turku, where 20% of the female and 44% of the male students drank to intoxication at least a couple of times per month, and only 19% of the women and 11% of the men never did so (Kunttu, 1997). In Sweden, 10% of the female and 21% of the male students in Uppsala (Sundbom, 1992), and 4% of the female and 12% of the male medical students in Stockholm reported hazardous drinking (at least 4-6 drinks per sitting) at least once a week (Borschos et al.1999). In the British study, 'binge drinking' was reported by 31% of the men and 24% of the women (Webb et al. 1996). Drinking to intoxication is not characteristic of only Finnish university students, as similar results have been found in several studies in different countries.

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This type of drinking starts already early in adolescence; every tenth of the girls and boys aged 14 years have drunk to intoxication at least once a month (Ahlström et al. 1994). The proportion of those who were drinking to intoxication also increased with the years. 24% of the girls and 39% of the boys in the age group of 18 years drank to intoxication at least once a month (Ahlström et al. 1994). No signs of maturation in this respect could be found among the students either, nor any signs of the European moderate, social drinking style. Drinking to intoxication sticks firmly in the Finnish alcohol culture. A tradition which is learnt early in adolescence often remains unchanged throughout life.

One of the main purposes of this study was to find out whether the students' alcohol drinking patterns had changed at all during the 5 years of follow-up. There were only 768 female and 361 male fifth-year students whose data could be compared to those of the first year. This leaves 67% of the female and 60% of the male fifth-year students. Even though the participation rates in both inquiries were almost equal, some students took part in the study only once, either in their first year or fifth year of studies. There were also about 80 students who answered anonymously in the fifth year, so their data could not be compared to those of the first year. The high proportion of fifth-year respondents, whose first-year data were not available, can be a source of bias. There may also have been moderately drinking students who participated in the inquiry in their first year, and subsequently increased their alcohol consumption to the level of heavy drinking and, perhaps for this reason did not answer the fifth-year inquiry. Or the development may have been the opposite. All in all, comparisons could be made among those students who responded at both time points, and the conclusions on the continuity of their drinking patterns could be considered to be reliable.

The classification of the students into abstainers, social drinkers and heavy drinkers did not show any significant difference in proportions at the two time points: about

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5-6% of the female students were abstainers, 90% social drinkers, and the remaining 4-5% heavy drinkers. The corresponding percentages among male students were 4-5%, 86-88% and 8-9%.

Within these 3 groups there were some changes during the follow-up. Among the female students over a half of the first-year abstainers (53%) remained abstainers throughout the study, and 95% of the social drinkers continued a similar drinking pattern in the fifth year. On the other hand, 71% of the first-year female heavy drinkers decreased their alcohol consumption to the level of social drinking. Among male students, almost two thirds of the first-year abstainers were still abstainers at the end of follow-up, and the remaining third had started to consume alcohol in moderation. It was noteworthy that none of the male abstainers had increased their drinking to the level of heavy drinking. A great majority of the first-year male social drinkers (92%) continued to drink moderately, and most of the heavy drinkers (73%) decreased their alcohol consumption to the level of social drinking. As a whole, even though there were not any considerable changes in the students' drinking habits, there was a slight shift to the direction of moderate drinking, so that some students, both abstainers and heavy drinkers, had changed their alcohol consumption to the level of social drinking. This transition was seen among both genders. Thinking of the health risks, it was positive that over 70% of the heavy drinkers had decreased their drinking to the level social drinking. Only 3% of the whole sample (those who responded to both inquiries) remained abstainers from the beginning to the end of follow-up.

About 4-5% of the female and 8-9% of the male students could probably benefit from an intervention on alcohol problems. The percentages of problem drinkers remained unchanged throughout the study. A brief intervention, applying methods to prevent early-stage alcohol problems, has been developed particularly for use in primary health care. The aim is to help people by means of brief interventions to

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reduce their consumption of alcohol before they experience serious health problems or social losses. The method has been proved to be effective also among college students (Baer et al. 1992; Marlatt et al. 1998). Both drinking rates and the harmful consequences of drinking decreased significantly when compared to students in a no-treatment control group. Providing heavy drinkers with personalized feedback on their consumption was found to be effective, even when the feedback was only mailed (Walters, 2000).

There are not many comparable studies in which the same students have been followed for several years. There is one rather old study, however, that can be used for comparison, carried out in 1972-1979 by Donovan et al. in the USA. The follow-up period for this high-school sample was 7 years and for the college sample 6 years, and the mean age of the students at the end of follow-up was 23-25 years for the high-school and 28 years for the college students, which was close to the mean age of the students in the present study. In that study the main interest was on the continuity/discontinuity of problem drinking between adolescence and young adulthood. Problem drinkers were defined as drinkers who had been drunk six or more times in the past six months or who had experienced at least 3/9 negative consequences due to drinking during six months.

The results were parallel with those of the present study, but unlike in our study, a clear gender difference was also seen in the degree of noncontinuity of problem drinking. Of the adolescent problem drinkers, 70% of the high-school-sample women, 80% of the college-sample women, 53% of the high-school-sample men and 50% of the college-sample men were nonproblem drinkers in 1979. According to this study most of the high-school adolescents and the college youth appeared to have 'matured out' of their earlier problem drinking behaviour by their middle or late twenties. Nonproblem drinking was by and large a more stable behaviour pattern than problem drinking between adolescence and young adulthood: of the

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adolescent nonproblem drinkers 76% of the high-school-sample women, 90% of the college sample women, 59% of the high-school-sample men and 78% of the college-sample men still exhibited a similar drinking pattern in 1979. This difference in the proportions between the younger high-school and older college samples may be a developmental one. The high-school cohorts, aged 23-25, were still in the midst of a high-risk period for drinking-related problems, whereas the college sample by 1979 had already developed beyond the high-risk period up to the age of 28, at which time 'maturing out' may already have taken place (Donovan et al. 1983).

