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Abbreviations used in the document

CI	Confidence Interval
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
ESPAD	European School Survey Project on Alcohol and Other Drugs
GDP	Gross Domestic Product
HBSC	Health Behaviour in School-aged Children
HDI	Human Development Index
HIV	Human Immunodeficiency Virus
LTP	Lifetime prevalence (use ever in life)
LYP	Last year prevalence (use in the last 12 months)
LMP	Last month prevalence (use in the last 30 days)
MDMA	3,4-Methylenedioxymethamphetamine
NSUM	Network Scale-Up Method
RSPCMH	Republican Scientific and Practical Center of Mental Health
UN	United Nations
UNODC	United Nations Office on Drugs and Crime
WHO	World Health Organization
YSDUH	Youth Survey on Drug Use and Health

Table of Contents

Acknowledgements.....	ii
Abbreviations used in the document.....	iv
Table of Contents	v
Executive Summary	vii
List of tables	xi
List of figures	xiii
1 Background.....	1
1.1 The Republic of Kazakhstan.....	1
1.2 Drug situation and trends.....	1
1.3 2018 Youth Survey on Drug Use and Health in Kazakhstan.....	3
2 Results.....	5
2.1 Self-reported substance use.....	5
2.1.1 Tobacco use.....	5
2.1.2 Alcohol use.....	7
2.1.3 Drug use.....	9
2.2 Knowledge and attitudes regarding psychoactive substances.....	11
2.2.1 Having heard of drugs.....	11
2.2.2 Disapproval of substance users	12
2.2.3 Perception of risk from substance use.....	13
2.2.4 Perceived availability of substances	16
2.3 Psychosocial variables	19
2.3.1 Self-reported problems	19
2.3.2 Social support and parental monitoring	20
2.3.3 Spare time activities and hobbies	23
2.3.4 School performance and truancy	24
2.3.5 The most serious problems: self-harm and running away from home	25
2.3.6 Psychometric scales measuring self-esteem, depressive mood, antisocial behaviour and feeling of social anomie	27
2.3.7 Having drug-using friends.....	28
2.4 Association of demographic variables, risk and protective factors and key measures of alcohol, tobacco and drug use	28
2.4.1 Discriminant analysis	28

3	Discussion.....	31
4	Limitations.....	38
5	Conclusions.....	42
6	Methodology.....	43
6.1	Aims of the survey	43
6.2	Target population and coverage of the total population in the respective age	43
6.3	Sampling method.....	44
6.4	Sampling frame	44
6.5	Final participation in the study and refusals	45
6.6	Description of the study sample – demographic variables.....	45
6.7	Mode of data collection.....	47
6.8	The Network Scale-Up Method.....	47
6.9	Indirect estimates of prevalence.....	48
6.10	Languages of the survey and the translation process	50
6.11	Cognitive testing of the questionnaire's novel module (Network Scale-Up Method-related questions).....	50
6.12	Pilot testing of the questionnaire	50
6.13	Final sample size.....	51
6.14	Consent and confidentiality, and the questionnaire administration process	51
6.15	Data collection timing.....	52
6.16	Study-related climate in the country and the need for advocacy.....	52
6.17	Data entry.....	52
6.18	Data cleaning.....	52
6.19	Some signs of reliability and validity of the data	52
6.19.1	Reliability	52
6.19.2	Validity	55
6.20	Data analysis.....	57
6.20.1	The Network Scale-Up Method	57
6.20.2	Discriminant analysis.....	61
6.20.3	Multinomial logistic regression models	61

Executive Summary

The Youth Survey on Drug Use and Health is an extensive school survey conducted in Kazakhstan in 2018 which sampled the views of 13-18-year olds in urban schools. The survey was conducted using a standard methodology for school surveys which has been used in other similar surveys carried out by UNODC and others, such as the European School Survey Project on Alcohol and Other Drugs (ESPAD).

The results suggest that **between 3.1% and 11.6%¹** of young people in Kazakhstan aged 13-18 years **have used drugs** (with the exception of alcohol and tobacco) during their lives. Furthermore, between **1.7% - 6.4%¹** of adolescents are estimated to have used any drug in the previous 12 months. The substances most often used were inhalants (0.7-3.85% in the last 12 months); and cannabis (0.8-2.27% in the last 12 months). Overall, the prevalence of drug use was higher among boys and those who were in the older age groups than among girls and those who were younger.

More than one third of teenagers reported using **alcohol during their life**; and about one in five had drunk alcohol in the last 12 months. About 7% reported using alcohol in the 30 days preceding the survey. Fewer than 10% of respondents reported being drunk at least once in their life. There was no difference between boys and girls in the reported use of alcohol.

Around 21% of the young people reported using **cigarettes during their life** – **25% of the boys and 17% of the girls reported using tobacco during their life**. Around 8% had smoked them in the last 12 months (10% of boys and 7% of girls); while 5% had smoked cigarettes in the last 30 days. About half of the students who reported ever using tobacco had started to smoke at age 13 or younger. In addition, around 5% of the students had tried naswar (smokeless tobacco) during their life.

The adolescents who participated in the survey were more aware of or knowledgeable about heroin, cocaine, spice, cannabis and amphetamine, in that order. Almost one third of respondents had heard of ecstasy and inhalants – notwithstanding the fact that the self-reported use of inhalants was comparable to that of cannabis. Among the respondents, the perceived availability of drugs was much lower than that reported among European students aged 15-16². The adolescents in Kazakhstan considered various drugs 4-10 times less readily available than the average respondents

¹ These intervals are based on self-report (lower bound) and an extrapolation based on a Network Scale-up Method.

² ESPAD Group, ESPAD Report 2015: Results from the European School Survey Project on Alcohol and Other Drugs, (Publications Office of the European Union, Luxembourg, 2016).

taking part in the European study (ESPAD) in 2015 (ibid). The students' perception of the risk of using different drugs and the pattern of their use was overall relatively 'flat' – they did not distinguish much in their perception of risk between the experimental, occasional or regular use of different drugs. The majority of the students perceived that there was considerable risk involved in using most of the substances listed.

One of the aims of the survey was to investigate **correlates of substance use**. In general, the correlates of substance use found in the current survey were similar to those reported in the literature related to this age group.³

The strongest correlates and predictors of drug use among adolescents in the country were (in this order):

- **Having at least one friend who had used drugs (this increased the likelihood of drug use by a factor of 8.4)**
- **Having used alcohol or smoked cigarettes in the last 12 months (this increased the likelihood of drug use by a factor of two)**
- **Showing increased symptoms of depression (compared to non-users)**
- **Displaying antisocial behaviour**
- **A perception that substances were readily available.**

In addition, further analysis suggests that other factors are also correlated or associated with substance use among adolescents. The following factors or conditions were higher among those young people who reported drug use as compared to those who did not report any use. Users:

- felt less social and emotional support from family and friends
- reported lower parental control or monitoring
- perceived lower perception of risk related to substance use
- reported less disapproval towards users of various substances
- displayed somewhat decreased self-esteem
- spent more of their time hanging out with friends.

Implications for policy and programmes

As is stated above, the analysis of correlates of substance use reveals that substance use in this age group is associated with a cluster of problems. Effective prevention of substance use among young

3 See for instance the World Drug Report 2018: Booklet 4 drugs and age

people will therefore need to be tailored to address those risk factors and protective factors linked with substance use. Crucially, well-researched, evidence-based education programmes both in schools and among families have the potential to help prevent young people becoming involved with the use of harmful substances. It is therefore advisable that efforts in the area of drug prevention for children and teenagers address these issues and problems by means of a holistic model that is constructed around well-researched, evidence-based interventions which work; and which are in line with the present state of knowledge on prevention of drug use⁴.

⁴ UNODC/WHO: International Standards on Drug Use Prevention. Second updated edition. March 2018.

Summary of survey methodology

10,222 questionnaires were collected from students aged 13-18. Following data cleaning, 9,111 were included in the final dataset. The questionnaires contained information on the demographic profile of the respondent; their spare-time activities; their use of tobacco, alcohol and other psychoactive substances; their attitudes to the use of these substances (risk perception and disapproval of users) and their perceived availability; their perceived social support; parental monitoring; and some additional psychosocial variables. These included psychometric scales assessing self-esteem; depressive mood; and the feeling of anomie and antisocial behaviour. Moreover, questions were included which dealt with various problems being experienced, with or without relation to substance use; and specific questions regarding self-harm and running away from home.

The data gathered through the questionnaire was first subjected to a detailed assessment of its validity and reliability. This analysis confirmed that there were no indications of any substantial systematic flaws related to the validity and reliability of the data: various measures of logical and internal consistency, missing items, etc. were comparable to those found in the ESPAD study.

As self-report is prone to biases, including social desirability, shame or fear of repercussions if the person admits to drug use, the self-reported prevalence was taken to be the lower bound of the actual prevalence. Indirect method-based estimates were thus seen as also essential in obtaining a complete picture of the prevalence of teenage drug use in Kazakhstan. As a result of various methodological considerations (see Discussion in the main report for more details), it is suggested that the indirect method-based estimates are interpreted as the upper limits of the estimates of the prevalence of drug use among the country's teenagers. The present study therefore uses a novel application of the Network Scale-Up Method, an indirect method successfully used elsewhere to estimate the size of hidden populations with often socially stigmatised behaviours. The questionnaire included seven questions designed to assess the size of the respondent's network of close friends; the number of close friends who used various psychoactive substances; and some variables related to the likelihood of correctly reporting such use in the respective social circle. In principle, the indirect estimates were approximately 2 to 10 times higher than the self-reported prevalence (the median was 3.75). This figure was subsequently used as an approximate under-reporting rate in order to make an extrapolation for the previous year and for the lifetime use of any drug.

Bivariate and multivariate analyses were applied to understand the relative importance of the various correlates of drug use.

List of tables

Table 1. Summary of self-reported tobacco use with confidence intervals of the estimated prevalence.....	5
Table 2. Summary of self-reported alcohol use with confidence intervals of the estimated prevalence.....	7
Table 3. Self-reported drug use by drug type.....	9
Table 4. Prevalence estimates - based on self-reported use of drugs	10
Table 5. Comparison of risk perceptions of harm between the present study and ESPAD 2011 (average).....	15
Table 6. Ever use of cannabis and risk perception of trying cannabis.....	15
Table 7. International comparison of perceived availability of various substances. Present study vs. ESPAD 2015.....	17
Table 8. Cannabis use ever in life and perceived availability of cannabis.....	18
Table 9. Any drug use in lifetime and perceived availability of cannabis.....	18
Table 10. The relationship between perceived availability of cannabis and its use in the last 12 months and during lifetime	18
Table 11. Missed school in the past 30 days	25
Table 12. Association of thoughts of self-harm with self-reported drug use in lifetime.....	26
Table 13. Association of self-reported suicide attempts with self-reported drug use in lifetime.....	26
Table 14. Structure matrices (association with the discriminant function) of three discriminant analysis models with substance use as the grouping variable.....	29
Table 15. Correlated of drug use ('predictors' in the model)	30
Table 16: Overview of indirect estimation of prevalence of substance use prevalence by a version of the Network Scale-Up Method.....	49
Table 17. Distribution of answers to question 'If you had ever used cannabis (marijuana or hashish), do you think you would have said so in this survey?'	53
Table 18. Overview of indirect estimation of substance use prevalence by a version of the Network Scale-Up Method.....	60
Table 19. Summary of three Discriminant Analysis models with substance use as the grouping variable (in columns)	61

Table 20. Parameter estimates of the 'full' Multinomial logistic regression model incorporating all available predictors from the collected data, potentially important according to the scientific literature.....	62
Table 21. Parameter estimates of the 'reduced' Multinomial logistic regression model incorporating only variables with theoretically explained or empirically proven relationship with drug use.....	64

List of figures

Graph 1. Prevalence of cigarette use.....	6
Graph 2. Increase in prevalence of cigarette use with age.....	6
Graph 3. Prevalence of alcohol use	8
Graph 4. Increase in prevalence of alcohol use with age.....	8
Graph 5. Have you ever heard of the following psychoactive substances?.....	11
Graph 6. Do you disapprove of people doing any of the following? (ordered by the greatest proportion of strong disapproval).....	12
Graph 7. Risk perception of harm from using substances, occasionally or regularly.....	14
Graph 8. How difficult would it be for you to obtain the following psychoactive substances within 24 hours if you wanted to?.....	16
Graph 9. Problems potentially related to the use of alcohol or drugs.....	20
Graph 10. Satisfaction with relationships.....	21
Graph 11. Obtaining money from parents and levels of parental monitoring.....	22
Graph 12. Social and emotional support.....	23
Graph 13. Spare time activities or hobbies.....	24
Graph 14. Self-harm and running away from home	26
Graph 15. YSDUH Kazakhstan - students aged 15-16 at the time of the study compared with the corresponding age group in the Kyrgyz ESPAD-like study (self-report).....	32
Graph 16. Estimates of substance use prevalence (% of respondents reporting use) in HBSC (lighter colours) and the present study (darker colours) among boys and girls of two age groups (13-year olds and 15-year olds)	34
Graph 17. Grade of the respondent	46
Graph 18. Achieved age of respondent in the year of survey	46
Graph 19: Educational level achieved by parents of the respondent (%).....	46
Figure 1. Distribution of total scores on the four psychometric scales used in the survey	27

1 Background

1.1 The Republic of Kazakhstan

The Republic of Kazakhstan, the largest landlocked country in the world, is situated in Central Asia. Kazakhstan has a population of more than 18.5 million inhabitants⁵. Formerly part of the Soviet Union, the republic declared its independence in 1991. Kazakhstan generates about two thirds of the GDP of Central Asia⁶ and has a high Human Development Index (HDI, 0.817 in 2018), putting it 50th on the list of 189 countries rated on this scale. In the past 13 years, the country's HDI has grown rapidly⁷.

1.2 Drug situation and trends

There is a scarcity of information, and in particular up-to-date information, on the overall situation in the country regarding the usage of drugs. The last general population survey in Kazakhstan was conducted in 2001. It covered those aged seven to 55 (sample size 7029); and reported that about 10% of respondents had used any drug in their lifetime. The most prevalent and regularly used drug was cannabis⁸.

Information on high-risk drug use is available, based on several data sources. As is the case in other Central Asian republics, Kazakhstan runs a narcological register which contains information on active drug users or those in early remission. These users are usually on the register because they have undergone state-organised drug treatment after being directed there by the police or medical services. The registry serves as a means of control (e.g. preventing drug users from obtaining a driving license or certain jobs) and users therefore try to avoid registration. Among the various means of avoiding registration is to undergo private treatment on an anonymous basis; and so the registry only captures a certain proportion of people with drug problems. The data therefore has to be interpreted with caution. In 2018, the register in Kazakhstan was updated⁹.

In 2017, the narcological register contained the names of almost 25,000 people. The vast majority of these were individuals with diagnoses relating to the use of opioids (about 11,500); cannabis

⁵Statistics Committee of the Ministry of National Economy of the Republic of Kazakhstan <https://stat.gov.kz/>

⁶Yuri Zarakhovich "Kazakhstan Comes on Strong." *Time*. (27 September 2006).

⁷UNDP *Human Development Report 2019, Kazakhstan*.

⁸Oleg Yussopov and others, *2018 National Report on Drug Situation in the Republic of Kazakhstan*. (ResAd, Prague, 2019).

⁹Tomáš Zábranský and Viktor Mravčík (Eds.), *The 2019 Regional Report on the Drug Situation in Central Asia* [Региональный обзор о наркоситуации в Центральной Азии 2019] (Bishkek/ Prague: CADAP 6/ResAd).

(approximately 8,500); and polydrug use (F 19 diagnosis, around 4,600). Over the last ten years, there has been a significant decrease in the number of records in this register relating to most drug groups. The only category that has remained unchanged is polydrug use. Among registered drug users, the rate per 100,000 of those aged under 18 declined by about ten-fold between 2009 and 2017; and more than three-fold between 2012 and 2017⁴. Almost half of the young people registered had used inhalants as their main drug and in 2017 40% had used cannabinoids as the main substance.

At the end of 2016, an estimated 120,500 people in Kazakhstan were injecting drugs, which is about 1% of the country's 15-64 age group¹⁰. The estimated average age of PWID was around 35 years with almost 17% women. Ethnic Russians were overrepresented in this population (they made up over 50% of the total while constituting only just over 20% of the overall population of Kazakhstan). Only 6.2% were estimated to be below the age of 25. The vast majority of the people injecting drugs were injecting heroin (over 90%). In 2017, about half of them had visited low-threshold services (60,705). HIV prevalence among injecting drug users in 2017 was relatively high at 9.3% (*ibid*).

Since the year 2000, there have been two studies conducted specifically among young people which have focused on their drug use and patterns of use. Both have used an ESPAD-like questionnaire to collect data. Baykenov¹¹ collected data in 2012 from 4000 young people aged 16, 19 and 22 by means of a household study which used stratified sampling based on the population register. The study took place in selected regions of Kazakhstan. It was estimated that the lifetime prevalence of any drug use among the 16-year-old respondents was 16%; while around 7% had used any drug in the last 12 months; and 4% in the last 30 days. Results by the type of drug used were available only for the entire sample (16-22-year olds). Figures for the lifetime use of drugs were as follows: cannabis – 11.2%; inhalants – 5.4%; stimulants – 2.3%; sedatives – 1.5%; and 0.9% of respondents indicated that they had used opiates during their lifetime.

In 2006, a school survey similar to ESPAD was conducted among 14-15-year-olds¹². It determined that the lifetime prevalence of drug use in this group amounted to 4.8% of the sample. 2.7% of the sample reported using cannabis at least once in the previous 12 months. 0.1% of the respondents reported injecting heroin.

¹⁰ RC AIDS, Estimation of the number of people who inject drugs in the Republic of Kazakhstan (Almaty, 2016).

¹¹ E.B. Baykenov, Report on the results of the study of the risks of involvement in chemical and non-chemical addictions among children and young people of the Republic of Kazakhstan (2013).

¹² O.V. Lavrentyev, The National School of Studies on Alcohol and Drugs in the Republic of Kazakhstan (Pavlodar: RSPC MSPDA, 2007).

There exists some anecdotal evidence of adolescents (i.e. young people under the age of 18) using various other substances in different regions of Kazakhstan. In the West Kazakhstan oblast, there were reports of the use of castor seeds, probably because of their hallucinogenic effects. In the South Kazakhstan oblast, use of the plant *Atropa Belladonna* was reported. In the city of Temirtau, in the Karaganda oblast, a number of reports of toluene (methylbenzene) sniffing emerged¹³.

In addition, evidence points to a recent increase in the use of new psychoactive substances. The evidence is mostly anecdotal; but there is also increasing data from treatment of those using drugs and medical treatment of those suffering acute intoxication. The new psychoactive substances are mainly synthetic cannabinoids and synthetic cathinones. The areas where most of these incidents have been reported are Almaty and Northern Kazakhstan (Almaty had 109 cases of NPS use in drug treatment and Northern Kazakhstan had 28 in 2017). The available data is scarce and suggests that the users are mostly young people below 30 years of age^{14,15}.

1.3 2018 Youth Survey on Drug Use and Health in Kazakhstan

As data from the last school survey in Kazakhstan was over 10 years old, experts in drug use in the country agreed unanimously that collecting fresh data would be useful and informative for the purposes of policy planning and evaluation. The Republican Mental Health Centre in Almaty was therefore tasked by the Ministry of Health of Kazakhstan to prepare a survey design in collaboration with UNODC's Regional Programme for Afghanistan and Neighbouring Countries and the headquarters of the UNODC; and to collect data and ensure correct data entry.

For the purposes of this survey, an established methodology was chosen, based on the experience of UNODC in implementing school surveys in different countries as well as the European School Survey Project on Alcohol and Other Drugs (ESPAD), and adapted to the national context. For example, the age range of the respondents (13-18) was broader than conventional school surveys; and a paper-and-pencil questionnaire was administered to a representative sample of classes in urban areas of the country. Bearing in mind that self-reporting is prone to many biases, such as underreporting, especially in settings where drug use is highly stigmatized or carries legal sanctions, the survey also

¹³ Oleg Yussopov and others, *2018 National Report on Drug Situation in the Republic of Kazakhstan*. (ResAd, Prague, 2019).

¹⁴ UNODC, responses from Kazakhstan to the annual report questionnaire.

¹⁵ G. A. Sadvakasova, *Problems of consumption of new psychoactive substances in the Republic of Kazakhstan* (Presentation, October 2008, Kazakhstan).

used a novel methodology to indirectly estimate the prevalence of drug use using the Network Scale-Up Method. See 'Methodology' for more detailed information.

2 Results

2.1 Self-reported substance use

2.1.1 Tobacco use

Approximately one in five teenagers reported smoking cigarettes at some point in their life. 8.6% of teenagers responded they had smoked cigarettes in the last 12 months, and 4.6% had done so during the previous 30 days. As regards the prevalence of smoking cigarettes, there was a statistically significant difference between boys and girls across all the survey recall periods. For instance, almost one quarter of boys had smoked cigarettes in their life, while only about 17% of girls had done so (see Graph 1). The prevalence of tobacco use increased with age, as expected. This was true across all examined recall periods, i.e. lifetime, last year and last month (see Graph 2). Current and regular smoking was rare, with only 3% of teenagers reporting smoking at least one cigarette daily in the previous 30 days. Heavy smoking (20 cigarettes or more per day) was reported by only 0.2% of the sample (0.5% reported smoking 10 or more cigarettes per day). Beginning cigarette smoking at an early age (13 or less) was reported by 10.5% of the sample, which is about half of those who had ever smoked.

