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Substance use among sportive adolescents in the French-speaking part of Switzerland

Richard E Bélanger, MD¹

Fabien Ohl, PhD²

André Berchtold, PhD¹

Vanessa Lentillon-Kaestner, PhD²

Joan-Carles Suris, MD, PhD¹

¹*Groupe de recherche sur la santé des adolescents
Institut universitaire de médecine sociale et préventive
Centre hospitalier universitaire vaudois et Université de Lausanne*

²*Institut des sciences du sport de l'Université de Lausanne
Université de Lausanne*

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CH-2532 Macolin
Suisse

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Institutions' contact addresses:

Groupe de recherche sur la santé des adolescents
Institut universitaire de médecine sociale et préventive
Biopôle 1 / Route de la Corniche 2
CH-1066 Epalinges
Suisse
Tél. : +41 (0)21 314 73 75
Fax : +41 (0)21 314 73 73

Institut des sciences du sport de l'Université de Lausanne
Université de Lausanne
Centre Administratif de Vidy
CH-1015 Lausanne
Suisse
Tél. : +41 (0)21 692 32 98
Fax : +41 (0)21 692 32 93

Introduction

Sports participation is associated with multiple positive health behaviors(1) and with the adoption of a healthy lifestyle(2) that have beneficial effects in adulthood(3;4). Longitudinal studies(5;6) indicate that attitudes formed in childhood and adolescence influence adult physical activity behavior, and that changes in physical activity between adolescence and adulthood predict the risk of adult overweight(7). Similarly, they also show that the greatest decline in both the weekly time spent in physical activity and the total amount of it takes place during adolescence(8).

It has been found that athletic adolescents exhibit healthier dietary behaviors(9;10), are less likely to report health problems(2;9;11;12), show a superior well-being and are more likely to be confident in their future health(2;11). Similarly, athletic adolescents are more likely to be well adjusted, being less likely to be anxious, nervous or to report a past suicidal ideation(1;11), to feel hopeless(13) or depressed(14). They are more likely to be full of energy and happy about their life(11), and to report a better body image(2;11;12).

For all these reasons, adults in general and parents in particular believe that sports practice is a protective factor against risky behaviors such as substance use among adolescents. However, the evidence reported in the literature is inconclusive.

Prevalence of substance use among young athletes

A Greek study among 11-16 year-olds found that athletes were less likely to smoke but found no differences in having tried cannabis or ecstasy(15). Several American studies(1;13) reported that young athletes were less likely to smoke and use cannabis, but that there were no differences for alcohol use or binge drinking. Moreover, Kulig et al.(16) stated that the only difference for males practicing sports was that those in a team were less likely to use other drugs than those not involved in a team. They found no differences for tobacco, alcohol or cannabis use. Among females, they were less likely to use tobacco or cannabis but no differences for the other substances studied were found. Among middle-school students (aged 12-14 years), those practicing sports were significantly more likely to use alcohol and to experiment with cigarettes, cocaine or inhalants, while there were no differences for current use of tobacco or cannabis(17). In France, Arvers and Choquet(18) concluded that moderate sport practice (1-8 hours per week) was protective against tobacco and cannabis use but not against alcohol use and misuse. However, practicing more than 8 hours per week was a risk factor for alcohol and illicit drug use for both genders and for alcohol misuse, smoking and non-prescribed sleeping pills and anxyolitics use for females. School-sponsored male-dominated sports seem to be associated to an increased risk for substance use among males, while out-of-school mixed gender sports seem to be a risk for females(10). A study among elite athletes in France found that the use of tobacco, alcohol and cannabis was lower among them than among adolescents not practicing sports, although being in a team sport was positively correlated with alcohol use for both genders while practicing a sliding sport was correlated to cannabis use among girls and alcohol use among boys. Furthermore, girls competing at the international level were more prone to smoke and use cannabis(19). Other studies(20) among elite sportspeople also found that they were more likely to misuse alcohol.

At the Swiss level, a study(21) found that higher levels of sportive activity were related to higher levels of substance use. A Swiss national survey carried out in 1993 found that adolescents practicing sports twice a week or more were significantly less likely to smoke, drink and use cannabis(11), but a more recent one carried out in 2002 found that female students and male apprentices practicing sport twice a week or more were less likely to smoke and that female apprentices were less likely to misuse alcohol, but no differences were found for current cannabis use(22).