Another longitudinal study by Raveis et al. in 1980-1984 also in the USA resembled the present study. In their study a sample of the young general population was followed for 4 years. The main interest was to study the changes in drug use behaviour of the young people from their mid- to late twenties. The mean age at the beginning (1980) was 25 years, and 29 years at the end of follow-up in 1984. These are close to the ages of the students in the present study as well. A similar 'maturing out' could also be demonstrated. No additional initiation of alcohol consumption occurred in the four-year follow-up interval. Alcohol showed the most persistence of use, but the periods of highest use declined sharply after the age 20-21, with a brief rise again at the age of 25 years. The data suggest that the young people went through a maturation process as regards their alcohol use (Raveis & Kandel, 1987).

In a cross-sectional study by Kunttu (1997) among first-year university students in Turku, the heaviest drinking occurred in the age group of 20-year-old men and 20-22-year-old women. At the age of 20 years, 25% of the male students were heavy drinkers, but at the age of 23-29 years, only 19% were drinking heavily. Among female students, the most significant age difference was found for those who drank only a little. In the age group of 21-22 years, this proportion was 29%, while in the

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age group of 23-29 years it was 43%. These findings suggest that some 'maturing out' could have happened between the ages of 20 and 28 years. Many other cross-sectional studies also show this decreasing tendency of alcohol consumption around the age of 20-24 years (Kandel et al. 1984; Wechsler et al. 1994; Wechsler et al. 1995; Wechsler et al. 1998).

2. Smoking

In Finland the progress has been very favourable with respect to smoking prevalence: since the 1960s the percentage of male smokers has declined from 60% to 27% (Puska et al. 1991; Paavola et al. 1996). Female smoking has shown different trends. In the 1960s it was still quite uncommon for women to smoke, but it has slowly increased up to 19-20 % in recent years. This increase is largely due to young women's smoking, and has fortunately recently turned slightly downwards. There is considerable controversy concerning the smoking rates analyzed according to age: Finland has the lowest total smoking prevalence of all the European countries, but we simultaneously have almost the highest proportion of young people smoking. This indicates that in future much more attention must be paid in Finland to prevent smoking especially among teenagers and young people.

This follow-up study demonstrated a decreasing trend in smoking prevalence among both female and male university students. It also seems that they smoke less than the general population of the same age. Although there was some reduction in total smoking during the first five years of university studies, the smoking habits acquired in adolescence seem to prevail. On the other hand, starting the habit during one's university years was very rare, only 17 (2%) female and 15 (4%) male students started smoking during the follow-up period, and only two of them smoked a lot (15 cigarettes or more). The consumption of cigarettes was rather low,

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as there were only 16 (2%) female and 14 (4%) male students who smoked at least 15 cigarettes per day in their fifth year of studies.

The study which was carried out in the same academic year (1993/1994) among first-year university students in Turku arrived at somewhat different figures (Kunttu, 1997). 83% of all the respondents were non-smokers, 11% were occasional smokers, and 6% regular smokers. The percentage of non-smokers was between that of the first-year and fifth-year students in Helsinki. Considering the decrease in smoking prevalence during the five years, these figures were very similar.

The smoking prevalences seen among European university students are much higher. Among Scottish postsecondary helping-profession students, 28% of the female and 38% of the male students over 25 years of age were smokers (Engs & van Teijlingen, 1997), and 8% of the female and 15% of the male students smoked over 20 cigarettes per day. Also, the differences in consumption between women and men were small. A higher addictive potential of nicotine was also demonstrated in this study. The prevalence of alcohol and marijuana use was highest 2-3 years before the maximum use of tobacco in the oldest group.

In a German study among university students in 1995, 34% of the female and 41% of the male students were current smokers, and the rates did not significantly differ from those of the general adult German population (Apel et al. 1997). In Norway, university students smoked less than other young people (Amundsen & Fekjaer, 1998). 23% of the students were regular daily smokers and no gender difference was seen.

The low participation rate (65%) in the present study may bias the results. A low smoking prevalence can be due to underestimation, as heavy smokers may avoid answering a health questionnaire. However, the participation rate was about the

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same in both the first-year and the fifth-year inquiry, so comparisons between these two analyses could be made. The students also answered in the same way, in both questionnaires, the question on whether they had ever smoked. This indicates that the percentages on the smoking habits are reliable. The response rate (65.3%) was about the same as in the Turku study (Kunttu, 1997). For a questionnaire study, these rates can be deemed to be quite reliable.

Smoking is considered to be a stepping stone to other narcotics. Nicotine is the most addictive substance of all, and nearly always precedes other drug use. Even though smoking showed a decreasing tendency in this study, cannabis seemed to be an increasing problem among university students. The association between cigarette smoking and cannabis use was obvious in this study, both among the first-year and fifth-year students. More than a half of the heavy smokers (56.1%) reported at least some cannabis use in their fifth study year. The same association was found in the Turku study (Kunttu, 1997). Cannabis has been found to be the most common initial substance in the progression of narcotics abuse, from first use to regular use and to established abuse (Byqvist, 1996; Koponen et al. 1996). Future narcotics abuse could be influenced by restraining today's smoking in order to curb the drug use progression.

The results also showed a strong correlation between smoking and alcohol use. In the fifth study year we could not find any non-drinkers among the heavy smoking female students, and there was only one non-drinker (2.9%) among the male heavy smokers. The total number of heavy smokers (23 women and 35 men) was, however, so small that no very firm conclusions can be drawn. But, almost one third (31%) of the heavy-smoking male students and 17% of the heavy-smoking female students were also heavy drinkers.

Students today seem to have an increasing number of mental health problems, but none of them appeared to associate with smoking. Some reported physical

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symptoms, however, appeared to associate with smoking. Even though the students in general took rather good care of their physical health, there seems to be a clear negative association between physical activity and smoking: non-smokers were much more active physically than heavy smokers ($p = 0.02$). Conway and Cronan (1992) found a similar negative association between smoking and spontaneous exercise activities in their study among young adults in the USA. Current smokers averaged almost 2 fewer exercise sessions per week than did former smokers or never-smokers. Additionally, results indicated that smokers also had lower physical endurance than non-smokers after the differences in exercise levels of smokers and non-smokers were taken into account. A follow-up study among Norwegian young adults (aged 20-22 and 30-32 years) confirms that those who were smokers in the beginning of the survey, 4 years later reported lower physical fitness, more pain, more emotional problems, limitations of social activities, and more problems in performing daily tasks than did non-smokers (Eriksen et al. 1999).