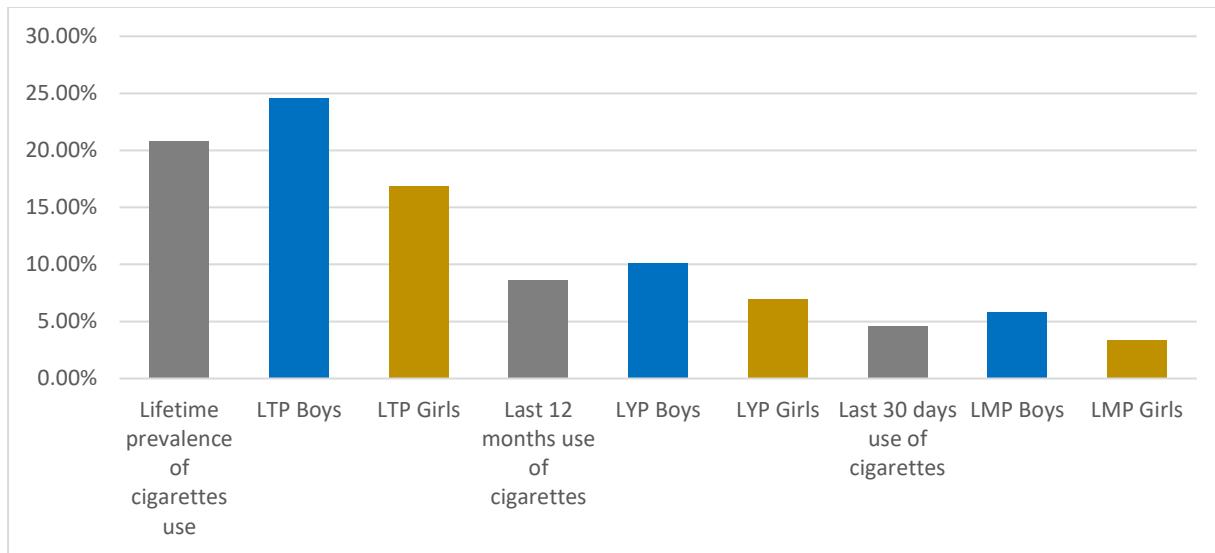
Nearly 5% of the sample reported having ever tried naswar (chewing/smokeless or tobacco snuff); with 2% reporting its use in the last 12 months and 1.5% in the last 30 days (see Table 1).

Table 1. Summary of self-reported tobacco use with confidence intervals of the estimated prevalence¹⁶

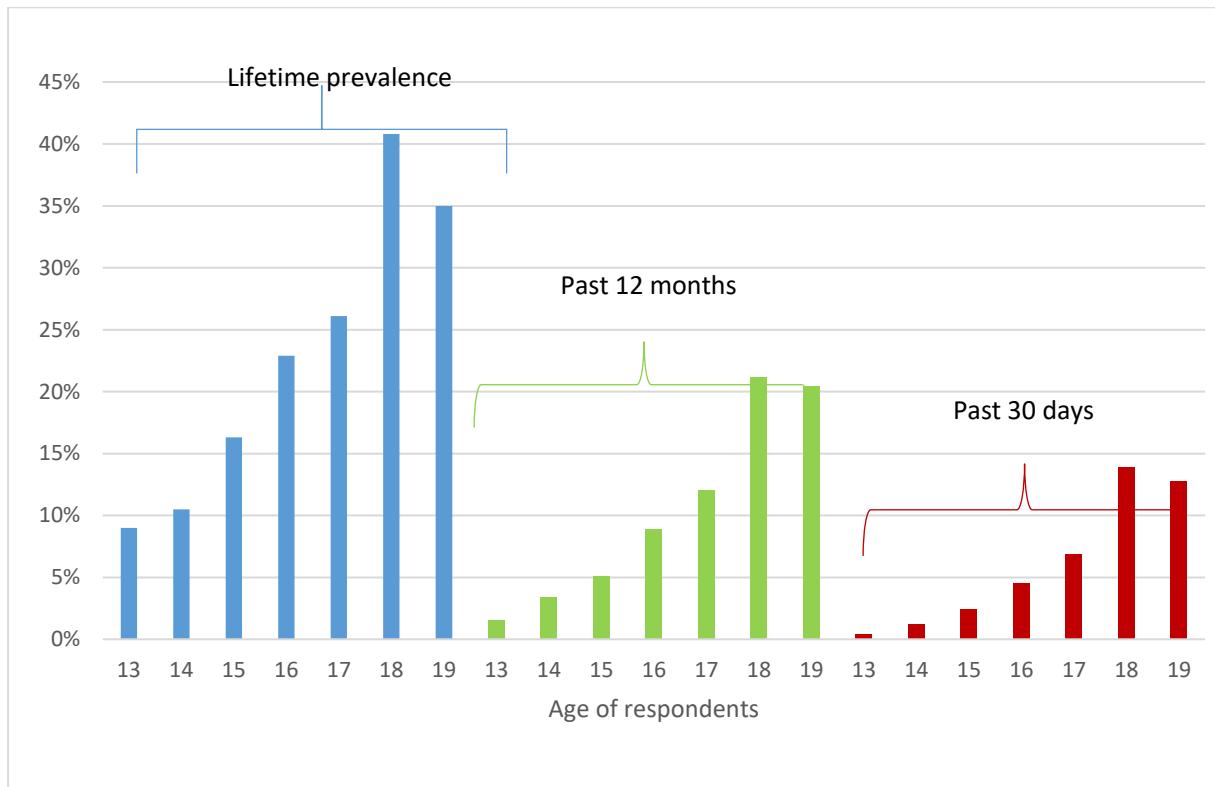
	Estimate	Lower bound	Upper bound
Lifetime prevalence of tobacco use	20.8%	20%	21.7%
- Boys	24.6%	23.4%	25.9%
- Girls	16.9%	15.8%	18.0%
Last 12 months use of tobacco	8.6%	8.0%	9.2%
- Boys	10.1%	9.2%	11.0%
- Girls	7.0%	6.3%	7.8%
Last 30 days use of tobacco	4.6%	4.2%	5.0%
- Boys	5.8%	5.1%	6.5%
- Girls	3.4%	2.9%	4.0%
Lifetime use of naswar use	4.6%	4.2%	5.0%
Last 12 months use of naswar	2.1%	1.8%	2.4%
Last 30 days use of naswar	1.5%	1.2%	1.7%

¹⁶ Based on 95% CI for proportion (normal approximation to binomial distribution). Sampling design could not be taken into account due to lack of the respective information on clustering.

Graph 1. Prevalence of cigarette use



Graph 2. Increase in prevalence of cigarette use with age¹⁷



¹⁷ Age here means the number of years for which the study participant had lived by the year 2018, based on their year of birth. A more precise age could not be calculated as, while the year and month of birth were available, the same was not true for the dates of the data collection.

2.1.2 Alcohol use

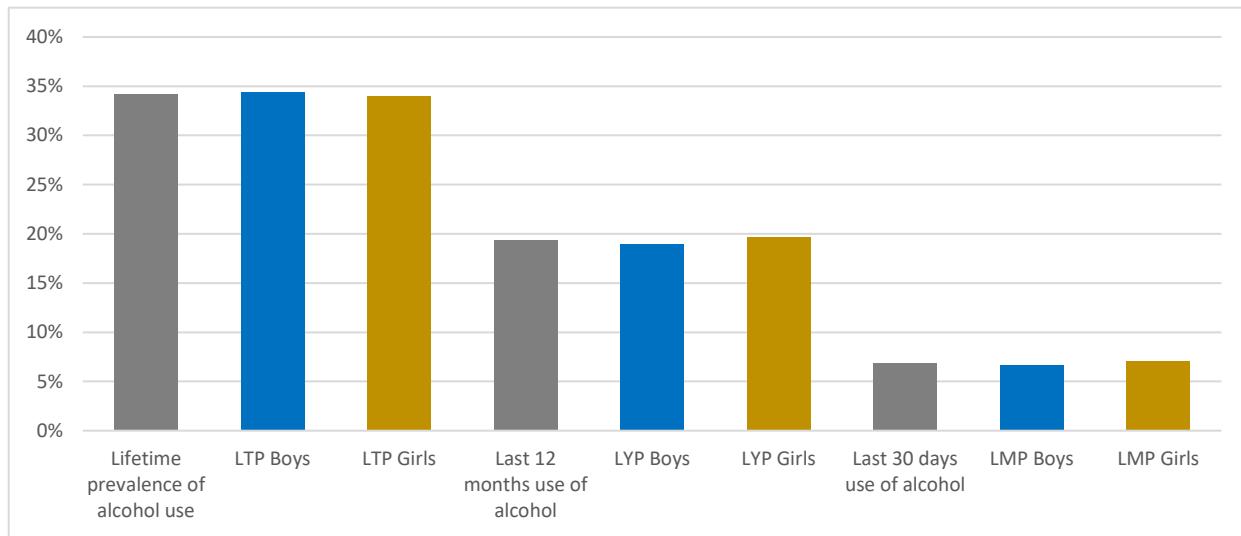
More than one third of the teenagers reported using alcohol during their lives; and about one in five responded that they had drunk alcohol during the last 12 months. About 7% reported using alcohol in the 30 days preceding the survey. Interestingly, there was no statistically significant difference between boys and girls for any of the recall periods in terms of drinking alcohol (See Table 2 and Graph 3 for more detailed information). 15% of the teenagers reported binge drinking at least once; and 4% of the sample reported binge drinking three or more times in their life. Some respondents reported beginning alcohol use at an early age: 14.4% had drunk their first beer by the age of 13; 9.7% had drunk their first wine by this age; and 5.2% drank their first alcohol at the age of 13 or younger. Fewer than 10% of respondents (9.7%) admitted getting drunk at least once; and nearly 3% had done so by the age of 13. Experience with alcohol use increased with age as expected (see Graph 4). From the graph, it can be seen that, for the study group, alcohol use had generally been initiated by the age of 15 or 16.

Table 2. Summary of self-reported alcohol use with confidence intervals¹⁸ of the estimated prevalence

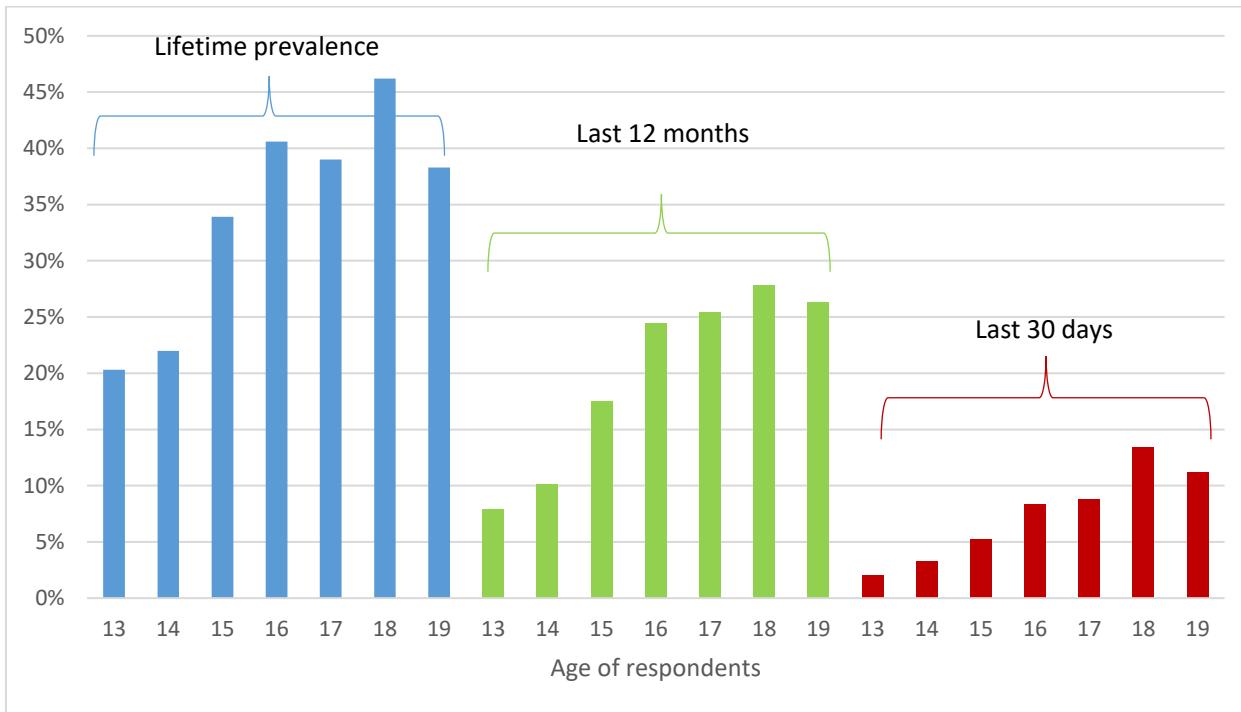
	Central estimate	Lower bound	Upper bound
Lifetime use of alcohol	34.2%	33.2%	35.2%
- Boys	34.4%	33.0%	35.7%
- Girls	34.0%	32.6%	35.4%
Last 12 months use of alcohol	19.4%	18.6%	20.2%
- Boys	19.0%	17.9%	20.2%
- Girls	19.7%	18.5%	20.9%
Last 30 days use of alcohol	6.9%	6.3%	7.4%
- Boys	6.7%	5.9%	7.4%
- Girls	7.1%	6.3%	7.9%

¹⁸ Based on 95% CI for proportion (normal approximation to binomial distribution). Sampling design could not be taken into account due to lack of the relevant information on clustering.

Graph 3. Prevalence of alcohol use



Graph 4. Increase in prevalence of alcohol use with age



2.1.3 Drug use

When broken down by drug type, self-reported prevalence of drug use was low and exceeded 1% only in the case of ever having used cannabis and ever having used inhalants (see Table 3 for detailed data).

Table 3. Self-reported drug use by drug type

	No use in lifetime		Lifetime use		Last 12 months use		Last 30 days use	
	Count	%	Count	%	Count	%	Count	%
Heroin	9004	99.7%	24	0.3%	13	0.1%	8	0.1%
Opium	9006	99.9%	13	0.1%	11	0.1%	8	0.1%
Morphine	8999	99.8%	17	0.2%	13	0.1%	7	0.1%
Cannabis	8912	98.8%	111	1.2%	69	0.8%	21	0.2%
Spice	8963	99.4%	57	0.6%	42	0.5%	11	0.1%
Amphetamine	8998	99.7%	24	0.3%	15	0.2%	7	0.1%
Methamphetamine	9011	99.9%	10	0.1%	8	0.1%	5	0.1%
Ecstasy	8998	99.7%	25	0.3%	16	0.2%	12	0.1%
Crack cocaine	9000	99.8%	22	0.2%	19	0.2%	10	0.1%
Cocaine powder	9003	99.8%	18	0.2%	10	0.1%	5	0.1%
Ketamine	9001	99.8%	21	0.2%	16	0.2%	11	0.1%
LSD	9000	99.7%	23	0.3%	17	0.2%	12	0.1%
Magic mushrooms	8996	99.7%	26	0.3%	17	0.2%	12	0.1%
GHB/GBL	8999	99.8%	18	0.2%	14	0.2%	12	0.1%
Opioids (painkillers e.g. Tramadol) non-medical use of	8950	99.3%	61	0.7%	26	0.3%	18	0.2%
Sedatives and Tranquillizer (e.g. Relanium) non-medical use of	8966	99.7%	30	0.3%	18	0.2%	13	0.1%
Inhalants	8679	98.5%	135	1.5%	63	0.7%	39	0.4%
Other psychoactive substances	8885	99.5%	47	0.5%	29	0.3%	20	0.2%

Looking in more detail at the lifetime prevalence of the use of various drugs, it was noted that there was a tendency towards a higher prevalence of use in males and with increasing age; although, due to the small numbers of users, these differences were not possible to test with relevant precision.

Notable exceptions to this pattern were the non-medical use of painkillers and sedatives/tranquillisers and the use of inhalants, where girls and boys reported very similar levels of use. The level of non-medical use of prescription drugs in females is consistent with findings of other researchers¹⁹. Since the number of self-reported users was so small, similar analysis of the use of different drugs in the last 12 months and the last 30 days could not be carried out.

Due to the same reason (the small numbers of students who self-reported the use of substances), meaningful composite categories were created in order to estimate the prevalence of drug use in the population in question. Based on the self-reported data, it was estimated that 3.1%²⁰ of respondents (2.7 to 3.4%) had ever used any drug other than alcohol and tobacco. The self-reported prevalence, even after grouping it into broader categories, was still too small to allow any meaningful analysis (see Table 4). It was therefore decided to focus in the subsequent analyses mainly on the data relating to ever having used any drug, especially in order to look at the protective and risk factors of substance use.

Table 4. Prevalence estimates - based on self-reported use of drugs²¹

	Central estimate	Lower bound	Upper bound
Lifetime use of any drug	3.1%	2.7%	3.4%
Use of any drug in the past 12 months	1.7%	1.5%	2.0%
Use of any drug in the past 30 days	0.9%	0.7%	1.1%
Lifetime use of opioids (heroin, opium, morphine or Tramadol)	0.8%	0.6%	1.0%
Lifetime use of cannabinoids (cannabis or Spice)	1.3%	1.1%	1.6%
Lifetime use of stimulants (amphetamine, methamphetamine, ecstasy, cocaine powder and/or crack)	0.6%	0.4%	0.7%
Lifetime use of hallucinogens (LSD, magic mushrooms and/or ketamine)	0.5%	0.3%	0.6%

¹⁹ Nora D. Volkow, *Prescription drugs: Abuse and addiction* (National Institute on Drug Abuse, 2005).

²⁰ This figure was calculated as the percentage of those saying 'yes' to the lifetime use of any drug as a proportion of all those who answered all the drugs questions (the dummy drug Relevin excluded). However, if we look at the percentage of those who answered yes to any lifetime use of any drug (except Relevin) as a proportion of all those who answered at least one drug question, the resulting figure is 3.3%.

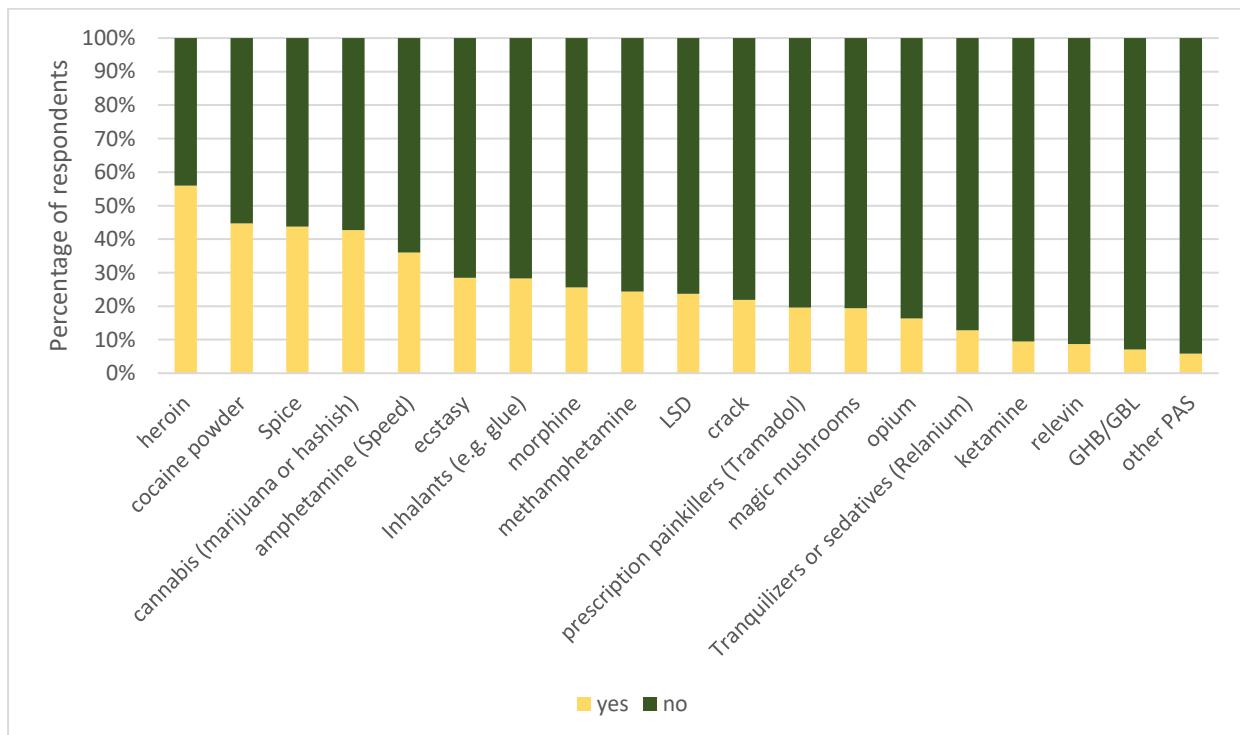
²¹ Based on 95% CI for proportion (normal approximation to binomial distribution). Sampling design could not be taken into account due to lack of the relevant information on clustering.

2.2 Knowledge and attitudes regarding psychoactive substances

2.2.1 Having heard of drugs

The respondents were asked whether they had heard of the different substances named in the questionnaire. The most well-known substances were heroin, cocaine, Spice, cannabis and amphetamine, in that order. Almost one third of the respondents had heard of ecstasy and inhalants; but the proportion was lower than this for the other substances. In general, the majority of respondents had not heard of most of the listed substances. Compared to female students and younger respondents, older male students were more likely to report having heard of a substance. Among the respondents, being male and older was associated with having heard of a substance. The exceptions to this were heroin, cocaine powder, prescription opioids, and inhalants. For these, no association with gender was found. Graph 5 summarizes the responses, ordered by the percentage of teenagers responding that they had heard of each of the substances.