Performance-enhancing substances

On the other hand, drug use by athletes to improve performance is not a new practice. Even though most studies on doping to date relate to older elite athletes(23-28), research indicates that it happens at a younger age(29). Moreover, anabolic steroids seem to be used by athletes and non athletes alike(30), as the demand for performance-enhancing drugs has been created by our societal fixation on winning and physical appearance(31).

Additionally, the message being sent by many sports idols today, society's emphasis on sport, and economic factors contribute to young people's using drugs to succeed in sports(29). For example, even though the great majority of the Swiss population (84%) consider as doping a serious threat to health and sport, very few parents would hold back their children from sports because of the risks of doping(32) and 7% of youngsters aged 8-18 years in France approve doping(33). The perception of widespread drug misuse is a continued pressure on athletes and a dangerous message to young athletes who believe that drug-taking has become a necessary part of the route to sporting success(34).

But doping is not limited to elite athletes. There is evidence indicating that doping is widespread as it also affects amateur athletes and adolescents(24;35;36). Several US-based studies(1;13;37-39) found that 4-6% of adolescent males and 1-3% of adolescent females had ever used steroids, without differences between those who participated in school teams and those who did not(1). Moreover, data on middle-school students (aged 9 to 13 years) published in the mid nineties indicated that around 3% of them reported ever using steroids(40). More recent data reported annual prevalence of 8% and 6% for middle-school males and females, respectively, these prevalence being higher than for high-school students(41). For those in grades 6-8th, there were no differences in steroid use prevalence between sports-participants (4.3%) and non-sports participants (3.5%)(17). Among males, rates as high as 6.6% have been reported(42). However, the trends seem to indicate a decrease in recent years(43;44).

In Europe, a French study among high-school students(45) found that 5% of boys and 2% of girls had ever tried doping agents, while among athletes competing at least at the regional level it increased to 5.6% and 2.6%, respectively(46). Another French study(35) excluding high-level athletes found similar rates both for males (4.8%) and for females (2.3%). A Swedish one(47) reported a lifetime use of 2.7% for males and 0.4% for girls. The only Swiss study to date performed among male recruits in the early nineties reported a prevalence of 1%(48).

Overall, the use of doping agents is more frequent among boys(39;41;46), increases slightly with age(43;45), with the hours of practice per week(45;46), among those competing at higher level and among those who judge their performance "not at all satisfactory"(46).

Nutritional supplements

There is a positive relationship between the use of anabolic steroids and nutritional supplements(45;49) that can be purchased legally at any health store(29). Nutritional supplements are also used to increase strength, with annual rates of 20% among high school students(50). Bell et al.(51) inform that slightly over 40% of 13-19 year-old males and females currently use multivitamin/minerals preparations. However, creatine is more frequently used by males (7.7%) than females (2.2%), while only males use androsterone (1.7%). As for illegal substances, creatine use increases with age and level of physical activity. It is the most commonly used supplement by adolescents(50) both to enhance performance and to improve appearance. Research based on students in New York indicates an overall use rate of 6%, ranging from 3% in grade 6th to 44% in grade 12th, also being more common among boys than girls(52). Other studies(45) have found creatine use rates of 6% and 2% and vitamin use rates of 34% and 51% for males and females, respectively. On the other side, the contents of dietary complements are often not clearly mentioned and they can contain drugs considered as doping agents(53).

Clustering of substance use among athletes

Research indicates that adolescents using doping agents also use other substances (both legal and illegal) indicating that, apart from its use for sports performance or to enhance appearance, it has much in common with the use of other substances(37;39;41;45;47;54). Lorente et al.(55) indicate that cannabis is used by French sport students both to enhance sportive as well non-sportive performances, and that its use was positively related to competitive level and to sliding sports. Moreover, there is evidence indicating that the frequency of steroid use is associated with other high-risk behaviors(38;41) and that certain problem behaviors (such as fighting, substance use and sexual risk) are better predictors of steroid use than physical activity(56). Kindlundh et al.(57) report that anabolic-androgenic steroids users present characteristic social, personality and health traits. Nevertheless, Dodge et al.(49) concluded that there was not a cluster of problem behaviors among users of legal or illegal performance-enhancing substances by age 21. However, there is evidence that those using doping agents are significantly more likely to use other substances as well(39;41;45).