3. Cannabis use

All recent analyses and statistics in Finland have shown that since 1990 there has been a steep nationwide increase in drug abuse. Both the prevalence and the criminal behaviour linked with drug abuse show growing figures (Hein, 1995).

Increased travelling and internationality, joining the European Union, and a more liberal attitude towards drug use within EU countries, are reasons for increased substance abuse. Nowadays the possession, handling and use of cannabis is illegal in Finland. The new drug abuse situation has prompted the country to re-evaluate its drug policy, including control actions, legalization of drugs, harm-reducing measures, as well as treatment protocols.

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Cannabis use appears to be an increasing problem also among university students, as more and more students are involved in cannabis abuse, and the frequency of use is increasing. Several other cross-sectional studies in the 1990s have brought to light the same trend: the prevalence of experimenting with drugs has increased among school children aged 13-18 years, and the age at first trial has become even a couple of years earlier (Kontula & Koskela, 1994; Ahlström et al. 1991; Rimpelä et al. 1995). Regularly repeated surveys among Finnish military conscripts have confirmed these findings. In the 1990s the prevalence of experimenting with or using cannabis reached the level of that in the 1970s. In 1996, 20% of the conscripts had experimented at least once with cannabis, 45% of them had been offered drugs, and 49% knew someone who used the drugs (Jormanainen et al. 1997). An alarming finding in this study was also that although the proportion of cannabis was decreasing, the proportion of harder drugs, such as heroin, amphetamine and LSD was on the increase. The prevalence of cannabis use among the conscripts was somewhat lower than that of the fifth year students (20% versus 28%). This difference in prevalence could be partly explained by age: the conscripts were about 5 years younger than the students.

In 1993/1994 there was another survey among university students in Turku: 1301 first-year students were surveyed via a mailed questionnaire, and the response rate was about the same as in this study, 65% (Kunttu, 1997). Compared to the results of the fifth-year students in the Helsinki area, the percentages of drug use among the first-year students in Turku were significantly lower: only 14% of the male and 10% of the female students reported some experimenting with drugs. Cannabis was by far the most common drug also in that study: 11% of all the men and 7% of all the women had at least experimented with it. Cannabis had been used more than once by 4% of the male and 1% of the female students. The higher prevalence of drug use among students in the Helsinki area may be due to two reasons: First, all the epidemiological studies have shown that the overall drug abuse has

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concentrated in the metropolitan Helsinki area, and secondly, the mean age of the students in this study was about 5 years higher than in Turku. A correlation between smoking and drug use was found also in the Turku study. Drug use was associated with alcohol consumption as well: 27% of the heavy drinkers had some experience with drugs, while among those who drank only a little the respective figure was 6%.

In most of the Finnish studies, the highest prevalence of drug use has been found in the age group of 18-27 years, to which also our university students belong. Similar observations have been made in the other Nordic countries as well: Cannabis use was most prevalent among those under 40 years of age in Denmark, Norway and Sweden, too (Hakkarainen et al. 1996).

There are not many comparable international statistics available concerning drug abuse among university students in different countries. In a recent study in the United Kingdom among second-year university students (mean age 20.9 years), 55% of the women and 60% of the men reported having used cannabis once or twice, and 20% of the sample reported regular cannabis use (Webb et al 1996). Drug use had started at school in 46% of the sample, and 13% began use after entering the university. Among Scottish students over 25 years of age, 3% of the female and 21% of the male students reported weekly use of marijuana (Engs & van Teijlingen, 1997). A significant difference was found in this study between different age groups in terms of marijuana consumption. In the youngest age group the consumption percentages were 22% for women and 39% for men (ibid.). Parallel high percentages of cannabis use were found in a study from Switzerland, where 35% of the female and 54% of the male students aged 19-20 years reported at least some life-time cannabis use (Michaud et al. 1993). In Spain, 21% of the university students had used cannabis and 9% amphetamine (Cami & Barrio, 1991). One third of Norwegian students had at least experimented with cannabis, and 16%

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had used it more than 5 times (Amundsen & Fekjaer, 1998). 14% of the students reported having used it during the previous year. In Sweden, 7% of the female and 8% of the male medical students had used some drugs (hashish, marijuana, cocaine) during the previous year (Borschos et al. 1999). In the USA, where drug abuse has a much longer history and appears on a larger scale, according to a study of 11 631 students in grades 9-12 (aged ca.13-17), 42% of the students in grade 12 had used marijuana in their life-time, and 19% during the 30 days preceding the study (Morbidity and Mortality Weekly Report, 1991).

When the prevalence of cannabis use among Finnish university students is compared to that of other countries, the situation in Finland is still much better, even though the figures of drug abuse do show an increasing trend. However, the high prevalence can be partly explained by a few experiments with the use of cannabis during the exchange year of many high-school students at the age of 16-18 years, usually in the USA. On the other hand, this survey shows that during the first five years of university studies, both the prevalence and the frequency of cannabis use is increasing. This means that not only adolescents experiment with drugs, but that also a number of students start to experiment with them at the ages of 22-27 years. This finding suggests that drug-related intervention programmes, focused on prevention or on treatment, must be targeted not only at adolescents, but also at young adults up to the age of about 30. There is a need for drug education and prevention programmes also within the students' health care system.

As with all questionnaire studies, reliability and accuracy must be assessed also in this study. Being a type of a follow-up study, the questionnaire could not be anonymous, and this increases the risk of underestimation and may lower the participation rate. In the first-year inquiry 2404/2520, and in the fifth-year inquiry 1714/1729 answered also the question on cannabis use. It is probable that the regular users have not answered this questionnaire at all. On the other hand, the

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participation rate was reasonably high and about the same in both analyses. Comparison between these two analyses can thus be considered reliable.

4. Physical and mental health parameters and stress experience

By and large, the university students' health status was good. In spite of being 4-5 years older at the end of follow-up, their subjective state of health had even improved. In the fifth year, 29% of the female and 35% of the male students regarded their health as excellent, 60% and 51% as good, respectively, and only 12% and 13% as satisfactory or poorer. At both time points, the male students considered their health to be excellent significantly more often than the female students.