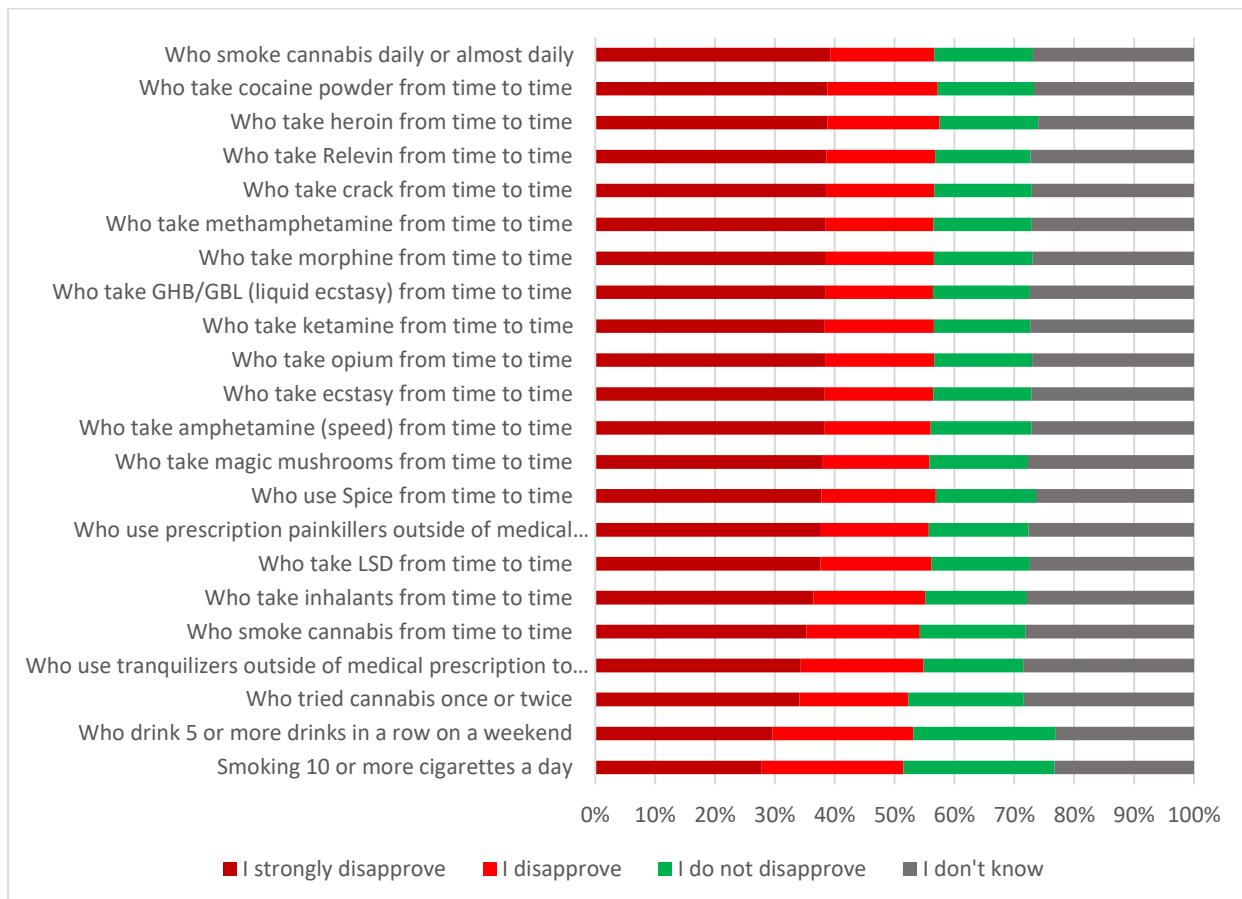
Graph 5. Have you ever heard of the following psychoactive substances?



2.2.2 Disapproval of substance users

Disapproval of those who used drugs, alcohol and tobacco was quite common among the students responding to the survey. However, over one quarter of respondents did not have a clear opinion on the relevant questions. Interestingly, disapproval did not vary much among the various substances or patterns of their use (for instance, disapproval of Spice use was as strong as for heroin use).

Graph 6. Do you disapprove of people doing any of the following? (ordered by the greatest proportion of strong disapproval)



There were strong associations between approval of drug use and self-reported drug use. Among those respondents who had a strong disapproval of substances, the self-reported use of those substances had a lower prevalence.

2.2.3 Perception of risk from substance use

Perception of risk is one of the known protective factors against substance use^{22,23}; and therefore it is often measured in drug-prevalence studies which are carried out among the general and school populations. Meaningful and appropriate information which individuals can use to form their perception of risk is typically communicated to the population by means of drug-prevention programmes. Graph 7 summarises risk perception among adolescents living in Kazakhstan. It can be seen from this graph that, apart from the low level of cigarette use and the relatively low level of alcohol use, the respondents do not distinguish between the levels of risk related to various substances and the specific patterns or frequency of their use. For example, the level of risk-perception for regular cannabis use or occasional ecstasy use was almost identical to that for heroin use.

According to the scientific literature, higher risk perception is correlated with low(er) substance use within a country.^{24,25,26} It may therefore be useful to compare the level of risk perception with other countries before comparing the prevalence of substance use per se. Such a comparison can be found in Table 5. It can clearly be seen that adolescents in Kazakhstan have a higher risk perception of different drugs than that found in the ESPAD study (according to the ESPAD average). However, any direct comparisons have to be made with caution, because the proportion of responses 'I don't know', even if excluded from the analysis, was generally higher among adolescents in Kazakhstan than in ESPAD respondents.

²² Julio Bejarano and others, "Perception of risk and drug use: An exploratory analysis of explanatory factors in six Latin American countries." *The Journal of International Drug, Alcohol and Tobacco Research*, Vol. 1, No. 1 (2011), pp. 9-17.

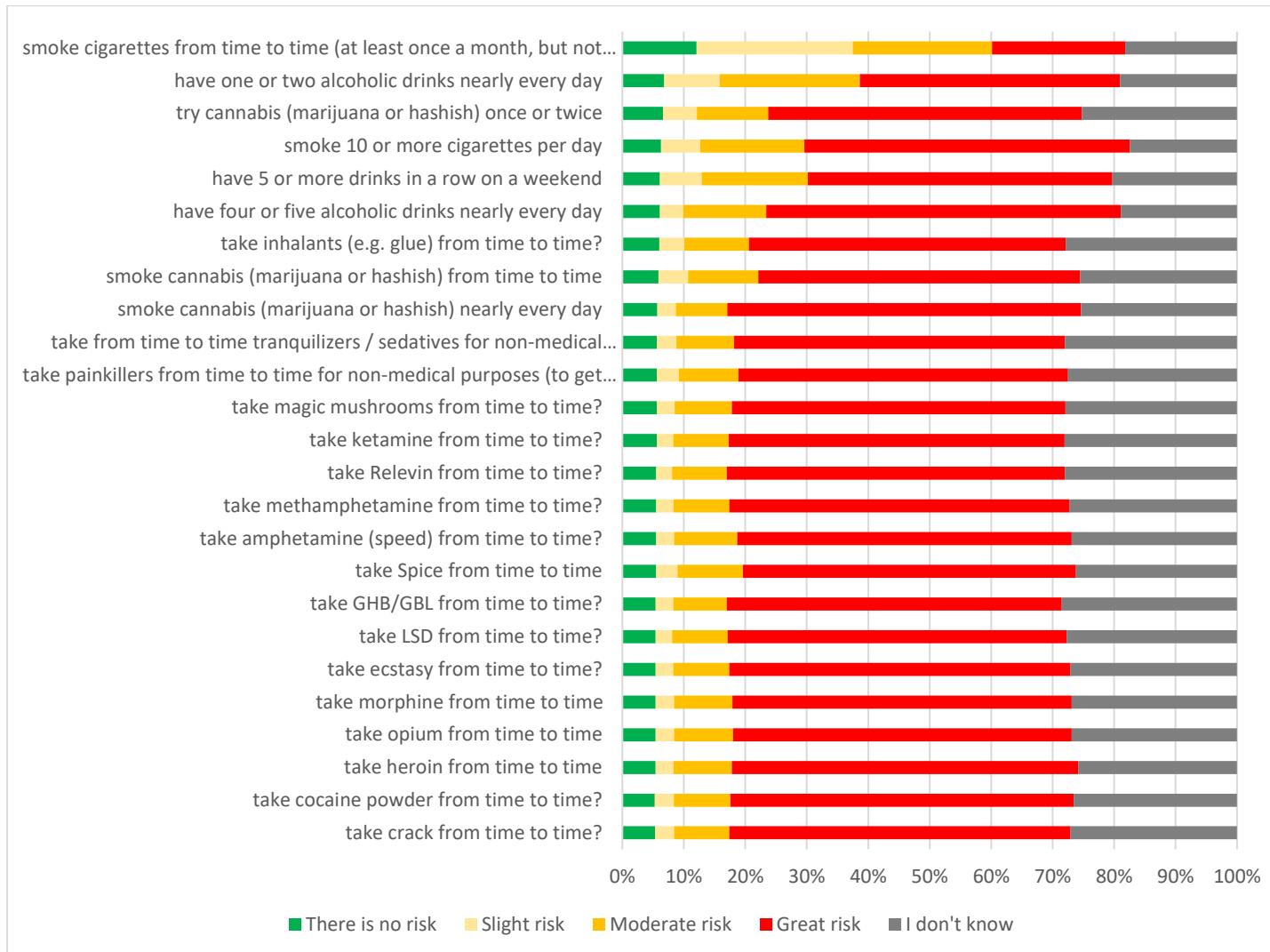
²³ Dagmar Dzúrová and others "Substance misuse and its risk perception in European teenagers", *Children's Geographies*, Vol. 14, No. 2 (2016), pp. 203-216.

²⁴ Mark Morgan and others, "The ESPAD study: Implications for prevention", *Drugs: education, prevention and policy*, Vol. 6, No. 2 (1999), pp. 243-256.

²⁵ Barbro Andersson and others, "The prevalences of and perceived risks from drug use among teenagers in 33 European countries", *Journal of Substance Use*, Vol. 14, No. 3-4 (August 2009), pp.189-196.

²⁶ Bjorn Hibell and others, *The 2011 ESPAD Report Substance Use Among Students in 36 European Countries* (CAN, Stockholm, 2012).

Graph 7. Risk perception of harm from using substances, occasionally or regularly



Note: This figure is based on responses to the question: 'How much do you think people risk harming themselves (physically or otherwise) if they do the following?' (ordered by the greatest proportion of responses 'there is no risk')

Table 5. Comparison of risk perceptions of harm between the present study and ESPAD 2011 (average²⁷)

	YSDUH Kazakhstan (2018)	ESPAD (2011)
smoke cigarettes occasionally	21.7%	14%
smoke 10 or more cigarettes per day	53%	64%
have one or two alcoholic drinks nearly every day	42.3%	30%
have four or five alcoholic drinks nearly every day	57.7%	62%
have 5 or more drinks in a row each weekend	49.6%	41%
try cannabis (marijuana or hashish) once or twice	51%	35%
smoke cannabis (marijuana or hashish) from time to time	52.4%	42%
smoke cannabis (marijuana or hashish) nearly every day	57.6%	72%
take heroin from time to time	56.3%	
take amphetamines from time to time	54.4%	40%
take ecstasy from time to time	55.5%	39%
take inhalants (e.g. glue) from time to time	51.6%	

Note: This table is based on responses to the question: 'How much do you think people risk harming themselves (physically or otherwise) if they do the following?' The percentage is of great risk (excluding 'I don't know' responses). Higher values are highlighted in red.

For the students in Kazakhstan, a strong association was found between drug use and risk perception in terms of using drugs: those who perceived the risk from using substances as great had significantly lower self-reported use of substances. However, a somewhat incongruous pattern was found in the responses from the students: overall, the perceived 'moderate or great' risk involved in the occasional use of cannabis, for instance, was associated with lower self-reported use of cannabis than among those who perceived there was 'slight risk' in the use of cannabis. (See Table 6 for an example of this pattern, on a question about risk perception involved in trying cannabis).

Table 6. Ever use of cannabis and risk perception of trying cannabis

		Risk perception of using cannabis once or twice					
		There is no risk	Slight risk	Moderate risk	Great risk	I don't know	
Self-reported cannabis use during lifetime	No	94.7%	90.2%	95.8%	98.0%	97.3%	
	Yes	5.3%	9.8%	4.2%	2.0%	2.7%	

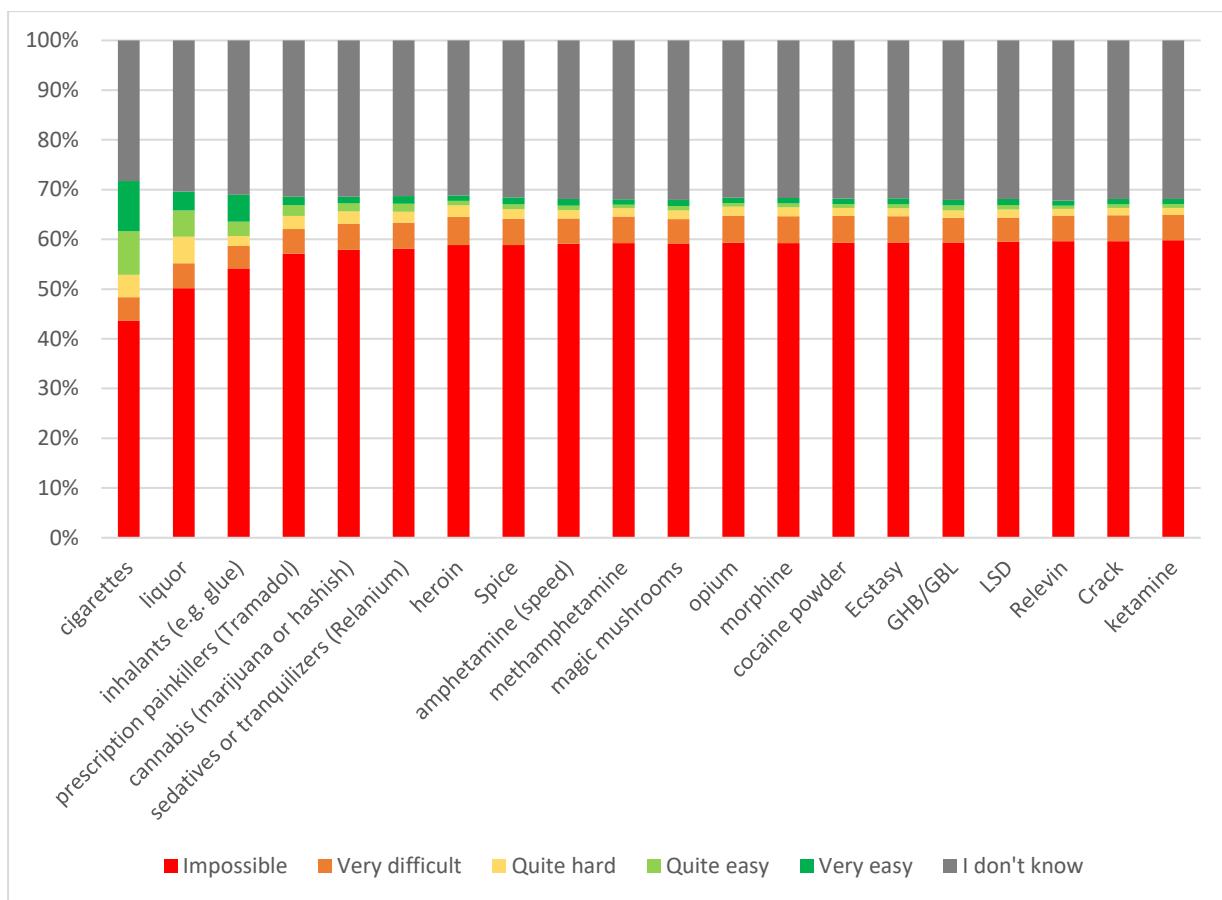
Lifetime prevalence of drug use by response categories. χ^2 square, $p<0.001$

²⁷ Refer to Hibell, Bjorn and others, 2012.

2.2.4 Perceived availability of substances

As the availability of various substances cannot be measured directly, especially when it comes to illicit substances, measures of perceived availability are used as a proxy. According to multiple studies, the perceived availability of a substance is strongly related to the levels of substance use^{28,29,30,31}. Graph 8 summarises the perceived availability of various substances and suggests that the (perceived) availability of substances is quite low in Kazakhstan for the young people who participated in the survey.

Graph 8. How difficult would it be for you to obtain the following psychoactive substances within 24 hours if you wanted to?



²⁸ Nathan A. Gillespie and others, "Pathways to cannabis abuse: a multi-stage model from cannabis availability, cannabis initiation and progression to abuse", *Addiction*, Vol. 104, No. 3 (March 2009), pp. 430-438.

²⁹ Emmanuel Kuntsche, "When cannabis is available and visible at school—a multilevel analysis of students' cannabis use", *Drugs: education, prevention and policy*, Vol. 17, No. 6 (December 2010), pp. 681-688.

³⁰ Thoroddur Bjarnason and others "Cannabis supply and demand reduction: Evidence from the ESPAD study of adolescents in 31 European countries", *Drugs: education, prevention and policy*, Vol. 17, No. 2 (January 2010), pp. 123-134.

³¹ Daniela Piontek and others, 2013. "Individual and country-level effects of cannabis-related perceptions on cannabis use. A multilevel study among adolescents in 32 European countries", *Journal of Adolescent Health*, Vol. 52, No. 4 (April 2013), pp. 473-479.

It is hard to conclude whether the resulting perceived availability is high or low without some international comparison. Table 7 thus displays the proportions of easy availability of substances reported by the students in Kazakhstan compared with the corresponding proportions obtained through the ESPAD study³². The table clearly shows major differences in the perceived availability of substances: the proportions of students reporting easy availability in Kazakhstan are just mere fractions of the average ESPAD values (approximately 1/4 to 1/10). Taking cannabis as an example, 3% of young people in Kazakhstan reported the easy availability of cannabis, ten times less frequent than the ESPAD average and lower than any country participating in ESPAD (the countries with the lowest levels of 'easy availability' of cannabis in the ESPAD study were Moldova with 5% and Ukraine with 11%³⁵). Precise comparisons have to be made with caution, as also under this question, there was an increased proportion of youth in Kazakhstan responding 'I don't know'. However, as many of adolescents responding in this way may actually not have access to the said substance, this response pattern probably still testifies to the lower availability of listed substances to the youth in Kazakhstan.

Table 7. International comparison of perceived availability of various substances. Present study vs. ESPAD 2015.

	YSDUH Kazakhstan (2018)	ESPAD (2015)
Alcohol	9.1%	78%
Cigarettes	18.8%	61%
Cannabis	3%	30%
Ecstasy	2%	12%
Cocaine	1.9%	11%
Amphetamine	2.1%	9%
Methamphetamine	1.8%	7%
Crack	1.8%	8%

Note: Responses 'quite easy' and 'very easy' to the question 'How difficult would it be for you to obtain the following psychoactive substances within 24 hours if you wanted to?' The table cell in each row marked in yellow shows the higher value for ease of availability.

In the present study, there were strong associations of self-reported drug use with perceived availability. However, a somewhat incongruous pattern was also found in the association of drug use with the questions on the perceived availability of various substances. Self-reported drug use was

³² ESPAD Group, *ESPAD Report 2015: Results from the European School Survey Project on Alcohol and Other Drugs*, (Publications Office of the European Union, Luxembourg, 2016).

higher among those who thought it would be 'quite easy' for them to obtain a particular substance, as compared to those who considered it was 'very easy' to obtain the substance. Table 8 presents an example of one such relationship, i.e. between self-reported use of cannabis and perceived availability of cannabis. Self-reported use of other drugs was higher among those who considered it 'quite hard' to obtain cannabis (see Table 9).

Table 8. Cannabis use ever in life and perceived availability of cannabis

		Perceived availability of cannabis (marijuana or hashish)						
		Impossible	Very difficult	Quite hard	Quite easy	Very easy	Don't know	
Use of cannabis in the lifetime	No	99.50%	97.20%	93.70%	85.50%	88.00%	99.30%	
	Yes	0.50%	2.80%	6.30%	14.50%	12.00%	0.70%	

Note: Answer to the question 'How difficult would it be for you to get the following psychoactive substances within 24 hours if you wanted to - cannabis': prevalence of cannabis use by response categories. χ^2 square, $p < 0.001$

Table 9. Any drug use in lifetime and perceived availability of cannabis

		Perceived availability - cannabis (marijuana or hashish)						
		Impossible	Very difficult	Quite hard	Quite easy	Very easy	Don't know	
Lifetime use of any drug	No	98.10%	92.60%	87.80%	84.30%	85.10%	97.60%	
	Yes	1.90%	7.40%	12.20%	15.70%	14.90%	2.40%	

Note: Answer to the question 'How difficult would it be for you to get the following psychoactive substances within 24 hours if you wanted to - cannabis': prevalence of any drug use by response categories. χ^2 square, $p < 0.001$

Merging the 'quite easy' and 'very easy' categories and comparing them with the merged categories of 'impossible', 'very difficult' and 'quite hard' in terms of cannabis use showed that students who perceived cannabis to be easily available had a sixteen-times higher self-reported use of cannabis over the previous 12 months; and an almost fifteen-times higher self-reported use of cannabis during their life.