Objectives

The main objectives of this study were:

1. To compare the prevalence of use of psychoactive (both legal and illegal) and performance-enhancing/doping substances between youth aged 16-20 years practicing sports and those not practicing sports in the French-speaking part of Switzerland.

We hypothesized that, probably with the exception of tobacco that is considered as negative for sports performance, the prevalence of substance use among sportive adolescents will be similar to the one reported by sedentary youth.

2. To compare the characteristics of sports practicing youth who use psychoactive and/or doping substances with those who do not.

We hypothesized that substance use would vary depending on the amount of sports practice following a U-curve, where those practicing less sports and those in higher competitive levels would be more likely to consume, although this pattern would be substance-dependent. We also hypothesized that substance use would be higher among males and among those in team sports.

3. To assess whether the use of psychoactive substances is associated to the use of doping substances.

We hypothesized that the use of doping substances is part of a larger cluster of substance use.

4. To describe the reasons why sedentary adolescents do not practice sports and whether there is an association between being currently sedentary and substance use.

We hypothesized that youth using substances were more likely to abandon sports practice.

Methodology

Approved by the Ethics Committee of the University of Lausanne's School of Medicine, this study assessed the use of psychoactive and performance-enhancing substances of both sportive (further referred as SA) and non sportive adolescents (further referred as NSA) aged 16-20 years in the French-speaking part of Switzerland. Using several recruiting methods, adolescents were invited to answer an anonymous online questionnaire about substance use where their personal and sportive characteristics were also inquired. Data were further weighted before analysis.

The questionnaire

The questionnaire was web-based and took at most 20 minutes to fill out. This method was chosen because evidence indicates that Internet-administered questionnaires show similar or even better results than mailed paper and pencil questionnaires(58-60), that they receive more favorable evaluations(58), that their respondents are less likely to give socially desirable answers(61) and more likely to report risk behaviors(60), and that they require less follow-up to achieve higher completion rates(59). In addition, such survey design offers that only required questions have to be answered by participants, based on their answers, limiting the total amount of time needed for completion. All questions were based on pre-existing validated questionnaires. The final questionnaire was pilot tested with a group of SA and NSA to guarantee its understanding (see [Annex 1](#) for the complete version of the questionnaire).

Defining psychoactive and performance-enhancing substances

Psychoactive substances included in our research were tobacco, alcohol, cannabis and other illegal substances such as cocaine, crack, ecstasy or speed. Only cigarette use was assessed for tobacco and drunkenness episodes for alcohol misuse. For cannabis and other illegal psychoactive substances, both current (last 30 days) and lifetime use were inquired.

The quest for a unique and accepted definition of doping was one of the reasons why the World Anti-Doping Agency (WADA) was established in 1999. Although the comprehensive WADA definition includes the presence of prohibited substances, but also other items such as trafficking, possession of doping substances, tampering doping control, and genetic alteration, it has of course been our reference(62). As we focused our attention only on the consumption of substances, doping was therefore limited to the wish of enhancing performance while using prohibited products that were on the 2009 WADA list(63). In addition, because several legal substances, from nutritional supplements to painkillers, are also used to enhance sports performance, various sorts of ordinary pharmacology consumption have also been analyzed.

Recruitment

To recruit a sample where both NSA and SA from different sports type and context had to be represented, several techniques were used over a 10 months period.

First, SA were recruited from team and individual sports clubs and associations in the French-speaking part of Switzerland. Each potential sportive participant received a sealed envelope containing a letter explaining the study and a password to access the web-based questionnaire. It also included a second sealed envelope containing another password for a matched partner, as SA were asked to recruit a non sportive friend of the same age and gender. Envelopes were distributed by students in sport sciences from the universities of Lausanne, Geneva, Fribourg and Neuchatel. Before becoming our collaborators, these students were met by the research team to

review with them the study protocol and objectives. As a result, 80 collaborators distributed a total of 1355 envelopes to SA during a five months period (February to June 2009). From these, out of 2 possible participants per envelope, 513 were used by at least one adolescent (37.9%), with a total 283 pairs created (220 being paired sportive and non sportive friends). Overall, even if we were not able to control the distribution of envelopes to non sportive friends, a total of 803 questionnaires, out of 2710 existing passwords, were completed (29.6%).