In young adulthood, there are seldom any chronic diseases which could worsen health. In the Turku study, 5% of the students reported serious chronic illnesses, such as diabetes, hypertension, thyroid diseases, asthma, rheumatoid arthritis, epilepsy, etc. (Kunttu, 1997). The results concerning subjective health status resembled those of this study; 86% of the female and 84% of the male students perceived their health to be good or excellent. Compared to employment, university studies are physically less strenuous, which might explain the fairly positive assessment.

In the first year, there was a higher percentage of heavy drinkers among both genders with poorer health, but in the fifth year only among male students. The percentage of heavy drinkers was even higher among those female students with excellent or good health (6% versus 5%) compared to those with poorer health. The total number of female heavy drinkers in the fifth year was relatively small (50 students), so any conclusions must be drawn with caution. Earlier studies among

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young people have nevertheless shown a linear association between drinking and health: The more the young people drink, the less often they perceive their health as being excellent or good (Ahlström, 1983; Rahkonen et al.1992).

On the other hand, students took good care of their physical fitness, and especially female students increased their physical activity during the follow-up. In the fifth year 34% of the female and 38% of the male students participated in some sports activity at least 3 times a week. In the Turku study, 27% of the female and 36% of the male first-year students were equally active in sports (Kunttu, 1997). In their fifth year of studies, 29% of the female and 28% of the male students in the present study reported less frequent or no activity in sports. Most of the physically active students were social drinkers. 89% of the female and 85% of the male students drank moderately. There was a positive correlation between physical activity and alcohol consumption among the female students. More than a half of the heavy-drinking female students were active in sports at least three times a week; the correlation was negative among male students, however. Only 21% of the heavy-drinking males were active in sports at least three times a week, while among other male students the corresponding percentage was 38%. In a study among university students in the United Kingdom, 62% of the female and 73% of the male students reported daily, twice weekly or weekly physical exercise. The remainder exercised only monthly or 'hardly ever' (Webb et al. 1996).

The correlations between alcohol use and involvement in athletics have also been studied in a nationally representative study among college students in the USA (Wechsler et al. 1997). The survey indicated that the students involved in college athletics engaged in binge drinking more often than the students not involved in athletics. This was seen among both genders. More of the men involved in athletics than those not involved also engaged in a life-style with frequent heavy drinking, getting drunk three or more times a month. One fifth of the athletically involved

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men intentionally drank to get drunk, compared with 15% of those not involved in athletics. Similar results were seen in a study by Leichter et al. (1998). Compared with nonathletes, both female and male athletes consumed significantly more alcohol per week, engaged in binge drinking more often, and suffered more adverse consequences as a result of their substance use.

Smoking also correlated, but negatively, with physical activity. In the fifth year more than a half of the students who were heavy smokers (smoking at least 15 cigarettes per day) were active in sports only occasionally or not at all, while among nonsmokers the corresponding percentage was 28%. Among American college students, those involved in athletics more often abstained from cigarette smoking than did students who were not involved (Wechsler et al. 1995). Only about half as many men involved in athletics were smokers, compared to those not involved in athletics. Students may be more aware of the harmful effects on sports caused by smoking than by drinking.

Depression, tension and anxiety increased during the follow-up. The increase in all of these was significant in both genders, except for the increase in tension among male students. In the Turku study, 55% of the female and 66% of the male first-year students seldom or never felt any tension or anxiety, and for depression the percentages were 51% and 67%, respectively. It seems that these mental health disorders were somewhat more prevalent among the students in Turku, but the questions and evaluations were not identical in these two studies.

The greatest proportion of high anxiety scores occurred among older female students also in a British study, in which 53% of those aged 26-40 years had scores of 11 or above (Webb et al. 1996). The mean scores for depression were also highest in older female students, 7% in women aged 26-40 years. There were no significant associations between anxiety scores and use of alcohol, or smoking or use of cannabis.

DISCUSSION

In the present study, all three symptoms (depression, tension, anxiety) were more common among heavy drinkers compared to other students, but a significant association was found only between female heavy drinking and depression. Many earlier studies among young people have shown an association between depression and alcohol consumption (Rohde et al. 1996; Clarc et al. 1997), but it has been difficult to demonstrate which comes first. Rohde et al. tried to find whether depression was a risk factor for alcohol problems, or the opposite. In their study 58% of the cases of depression had started before drug problems. They concluded that alcohol consumption was not a separate phenomenon, but developed together with other aspects of pathopsychology. Deyking et al. (1992) found that in two out of three boys drug problems were followed by depression, whereas among girls depression usually preceded drug problems. Smoking correlated with neither depression nor tension. Alcohol and drugs seemed to be taken mainly for pleasure, and were perceived by many as a normal part of student life, rather than being a manifestation of anxiety.

Stress increased significantly during the follow-up. In the first year stress was reported by 9% of the female and 8% of the male students, and in the fifth year the figures were 14% and 16%, respectively. There were no gender differences in stress experience. In this study stress was determined by using a mental health screen, from which stress was calculated as a sum of negative answers. Stress existed if the sum of negative answers was four or more. First-year students in Turku, on the other hand, were more stressed: 13% of the female and 9% of the male students got three stress points or more (Kunttu, 1997).

Earlier research has indicated that stress and coping responses may play a significant part in students' alcohol use and abuse (Fromme & Rivet, 1994; Perkins, 1999; Tyssen et al. 1998). College students who have greater expectancies about the tension-reducing effects of alcohol have been found to drink more frequently

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than other students (Hittner, 1995). In competitive academic environments where the demands for achievements are significant, students may turn to alcohol in an attempt to reduce their anxiety and sense of pressure. In the first year, the stress experience was higher among heavy drinkers than the others, but the difference was significant only among female students. In the fifth year, on the contrary, the difference was significant only among male students.

In campus settings drinking is a substantial part of the social scene, and the perceived peer norms encourage drinking. Among students, extraversion and sensation seeking are characteristics that dispose a person towards drinking (Schall et al.1992). Reasons for drinking, such as 'to escape from cares', 'to steady the nerves' or 'to get drunk', were not highly rated among the students. The reasons rated the highest were 'to be sociable' and 'to enjoy the taste' (West et al. 1990).