Table 10. The relationship between perceived availability of cannabis and its use in the last 12 months and during lifetime

		Perceived availability of cannabis (marijuana or hashish) recoded question	
		Impossible, very difficult or quite hard	Quite easy or very easy
Cannabis use in the last 12 months		0.5%	8.0%
Cannabis use ever in life		0.9%	13.3%

Note: The two table rows are a summary from two cross-tabulations, both tested by χ^2 square with $p < 0.001$

2.3 Psychosocial variables

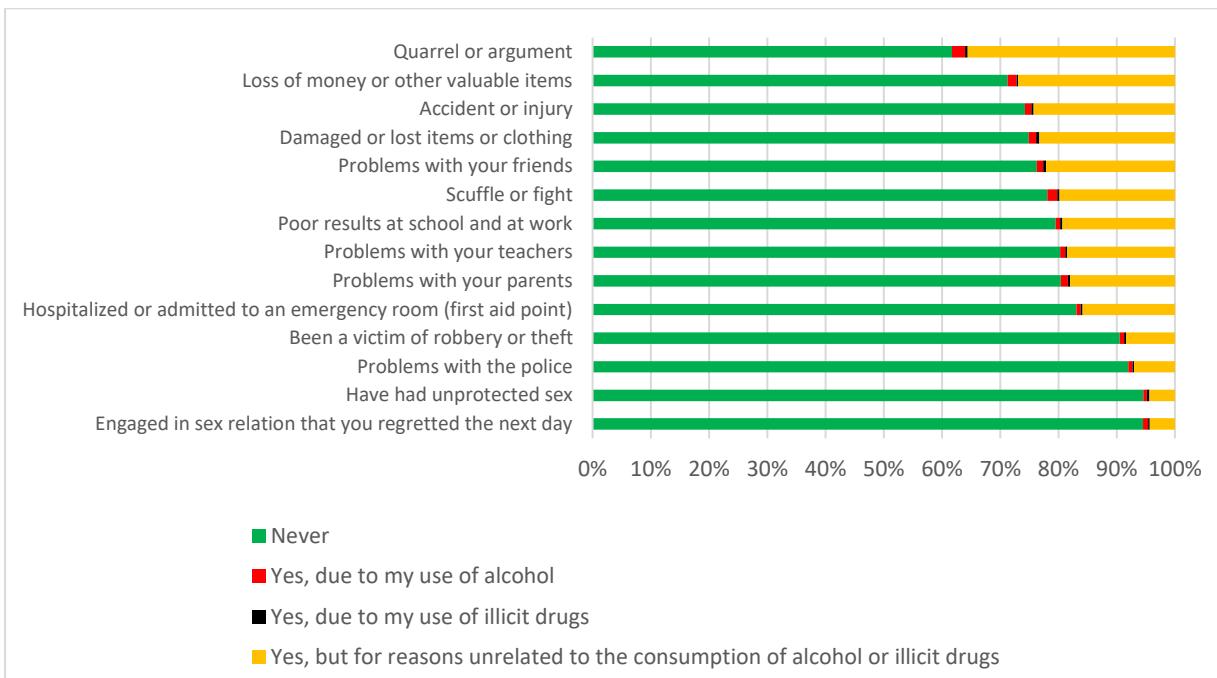
A number of factors have been shown to be associated with the initiation of substance use by adolescents and its progression to substance-use disorders. These factors include environmental factors such as family structure; parental support; parental substance-use disorders; parental monitoring; peer influences; and prevailing attitudes towards substance use and the availability of substances. Alongside these, there are individual behavioural, psychological and psychopathological characteristics such as conduct disorders in childhood; antisocial behaviour; aggressiveness; truancy; running away from home; low self-esteem; depressive mood; and suicidality³³. The findings from the current study regarding these measures are presented in the following sections.

2.3.1 Self-reported problems

The study respondents were also asked about various problems and their possible connection with alcohol and/or drug use. Reporting various problems in general – arguments; fights; accidents; problems with parents and friends; and problems at school, etc. - was associated with drug use: higher use was detected in people who reported the occurrence of these problems. Graph 9 summarises the responses to these questions.

³³ Bjorn Hibell and others, *The 2007 ESPAD report. Substance use among students in 35 European Countries* (CAN, Stockholm, 2009).

Graph 9. Problems potentially related to the use of alcohol or drugs

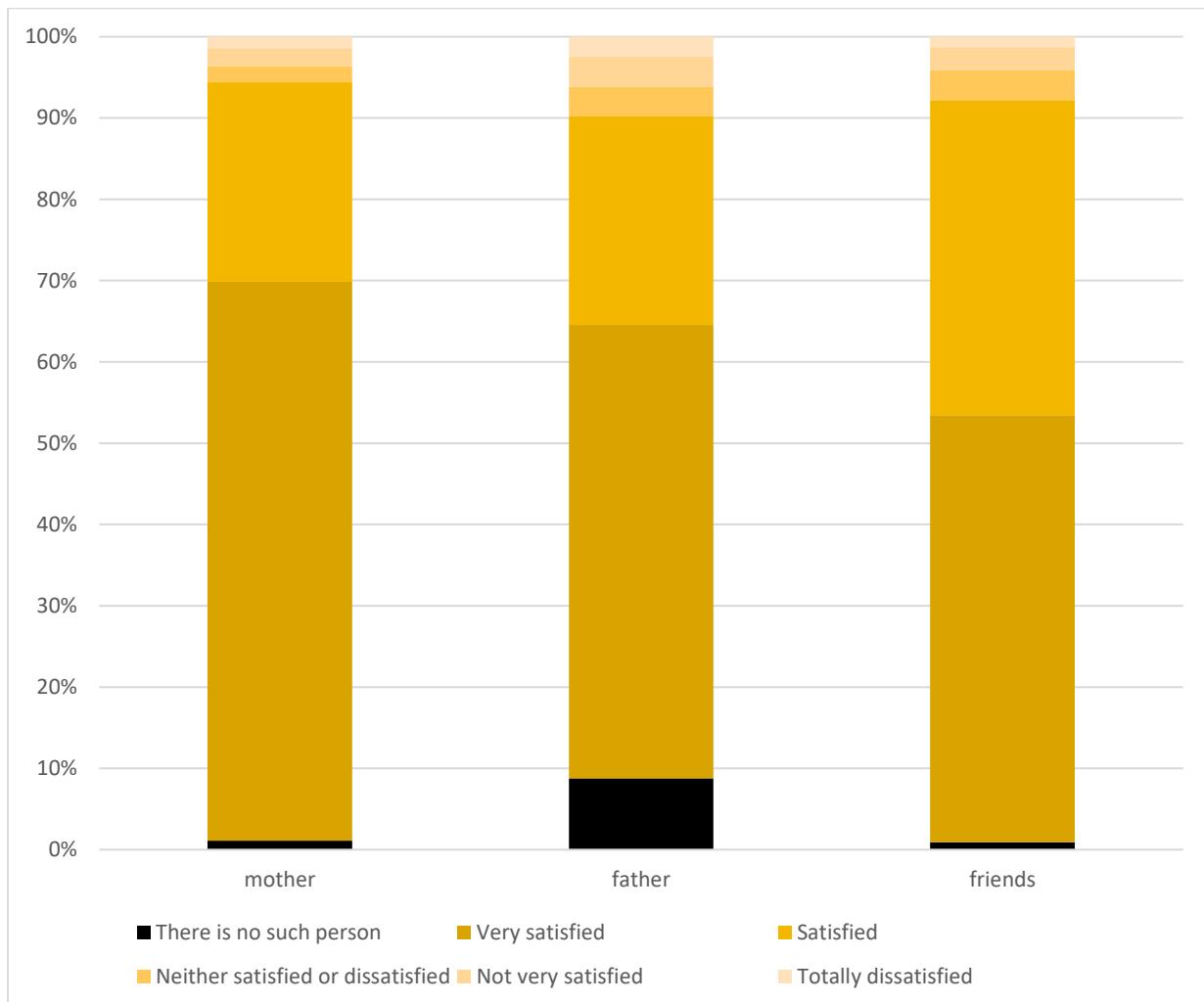


Note: Responses to question: 'Have you ever had any of the following problems?' (ordered according to greatest % of 'yes but unrelated to consumption of alcohol or drugs')

2.3.2 Social support and parental monitoring

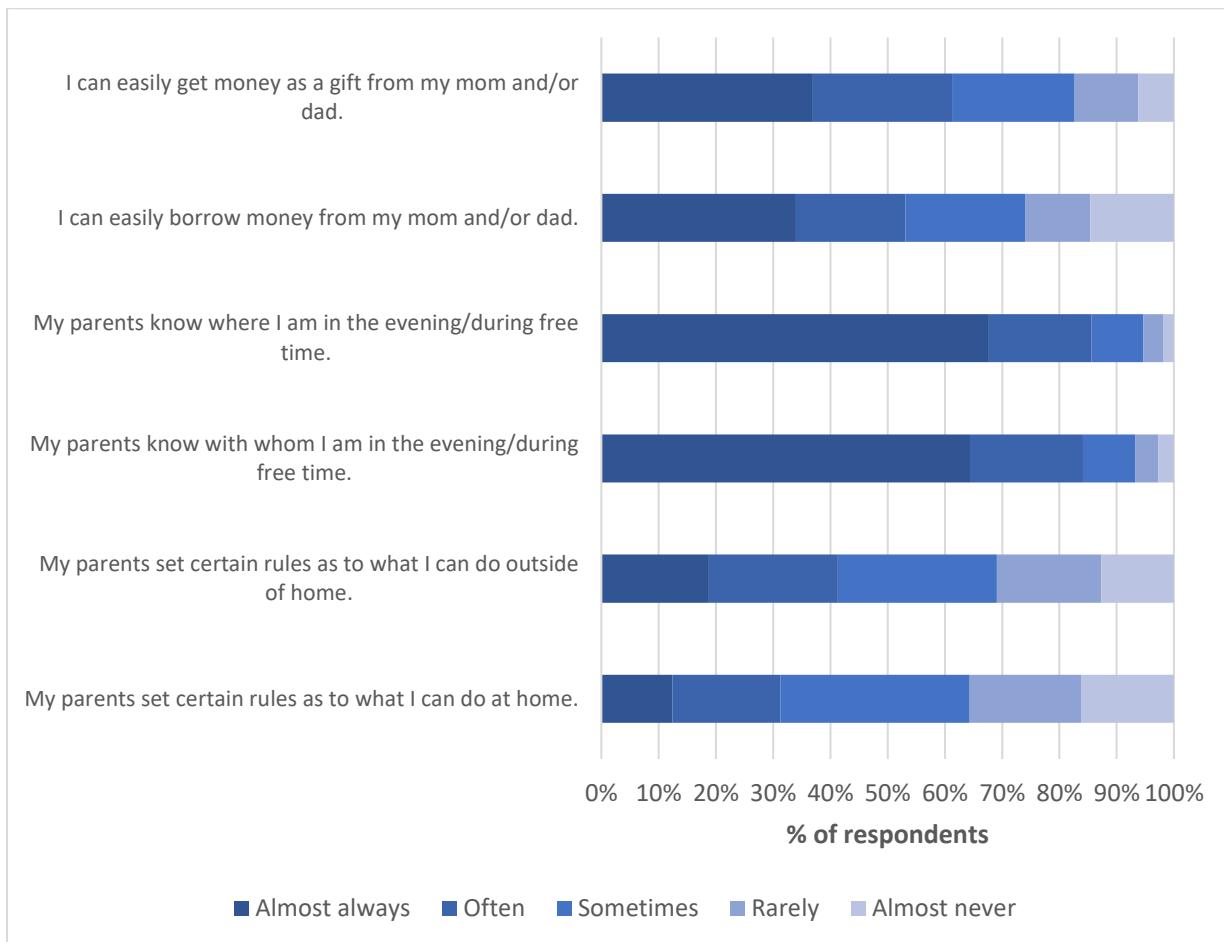
Satisfaction with relationships in the social environment of the respondents was measured by three variables: satisfaction with relations with mother, father and friends. Overall, satisfaction with relationships was relatively high in the sample, with more than 90% of respondents satisfied or very satisfied with their relationship with their mother and friends; and more than 80% satisfied with their relationship with their father. However, almost 9% of the respondents stated that there was no such person as "father" in their lives.

Graph 10. Satisfaction with relationships



Most students were able to obtain money from their parents at least sometimes, usually as a gift but also by borrowing it from them (see Graph 11). The levels of parental monitoring and control were measured by several questions. Most young people responded that their parents knew where they were during their free time and in the evenings; and that the parents knew with whom the young person was spending that time. Setting rules for what the child might do was, however, less strict and applied slightly more to behaviour outside of the home than when at home.

Graph 11. Obtaining money from parents and levels of parental monitoring

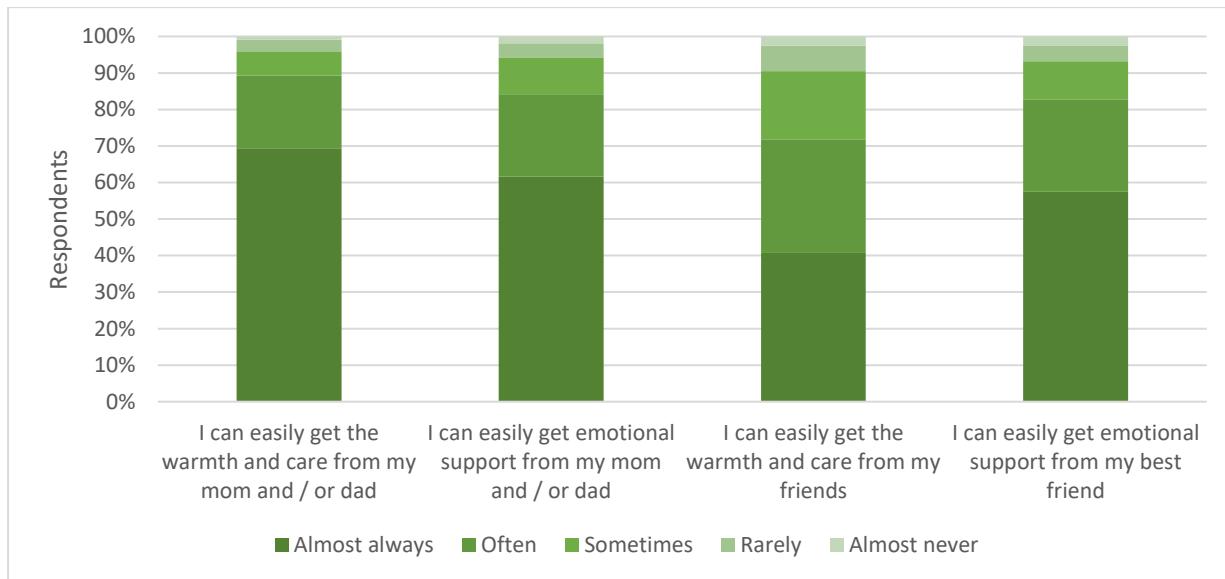


In a similar question, 90.4% of students asserted that their parents always (73%) or quite often knew where the students spent their evenings on Friday, Saturday or other day off. 7.7% ticked the option 'sometimes they know'; and only 1.9% of students responded that their parents usually did not know where the student spent time on those evenings.

Most young people were reportedly able to obtain social and emotional support from their parents and/or friends (see Graph 12). Cross-tabulation of these 'warmth and care' variables showed that only a small proportion of the young people reported difficulties in obtaining warmth and care from their parents or friends (1.3% of young people responded 'rarely' or 'almost never' for both parents and friends). Similarly, for the 'emotional support' variables, 1.5% of adolescents responded that they had difficulties in obtaining 'emotional support' from either parents or their best friend. For further analyses of these variables, an index was created which summed the social and emotional

support perceived by a teenager measured by the four questions on social support. Using a Likert scale, 0 points were assigned to the answer option 'almost never' and 4 to 'almost always' as the maximum. Thus, the aggregate level of social and emotional support ranged from 0 to 16. Among the respondents, 7.2% achieved a total score of 8 or less, meaning these students perceived a lower level of social and emotional support compared with their peers.

Graph 12. Social and emotional support

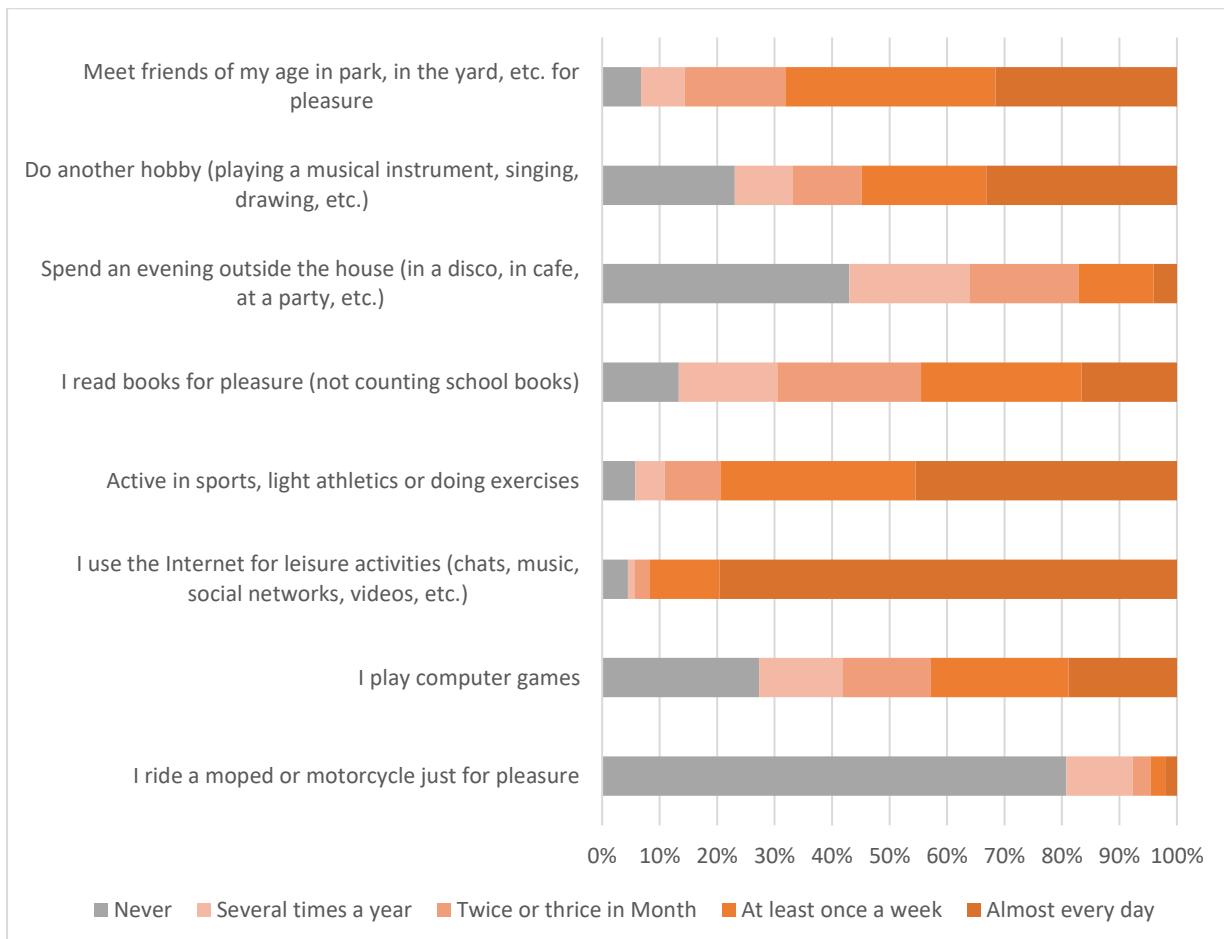


In bivariate analysis, lower satisfaction with relationships (with parents and/or friends) among adolescents in Kazakhstan was associated with a higher use of drugs compared to those who reported higher satisfaction in their relationships. Likewise, adolescents who reported lack of social support (warmth, care and emotional support of parents and/or friends) also reported a higher use of drugs than those who were satisfied with the social support of parents and family. Similarly, a strong predictor of drug use was lower or lack of parental monitoring or control, especially where parents reportedly did not enforce rules outside of the home and/or were not aware with whom and where the teenager spends their time. There was also a very strong association of drug use with parents not knowing where the child spent weekends or holiday evenings.

2.3.3 Spare time activities and hobbies

The students were also asked about their spare-time activities and hobbies. As can be seen from Graph 13, the most popular activity was using the internet for leisure; but also popular were doing sports; hanging out with friends; and taking part in a number of other hobbies.

Graph 13. Spare time activities or hobbies



Interestingly, some free-time activities were also associated with higher drug use. These were: riding a motorcycle or moped for pleasure (in a dose-response relationship); frequent playing of computer games; meeting friends more often; and not reading books. In line with lower parental monitoring or control, spending an evening away from home (at a disco, party, or café) also showed a strong association with drug use.

2.3.4 School performance and truancy

Students were then asked about their school performance and truancy. 92.7% of the students assessed themselves as average or better with regard to their school performance (more than half - 55% - felt they were above average). Nearly 70% of the students reported they had not missed a lesson or school without good reason in the previous 30 days. Those reporting missing school most often reported having missed one day of school (see Table 11).

Table 11. Missed school in the past 30 days

In the past 30 days, how many times have you missed a lesson or school without a good reason?	
Number of days	Percentage of students
0 days	69.6
1 day	11.4
2 days	8.5
3-4 days	6.3
5-6 days	2
7 days or more	2.3

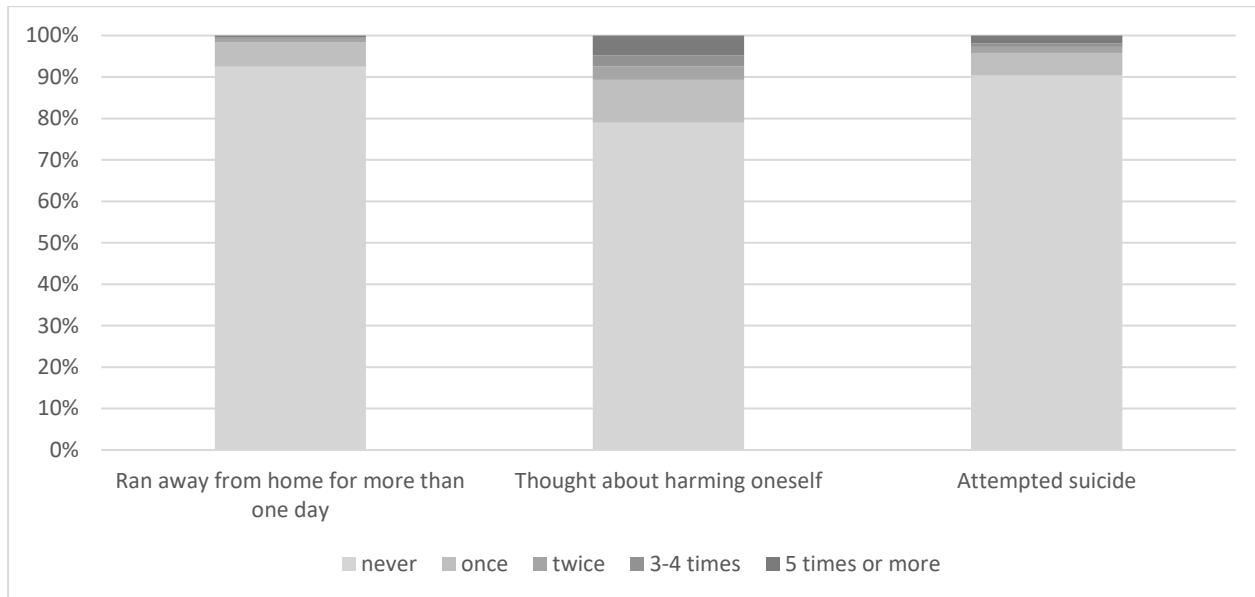
While self-assessed school performance was not significantly associated with drug use (although there was somewhat higher use among the weakest students), truancy was significantly associated with drug use.