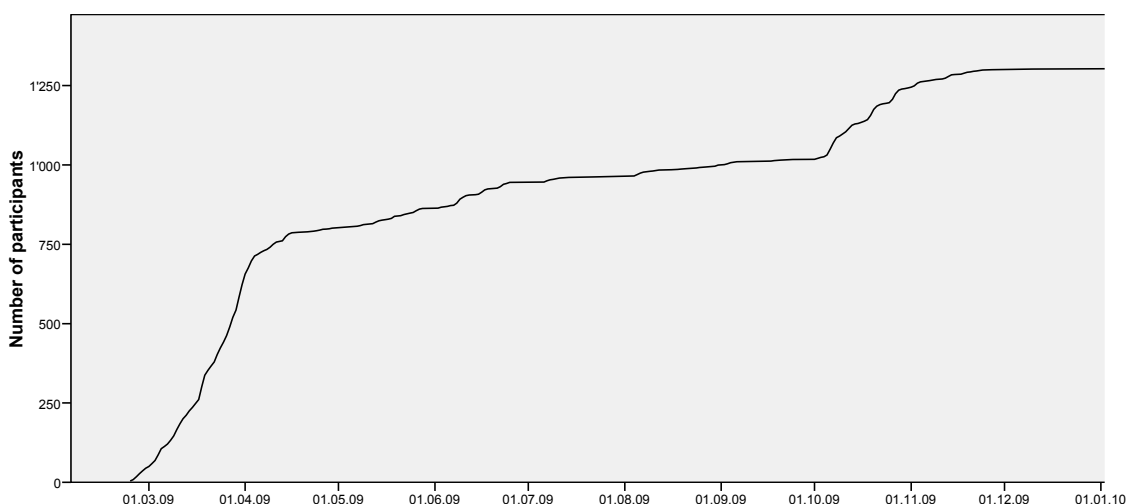
In addition, 23 recruiters were offered to collect electronic addresses of informed SA willing to participate. Each of those potential participants further received up to 3 messages explaining the study and inviting them with a unique password to access the web-based questionnaire. In the sent messages, both the name of the recruiter and identification of the study were cited in the email heading. Furthermore, SA recruited by that method were also asked to recruit a non sportive friend of the same age and gender. From May to June 2009, electronic messages were sent to 294 valid email addresses and 144 questionnaires were completed (response rate of 49.0%).

As of May 2009, nearly 900 sportive officials in the French-speaking part of Switzerland were contacted electronically twice to offer SA within their clubs or associations the opportunity to answer our survey. The proposed options were either an information visit by our research team, or to provide the electronic addresses of SA within their organization willing to participate. In addition to information about the research, a unique password and the identification of the sportive leader having referred them were included in sent electronic messages. Those adolescents were contacted no more than 3 times for participation. Participants having answered the questionnaire and willing to be further contacted for research purposes were also offered the opportunity to refer either sportive or non sportive friends. From a total of 642 valid email addresses, 276 questionnaires were completed (response rate of 43.0%).

Finally, some adolescents were directly forwarded to the online questionnaire via the GRSA's Facebook® page where research information had been posted, as well as by sportive leaders or friends (total of 37 participants). Additionally, 849 adolescents below 21 years old having their age and area of residence specified on their MySpace® page were invited at most 3 times to participate to our survey. Only 43 adolescents were recruited by this method (response rate 5.1%).

To thank them, all participants were included in one of two prize draws where a total of 300 gifts cards (25.- CHF each) were given.

Figure 1. Number of participants during the recruitment period



Consequently, from February 23rd 2009 to January 3rd 2010, a total of 1303 online questionnaires were completed. Among those, 56 were excluded from further analysis: 13 because participants did register but specified in the consent page that they did not want to answer the questionnaire, 16 because they did not live in the French-speaking part of Switzerland (3 from France, 11 from Ticino, 1 from Zurich, and 1 from an unknown

location), 1 because of his age, 3 because of obvious duplication in questionnaires, 1 for incomplete data, and 23 because questionnaires had been incorrectly filled. Therefore, all analyses were based on 1247 valid questionnaires.