5. Developing health services for university students

Health services for university students in Finland are provided by FSHS. The health check-up of first-year students is very important as it reaches all the students enrolled in the universities. About 70% of the first-year students participate in it. Every student's health status is thoroughly surveyed in an interview by a nurse. In addition to their physical and mental health, the students' health behaviour is discussed. It covers alcohol drinking patterns, smoking and drug use, as well as engagement in physical activity.

The results of the present study give a good basis for developing the contents of the health check-up. As the alcohol drinking patterns remained almost unchanged throughout the study, there is no need to re-evaluate the overall trend more frequently than every 5 years. On the other hand, the increasing use of cannabis among students gives grounds for more active discussion about arranging

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counselling services and interventive actions to help students with drug use. It should be surveyed at the first-year health check-up, but also on later visits to the physician. There is a real need for drug education and prevention programmes.

More than a half of all the university students visit a physician every year. 60% of the visits are to general practitioners. These visits, in addition to medical care, include a lot of guidance on prevention. The drinking problems of some students which did not show any signs of decreasing tendency, give grounds for intervention at the normal visits. It appears that about 5% of the female and 9 % of the male students could benefit from a brief intervention. Drinking behaviour should be discussed openly, especially if mental problems are the cause of the visit, because there is a strong association between alcohol consumption and mental problems.

In spite of a favourable progress in the smoking prevalence of university students, continuation of the smoking habit is very common. Therefore smoking habits should be brought up with the student, especially if the visit was prompted by medical reasons possibly associated with smoking. Due to the strong correlation between smoking and alcohol consumption, regularly smoking students should be asked about their drinking habits, too. Prevention and education programmes should be developed to address both binge drinking and its association with other substance use (cigarettes, cannabis and other illegal substances).

The reasons for the increasing mental health problems among university students should be studied. At present about 5% of all the university students had annually used the mental care services of the FSHS. Many visits to general practitioners are made for the same reasons. The increasing need for mental health services should be taken into consideration when new operations for FSHS are being developed.

CONCLUSIONS

The participation rate among fifth year students was 65.5%, which was close to that of the first-year students in 1989/1990. The gender distribution also remained unchanged. One third of the respondents were male students in both inquiries. All the students who responded were included in the descriptive statistics, but the comparison material was smaller, because many students took part in the study only once, either in their first year or in fifth year. Numerous anonymous answers also decreased the number of students whose fifth-year data could be compared to those of the first year. The participation rate was lowered by the fact that many students had already completed their studies and did not consider themselves as students any more. The students were presumed to answer by name and social security number, but this raised a lot of criticism and might lead to a lower response rate.

Conventional laboratory tests for detecting heavy drinkers were first intended to be included in the study. The number of students who went to the laboratory in the fifth year was, however, regrettably low, only 38.4% of the students who responded by name. The laboratory test results were normal except for a few elevated MCV and cholesterol values. For these reasons conventional laboratory values were not analyzed further.

The limit for heavy drinking was 190 g of pure ethanol per week for female and 280 g for male students. In the fifth year of studies 4.4% of the female students and 10.8% of the male students were classified as heavy drinkers. There was not any statistically significant change compared to the results of the first year.

CONCLUSIONS

In the fifth year 5.4% of the female and 4.7% of the male university students were abstainers. Compared to the proportions of abstainers in the first year, a slight but not significant decrease had occurred.

In their fifth year of studies female university students reported an average alcohol consumption of 3.0 kg/year as pure ethanol (median 1.8), and male students 6.9 kg/year (median 4.2). These figures were for users only. There was hardly any change in mean alcohol consumption during the five years. Female students drank about one third of the alcohol consumed by all the students.

Drinking for intoxication at least once a week was reported by 6.7% of female and 19.9% of male fifth-year students, sometimes by 78.6% of female and 73.1% of male students, and never by 14.6% of female and 7.0% of male students. These proportions were about the same as those of the first year. Drinking with the intention of becoming intoxicated remained a predominant trait among Finnish university students.

About 2/3 of fifth-year students answered also the questions on alcohol consumption in their first year of studies. About a half of the first-year abstainers remained abstainers during the follow-up. Among those who started to drink alcohol, only one student was classified as a heavy drinker in the fifth year, all the rest were social drinkers. 95% of the social drinkers continued along the same line throughout the study. On the other hand, more than 2/3 of first-year heavy drinkers decreased their alcohol consumption to the level of social drinking.

Comparison of the alcohol consumption and drinking patterns of university students at intervals of 5 years showed only minor changes. This period was probably too short for any perceptible changes. On the other hand, earlier studies have confirmed that the drinking patterns of young people often become established already in adolescence before the university years. Early initiation and

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drinking for intoxication are typical features for young people in Finland. University students have already adopted their drinking patterns before starting university. In spite of the changes in their life-style and social settings, no 'maturing out' took place during this interval.

Alcohol consumption associated strongly with smoking also in this population. There was only one non-drinking student among the heavy smokers. Heavy smokers were often also heavy drinkers.

Although cannabis use is often regarded as an alternative to alcohol consumption, experimenting with cannabis or using it was significantly more common among those students who were also heavy drinkers. This association was seen in both inquiries. Alcohol consumption was not found to be replaced by cannabis use during the university years.

Alcohol consumption was not associated with the university students' health status. This may be due to their young age. Their health was mainly excellent or good, and no detrimental effects of excessive drinking had yet manifested. Alcohol consumption was associated with depression only among female students in their fifth study year. There was no significant correlation between alcohol use and tension or anxiety.

The favourable progress in smoking prevalence was still seen among university students. In their fifth year, 89.7% of the female and 84.2% of the male students were non-smokers. The proportions of non-smokers increased statistically significantly as compared to those of the first year. Many students smoked only occasionally, and most of the regular smokers smoked only a few cigarettes per day. 2.1% of the female and 5.9% of the male fifth-year students were classified as heavy smokers, i.e. smoking at least 15 cigarettes per day. These proportions remained unchanged during the five years of university studies.