2.3.5 The most serious problems: self-harm and running away from home

Self-harm and running away from home are two of the most serious forms of indirectly calling for help open to adolescents. Among the adolescents surveyed, running away from home was reported less frequently than absenteeism from school. 7.5% reported running away from home for more than one day at least once; 21.1% reported “ever thinking of harming themselves”; and almost 10% reported ever attempting suicide. While the prevalence of attempted suicide is alarming, it is in line with European studies where self-reported attempts to commit suicide average 10.5% (ranging between 4.1% and 23.5% across 17 countries)³⁴.

³⁴Anna Kokkevi and others, “Adolescents’ self-reported suicide attempts, self-harm thoughts and their correlates across 17 European countries”, *Journal of Child Psychology and Psychiatry*, Vol. 53, No.4 (April 2012), pp. 381-389.

Graph 14. Self-harm and running away from home



Note: Responses to question: 'Did any of the following happen to you?'

Among the sample of schoolchildren, the prevalence of self-reported drug use increased with the increasing frequency with which the respondents reported running away from home (data not shown); thinking about self-harm; and actually attempting suicide (see Tables 12 and 13).

Table 12. Association of thoughts of self-harm with self-reported drug use in lifetime

		'thoughts about self-harm'				
		never	once	twice	3-4 times	5 times or more
Use of any drug in lifetime	no	97.9%	96.3%	94.6%	90.1%	87.9%
	yes	2.1%	3.8%	5.4%	9.9%	12.1%

Note: Answer to the question 'Did any of the following happen to you?' prevalence of drug use by response categories. χ^2 square, $p<0.001$

Table 13. Association of self-reported suicide attempts with self-reported drug use in lifetime

		Attempted suicide				
		never	once	twice	3-4 times	5 times or more
Use of any drug in lifetime	no	97.4%	96.3%	92.1%	82.6%	84.0%
	yes	2.6%	3.7%	7.9%	17.4%	16.0%

Note: Answer to the question 'Did any of the following happen to you?' prevalence of drug use by response categories. χ^2 square, $p<0.001$

2.3.6 Psychometric scales measuring self-esteem, depressive mood, antisocial behaviour and feeling of social anomie

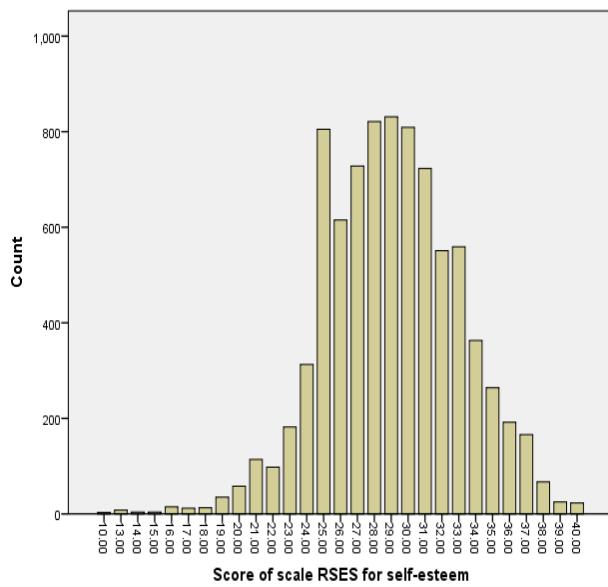
In this survey, four psychometric scales were used to measure the following: students' level of self-esteem (Rosenberg's self-esteem scale); depressive mood (CES-D); feeling of anomie (Anomie Scale of Exteriorty and Constraint³⁵); and antisocial behaviour (Antisocial Behaviour Scale). The latter two scales were applied with slightly modified answer options compared to their original versions. Overall, Kazakh teenagers who participated in the survey had similar results in these psychometric scales compared to those reported among adolescents in Europe³⁶, apart from depressive mood where their scores were double on average compared to their European counterparts. According to bivariate analyses, those who reported the use of substances more often experienced depressive mood, reported higher antisocial behaviour and feeling of anomie and displayed somewhat decreased self-esteem.

Figure 1. Distribution of total scores on the four psychometric scales used in the survey

Rosenberg's self-esteem scale (10 items)

Cronbach's alpha=0.651

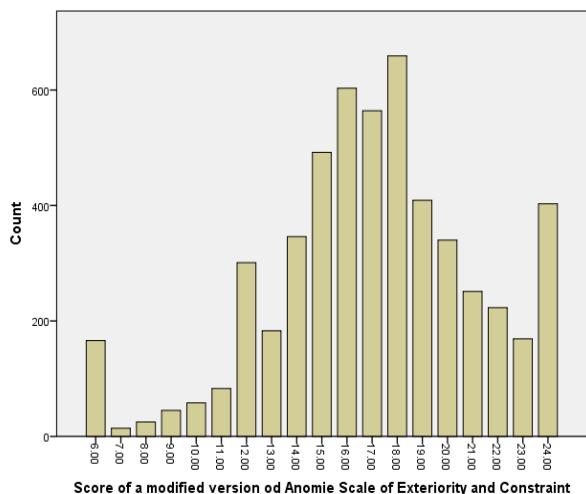
Score distribution: Minimum=10, maximum=40; average=29, SD=4



Anomie Scale of Exteriorty and Constraint (6 items)

Cronbach's alpha=0.815

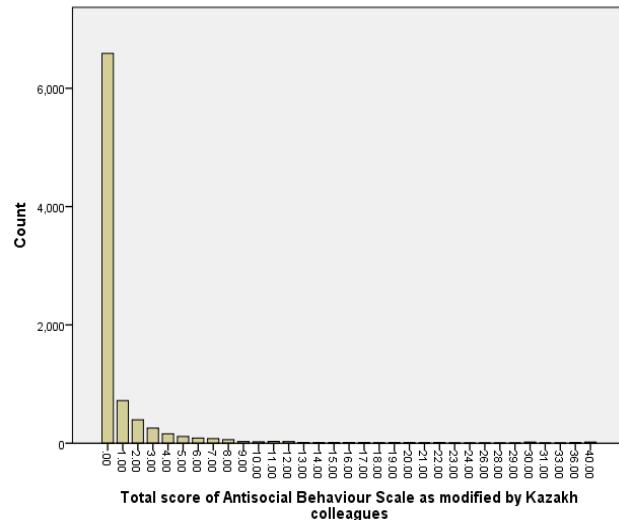
Score distribution: Minimum=6, maximum=24; average=17, SD=4.1



Antisocial Behaviour Scale (10 items)

Cronbach's alpha=0.883

Score distribution: Minimum=0, maximum=40; average=1, SD=3.5



2.3.7 Having drug-using friends

A strong factor related to one's drug use was drug use among close friends. Those who self-reported any drug use during their life (except alcohol and tobacco) were significantly more likely to have friends who used drugs and to give a significantly higher number of friends using drugs. Those who reported ever having used drugs had on average seven friends who also used drugs; while those who did not report any drug use had on average fewer than one friend using drugs.

2.4 Association of demographic variables, risk and protective factors and key measures of alcohol, tobacco and drug use

After examining the bivariate relationships between the measured variables and self-reported substance use (i.e. analysing the association between drug use and various variables one by one), multivariate data-analysis was carried out, while controlling for the interrelations between various variables.

2.4.1 Discriminant analysis

For a number of areas that were explored in the survey, such as problems experienced by the respondent, their self-reported levels of parental monitoring or perceived levels of social support, the response categories or options were often on Likert-type scales. For further analysis, therefore,

these responses across multiple items were summarised into composite measures or indices of the measured concepts and analysed to determine how substance use was associated with these concepts. The concepts included problems experienced by the respondent; their self-reported levels of parental monitoring; their perceived level of social support; the perceived availability of substances and the perceived risk posed by their use; the disapproval of users; and the total scores on four applied scales (depressive mood, self-esteem, feeling of anomie and antisocial behaviour). See the 'Methodology' section for more technical details on the analyses, including model fit.

The above analysis suggests that self-reported drug use is most strongly associated with the most serious problems, such as self-harm (contemplated or actually carried out in the form of attempted suicide) and running away from home; but also other reported problems, signs of antisocial behaviour and depressive mood. As expected, lack of parental monitoring as well as lack of social and emotional support were also associated with substance use. This differed slightly for alcohol and tobacco use, but mostly only in the order of importance of the various factors. Tobacco use in the previous 12 months was most strongly associated with lack of parental monitoring and respondent's age, followed by association with reported problems and antisocial behaviour. Alcohol use in the previous 12 months was most strongly associated with various reported problems and depressive mood, and lack of parental monitoring.

Table 14. Structure matrices (association with the discriminant function) of three discriminant analysis models with substance use as the grouping variable

	Drug use in lifetime	Tobacco use past 12 months	Alcohol use past 12 months
Index of the most serious problems*	.565	.443	.519
Number of problems reported (question 32)	.531	.389	.652
Antisocial Behaviour Scale score	.531	.436	.227
Depressive mood score on CES-D scale	.522	.333	.573
Index of perceived availability of substances	.507	.339	.358
Anomie Scale of Exteriority and Constraint	.423	.266	.269
Index of parental monitoring	-.393	-.557	-.471
Index of social and emotional support	-.232	-.329	-.099
The index of disapproval of substance use	-.162	-.244	-.234
Self-esteem (scale RSES)	-.131	-.069	-.133
Perception of risk related to substance use - index	-.124	-.097	-.025
Age	.122	.534	.368

*Includes running away from home, thinking of self-harm and attempting suicide.

Note: Higher values indicate stronger relationship; negative values indicate inverse relationship (e.g. the less parental monitoring, the more substance use). Predictors are ordered according to the strongest association with drug use (first column).

Further multivariate analysis suggested that having at least one friend who used drugs is the strongest predictor of drug use among adolescents in Kazakhstan. Those who reported at least one friend who used drugs were about eight times more likely to self-report the use of drugs at least once in their lifetime than those who did not have friends who used drugs. Similarly, having used alcohol or tobacco also increased the adolescents' likelihood of using drugs by a factor of two. Likewise, stronger depressive mood, having more antisocial behaviour and perceiving substances as more readily available was associated with drug use during their lifetime. Parental control or monitoring, in the context of controlling for all other variables, was not statistically significantly related to drug use, although *per se* (in bivariate analyses) it was.

Table 15. Correlated of drug use ('predictors' in the model)

Parameter Estimates					
Lifetime use of any substance except alcohol and tobacco ^a		Sig.	Adjusted Odd Ratios	95% Confidence Interval for Exp(B)	
no				Lower Bound	Upper Bound
Depressive mood scale CES-D score	.001		.924	.882	.967
Antisocial Behaviour Scale score	.018		.953	.915	.992
Perceived availability index	.010		.984	.972	.996
Index of parental monitoring	.100		1.051	.991	1.115
Reported using any drug using friends	.000		8.432	5.387	13.197
Past year use of alcohol	.000		2.568	1.573	4.191
Past year use of tobacco (cigarettes)	.001		2.327	1.390	3.897

a. The reference category is yes.
b. This parameter is set to zero because it is redundant.
Nominated users: 0: didn't report any drug-using friends, 1: reported at least one drug-using friend
LYPalcohol: 0: didn't use alcohol in the last year, 1: used alcohol at least once in the last year
LYPcigs: 0: didn't smoke cigarettes in the last year, 1: smoked cigarettes at least once in the last year

3 Discussion

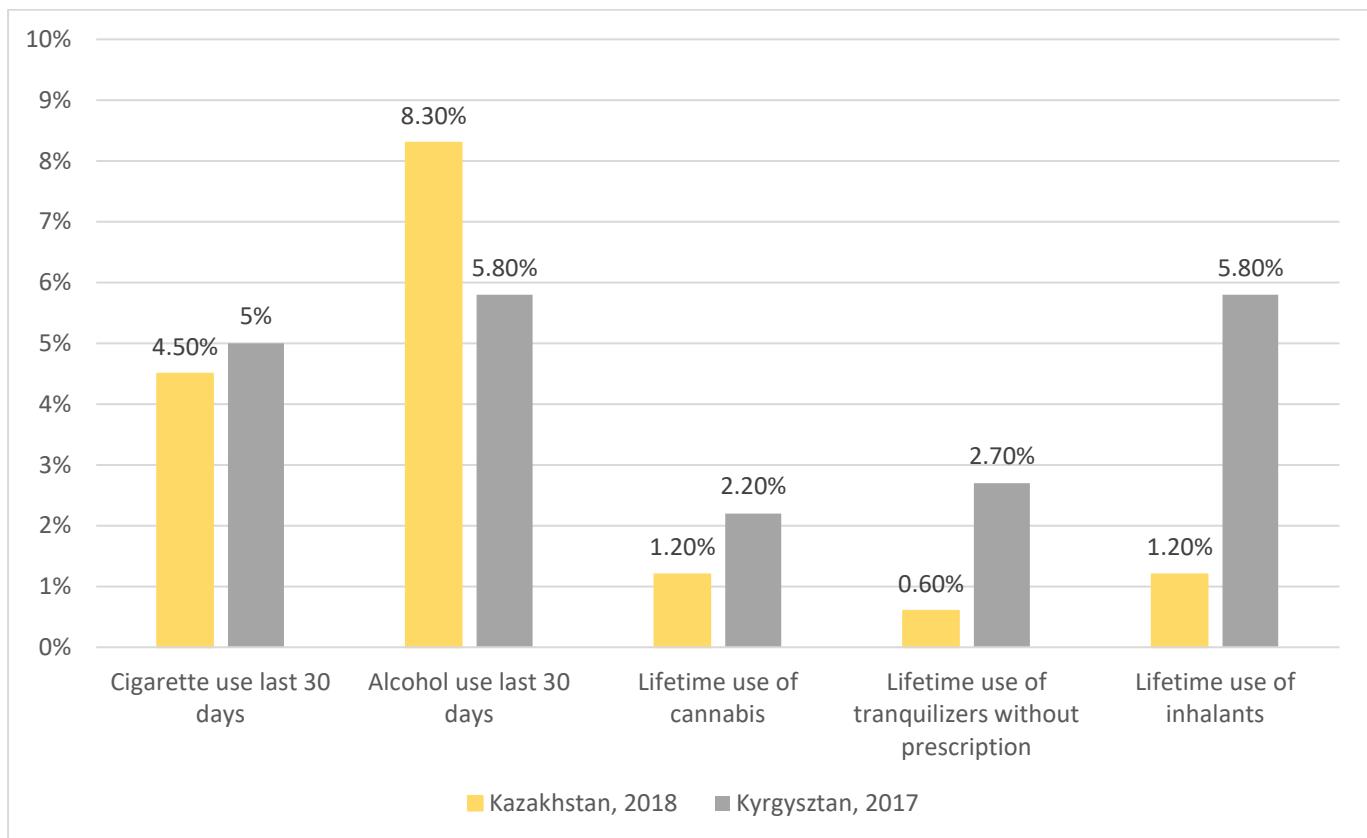
The Youth Survey on Drug Use and Health (YSDUH) carried out in Kazakhstan in the first half of 2018 sampled all the country's regions. It was largely based on the school-survey methodology developed by UNODC for implementation in middle and low-income countries. The methodology in part draws on ESPAD; but the questionnaire was adapted to the national situation and needs through a process of cognitive testing and pretesting. The survey has proven it is possible to collect data in Kazakhstan by means of a school survey; although enhanced advocacy was required to ensure good collaboration between the different stakeholders (the Ministry of Education; the municipalities; schools, etc.).

The results of the self-reported component of the questionnaire suggest that prevalence of substance use is relatively low in Kazakhstan. Relevant international comparisons are however difficult to make, as data in the region or geographically closer countries is scarce. A recent study in Tajikistan suggested that the lifetime prevalence of any drug use ranged between 0.2% and 5%. 5% of the Tajik adolescents reported use of cigarettes and 2.2% the use of alcohol in their lifetime, with pronounced differences between boys (significantly higher self-reported use) and girls. There were, however, doubts about the validity of the results, mainly due to the unknown (and potentially high) extent of underreporting³⁷. Corresponding data is available from a neighbouring country, Kyrgyzstan, which applied ESPAD methodology to a sample of 4,542 15 to 16-year olds in 2017³⁸. Kyrgyzstan is comparable to Kazakhstan both culturally and historically. As can be seen from Graph 15, the survey results are largely comparable for tobacco, alcohol and cannabis. However, in case of tranquilisers and inhalants, Kyrgyz students reported higher lifetime prevalence of the use of these substances.

³⁷ UNODC. *Youth Substance Use in Tajikistan 2016. Report* (Vienna, 2017, unpublished report).

³⁸ Dinara Madybaeva and Aida Karipova, *2017 Analytical report. Substance use and addiction among youth. Kyrgyzstan*. (ResAd, Prague, 2018).

Graph 15. YSDUH Kazakhstan - students aged 15-16 at the time of the study compared with the corresponding age group in the Kyrgyz ESPAD-like study (self-report)



The most recent ESPAD study which uses a comparable methodology appears to show considerably higher scores. However, the results of the ESPAD study are not directly comparable with the present study due to the very different context of most ESPAD countries. Most importantly, drug use is criminalised in Kazakhstan but not in most ESPAD countries. In addition to the legal context, the cultural context also differs, in all probability very considerably, in terms of the levels of conservativeness and permissiveness. More studies are needed which would look at the possible adjustment for these factors in any comparisons of self-reported levels of drug use.

Another study focussing on Kazakhstan's young people which was carried out at almost the same time as YSDUH is the WHO-coordinated Health Behaviour in School-aged Children survey (HBSC)³⁹.

³⁹ See <http://www.hbsc.org/membership/countries/kazakhstan.html> for the results specific to Kazakhstan and WHO. *Spotlight on adolescent health and well-being: Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) survey in Europe and Canada International Report*. For the full report. Available at: <https://apps.who.int/iris/bitstream/handle/10665/332091/9789289055000-eng.pdf>

Kazakhstan is one of 49 countries where this study was conducted in 2017/2018. As it also contains a number of questions focussing on substance use (tobacco, alcohol and cannabis), it is able to serve as an external-validation tool for the present study. Looking at the results of both studies side by side (Graph 16) reveals interesting tendencies; but caution must be applied in making comparisons. This is in part due to differences in methodology; but also due to the small sample sizes resulting from some breakdowns (e.g. breaking down the 13-year olds from the present study by gender will result in small sub-samples). The latter can lead to an increase in random fluctuations in the resulting numbers and proportions. In part, it is possible to explain the differences in terms of the focus of YSDUH on urban young people. It is possible that while the present survey might have been subject to underreporting of cannabis use, at least among the 15-year old teenagers, it was probably much less subject to underreporting of alcohol and tobacco use at any point in life across both age groups. An explanation of this probable effect may be sought in terms of social desirability in relation to the students' perception of the context of the survey. The context of a survey has a proven influence on the willingness of the respondents to admit substance use^{40,41,42,43}. The survey respondents in this case may have (knowingly or unknowingly) attempted to look more positive when it came to their health-related behaviours in HBSC; and more positive when it comes to their use of drugs (especially illicit drugs) under the context of a drug survey with the logo of the United Nations Office on Drugs and Crime on its first page.

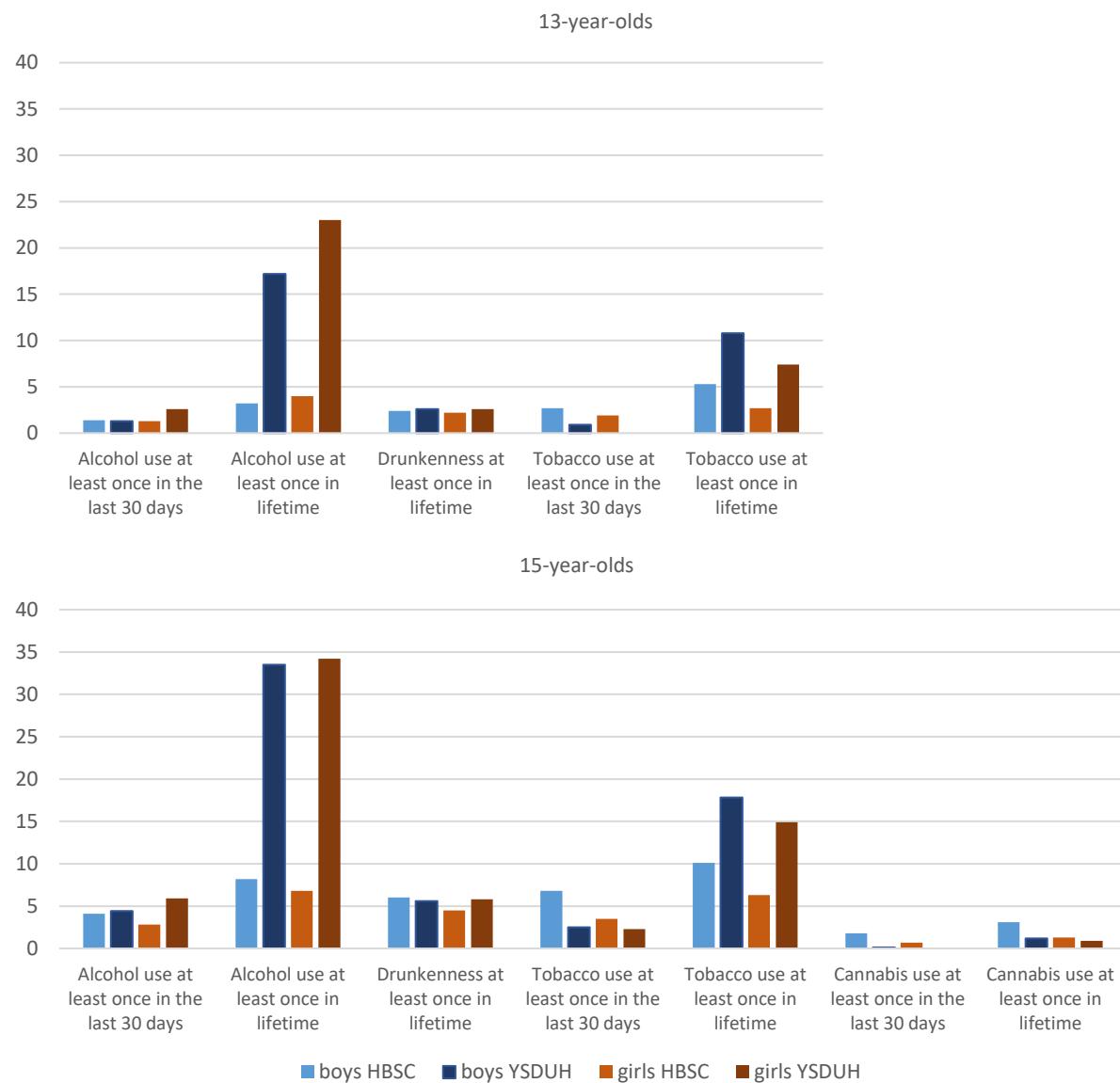
⁴⁰ Lana Harrison and Arthur Hughes, *The validity of self-reported drug use: Improving the accuracy of survey estimates* (NIDA research monograph, 167, 1997) pp. 1-16.