Sample weighting procedure

Our sample being a convenience one, its socio-demographic characteristics did not entirely match those of the whole adolescent population living in the French-speaking part of Switzerland. Since we wanted to be able to draw conclusions regarding the whole population, we had then to rectify the sample through a weighting procedure. Five socio-demographic characteristics were used for that purpose: age, gender, academic track, as well as canton and place of residence. After weighting, 1247 subjects were available for statistical analyses. Details of the weighting procedure are provided in *Annex 2*.

Statistical analysis

Uni-, bi-, and multivariate statistical methods were applied on weighted data to answer the four research questions. Univariate tools included the computation of means, proportions, and frequency distributions. Bivariate methods included the computation of crosstables and of chi-square and ANOVA tests. Finally, logistic regressions were used as the main multivariate method. Analyses were mainly performed by sportive status (SA vs. NSA), sports type (individual or team, a list can be found in *Annex 3*) or context (competitive vs. leisure). STATA version 10.1 was used for statistical computations. Differences were identified as significant when $p < 0.05$.

Results: Characteristics of the sample

Sociodemographic characteristics

Analyses were performed on a weighted sample of 1247 participants (632 males; 50.7%). As seen in [Table 1](#), all 7 surveyed cantons where French-speaking families are in significant number were represented. More than one third of adolescents reported living in the canton of Vaud, while 22.7% came from the canton of Geneva and 11.1% from Valais. As the number of French-speaking families is lower in some areas, only 3.0% of the total sample came from the Canton of Bern.

Globally, the mean age of the adolescents surveyed was 18 years with no differences according to gender or canton of residence. Of all the adolescents, 92.0% were born in Switzerland. Yet, non-Swiss born participants had lived a large part of their adolescence in Switzerland (mean: 9.5 years [95%CI: 7.0-12.0]). Students represented 45.6% of the total sample.

Regarding place of residence, 52.8% were living in a rural setting. One adolescent out of nine reported having a chronic condition lasting at least 12 months that may necessitate regular medical care. Concerning family status, 71.2% of adolescents lived with both parents and 63.4% reported a high socioeconomic status.

Table 1. Canton of residence

| Canton | n | Proportion |
|-----------|------|------------|
| Vaud | 493 | 39.5% |
| Geneva | 283 | 22.7% |
| Valais | 138 | 11.1% |
| Fribourg | 127 | 10.2% |
| Neuchatel | 118 | 9.4% |
| Jura | 51 | 4.1% |
| Bern | 37 | 3.0% |
| Total | 1247 | 100% |

Table 2. Characteristics of participants according to sportive status

| Characteristics | SA (n=894) [95%CI] | NSA (n=353) [95%CI] | Total (n=1247) [95%CI] |
|------------------------------|-----------------------|------------------------|---------------------------|
| Age - mean | 17.8 [17.7-18.0] | 18.3 [18.0-18.7] | 18.0 [17.8-18.1] |
| Gender - male | 52.7% [47.8-57.6] | 45.6% [35.3-56.3] | 50.7% [46.1-55.3] |
| Place of birth - Switzerland | 93.9% [91.3-95.8] | 87.2% [72.2-94.7] | 92.0% [87.7-94.9] |
| Academic track - student | 49.4% [44.5-54.4] | 36.0% [28.4-44.3] | 45.6% [41.3-50.0] |
| Residence - rural | 56.1% [51.2-60.8] | 44.6% [34.8-55.0] | 52.8% [48.2-57.4] |
| Chronic condition - yes | 8.9% [6.3-12.4] | 16.0% [7.2-31.8] | 10.9% [7.4-15.8] |
| Family - parents together | 73.7% [68.6-78.1] | 65.0% [53.3-75.2] | 71.2% [66.3-75.7] |
| Socioeconomic status - high | 62.3% [57.5-67.9] | 64.9% [55.4-73.3] | 63.4% [58.8-67.9] |

Sportive activities

A total of 353 adolescents reported not being involved in any sport (NSA; 28.3%) and 894 practiced at least one sportive activity (SA; 71.7%). As seen in [Table 2](#), these two groups significantly differed on mean age and residence, with SA being significantly younger (17.8 vs. 18.3; $p < 0.001$) and more likely to live in a rural setting (56.1% vs. 44.6%; $p < 0.05$). More SA were also following a student academic track (49.4% vs. 36.0%; $p < 0.01$).