CONCLUSIONS

Totally 1090 students reported their smoking patterns in both inquiries. Of these, only 18 female and 15 male students had started smoking during the follow-up. On the other hand, more than a half of the smokers had quit smoking by their fifth study year. One half of the heavy smokers nevertheless continued to smoke as before in their fifth year; this reflects the high addictivity of nicotine.

In the fifth year of studies, 78.4% of the students reported no experience with cannabis. This was significantly less than in the first year (87.8%). Only one life-time trial with cannabis was reported by 7.6% of the fifth-year students, and the maximum use by 5.1%. The increase in the prevalence of maximum use was also significant. The gender difference was obvious in both surveys, regarding both the prevalence and frequency of use. In the fifth year 18.5% of the female and 27.7% of the male students reported at least some use of cannabis, and the maximum use was reported by 4.0% of the female and by 7.3% of the male students.

8.7% of the students who reported no cannabis use in their first study year, reported at least some use in the fifth year. Fortunately, most of them reported only one trial. Some students also increased their frequency of cannabis use during the five-year follow-up.

In the first inquiry (1989/1990), it was estimated that about 4-5% of the female students and 8-9% of the male students could benefit from a brief intervention programme focussed on their heavy drinking. These proportions remained unchanged throughout the study.

The same method, a brief intervention, can also be used in the prevention of smoking and drug abuse. Among university students, whose regular smoking is less frequent, more than a half of the first-year smokers quit smoking before the fifth year. About 2% of the female and 6% of the male students in their fifth study year would benefit from a brief intervention.

CONCLUSIONS

Both the prevalence and the frequency of cannabis use increased during the follow-up. This was mostly, however, occasional experimenting with cannabis, and the real need for an intervention on cannabis use is thus difficult to estimate. In this study, about 4% of the female and 7% of the male fifth year students had used cannabis at least five times in their life-time. These percentages cannot be used for estimating the need for an intervention, however. The number of university students having actual problems with drug abuse is certainly smaller.

Of all these risk behaviours, alcohol still seemed to be the most important and frequent factor. This study also revealed that different forms of addiction, i.e. alcohol, nicotine, cannabis, accumulated on a rather small number of students, and the great majority of students did not have any of them. The current health check-up of first-year university students can still serve as an appropriate situation to chart a student's drinking patterns, smoking, drug abuse, and to plan a brief intervention if needed.

By and large, the university students' health status was good, and during the follow-up it even improved somewhat. In the fifth year, 28.8% of the female and 35.1% of the male students regarded their health as excellent, and only 11.6% and 13.4%, respectively, as satisfactory or poorer. At both time points, male students considered their health to be excellent significantly more often than did female students.

Young people seldom have chronic diseases which could worsen their health. The students' good health may also be partly due to their physical activity. More than one third of the students engaged in some sports activity at least three times a week in their fifth study year.

Depression, tension and anxiety increased during the follow-up, and the increase in all three was significant in both genders, except for tension among male students. In

CONCLUSIONS

the fifth year some or much depression was reported by 34.4% of the female students and by 25.7% of the male students; some or much tension by 24.4% of the female and by 20.3% of the male students, and some or much anxiety by 22.1% and 16.1%, respectively.

A significant increase was also found in stress experience during the follow-up. The differences between the genders were not significant.

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APPENDIX

Appendix 1

Questionnaire used the study. Questions indicated with '...' were not analyzed.

FINNISH STUDENT HEALTH SERVICE (FSHS)

HEALTH QUESTIONNAIRE

Name _____

Date of birth _____

Social security number _____

Address _____

1 How is your health right now?

1 excellent

2 good

3 fairly good

4 satisfactory

5 poor

2 and 3...

APPENDIX

4 Do you work during the terms to earn your living?

- 1 no
- 2 full-time job
- 3 a part-time job
- 4 other, what? _____

5 to 11...

12 Height _____ cm weight _____ kg

13...

EXCERCISE

14 How often do you stay outdoors at least one hour per day in connection with your ordinary activities?

- 1 every day
- 2 4-5 times a week
- 3 about twice a week
- 4 less frequently

15 Are you active in sports for physical fitness, swimming, jogging, skiing, ball games, etc

- 1 every day
- 2 3-4 times a week
- 3 1-2 times a week
- 4 less frequently
- 5 not at all

APPENDIX

16 Do you participate in competitive sports?
1 yes, type _____

17...

SMOKING

18 Have you ever smoked regularly every day?

1 no

2 yes

19 and 20...

21 How much do you smoke every day?

1 cigarettes _____

2 pipers (pipefuls) _____

3 cigars _____

22...

ALCOHOL

23 How often do you use light alcoholic beverages like beer or wine?

1 never

2 once a month - once a year

3 once a week - twice a month

4 at least twice a week

APPENDIX

24 How often do you use heavy alcoholic beverages?

- 1 never
- 2 once a month - once a year
- 3 once a week - twice a month
- 4 at least twice a week

25 How many glasses or bottles of following alcoholic beverages do you drink in average during a week? Mark 0 for nothing. Answer every item.

- 1 light beer _____ bottles
- 2 strong beer _____ bottles
- 3 long-drink _____ bottles
- 4 wine _____ bottles
- 5 spirits _____ units (4cl)

26 How often do you get drunk?

- 1 never
- 2 once a month - once a year
- 3 once a week - twice a month
- 4 at least twice a week

27 Have you ever had a hangover?

- 1 no
- 2 yes

APPENDIX

28 Has your use of alcohol during the last year

1 decreased?

2 remained unchanged?

3 increased?

SOME GENERAL SYMPTOMS

29 Have you been troubled by the following symptoms during the last six months?

	very much	to some extent	not at all
excessive fatigue	1	2	3
shortness of breath	1	2	3
continuing cough	1	2	3
headache	1	2	3
heartburn, tachycardia	1	2	3
insomnia	1	2	3
acid indigestion	1	2	3
flatulence	1	2	3
pains in the abdomen	1	2	3
constipation	1	2	3

30 to 53...