⁴¹ Malcolm Ramsay and Sarah Partridge, *Drug misuse declared in 1998: results from the British Crime Survey* (London: Home Office, 1999).

⁴² Michael Fendrich and Mary E. Mackesy-Amith, "Decreased drug reporting in a cross-sectional student drug use survey", *Journal of Substance Abuse*, Vol. 11, No.2 (January 2000), pp. 161-172.

⁴³ Michael Fendrich and others, "Tobacco-reporting validity in an epidemiological drug-use survey", *Addictive behaviors*, Vol. 30, No. 1 (January 2005), pp. 175-181.

Graph 16. Estimates of substance use prevalence (% of respondents reporting use) in HBSC (lighter colours) and the present study (darker colours) among boys and girls of two age groups (13-year olds and 15-year olds)



Some level of underreporting may always be expected in school surveys; but the extent of this is largely unknown. The present study has therefore incorporated a novel module based on the Network Scale-Up Method. Questions were included which asked about the respondent's peer networks, the peers' substance use and the probability of the respondent knowing about the latter and reporting it. The data was used to obtain indirect estimates of the prevalence of substance use

(Table 16 below). The resulting estimates were comparable with self-reported prevalence in relation to alcohol use over the previous 12 months; but higher in the case of all other substances by factors of 2 to 10. While these estimates offer a glimpse of the true nature of under-reporting, they have to be interpreted with caution, for several reasons (see the Limitations section below for more information). On the other hand, the finding that alcohol use was almost identical between self-reporting and indirect estimate, while the use of drugs and in particular illicit drugs with high stigma was several times higher when estimated indirectly than directly by self-report, also serves as a validation of the indirect estimates obtained.

Another question which was considered for use in the assessment of under-reporting and for possible correction of self-reported prevalence was: 'If you had ever used cannabis (marijuana or hashish), do you think you would have said so in this survey?'. 5.2% of students replied 'I have already said that I have taken it'; while self-reported cannabis use was only 1.2% lower than the respective questions. This would suggest that prevalence of cannabis use during a student's lifetime could have been 5.2%. However, detailed analysis (see below) has cast some doubt on the validity of the responses to this question. This question was therefore not used in the correction of the prevalence levels obtained. It should however be considered that there is a possibility that the respondents answered this question correctly; and that the prevalence of cannabis over their lifetime is closer to the figure of 5.2% as compared to the self-reported 1.2% or the indirectly estimated prevalence of 2.27%.

The survey yielded a very rich dataset with many variables relating to adolescents' lifestyle; social support and parental monitoring; problems; and personality etc. This has provided many options not only in terms of the present study but also subsequent data analyses. One of the issues revealed in the analysis was the fact that the perception of risk for various drugs and their various levels of use was inconsistent with the levels of risk these substances pose. For example, the students did not distinguish very much between experimental, occasional and regular use; or between substances which pose milder risks and potentially more harmful substances. This was unlike the picture revealed by the ESPAD study, where the various levels of risk were distinguished by the respondents, albeit very approximately⁴⁴. Besides potential room for improvement in terms of drug-prevention messages, the perception of risk may be influenced also by other factors. This is especially the case in countries like Kazakhstan where there are legal and social sanctions against drug use; and so use

⁴⁴ Bjorn Hibell and others, *The 2011 ESPAD Report Substance Use Among Students in 36 European Countries* (CAN, Stockholm, 2012).

is connected not only with the risks to health but also with legal and social risks. Factors in relation to cultural context and stigma may also play a role in the reporting of perceived levels of risk.

Furthermore, such a rich dataset offers many possibilities for exploring correlates and possible predictors of substance use. In general, these correlates are similar for the use of alcohol, tobacco and other drugs. This is often found in younger age groups such as adolescents^{45,46,47}. Bivariate and multivariate analyses were applied to understand the relative importance of the various factors. The picture that emerges is in line with the published literature on risk and protective factors in relation to substance use: that is, substance use is higher among those young people who felt less social and emotional support; reported less parental monitoring; reported more problems in general, including the most serious problems such as running away from home or self-harm; who spent their time hanging out with friends, but also spent more time on the internet or playing computer games (which could also indicate less time spent with parents/family); and who reported more peer substance use. Interestingly, the use of all substances – as a group and also individually – was positively associated with riding a motorcycle or moped for pleasure in a dose-response relationship (more frequent motorcycle riding meant higher use). This question could be an indirect indication of sensation-seeking, which has also been reported to be associated with drug use^{48,49,50}. Substance use was also associated with lower perception of risk and not showing disapproval towards users of various substances. This was as expected and as reported in the literature. As also reported in other studies,⁵¹ the strongest relationship among the variables examining drug-related attitudes and perceptions was with perceived availability of substances. Interestingly, students who reported that it would be 'quite hard' for them to obtain the listed substances had increased use. This could indicate the low availability of substances overall to teenagers in Kazakhstan, as confirmed by a comparison with the published ESPAD average of 'easy' availability of substances. However, as the surveys can look only

⁴⁵ Mohammad R. Torabi, William J. Bailey and Massoumeh Majd-Jabbari, "Cigarette smoking as a predictor of alcohol and other drug use by children and adolescents: evidence of the "gateway drug effect""", *Journal of school health*, Vol. 63, No. 7 (September 1993), pp. 302-306.

⁴⁶ Michael T. Lynskey and David M. Fergusson, "Childhood conduct problems, attention deficit behaviors, and adolescent alcohol, tobacco, and illicit drug use", *Journal of Abnormal Child Psychology*, Vol. 23, No. 3 (June 1995), pp. 281-302.

⁴⁷ William A. Vega and Andres G. Gil, "Revisiting drug progression: Long-range effects of early tobacco use", *Addiction*, Vol. 100, No. 9 (September 2005), pp. 1358-1369.

⁴⁸ Laine T. Jaffe and Robert P. Archer, "The prediction of drug use among college students from MMPI, MCMI, and sensation seeking scales", *Journal of personality assessment*, Vol. 51, No. 2 (June 1987), pp. 243-253.

⁴⁹ Gay L. Andrucci and others, "The relationship of MMPI and sensation seeking scales to adolescent drug use", *Journal of personality assessment*, Vol. 53, No. 2 (June 1989), pp. 253-266.

⁵⁰ Lewis R. Donohew and others, "Sensation seeking and drug use by adolescents and their friends: models for marijuana and alcohol", *Journal of studies on alcohol*, Vol. 60, No. 5 (September 1999), pp. 622-631.

⁵¹ Jerald G. Bachman, Lloyd D. Johnston and Patrick M. O'Malley, "How changes in drug use are linked to perceived risks and disapproval: Evidence from national studies that youth and young adults respond to information about the consequences of drug use", *Persuasive communication and drug abuse prevention*, (September 1991), pp. 133-155.

at perception of availability and cannot measure availability directly, the real extent of the availability of substances is unclear. Substance users were also more often in depressive mood, reported higher antisocial behaviour and feeling of anomie and displayed somewhat decreased self-esteem. Interestingly, only alcohol use was associated with obtaining money from parents more easily.

Multivariate analyses have shown that the strongest correlates and predictors of drug use were, in this order: having at least one friend who uses drugs (increased likelihood of drug use by a factor of 8.4); having used alcohol or smoked cigarettes in the last 12 months; displaying stronger depressive mood; and displaying more antisocial behaviour and perceiving substances as more readily available (multinomial logistic regression). Discriminant analysis (in which only (pseudo-)continuous variables were considered) has also underlined the role played by the amount of problems, and even more so of the most serious problems, in connection with self-harm or running away from home as correlates of ever having used drugs.

Indications of the validity and reliability of the survey results; possible under-reporting or over-reporting; and logical consistencies or inconsistencies in the answers obtained were all examined thoroughly (see below and Annex 2). In summary, the many aspects examined allow the present study to be deemed reliable and valid, although the exact extent of underreporting of drug use remains unknown. Various analyses of logical consistency have shown similar results to the ESPAD group studies. The extent of over-reporting seemed rather small as indicated by the answers regarding the dummy drug 'Relevin' and other analyses. All detected relationships between variables in the many analyses performed were logical and consistent with the published literature. This was true also on the country level in the case of some variables - for example, the very low perceived availability is consistent with low levels of substance use reported by the analysed sample.

4 Limitations

Limitations are inherent in scientific research; and thus the Kazakh YSDUH is not without its limitations. These need to be taken meticulously into account in order to ensure a correct interpretation of the estimates gathered through the survey.

First of all, the survey covered only urban areas. Rural areas were not covered due to the prohibitive costs related to the geography of Kazakhstan. Urban areas typically have a higher prevalence of illicit drug use⁵² which is in turn mainly related to the availability of the substances. However, for some substances and in some countries the opposite can be the case⁵³. Thus, if rural areas had been included, the estimates of overall prevalence of substance use might have been lower (or, for some substances, possibly higher). Moreover, it was not possible to obtain nationally-representative estimates for all of the regions of Kazakhstan due to the fact that data on regions was not collected together with the questionnaires (the individual questionnaires could not be assigned to specific regions). As approximately the same number of questionnaires were collected per region (about 600), regions with smaller population sizes will be overrepresented in the overall estimates and those with larger populations will be underrepresented, as no weighting could be applied within the data analysis.

Another limitation stems from the fact that schools for young offenders were not included in the sampling frame. There are not many of these schools (about one per region); but from anecdotal evidence together with the fact that in the study antisocial behaviour was a strong predictor of drug use, the concentration of drug-using individuals is likely to be much higher in these schools. Taking these young people into account, the overall prevalence of substance use in the age group under examination may well be somewhat higher than estimated in the study.

The study had also a relatively high number of discarded questionnaires (over 10%). While those discarded during the process of data cleaning (about 450) were verified and posed no information loss and thus could not have caused artificially-lower prevalence estimates, 622 questionnaires were discarded during the data-entry process due to the fact that a large number (or all) of the answers were missing. While officially there were virtually no refusals to participate in the survey (less than

⁵² Christine E. Cronk and Paul D. Sarvela, "Alcohol, tobacco, and other drug use among rural/small town and urban youth: a secondary analysis of the monitoring the future data set", *American Journal of Public Health*, Vol. 87, No. 5 (May 1997), pp. 760-764.

⁵³ Jennifer R. Havens, April M. Young and Christopher E. Havens, "Nonmedical prescription drug use in a nationally representative sample of adolescents: Evidence of greater use among rural adolescents", *Archives of Pediatrics & Adolescent Medicine*, Vol. 165, No. 3 (March 2011), pp. 250-255.

20 cases reported during the entire study), this could have been a way for some adolescents to refuse to continue with the survey. This may be in part a cultural issue (open refusal could be viewed as socially inappropriate); and in part a confidentiality issue. The idea cannot be ruled out that substance use was one of the reasons students had to refuse to continue in filling in the questionnaire. These 622 questionnaires would constitute just over 6% of the original sample.

Another known flaw in the study is that data on class and school were not collected due to heightened concerns around confidentiality. The cluster-sampling design applied in the study could therefore not be taken into account in the data analyses. This should have had little or no influence on point estimates obtained by the direct methods of means and proportions. However, confidence intervals tend to be larger if cluster sampling is taken into account.⁵⁴ The interference from using cluster sampling, in the case of indirect methods, could be even larger. Due to the fact that the primary sampling unit is the class and not the individual, there is a much higher chance that several respondents nominated the same user (e.g. a classmate about whom it is known that he or she takes/took drugs) than in the case of general population samples, where the individual respondents are usually socially well separated from each other. Incorporating cluster sampling in the analysis is, however, not much studied as yet according to the published literature on the Network Scale-Up Method (NSUM), even if some approaches have been suggested⁵⁵ which relate mainly to the construction of confidence intervals. It is possible that more research in this area would lead to an entirely new set of formulas for the NSUM applied in school surveys.

As mentioned above, the results of the indirect estimates obtained by the Network Scale-Up Method should be treated with caution. First of all, it is reported in the literature on the Network Scale-Up Method that behaviours with low prevalence, largely below 1%, tend to be overestimated by the method^{56,57,58} and this covers most of the drugs referred to in the present study.

⁵⁴ ESPAD Group, *ESPAD 2015 Methodology: Results from the European School Survey Project on Alcohol and Other Drugs* (Publications Office of the European Union, Luxembourg, 2016).

⁵⁵ Dennis M. Feehan and Matthew J. Salganik, "Generalizing the network scale-up method: a new estimator for the size of hidden populations", *Sociological Methodology*, Vol. 46, No. 1 (September 2016), pp. 153-186.

⁵⁶ Peter D. Killworth and others, "Two interpretations of reports of knowledge of subpopulation sizes", *Social Networks*, Vol. 25, No. 2 (May 2003), pp. 141-160.

⁵⁷ Tian Zheng, Matthew J. Salganik and Andrew Gelman, "How many people do you know in prison? Using overdispersion in count data to estimate social structure in networks", *Journal of the American Statistical Association*, Vol. 100, No. 474 (June 2006), pp. 409-423.

⁵⁸ Matthew J. Salganik and others, 2011. "Assessing network scale-up estimates for groups most at risk of HIV/AIDS: evidence from a multiple-method study of heavy drug users in Curitiba, Brazil", *American Journal of Epidemiology*, Vol. 174, No. 10 (November 2011), pp. 1190-1196.

Second, little is known about biases inherent in the method as they relate to the sample of young people under examination in this study. Recall bias was reduced, to some extent, by focusing on the group 'close friends'. In relation to the 'barrier effect', one important factor to consider is the drug use of the respondent himself or herself. We know from the data that students who had used drugs themselves had a higher probability, by a factor of 10 to 20, of reporting at least one friend who had used drugs. This is in line with studies modelling drug use from an epidemiological perspective as a "communicable disease"⁵⁹ or using more complex models of social interaction⁶⁰; and studies asserting the important role of peers in adolescents' substance use^{61,62,63}. Being or not being a drug user is clearly connected with a strong barrier effect when it comes to knowing other drug users.

The last on the list of the known biases of the Network Scale-Up Method is the 'transmission effect', or 'transmission bias'. The present study included four questions to obtain some insight into it. Two dealt with the self-assessment of the probability of knowing that a close friend is using alcohol/tobacco or illicit drugs; and two dealt with the self-stated probability of anonymously reporting close friends using substances. Unfortunately, the latter two questions did not work in the way expected (in fact, students answering at this point that they would not anonymously report their friends' substance-use were more likely to do so later in the survey); and so the 'transmission probability' coefficient was derived from the first two questions alone. The 'transmission probability' coefficient was thus based on self-assessment and covered only some aspects of the transmission error. As listed in Table 16 below, the magnitude of difference of the indirect estimates from self-reported use varied among substances. It was comparatively high, for example, for tobacco, heroin or inhalants. This is probably due to the fact that there was only one figure of transmission probability for alcohol and tobacco and one for all drugs while in reality the transmission probability might vary considerably among different drugs. This is, in part, due to the visibility of the use of certain substances. This could well be significantly higher for tobacco compared with alcohol; or for heroin compared with sedatives, for example. More research is needed into the transmission bias in the group studied.

⁵⁹ Carla Rossi, 2003 "The role of dynamic modelling in drug abuse epidemiology", *Bulletin on Narcotics* (2003), pp. 33-44.

⁶⁰ Hans O. Melberg, 2005. "The spread of drug use: Epidemic models or social interaction?" *Advances in health economics and health services research* Vol. 16 (2005): pp. 173-199.

⁶¹ Stephen J Bahr, John P. Hoffmann and Xiaoyan Yang, "Parental and peer influences on the risk of adolescent drug use", *Journal of Primary Prevention*, Vol. 26, No. 6 October 2005), pp. 529-551.

⁶² Rhonda Ramirez and others, "Peer influences on adolescent alcohol and other drug use outcomes", *Journal of Nursing Scholarship*, Vol. 44, No. 1 (February 2012), pp. 36-44.

⁶³ Alice Y. Loke and Yim-wah Mak, "Family process and peer influences on substance use by adolescents", *International Journal of Environmental Research and Public Health*, Vol. 10, No. 9 (August 2013), pp. 3868-3885.

Another weakness of the NSUM method in the analyses comes from the fact that the estimate of size for the average personal network of close friends (the denominator of NSUM) was derived from modelling rather than being calculated directly from the available data. It could not be calculated from the data as the national research team decided to collect the number of close friends in categories and not as an integer. In addition, there was some, possibly non-negligible, proportion of teenagers who also nominated peers who did not belong to their network of close friends. This can clearly be proven for those respondents who nominated a bigger number of users than made up the reported size of their network of close friends (e.g. one young person reported that they had between one and three close friends but nominated nine users of a particular substance). This happened more often with alcohol and tobacco-related nominations. However, if the respondent's number of nominations of users of a particular drug did not exceed the number of close friends he or she reported, there is no way of knowing whether they were nominating users from their close friends or from their wider peer network. It was therefore not possible to quantify the size of this error based on the available data. This error will lead to the figure for the indirectly estimated prevalence of drug use being higher than it should be.

In relation to other questions, analysing the willingness to report drug use among friends as compared with the actual reporting of drug-using friends points to the acceptability of the completely anonymous reporting of drug-using friends in terms of numbers only (see 'Methodology' section). Still, the precise extent of the underreporting of drug use among friends is unknown; and if some students felt uncomfortable reporting the number of their drug-using friends this would result in an underestimate of prevalence within the NSUM as it was applied.

In summary and despite all its inherent limitations, the exercise of applying an indirect estimation technique, a variant of NSUM, appears to be useful overall; and it can be recommended for other studies, perhaps with some modifications and with careful interpretation of the findings.

Lastly, some limitations in more precise interpretation of the collected data stem from the fact that certain issues of cultural adaptation, which are usually (but not always) captured in the formative-research stage of studies (the cognitive testing, pre-testing and pilot testing of the questionnaire), in all probability escaped the focus of the national research group. These issues mainly relate to the precise understanding of some of the survey questions and the resulting reliability of the answers given by the students.

5 Conclusions

The Youth Survey on Drug Use and Health conducted in 2018 in Kazakhstan among young people aged 13-18 has proven that it is possible to conduct studies of this nature and scope with the nation's school students. Moreover, the detailed analysis suggests that the figures obtained as a result of the survey are valid and reliable as far as the available indicators are concerned.

As is often the case in studies using self-report as a method of data collection, an unknown amount of under-reporting of substance use needs to be assumed. However, the resulting low prevalence probably to some extent corresponds to reality. The low prevalence is consistent with the respondents' very low perceived availability of substances as compared to international standards. However, it may not be as low as the figure of 3.1% of teenagers admitting the use of drugs at least once in their lifetime. The survey has successfully used a novel methodology: a modified version of the Network Scale-Up method to obtain indirect estimates of drug use by the target population. This method has led to indirect estimates of prevalence approximately 2-10 times higher than the self-reported prevalence (the median was 3.75). Given the limitations discussed above, these can be considered as the upper bounds of the estimated prevalence of substance use. If we use the median difference between direct and indirect estimates as an approximate under-reporting rate, we can make an extrapolation and estimate that up to 6.4% of young people aged 13-18 in Kazakhstan will have used any drug in the last 12 months; and up to 11.6% of the same group of young people will have used drugs at any point in their life.

A detailed analysis of predictors of substance use has revealed that substance use in this age group comes with a cluster of problems, including: lack of social support and parental monitoring; depressive mood; and a range of other problems including the most serious ones connected with running away from home and attempting suicide, a tendency towards antisocial behaviour and a higher perceived availability of substances. It is therefore advisable for drug-prevention efforts to address in a holistic way the issues and problems in this area that affect children and young people. This is in line with the scientific literature on drug prevention. Another conclusion which emerges from the findings and which is also of interest as far as drug prevention is concerned is that teenagers in Kazakhstan lack proportional perception of the risk of using various substances. Even if they do consider use per se to be risky, they do not distinguish between the varying levels of risk associated with particular substances and patterns of use, such as frequency of use (i.e. experimental,

occasional, regular, and intensive use). It would therefore also be necessary for an education programme to address this lack of preventative knowledge.

6 Methodology

In summary, the methodology implemented was the standard methodology for school surveys of drug use among adolescents as used in most school surveys (such as the European School Survey Project on Alcohol and Other Drugs (ESPAD) study), while covering a wider age range of students. In the Kazakh Youth Survey on Drug Use and Health, the target group was teenagers aged 13-18.

6.1 Aims of the survey

The aims of the survey were:

1. To obtain insight into the extent of drug, alcohol and tobacco use among Kazakh adolescents aged 13-18.
2. To assess the risk and protective factors and other vulnerabilities (or correlates) of substance use among adolescents such as perceptions of risk and harm from substance use, substance use among peers, etc.
3. To test a novel, indirect methodology, based on the social network scale-up method, in an attempt to obtain additional insight into the levels of substance use among Kazakh adolescents.

6.2 Target population and coverage of the total population in the respective age

The target population of the study was students aged 13 to 18 who were enrolled in the educational system. Included in the study were grades 7-9 (lower secondary, covering ages 12-15); grades 10-11 (higher secondary, covering ages 15-18; and years 1 and 2 (ages 15-18) in secondary vocational schools, called 'colleges' and 'lyceums' in Kazakhstan. In Kazakhstan, secondary education is compulsory up to the age of 15-16; and the level of enrolment is high. According to UNESCO data, the net enrolment rate in secondary education (defined by UNESCO as schooling for ages 10-18) in Kazakhstan in 2018 was 99.84%⁶⁴.