Regarding sports type, the main sportive activities reported by SA were identified as either practiced individually ($n=495$; 55.3%) or in team ($n=399$; 44.7%) ([Table 3](#)). A greater proportion of adolescent males was found among team sports compared to individual ones (67.4% vs. 40.8%; $p < 0.001$). Concerning the context of their main sportive activities, 583 SA (65.3%) reported competition and 311 (34.7%) leisure. Males were found in higher

number in a competitive context (75.0% vs. 54.4%; $p<0.001$), as were those being students (53.1% vs. 42.6%; $p<0.05$), or those reporting a high socioeconomic status (68.0% vs. 53.2%; $p<0.01$).

Overall, the vast majority (82.8%) of SA performing team sports also reported a competitive sportive context. On the other hand, similar numbers of SA practicing individual sportive activities reported competition (51.1%) or leisure (48.9%) sports contexts.

Table 3. Characteristics of sportive participants according to sports type

| Characteristics | Team sports (n=399) [95%CI] | Individual sports (n=495) [95%CI] |
|------------------------------|--------------------------------|--------------------------------------|
| Age - mean | 17.7 [17.5-17.9] | 17.9 [17.7-18.1] |
| Gender - male | 67.4% [60.6-73.5] | 40.8% [34.4-47.6] |
| Place of birth - Switzerland | 93.5% [89.9-95.9] | 94.2% [90.0-96.8] |
| Academic track - student | 47.1% [39.9-54.5] | 51.3% [44.6-57.9] |
| Residence - rural | 53.0% [45.5-60.4] | 58.5% [52.1-64.6] |
| Chronic condition - yes | 8.3% [5.0-13.5] | 9.4% [5.9-14.6] |
| Family - parents together | 73.6% [65.1-80.6] | 73.7% [67.4-79.2] |
| Socioeconomic status - high | 63.9% [55.6-71.4] | 62.1% [55.0-68.7] |

Results : Psychoactive substances

Tobacco

Tobacco is still the leading cause of preventable death in the world(64). Its long term consumption has several adverse consequences on health. Short term effects such as respiratory problems are also present and may decrease the sportive performance of athletes.

As seen in *Figure 2*, adolescents practicing sports differed significantly ($p < 0.001$) from their non sportive peers regarding current tobacco use: NSA were twice more likely to be daily smokers than SA (9.4% vs 4.7%) and almost three times more likely to be weekly smokers (18.7% vs. 6.5%).

Among daily smokers, SA and NSA barely differed on the number of cigarettes smoked, with a mean near 10 cigarettes per day. On the other hand, non sportive weekly smokers reported higher number of cigarettes smoked per week with a mean of 12, compared to SA with 8 ($p < 0.05$). Both sportive and non sportive respondents in our survey started to smoke around 15 years of age.

No significant difference was found on the smoking status of SA whether their principal sport was practiced in a team or individually (respectively 9.9% and 12.3%) (*Figure 3*). However, more smokers were found among adolescents practicing sports in a leisure context (18.5%), than among those reporting competition (7.4%; $p < 0.001$). It is worth noting that the lowest prevalence of daily smokers was found among competitive SA (3.4%).