APPENDIX

MENTAL HEALTH

54	Have you had some of the following symptoms during the last six months?				
		much	some	a little	not at all
	depression	4	3	2	1
	tension	4	3	2	1
	anxiety	4	3	2	1

55 How do you feel about the following areas of your life or situations? Answer by noting appropriate alternatives in parentheses. Appraise your present situation.

The alternatives are:

(-2) is a real problem, makes my life difficult

(-1) is clearly a problem, but does not bother me much

(0) I have not paid any special attention to it

(+1) I have usually experienced it positively

(+2) is really a satisfying factor

(?) I do not know, difficult to say

() studying

() giving a presentation in public, lecturing

() contacts with fellow students and people in general

() contacts with the opposite sex

() my sexual life

() my relationship with my parents

() planning for the future

() my strengths and abilities

() my general mood

APPENDIX

56 and 57...

MEDICINES

58 Do you now use any medicine prescribed by a doctor?

59 What kind of medicine or vitamins, not prescribed by a doctor, do you use regularly or often?

60 Do you use regularly or often any natural products?

61 to 63...

CONTINUATION TO HEALTH QUESTIONNAIRE

64	Marital status	
	unmarried	1
	married	2
	cohabiting	3
	judicial separation or divorced	4
	widowed	5

65 Number of children I take care of _____

APPENDIX

66 During most of my childhood I lived in

- a rural area 1
- a rural population centre 2
- Helsinki-Espoo-Vantaa 3
- some other town 4

67 Most of my time at school I have lived in the following:

_____ province

68 Do you live now

- with your parents 1
- in a student dwelling 2
- as a sublessee 3
- in your own dwelling 4

69 Your parents' education

	father	mother
elementary school	1	6
vocational school	2	7
institute	3	8
university	4	9
do not know	5	10

APPENDIX

70 The average grade of your secondary school certificate: _____

71 The atmosphere of my childhood home was on a scale from 1 to 5 (1 for bad and 5 for very good): _____

72	Parents' drinking history:	father	mother
	do not use alcohol	1	6
	drink alcohol once a month or less	2	7
	once a week or twice a month	3	8
	at least twice a week	4	9
	do not know	5	10

73 The use of alcohol is at least sometimes a problem for:

my father	1
my mother	2
both of them	3

74 The use of alcohol is or was a problem for my grandparents, their or my sisters and brothers.

yes, for one	1
yes, for some	2
for nobody	3

APPENDIX

75 I finance my studies mainly by

- | | |
|------------------|---|
| loan for studies | 1 |
| my parents | 2 |
| my own savings | 3 |
| my employment | 4 |
| my wife/husband | 5 |
| other | 6 |

76 Is your grip on your studies

- | | |
|----------------|---|
| as you thought | 1 |
| better | 2 |
| worse | 3 |

77 Your most important personal relationships are

- | | |
|----------------------------------|---|
| among your relatives and parents | 1 |
| among students | 2 |
| your spouse | 3 |
| in your hobbies | 4 |
| in your employment | 5 |
| other | 6 |

APPENDIX

78 Do you use alcohol? In other words have you used alcoholic beverages at least one drink, glass of beer or wine during the last 12 months?

- | | |
|-----|---|
| yes | 1 |
| no | 2 |

79 If you do not use alcohol the main reason is:

- | | |
|---|----|
| reasons of religion | 1 |
| health reasons | 2 |
| I am afraid of not being able to control my behavior if I drink | 3 |
| my family or friends do not approve of it | 4 |
| I am afraid I would become dependent on alcohol | 5 |
| economic reasons | 6 |
| I have seen so many bad examples of alcohol | 7 |
| I have been raised in an environment of abstinence | 8 |
| alcohol tastes and smells unpleasant | 9 |
| I support abstinence in principle | 10 |

Abstainers (the answer to question 78 is no) can go to question 111.

80 At what age did you drink an alcoholic beverage for the first time? _____

81 At what age did you begin to drink alcoholic beverages regularly? _____

APPENDIX

82 How often do you drink alcoholic beverages (beverages containing at least 2.25% alcohol)? Try to include in your estimate also those occasions when you take small amounts, like half a bottle of beer.

Several times a day	1
2-3 times a day	2
About once a day	3
2-4 times a week	4
about once a week	5
2-3 times a month	6
about once a month	7
5-6 times a year	8
1-3 times a year	9
never	10

83 How often do you drink for intoxication or more than 5 drinks or for example a bottle of wine at one sitting?

Several times a day	1
2-3 times a day	2
About once a day	3
2-4 times a week	4
about once a week	5
2-3 times a month	6
about once a month	7
5-6 times a year	8
1-3 times a year	9
never	10

APPENDIX

- 84 Try to estimate the amount of alcoholic beverages you normally drink at one sitting as the amount of alcoholic beverage you prefer to drink.

Mild beer _____ bottles or _____

Strong beer _____ bottles or _____

Long-drink _____ bottles or _____

Wine _____ glasses or _____

Strong wine _____ glasses or _____

Distilled spirits _____ drinks (4cl) _____

- 85 Do you feel that, compared to other students, you use alcohol

less 1

equal to 2

more 3

- 86 Next we shall mention some situations which may arise when drinking alcohol. Decide for each whether you have been caught in similar situations during the past 12 months

	yes	no
Quarrel or argue	1	2
Scuffle or fight	1	2
Accident or injury	1	2
Loss of money or other valuables	1	2
Damage to objects or clothing	1	2
Victimized by cheating or swindling	1	2
Driving a car under influence of alcohol	1	2
Victimized by robbery or theft	1	2
Regretted something you have said or done	1	2
More loud-voiced and boisterous than usual	1	2

APPENDIX

87 Have you lost a friend or a girl- or boyfriend because of drinking?

yes 1

no 2

88 Have you been away from your studies or work because of drinking?

yes 1

no 2

if yes how many days during last 12 months _____

89 Do you usually take a drink before going to a party?

yes 1

no 2

90 Do you usually drink a bottle of wine or corresponding amounts of alcohol over the weekend?

yes 1

no 2

91 Do you have a couple of drinks or beer a day to relax?

yes 1

no 2

92 Do you tolerate more alcohol now than you did some years ago?

yes 1

no 2

APPENDIX

93 Do you have difficulties not drinking more than your friends?

yes 1

no 2

94 Have you ever waken up in the morning after drinking on the night before and found you could not remember how you got to bed?