⁶⁴ UNESCO. *Country report online. Kazakhstan. General Information* (2019).

6.3 Sampling method

The study employed geographic stratification and then a two-stage cluster-sampling method. During the first stage, the country was stratified by region. The schools in each of 16 regions⁶⁵ were sampled using a pseudo-random selection⁶⁶. Using maps, each city was divided into four segments and two schools and one 'college' were selected from each segment (as there are more schools than 'colleges' in Kazakhstan). During the second stage, classes from the selected schools were selected using a similar randomisation method. One grade was selected from each 'college'; and two classes from each school. The final sampling unit was therefore the class. However, due to heightened concerns around confidentiality, the information on school and class was not collected.

It was decided to sample approximately equal numbers of questionnaires from each region/city. Unfortunately, the information on the region of origin of each questionnaire was also not collected due to heightened confidentiality concerns.

6.4 Sampling frame

The sampling frame consisted of all general schools, lyceums and colleges in urban areas, where 56% of the country's residents live. To illustrate the coverage of schools and students, we can look at the distribution of schools and students in one of the sampling segments: the general secondary schools. In Kazakhstan, there are 7161 general secondary schools. Among them, only about 22% are urban schools. However they educate more than 55% of the children and young people of the relevant age⁶⁷.

Urban areas were selected due to the prohibitive financial and human costs of researchers travelling to the many rural and remote areas of the country. An additional advantage of this approach is that the schools and classes in urban areas were of similar size and thus 'the problem of small

⁶⁵ The 16 regions covered the whole country and consisted of: 2 cities of national status (Astana and Almaty) and 14 regional (oblast) centers – cities or towns (Aktau, Aktobe, Atyrau, Karaganda, Kokshetau, Kostanai, Kyzylorda, Pavlodar, Petropavlovsk, Taldykorgan, Taraz, Shymkent, Uralsk, Ust-Kamenogorsk), and a city of oblast subordination Semey (East-Kazakhstan oblast).

⁶⁶ The method described by H.A. Kahn, C.T. Sempos (1989) was used. For instance, there are 40 schools in Pavlodar geographically located in four districts. On average, there are 10 schools per territorial district. We selected two schools from each district and one vocational school. Each of the ten "territorial" schools was given a serial number from 1 to 10. After that, we divided 10 by 3 to obtain 3.33, rounded to 3, which meant that every third school was selected. The day of the week when the selection was conducted corresponded to the initial number of the selected school. For example, if it was Tuesday, then the schools were selected with ordinal numbers: 2, 5, 8. In a similar way, we selected the classes in the selected schools.

⁶⁷ OECD, *OECD Reviews of School Resources: Kazakhstan 2015. School Education in Kazakhstan*. (22 Oct 2015).

schools/classes' being overrepresented⁶⁸ would not have occurred or occurred only rarely. The sampling frame also excluded special schools/schools for adolescents with disabilities as these cater for a very specific population. With regard to prevalence of drug use, an important but relatively small group of students not included in the sampling frame was students in educational institutions for young offenders. Here, the prevalence of drug use would be expected to be high. This type of school amounts to about one school per region/city.

6.5 Final participation in the study and refusals

In total, 192 educational institutions participated in the survey, consisting of 128 schools and 64 'colleges'/'lyceums'. There were 320 classes altogether.

Refusal to participate in the study on the part of schools, students and their parents was very rare. This was in all likelihood due to the fact that experts in the field and representatives of the local authorities held very detailed discussions with parents at parents' meetings and with students themselves in order to help explain the significance of the study. There were fewer than 20 refusals in total. Classroom reports and daily reports about the survey process were collected orally by means of phone calls made in the relevant educational establishment during the evening of the day of the data collection.

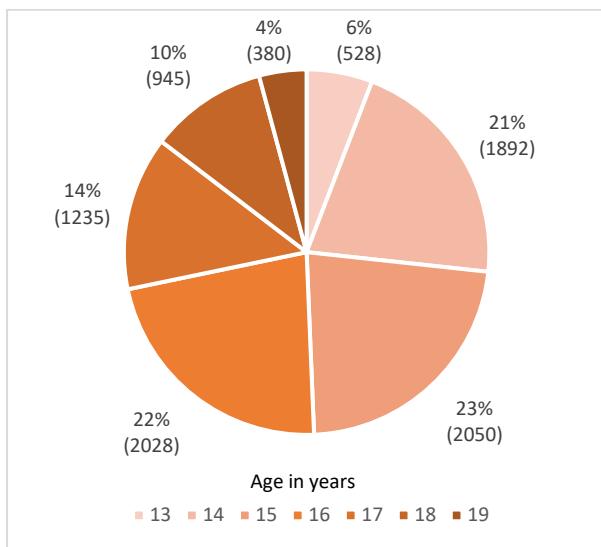
6.6 Description of the study sample – demographic variables

The final sample consisted of 9,111 respondents. 51% of them were male and 49% were female. The mean age of the respondents was 15.6 years (SD +1.5). The majority of the respondents (64 percent) were from grades 8 – 10. Overall, the grade level of the students ranged from grade 7 to 11 and the 1st and 2nd years of vocational school (age levels 15-17)⁶⁹ (see Graphs 17 and 18).

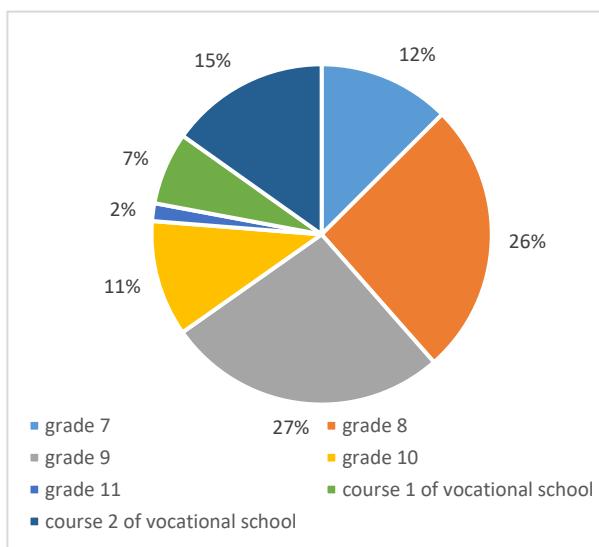
⁶⁸ ESPAD Group, *ESPAD 2015 Methodology: Results from the European School Survey Project on Alcohol and Other Drugs* (Publications Office of the European Union, Luxembourg, 2016).

⁶⁹ See Methodology, subsection 6.2 for more information.

Graph 18. Achieved age of respondent in the year of survey

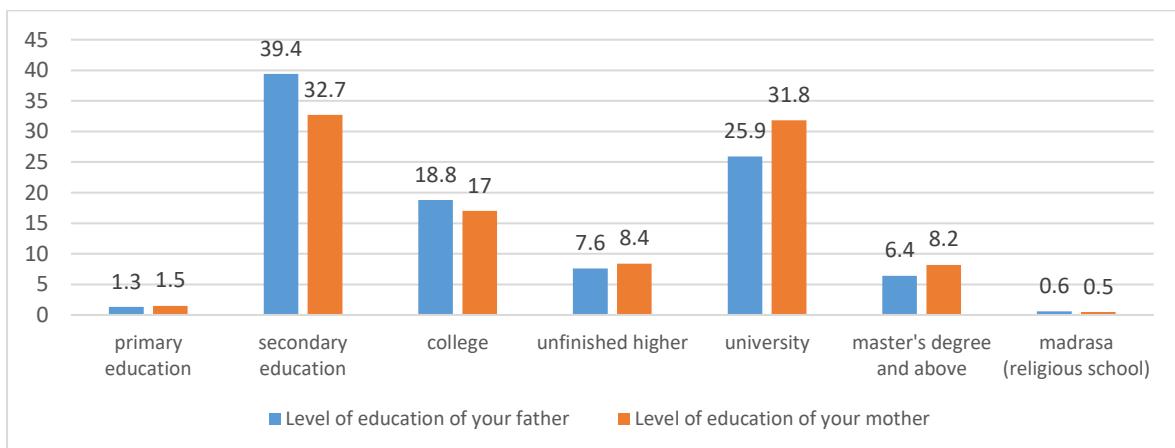


Graph 17. Grade of the respondent



The reported educational levels achieved by parents of the respondents were in line with the national picture⁷⁰ - more than a third of the parents had been educated to secondary level while around a quarter had been educated to university level. On average, the mothers had slightly higher levels of education than the fathers (See Graph 19 for an overview of parental levels of education).

Graph 19: Educational level achieved by parents of the respondent (%)



⁷⁰ Helen Dubok and Dilbar Turakhanova, Gender Study for Central Asia. Kazakhstan Final Report (2017).

6.7 Mode of data collection

The mode of data collection was a paper-and-pencil questionnaire. The questionnaire used for the school survey in Kazakhstan contained questions on the demographic profile of the respondent, including spare-time activities; their tobacco, alcohol and other psychoactive substance use; attitudes to drugs and their perceived availability; and their social profile – mainly social support from parents and friends and parental monitoring and some additional psychosocial variables. In the present study, the selected scales assessed self-esteem (Rosenberg's Self-Esteem Scale); depressive mood (CES-D); feeling of anomie (Anomie Scale of Exteriorty and Constraint); and antisocial behaviour (Antisocial Behaviour Scale). Moreover, questions were included about various problems which had been experienced, with or without relation to substance use, specific measures of self-harm or running away from home. All these elements of the questionnaire were based on decades of research into risk and protective factors in relation to substance use; and were expected to show correlations with that research. Besides these modules, questions were added which examined the students' social networks and the drug use taking place within those networks. This was in order to obtain indirect estimates by means of the Network Scale-up Method (see below).

6.8 The Network Scale-Up Method

The Network Scale-Up Method is a relatively new method applied in estimating the prevalence of hidden populations, who often have stigmatized behaviours^{71,72}. It is based on estimating the size of the social network (usually the acquaintances) of the members of the 'total population'; and the number of persons known from among the population of interest (the 'hidden population'). The main idea behind the method is that the prevalence among the social network of the surveyed sample equals the prevalence among the total population. Various methods are used to estimate the size of the personal social networks. In practice, this is based around either nomination of its members (or, more precisely, their number); or estimation based on a known subpopulation, such as knowing people with a certain first name or profession, etc. As the reporting of the number of the members of the hidden population among one's social network is not always straightforward, different correction factors and modelling approaches are used to account for the known biases. These biases

⁷¹ Russel H. Bernard and others 2010. "Counting hard-to-count populations: the network scale-up method for public health", *Sexually Transmitted Infections*, Vol. 86, Suppl. 2, pp. ii11-ii15.

⁷² UNAIDS, *Network scale-up: a promising method for national estimates of the sizes of populations at higher risk*. UNAIDS quarterly update on HIV epidemiology / 2Q 2010 (UNAIDS, GENEVA, 2010).

include non-random mixing or the ‘barrier effect’ (some population members have a higher probability of knowing others with a particular characteristic); ‘transmission bias’, which generally includes not knowing that one’s acquaintance is a member of the specified subpopulation (e.g. not knowing that he or she uses drugs); not willing to report this fact in the survey (e.g. due to fear of repercussions); but also ‘recall bias’ – not remembering a particular member of the subpopulation during the survey.

In the present study, the parameters for the Network Scale-Up Method were estimated on the basis of seven questions included in the survey questionnaire. These consisted of questions on the number of close friends (which represents the size of the personal social network of close friends); and self-estimate by the respondent - how likely they were to know about close friends’ substance use and the willingness of the respondent to anonymously report this use. Following that, the number of users of various listed drugs who were known by the respondent and belonged to their network of ‘close friends’ was collected.

6.9 Indirect estimates of prevalence

It is quite likely in drug-use surveys that there is under-reporting in questions which require the respondent to self-report the use of substances considered illegal, as the use of such drugs carries legal sanctions and is highly stigmatized. In the light of this, the YSDUH in Kazakhstan was designed to include a module enabling the indirect estimation of substance-use prevalence using a modified version of the Network Scale-Up Method⁷³ (see the Methodology section for details). The resulting estimates are summarized in Table 16. This also sets out, side by side with the indirect estimates, the prevalence for the previous year of the self-reported use of the same substances. This is for comparison, as the reference-recall period for the indirect estimates was also the previous 12 months. The prevalence of alcohol use among friends was almost identical to that estimated from the self-reported data. This has also been observed in adult surveys on substance use where NSUM has been used: there is little difference here between estimates based on self-reported use and those based on NSUM for those substances which have a higher degree of social acceptance.⁷⁴ The prevalence of substance use estimated by the modified Network Scale-Up Method was, as expected, several times higher than the self-reported prevalence. Therefore, the estimates based on self-

⁷³ NSUM has been used in conventional surveys with adult respondents to estimate the size of the hidden population. This study is the first where NSUM has been adapted for use in a survey conducted with adolescents.

⁷⁴ See for instance National Bureau of Statistics and UNODC, Drug Use Survey in Nigeria 2018 (Funded by the European Union) (Vienna, 2019).

reported use are presented as the lower bound and those based on the Network Scale-Up Method are presented as the upper bound of the extent of drug use among school students in Kazakhstan.

Table 16: Overview of indirect estimation of prevalence of substance use prevalence by a version of the Network Scale-Up Method

Substance	Indirect prevalence estimate	Confidence Interval low	Confidence Interval high	Self-reported prevalence	Difference between indirect and direct estimate
Cigarettes	23.3%	22.5%	24.2%	8.6%	271.4%
Alcohol	22.2%	21.4%	23.1%	19.4%	114.6%
Inhalants (e.g. glue)	3.9%	3.4%	4.3%	0.7%	549.4%
Cannabis	2.3%	2.0%	2.6%	0.8%	284.2%
Pharmaceutical opioids (Tramadol) (non-medical use)	2.0%	1.7%	2.3%	0.3%	668.2%
Spice	1.9%	1.6%	2.2%	0.5%	372.1%
Ecstasy	1.2%	1.0%	1.4%	0.2%	594.4%
Heroin	1.0%	0.8%	1.2%	0.1%	1016.2%
Opium	0.4%	0.3%	0.5%	0.1%	378.9%
Morphine	0.4%	0.2%	0.5%	0.1%	348.7%
Amphetamine	0.7%	0.6%	0.9%	0.2%	361.6%
Methamphetamine	0.6%	0.4%	0.7%	0.1%	572.6%
Crack cocaine	0.4%	0.3%	0.6%	0.2%	213.1%
Cocaine powder	0.5%	0.3%	0.6%	0.1%	474.8%
Ketamine	0.4%	0.3%	0.5%	0.2%	189.8%
LSD	0.8%	0.6%	0.9%	0.2%	379.7%
<i>Magic mushrooms</i>	1.4%	1.2%	1.7%	0.2%	702.1%
GHB/GBL	0.6%	0.4%	0.8%	0.2%	299.3%
Sedatives or Tranquilizers (Relanium) (non-medical use)	0.6%	0.4%	0.8%	0.2%	297.2%

6.10 Languages of the survey and the translation process

The survey was conducted in a genuinely bilingual manner. The questionnaires were available in Kazakh and Russian, the country's two official languages. Each student was able to choose the language with which he or she was most comfortable. This was especially true in mixed-language schools, where education is conducted in both languages.

The translation process was carried out by three independent translators per language who worked from an English version. Their three translations were then discussed by an expert panel consisting of various experts in the drugs field and the final version was arrived at by consensus.

6.11 Cognitive testing of the questionnaire's novel module (Network Scale-Up Method-related questions)

In Pavlodar and Almaty, the researchers conducted cognitive tests by means of three focus groups per city in order to analyse respondents' understanding of the novel module in the questionnaire. This meant looking at the seven questions which were added to the survey in order to collect data for the Network Scale-up Method (see above), the indirect method of estimating prevalence. This was done according to the research protocol prepared by UNODC.⁷⁵ The outcomes of the focus groups were then used to fine-tune the final questionnaire for the survey.

6.12 Pilot testing of the questionnaire

The questionnaire was pilot-tested in the city of Pavlodar with 604 students – 482 from the general secondary schools and 122 from 'colleges'. This sample was not included in the national analysis. During the pilot study, the respondents asked several questions; but in general the survey questions were, according to the national research team, reasonably clear and well understood. The main questions asked by the respondents concerned psychoactive substances - for example, what are LSD and GHB? The students also prompted researchers to add some options in the questionnaire to reflect their life situation (for example, the loss of a parent). Overall, the respondents were interested in the survey and no difficulties were observed with the data-collection process.

⁷⁵ UNODC, *Research Protocol for Focus Groups to guide NSUM* (September 2019, working document).

6.13 Final sample size

Originally, the researchers aimed for a sample size of approximately 10,000 students. This initial decision was based on a preliminary estimate of the number of schools and colleges.

The sample size achieved was 10,222. However, 622 questionnaires were either missing more than half of the key items or returned blank (which probably meant refusal of the student to participate further in the survey). These were therefore discarded before or during the data-entry process. 9,600 questionnaires were entered into the SPSS software prior to the second round of data screening and cleaning. These represented on average 600 questionnaires from each of the regions where data was collected (the exact number varied but counts are not available by region/city).

As the classroom report was only collected in verbal form, there is no precise record of the numbers of students absent on the day of survey in the various classrooms.

6.14 Consent and confidentiality, and the questionnaire administration process

Before the study, passive consent was obtained from students' parents during a parents' meeting at each school where there was participation on the part of specialists as mentioned above. This was followed by the students being informed about the purpose of the study during an introductory briefing at the start of the data collection. They were also informed at this time that their participation was voluntary and anonymous.

The questionnaires were collected by 200 trained survey leaders – research assistants from local narcological organisations, who remained at the front of the classroom during the data collection. The schoolteachers were present in the classroom in a passive role, which was to observe that the children's rights were not violated in any way. The survey leaders only moved towards a student who asked for an explanation of a question in the questionnaire. The students were reassured in the text on the front page of the questionnaire about full confidentiality and voluntary participation without repercussions if they refused; and they were explicitly asked not to write their name anywhere on the questionnaire. After completing the questionnaire, the students inserted the filled-in questionnaire in a blank envelope and personally sealed it.

The approval of the study by an ethics committee was not required according to national law, as the study was anonymous.

6.15 Data collection timing

The period of data collection was from December 2017 to June 2018. The time of the year when data collection was performed was thus very similar to that employed in the countries participating in the ESPAD study. The approximate time for completion of the questionnaire was 45-60 minutes.

6.16 Study-related climate in the country and the need for advocacy

It is also important to note that numerous national and regional institutions and schools were not very keen to participate in this type of study at first. This can be due to the fact that drug use per se is criminalized in Kazakhstan and also due to the fact that Kazakh society is not accustomed to this type of study and so people did know what to expect (for example, whether the confidentiality claimed could really be relied upon). Substantial advocacy work was therefore needed, including with the Ministries of Education and Science and Health, municipalities, school principals etc.

6.17 Data entry

Data entry using the SPSS software was carried out manually by the BRIF Research Group.

6.18 Data cleaning

As mentioned above, 622 questionnaires were discarded before data entry due to being empty (nothing completed) or containing more than 50% of missing data under important items. A second round of data cleaning was carried out by the UNODC consultant and this resulted in the removal of another 459 questionnaires. The process is detailed in Annex 1. Altogether, 1,111 questionnaires out of the 10,222 originally collected were discarded. This is a high proportion (10.9%) compared to the ESPAD average (1.8%; or 1.6% if the outlier of Latvia with 7.6% questionnaires discarded is not included). The final number of valid questionnaires included in the analysis was 9,111.

6.19 Some signs of reliability and validity of the data

6.19.1 Reliability

Reliability in general terms means consistency of measurement. In general, no indications of any major reliability issues were found, based on the questions examined.

The inconsistent answer patterns examined included: reporting age at first use while reporting no use ever in life for various substances; reporting 'never' as age of first use while reporting ever

having used alcohol; reporting ever having participated in binge-drinking without reporting ever having used alcohol; and reporting alcohol intoxication without reporting ever having used alcohol. The proportion of students who gave inconsistent answers to the questions examined was quite low in most questions. An exception was 3.6% of students giving 'never' as the age of smoking their first cigarette while at the same time reporting ever having used cigarettes. However, the ESPAD average for this inconsistency, 3%, is very similar. It should also be noted that the questions asking about age at first use do not contain the option 'I don't remember', which may result in some respondents who do not remember their age of first use answering 'never' (see Table A in Annex 2). In addition to this, 1.8% of the sample (who responded to both questions) reported binge-drinking without reporting ever having used alcohol. 0.6% of the sample (who responded to both questions) reported alcohol intoxication without reporting ever having used alcohol.

However, there were inconsistencies found in a question placed later in the questionnaire which is in the literature termed 'the honesty question' and was meant to indicate approximately whether the students reported their cannabis use truthfully: 'If you had ever used cannabis (marijuana or hashish), do you think you would have said so in this survey?' This question had a high inconsistency when compared with previous replies related to cannabis use. The proportion of students who answered 'I already said I took' (5.2%) was about four times larger than the number of students reporting any use in their lifetime (1.2%) - see Table 17. This is much higher than in any ESPAD country, where in the 2007 and 2011 reports^{85,86} the difference between these questions for most countries was a factor of 1, plus or minus 0.2%.

Table 17. Distribution of answers to question 'If you had ever used cannabis (marijuana or hashish), do you think you would have said so in this survey?'

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I already said I took	454	5.0	5.2	5.2
	Of course, yes	2522	27.7	28.8	34.0
	Maybe yes	2284	25.1	26.1	60.1
	Probably not	712	7.8	8.1	68.3
	For sure not	2778	30.5	31.7	100.0
	Total	8750	96.0	100.0	
Missing	System	361	4.0		
Total		9111	100.0		

This issue was carefully analysed and consulted upon by national experts. The national experts pointed out that the question requires thinking in terms of a double negative, a grammatical construction which doesn't exist in the Kazakh language and is formulated in a way which is complicated for the respondents⁷⁶. Unfortunately, this question had not been subjected to cognitive testing; and in the pilot-testing phase doubts about it had not arisen spontaneously.