Figure 2. Smoking in the last month according to sportive status

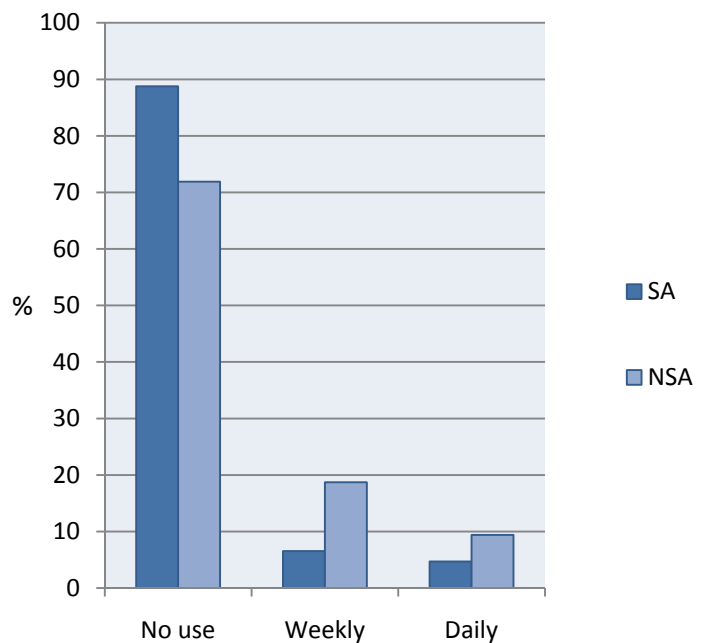
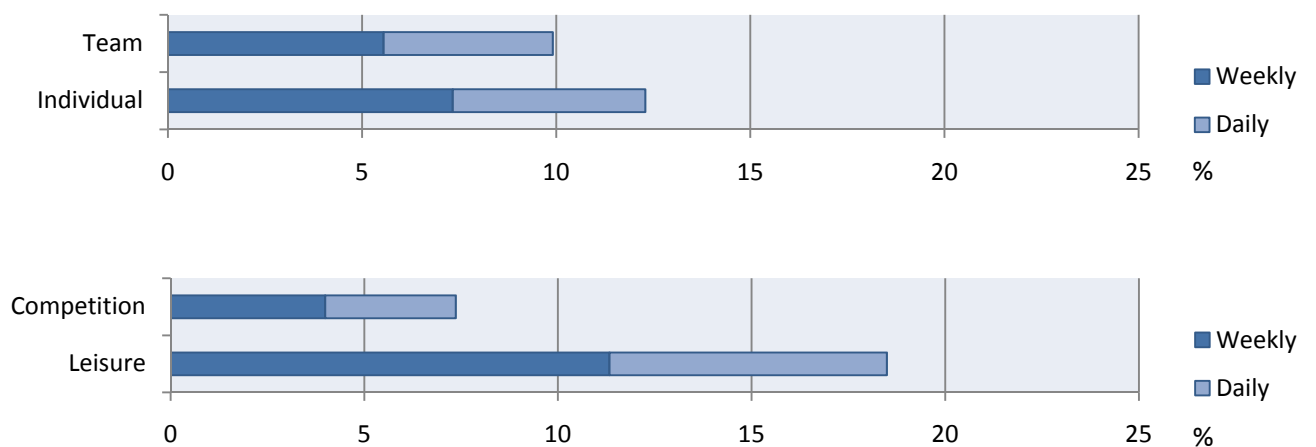


Figure 3. Smoking in the last month according to sports type and context



Alcohol

Alcohol is usually the first used substance during adolescence. Research demonstrates that nearly all school students in developed countries report some experience with alcohol before the completion of mandatory school(65). Although its use is socially accepted, alcohol misuse can have important health consequences.

Globally, SA and NSA reports were quite similar for the presence of drunkenness episodes in the 30 days preceding the survey (Figure 4). In fact, more than a third reported at least one drunkenness episode in the last month (41.1% for NSA and 35.3% for SA). Yet, even if both reported similar rates for one or two episodes, NSA reported frequent episodes of drunkenness (3 times or more) in a higher proportion than their sportive peers (10.1% vs. 6.0%)

SA practicing team sports significantly differed from their individual sportive peers, reporting more often at least one recent drunkenness episode (41.1% vs. 30.7%; $p < 0.05$) (Figure 5). Moreover, the proportion of adolescents practicing team sports and reporting frequent last month drunkenness episodes was nearly three times higher than what was found among those practicing individual ones (respectively 9.0% and 3.5%; $p < 0.01$).

No significant differences regarding either occasional or frequent drunkenness episodes were found according to sports context, even though it was slightly higher among those practicing as a leisure.