yes 1

no 2

95 Have you had memory losses when drinking?

yes 1

no 2

96 Have you ever felt a need to cut down your drinking?

yes 1

no 2

97 Have you become annoyed at criticism of your drinking?

yes 1

no 2

98 Have you ever felt of quilt about your drinking?

yes 1

no 2

APPENDIX

- 99 Do you ever need an 'eye-opener' or a beer the first thing in the morning after drinking?
- | | |
|-------------------|---|
| never | 1 |
| 1-2 times | 2 |
| more than 3 times | 3 |
- 100 Do you try to avoid alcoholic beverages for a determined period of time, e.g. a week?
- | | |
|-----|---|
| yes | 1 |
| no | 2 |
- 101 Have you been treated for drinking problems?
- | | |
|-------------------------|---|
| in a hospital | 1 |
| at AA | 2 |
| at the FSHS | 3 |
| in a health care centre | 4 |
| other | 5 |
| no treatment | 6 |
- 102 Have you been warned by a doctor for drinking too much?
- | | |
|-----|---|
| yes | 1 |
| no | 2 |
- 103 Have you been arrested for driving while intoxicated?
- | | |
|-----|---|
| yes | 1 |
| no | 2 |

APPENDIX

104 Have you been arrested because of drunken behaviour?

yes 1

no 2

105 Have you felt, in the course of the last 12 months, that drinking has helped you to:

yes no

Sort out problems relating to those nearest you 1 2

Take a more optimistic view? 1 2

Express your feelings better than ordinarily? 1 2

Get closer to someone of the opposite sex? 1 2

Sort out problems related to your job? 1 2

Be funnier and wittier? 1 2

Be encouraged in the company of others? 1 2

Learn to know someone better? 1 2

106 After drinking and most probably because of it, I have done something that I enjoy

very much 1

a little 2

nothing like that has happened 3

107 After drinking and most probably because of it, I have done something that I regret

very much 1

a little 2

nothing like that has happened 3

108 People drink alcoholic beverages in different places. For me the most common

APPENDIX

place is:

- a restaurant 1
- a pub or beer-cafe 2
- places for students 3
- home environment 4
- summer cottage or sauna 5
- other place: _____ 6

109 When drinking alcoholic beverages I am most often in the company of:

- other students 1
- members of my family or relatives 2
- people from my job 3
- people from my hobbies 4
- friends who are not studying 5
- I prefer to drink alone 6
- I drink only on official occasions 7

110 When I drink my company consists mostly of:

- the opposite sex 1
- the same sex 2
- both sexes 3
- I drink alone 4

111 I have more positive experiences than negative ones from alcohol

- yes 1
- no 2

APPENDIX

112	Since your 16th birthday have you had/been			
	fractures of bones/dislocations to joints	1		
	injured in a traffic accident	2		
	a head injury	3		
	injured in a fight	4		
	injured after drinking	5		
113	How do you think these statements fit you			
		Very well	to some extent	not at all
	I believe in myself	1	2	3
	I am not worried about what people think about me	1	2	3
	I have a sense of inferiority	1	2	3
	I have no more problems than my friends	1	2	3
	If my home conditions had been better I would have managed better in my life	1	2	3
	I am not what I wanted to be	1	2	3
	I consider myself a happy person	1	2	3
	I am not afraid of difficulties; I feel I can manage them	1	2	3
	Up to now I think I have done well in my life	1	2	3
	I am often disappointed with myself	1	2	3
	I have not had to worry about my health	1	2	3
	When something exciting is happening I always want to be there	1	2	3

APPENDIX

114 Have you used or tried ?

	No	once	2-4 times	More often
Cannabis or marijuana	1	2	3	4
Iv-drugs	1	2	3	4
Other drugs	1	2	3	4
Medicines to get dizzy	1	2	3	4
Medicines and alcohol together for intoxication	1	2	3	4

115 Related to this questionnaire I would like to add:

Appendix 2

Calculating annual alcohol consumption

Alcohol consumption was estimated as kg of pure ethanol per year, both by a quantity-frequency scale (Q-F scale), and also as a mean weekly alcohol intake estimate of five different beverages (M-W scale). The Q-F scale was mostly used, but if this value was missing or smaller than the value from the M-W scale, then the latter value was used. Some students preferred to report their average weekly consumption and they were not forced to answer the other way too. Annual consumption was divided by 52 to get the weekly consumption and by 365 to get the daily consumption.

The Q-F scale

The respondents were first asked how often they used alcohol on a scale with 10 different fixed frequency alternatives (question no.82, see Appendix 1). The reported frequencies were used to determine which intervals drinking data (question no. 84, see Appendix 1) were requested for. The various frequency and survey period options are given below. The alcohol volymes per sitting were multiplied by the coefficients of the tabulations to change the consumption into annual consumption estimates.

APPENDIX

Drinking frequency	Survey period length	Coefficient
1 Several times a day	daily	365
1 2-3 times a day	daily	365
3 About once a day	daily	365
4 2-4 times a week	3 times a week	156
5 about once a week	weekly	52
6 2-3 times a month	twice a month	30
7 once a month	monthly	12
8 5-6 times a year	every second month	6
9 1-3 times a year	twice a year	2
10 Never		1

The alcohol volume per sitting was calculated from question no. 84 as grams of pure ethanol. According to the units, bottles or cl of the different beverages were used; a standard Finnish drink is 13 g (12 cl wine, 8 cl fortified wine or 4 cl spirits), a bottle (33 cl) of beer is for medium beer 12.5 g and for strong beer 15 g, a bottle (75 cl) of light wine is 80 g, a bottle (75 cl) of strong wine is 180 g and a bottle (50 cl) of distilled spirits is 150 g for Koskenkorva and 160 g for Vodka as pure ethanol.

The M-W scale

In question no. 25 (see Appendix 1) the respondents were asked to estimate their weekly consumption for five different alcoholic beverages. The weekly alcohol consumption was calculated as grams of pure ethanol, analogous to question no. 84 and was multiplied by 52 to get the annual consumption.