Subsequent analyses have shown that those who replied 'I already said I took' to the 'honesty question' (the 454 or 5.2% of valid responses to this question) replied in the following proportions: use of cannabis, 12.5%; use of other drugs, 19.1%; use of cigarettes, 42.3%; and use of alcohol, 50.8%. This indicates that there could have been some misunderstanding as to this question being focused on cannabis. 45% of this group did not report any use of alcohol, tobacco or drugs. Some combination of tiredness, lack of clarity and not reading the question carefully may be to blame for this result.

Another indication of the reliability of the answers given in the questionnaire, although not directly related to substance use, was the internal consistency of the psychometric instruments which were used (Rosenberg's self-esteem scale; the depressive-mood short screening scale CES-D; and the Anomie Scale of Exteriorty and Constraint and Antisocial Behaviour Scale). The results for Cronbach's alpha, the most widely used measure of internal consistency, were well within those reported in the scientific literature⁷⁷ and even tended towards the higher end of the results reported in the literature (see Figure 1 above).

An additional check on the logical consistency of the responses which was carried out was comparing the lifetime use of any drug (except alcohol and tobacco) and a variable asking for the name of the first drug the person used (if any). The answers were also quite consistent; but 2.2% of the young people who denied ever having tried any substance during their life reported a substance under this question. This may be worrying, as the resulting prevalence in the present study is a relatively low number; and altogether 3.9% of the respondents named a drug in response to this question. A further analysis was therefore carried out. This looked at how the adolescents who named a drug under the 'first drug used' question answered the questions which have proven to be the strongest predictors of drug use in the present study. In summary, their answers had a slight tendency to follow the pattern of the answers of the young people who admitted they used drugs. However, these

⁷⁶ Zhanerke Omarova and Bakitzan Nuraliev, Personal communication (Almaty, 2019).

⁷⁷ Refer to Bjorn Hibell and others, 2009.

differences were not statistically significant for virtually all the variables. It was thus concluded that while there may be some individuals who did use drugs and have only said so under this question ('first drug used'), most of the answers to this question were probably 'random noise' (data not shown).

6.19.2 Validity

As mentioned above, the translation process included three independent translators per language (Kazakh and Russian) and a panel of experts who agreed on the final version of the questionnaire. This was to ensure the content validity of the questions translated and adapted from English.

There are no written classroom reports available, as the survey leaders in classrooms delivered the classroom reports in oral form only to the RSPCMH co-ordinating the study (usually by phone). However, the reports overall indicated: no difficulties or disruptions in the classrooms; a high interest on the part of the students in participating in the study; and fewer than 20 cases of parental or student refusal across the entire study (up to 0.2%).

One issue which should be mentioned here is that students may not have had a feeling of complete confidentiality in relation to their peers. They are typically seated very close to each other in their classrooms, either with two students sitting together at benches; or in study rooms seated in a circle quite near to one another. Even though the supervisor in the classroom paid close attention to the students to ensure that they worked independently, the latter may have felt that their privacy had been reduced.

Another possible issue in relation to validity could be the 622 questionnaires which were submitted blank or quasi-blank. This represented 6% of the original sample. Although the official refusal rate was very low, it may have not been considered appropriate within Kazakh culture to refuse directly; and so these 6% may be considered as actual refusals to participate. One of the reasons for doing so may be substance use on the part of the respondent.

The rates of missing answers in the filled-in questionnaires were mostly 1-1.7% (see Table B in Annex 2), very similar to the average of the ESPAD countries. The exception was inhalants, which had a missing-answers rate of 3.3%. This figure is higher than the ESPAD average but lower than the highest rates found in the ESPAD countries. It is possible that the inhalants question was to some extent confusing for students in Kazakhstan (there was clarification in brackets, asking them if they

have used, for example, glue). However, in summary, the rates of missing responses do not indicate any significant validity problem in the key substance-use-related answer domains.

Examining indications of possible under-reporting, the answers to the above-mentioned question, 'If you had ever used cannabis (marijuana or hashish), do you think you would have said so in this survey?', might signify potential problems with validity, with 31.7% of students answering that they would definitely not admit cannabis use. This makes Kazakhstan a clear outlier in relation to the European data, where the highest proportion in ESPAD was reported by FYROM (Macedonia): 24%. The proportion for this question was mostly between 5 and 10% in the ESPAD countries⁷⁸. Moreover, another 8.1% of students in Kazakhstan claimed that they would 'probably not' admit cannabis use if they had used it. A similar study from a neighbouring country, Tajikistan, has, however, indicated 47% and 10% of students responding they would 'definitely not' and 'probably not' be willing to admit their own cannabis use if it had occurred during their life⁷⁹.

This question is considered by the ESPAD group as useful in a cross-cultural context because in part it signifies that cannabis use is considered to be something too shameful to allow a respondent to imagine reporting it even in a hypothetical context. Thus, on the one hand, the high proportion of students unwilling to report cannabis use can signify problems with validity due to under-reporting; but on the other it might also describe the attitudes of young people for whom cannabis use is an entirely hypothetical situation; and who might change their minds about their willingness to report it once they had actually used it.

The survey also included questions about use of a dummy drug, 'Relevin', in order to provide some indication of over-reporting. Only 0.12% students reported the use of Relevin under any variables related to ever having used it during their lifetime, during the last 12 months or during the last 30 days (the ESPAD average in 2015 was 0.7%⁸⁰). This provides an indication that over-reporting was rather rare in the sample. In addition, it must be mentioned that it is possible to confuse the dummy ESPAD drug 'Relevin' with 'Relanium' - a benzodiazepine drug available in Kazakhstan and also mentioned in the questionnaire. The local experts believe that the confusion rate will be low as Relanium abuse is not prevalent any longer (the rate was higher ten to twenty years ago). However,

⁷⁸ ESPAD Group, *ESPAD 2015 Methodology: Results from the European School Survey Project on Alcohol and Other Drugs* (Publications Office of the European Union, Luxembourg, 2016).

⁷⁹ UNODC. *Youth Substance Use in Tajikistan 2016. Report* (Vienna, 2017, unpublished report).

⁸⁰ ESPAD Group, *ESPAD Report 2015: Results from the European School Survey Project on Alcohol and Other Drugs* (Publications Office of the European Union, Luxembourg, 2016).

even if Relevin had been frequently confused with Relanium, it should have resulted in higher reporting of Relevin use, which is not the case. In addition, those students reporting the use of Relevin were filtered out during the working-out of the estimates of prevalence. As a result, minor changes to the calculation for lifetime prevalence (typically a reduction of 0.1%) were observed. The influence of possible over-reporting as measured by the dummy drug Relevin was thus very small; and it is very unlikely that it outweighed the effect of under-reporting.

As another measure of possible over-reporting, we looked into the use of drugs students claimed they had never heard about. The number of students claiming they had used a particular drug as a proportion of those who reported never hearing about the same substance ranged from 0 to 0.6%, with the percentage for most substances between 0.1-0.2% (see Table C in Annex 2). This confirmed low inconsistency rates between these questions; and this therefore does not indicate any additional signs of over-reporting. The rates which resulted may in all likelihood be ascribed to errors in filling in the questionnaire.

6.20 Data analysis

The study data was analysed according to a data-analysis plan and by the use of SPSS software; Microsoft Excel; and R software.

Even though many of the tested variables and some of the obtained indices or screening-scales scores were not, strictly speaking, of the interval or ratio type of measurement, they were pseudo-continuous and carried a lot of information which would have been lost if the data had been analysed as strictly ordinal. Parametric methods were therefore chosen, as suggested by many authors, as they are deemed to be more robust, especially when Likert-type scales are used^{81,82,83}. Likert-type scales were used in many of the questions contained in the questionnaire which was put into use.

6.20.1 The Network Scale-Up Method

As mentioned in the Results section, the study employed a version of the novel Network Scale-Up Method. Here we provide details of the estimation process and results.

⁸¹ Geoff Norman, "Likert scales, levels of measurement and the "laws" of statistics", *Advances in Health Sciences Education. Theory and Practice*, Vol. 15 (2010), pp. 625–632.

⁸² Gail M. Sullivan and Anthony R. Artino, "Analyzing and interpreting data from Likert-type scales", *Journal of Graduate Medical Education*, Vol. 5, No. 4 (December 2013), pp. 541–542.

⁸³ M.E. Cohen, "Concise review: analysis of ordinal dental data: evaluation of conflicting recommendations", *Journal of Dental Research*, Vol. 80, No. 1 (January 2001), pp. 309–313.

First, the study aimed to establish the size of the individual's personal network of close friends. It then asked how many of the individual's close friends happened to be users of the listed drugs. Within the same questionnaire, four questions were included which aimed to collect information needed to estimate the 'transmission probability'. These questions were:

'If one of your close friends smoked cigarettes or drank alcohol, how likely are you to know about it?',

'If any of your close friends have used illegal psychoactive substances, such as, cannabis or heroin, how likely are you to know about it?',

'If any of your close friends smoked cigarettes or drank alcohol, how likely it is that you will anonymously provide information about your friend in this survey?' and

'If any of your close friends have used illegal psychoactive substances, such as cannabis or heroin, how likely is it that you anonymously provide information about your friend in this survey?'.

All of the questions provided answer options on a four-point Likert-type scale ('definitely yes', 'maybe yes', 'probably no' and 'I have no idea'). The first two questions were correlated with reporting at least one friend who used alcohol, tobacco or drugs in a dose-response manner: students who said 'definitely yes' reported the highest number of substance-using friends; and these reports decreased with the self-assessment of knowing whether the respondent's close friends used substances and were lowest in those students who responded 'I have no idea'. However, the latter two questions (concerning willingness to anonymously report substance-using friends in the present survey) had an inverse relationship with actually reporting counts of substance-using friends: those respondents who said that they would be 'probably not' willing to anonymously report substance-using friends in the present survey were in fact more likely to report at least one friend who used substances. We therefore concluded that these questions did not perform in the study as intended – those who reported unwillingness to report their friends' substance use actually reported more substance-using friends. Thus, these questions were not used in the subsequent analyses. In a way, the response patterns also suggested that the way data was collected – only as a count of drug-using friends without any kind of personal identification – appeared non-threatening to the respondents and thus probably many of those who were originally not willing to report substance-using friends did so in the end. The first two questions were used to construct a proxy of 'transmission probability' by merging the 'definitely yes' and 'maybe yes' categories. Transmission

probability was here quantified as the probability of knowing that one's close friends use the substances in question. It was estimated to be 0.8 for alcohol and tobacco and 0.54 for other substances.

From these data we proceeded to the indirect estimation of the prevalence of substance use among the population of young people aged 13-18.

Unfortunately, the data on the number of close friends was collected in categories; and therefore the mean size of the network of close friends had also to be estimated by finding, by means of modelling approaches, a Poisson distribution which fitted the data best (see Annex 3 for details). The resulting average number of close friends was 4.95. Table 18 provides all the details of the estimates which were obtained.

Table 18. Overview of indirect estimation of substance use prevalence by a version of the Network Scale-Up Method

Substance	No. of nominated users	First estimate	Transmission probability	Final estimate	CI low (according to Killworth, 1998)	CI high (according to Killworth, 1998)	CI low (normal approximation to binomial)	CI high (normal approximation to binomial)	Self-reported prevalence	Indirect estimate/direct estimate
Cigarettes	8025	0.1867	0.8	23.34%	22.83%	23.85%	22.45%	24.23%	8.60%	2.714
Alcohol	7628	0.1778	0.8	22.23%	21.73%	22.73%	21.35%	23.10%	19.40%	1.146
Heroin	236	0.0055	0.54	1.02%	0.89%	1.15%	0.81%	1.23%	0.10%	10.162
Opium	88	0.0020	0.54	0.38%	0.30%	0.46%	0.25%	0.51%	0.10%	3.789
Morphine	81	0.0019	0.54	0.35%	0.27%	0.42%	0.22%	0.47%	0.10%	3.487
Cannabis	528	0.0123	0.54	2.27%	2.08%	2.47%	1.96%	2.59%	0.80%	2.842
Spice	423	0.0100	0.54	1.86%	1.68%	2.04%	1.57%	2.15%	0.50%	3.721
Amphetamine	168	0.0039	0.54	0.72%	0.61%	0.83%	0.55%	0.90%	0.20%	3.616
Methamphetamine	133	0.0031	0.54	0.57%	0.48%	0.67%	0.41%	0.73%	0.10%	5.726
Ecstasy	276	0.0064	0.54	1.19%	1.05%	1.33%	0.96%	1.42%	0.20%	5.944
Crack	99	0.0023	0.54	0.43%	0.34%	0.51%	0.29%	0.56%	0.20%	2.131
cocaine powder	110	0.0026	0.54	0.47%	0.39%	0.56%	0.33%	0.62%	0.10%	4.748
Relevin	41	0.0010	0.54	0.18%	0.12%	0.23%	0.09%	0.27%	0.10%	1.768
ketamine	88	0.0020	0.54	0.38%	0.30%	0.46%	0.25%	0.51%	0.20%	1.898
LSD	176	0.0041	0.54	0.76%	0.65%	0.87%	0.58%	0.94%	0.20%	3.797
magic mushrooms	324	0.0076	0.54	1.40%	1.25%	1.56%	1.16%	1.65%	0.20%	7.021
GHB/GBL	138	0.0032	0.54	0.60%	0.50%	0.70%	0.44%	0.76%	0.20%	2.993
prescription painkillers (Tramadol)	462	0.0108	0.54	2.00%	1.82%	2.19%	1.71%	2.30%	0.30%	6.682
sedatives or tranquilizers (Relanium)	137	0.0032	0.54	0.59%	0.49%	0.69%	0.43%	0.76%	0.20%	2.972
inhalants (e.g. glue)	884	0.0208	0.54	3.85%	3.59%	4.10%	3.44%	4.25%	0.70%	5.494

6.20.2 Discriminant analysis

Three models were looked at in terms of fit: two with outcomes of alcohol and cigarette use for the last year; and one with the lifetime use of any drug as an outcome. The same set of predictors was used for all three models.

In general, although the models explained the differences between the substance-using and non-substance-using groups significantly better than by chance, the Eigenvalues were poor (a small part of the variance in substance use was explained by the variables used). In addition, a relatively smaller number of cases was included in the analyses due to missing values (see Table 19). The models confirmed some of the observations made at the stage of bivariate analyses. Table 19 summarises the models' fit.

Table 19. Summary of three Discriminant Analysis models with substance use as the grouping variable (in columns)

	Lifetime use of drugs	Last year use of cigarettes	Last year of use alcohol
Number of non-users included	1864	1767	1500
Number of users included	57	184	445
Eigenvalue	0.076	0.181	0.193
Canonical correlation	0.265	0.391	0.402
Wilks' Lambda	0.930	0.847	0.838
Chi-Square	139.5	322.9	342.0
p	0.000	0.000	0.000

6.20.3 Multinomial logistic regression models

Due to missing data, only 1,783 cases from the entire data set of 9,111 observations had all the variables included in the model; and so analyses were performed to ensure that missing data points had not biased the results in a significant way. This was necessary, because, due to the sensitive nature of many of the questions in the questionnaire, it was likely that data points would be missing in a non-random way. Fortunately, this has been proven not to be true (analyses not shown); and it was thus possible to perform analyses on the subset of cases with values across all the variables included in the analysis (list-wise exclusion of cases from the analysis). The first ('full') model contains 16 predictors: four are dichotomous and twelve are continuous or, for the most part, pseudo-continuous (as most were indices based on a combination of, essentially, ordinal scale measurements). All the continuous as well as the pseudo-continuous variables were then tested for

multicollinearity (R package usdm⁸⁴, results not shown). No multicollinearities were observed. According to the model-fitting tests performed by SPSS, the model predicted membership in one of the response categories (any vs. no self-reported use of drugs in the person's lifetime) significantly better than chance. McFadden's Pseudo R-Square was 0.255.

Table 20 summarises the full information concerning the parameter estimates obtained from the model. We also calculated the AIC (346.776, 422.0 for intercept-only) and BIC (440.039, 427.486 for intercept-only) of the model. This suggests the model is not very parsimonious and probably contains too many predictors.

Table 20. Parameter estimates of the 'full' Multinomial logistic regression model incorporating all available predictors from the collected data, potentially important according to the scientific literature.

Parameter Estimates								
Lifetime prevalence of the use of any substance except alcohol and tobacco ^a		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)
								Lower Bound
no	Intercept	3.042	2.806	1.176	1	.278		
	age	.076	.124	.372	1	.542	1.079	.846 1.375
	RSES score	-.003	.039	.007	1	.932	.997	.924 1.075
	CES-D score	-.097	.047	4.302	1	.038	.907	.828 .995
	ASEC score	-.120	.050	5.685	1	.017	.887	.804 .979
	ABS score	-.070	.034	4.274	1	.039	.932	.873 .996
	Emotional support (index)	-.026	.063	.170	1	.680	.975	.862 1.102
	Disapproval of users (index)	.000	.011	.000	1	.993	1.000	.979 1.021
	Risk perception (index)	.007	.010	.588	1	.443	1.007	.988 1.027
	Perceived availability (index)	-.014	.010	1.796	1	.180	.986	.966 1.007
	Problems (number, quest.32)	-.033	.041	.680	1	.410	.967	.893 1.047
	Parental control (index)	.029	.049	.350	1	.554	1.030	.935 1.134
	Serious problems (index)	-.002	.085	.001	1	.981	.998	.845 1.179
	[@1=1] gender	-.364	.364	1.002	1	.317	.695	.341 1.417
	[@1=2]	0 ^b	.	.	0	.	.	.
	[nominated_users=.00]	1.497	.390	14.766	1	.000	4.470	2.083 9.595
	[nominated_users=1.00]	0 ^b	.	.	0	.	.	.
	[LYPalcohol=.00]	1.068	.400	7.122	1	.008	2.909	1.328 6.374
	[LYPalcohol=1.00]	0 ^b	.	.	0	.	.	.
	[LYPcigs=.00]	.462	.433	1.135	1	.287	1.587	.679 3.708
	[LYPcigs=1.00]	0 ^b	.	.	0	.	.	.

⁸⁴ Babak Naimi and others, 'Where is positional uncertainty a problem for species distribution modelling?' *Ecography*, Vol. 37, No. 2 (February 2014), pp. 191-203.

a. The reference category is: yes.
 b. This parameter is set to zero because it is redundant.
 Nominated_users: 0: didn't report any drug-using friends, 1: reported at least one drug using friend
 LYPalcohol: 0: didn't use alcohol in the last year, 1: used alcohol at least once in the last year
 LYPcigs: 0: didn't smoke cigarettes in the last year, 1: smoked cigarettes at least once in the last year
 A 'reduced model' was constructed on the basis of a combination of statistical criteria and theoretical criteria. The following variables were excluded from the model:

- Age and gender: these variables were not significant in the 'full' model, and also in previous bivariate analyses, even though in most studies they were important predictors of drug use.
- RSES, the Rosenberg's Self-Esteem Scale: In the bivariate analyses, there was already a small difference between users and non-users; and even though the difference was statistically significant it was not clinically significant.
- ASEC – the Anomie Scale of Exteriorty and Constraint – although there is definitely a correlation between the feeling of anomie and drug use, it is very likely that the feeling of anomie explains only a small part of the variance of drug use. In theory, the person with a high feeling of anomie may choose different behaviours than drug use to 'act out' the feeling of anomie. It is also likely that the component of anomie related to drug use will be correlated and possibly even explained by ABS – the Antisocial Behaviour Scale.
- Risk perception had an inverted U-shaped relationship with drug use in the bivariate analyses and therefore may not perform well as a linear predictor. This is likely due to the fact that some risks related to drug use and especially their levels are not very clear to young people in Kazakhstan.
- Disapproval of users also did not differ much between users and non-users in the bivariate analyses.
- The indices of emotional support, problems and serious problems (not significant in the 'full' model) may be modulated in their relationship with drug use by depressive mood – i.e. it is only if the person feels low due to lack of emotional support or different problems that they might self-medicate with drugs (in line with Khantzian's self-medication hypothesis⁸⁵). This may be the reason why the 'full' model rendered these factors not significant. Therefore, only depressive mood was retained in the final model.

According to the model-fitting tests performed by SPSS, the model predicted membership in one or the other response category (any vs. no self-reported use of drugs in the person's lifetime)

⁸⁵ Edward J. Khantzian, "The self-medication hypothesis of addictive disorders: focus on heroin and cocaine dependence", *American Journal of Psychiatry*, Vol. 142, No. 11 (November 1985), pp: 1259–64.

significantly better than by chance. McFadden's Pseudo R-Square was equal to that of the first model, 0.255. Table 21 summarises the parameter estimates obtained by the model. AIC was 708.941 and BIC was 760.46 (956.803 and 963.243 for intercept-only model, respectively).

Table 21. Parameter estimates of the 'reduced' Multinomial logistic regression model incorporating only variables with theoretically explained or empirically proven relationship with drug use

Parameter Estimates								
Lifetime prevalence of the use of any substance except alcohol and tobacco ^a		B	Std. Error	Wald	Df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)
								Lower Bound Upper Bound
no	Intercept	.507	.589	.741	1	.389		
	CES_D score	-.079	.023	11.526	1	.001	.924	.882 .967
	ABS score	-.048	.020	5.561	1	.018	.953	.915 .992
	Perceived availability index	-.016	.006	6.578	1	.010	.984	.972 .996
	Index of parental monitoring	.050	.030	2.712	1	.100	1.051	.991 1.115
	[nominated_users=.00]	2.132	.229	86.987	1	.000	8.432	5.387 13.197
	[nominated_users=1.00]	0 ^b	.	.	0	.	.	.
	[LYPalcohol=.00]	.943	.250	14.229	1	.000	2.568	1.573 4.191
	[LYPalcohol=1.00]	0 ^b	.	.	0	.	.	.
	[LYPcigs=.00]	.845	.263	10.311	1	.001	2.327	1.390 3.897
	[LYPcigs=1.00]	0 ^b	.	.	0	.	.	.

a. The reference category is: yes.
b. This parameter is set to zero because it is redundant.
Nominated_users: 0: didn't report any drug-using friends, 1: reported at least one drug using friend
LYPalcohol: 0: didn't use alcohol in the last year, 1: used alcohol at least once in the last year
LYPcigs: 0: didn't smoke cigarettes in the last year, 1: smoked cigarettes at least once in the last year



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