Figure 4. Drunkenness episodes in the last month according to sportive status

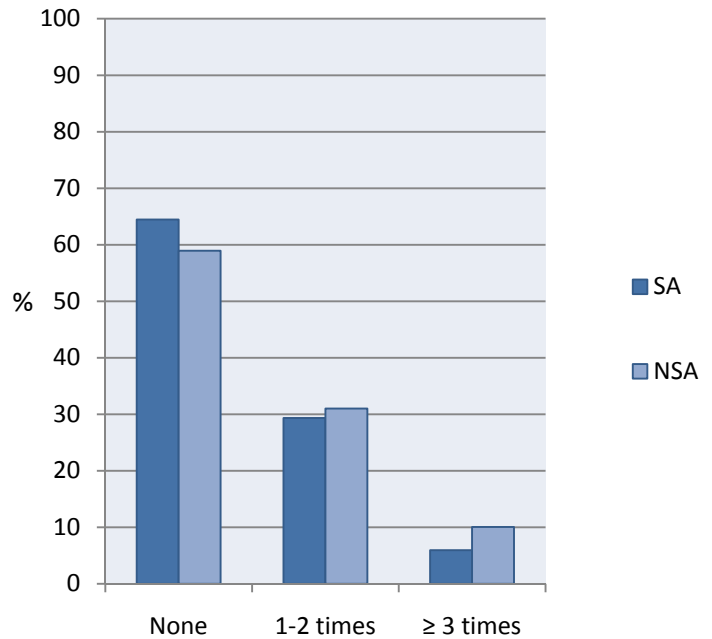
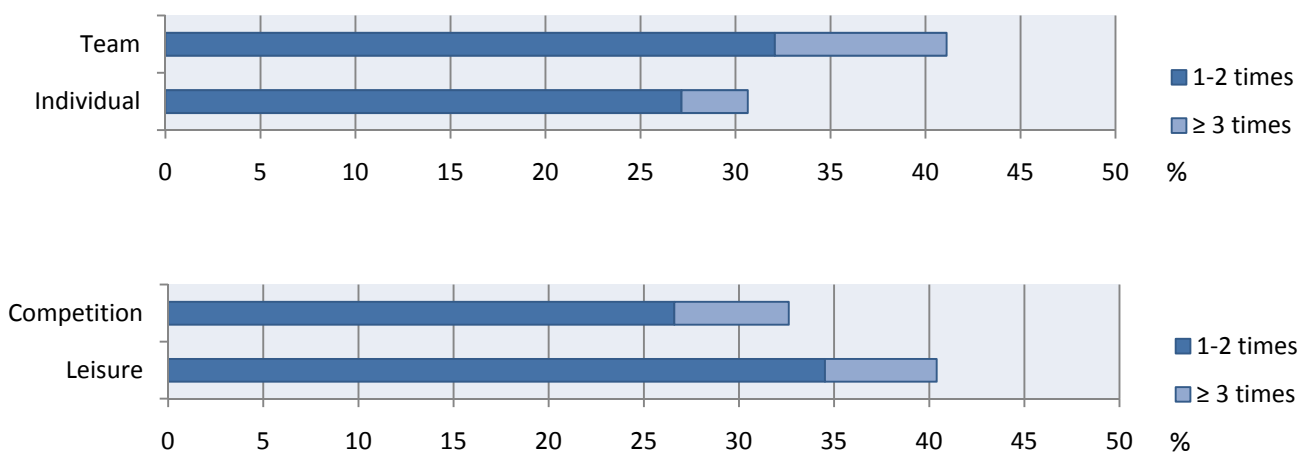


Figure 5. Drunkenness episodes in the last month according to sports type and context



Cannabis

Cannabis is the most frequently used illegal drug. Upmost, its use among adolescents living in Switzerland is one of the highest of all European countries(66).

One third of adolescents in our sample reported ever having used cannabis, independently of their sportive status. SA and NSA both reported having tried cannabis for the first time around age 15. No difference in lifetime cannabis use was seen between adolescents practicing sports either in a team or individually. However, 45.1% of those practicing sports as a leisure reported having used cannabis at least once in their lifetime, significantly more than among those in competition (30.7%; $p < 0.01$).

Regarding current use, as seen in *Figure 6*, 11.3% of SA reported having used cannabis during the last month, significantly less than 21.7% of those not practicing sports ($p < 0.01$). It is worth noting that 6.5% of all adolescents who practiced sports had used cannabis once or twice in the last month, and 4.8% 3 times or more. No difference in reported last month use rates was seen between adolescents practicing individual or team sports (*Figure 7*). On the other hand, 18.5% of SA involved in sports as a leisure had used cannabis in the last month, more than twice the rate seen among those in competition (7.5%; $p < 0.001$).

Figure 6. Cannabis use in the last month according to sportive status

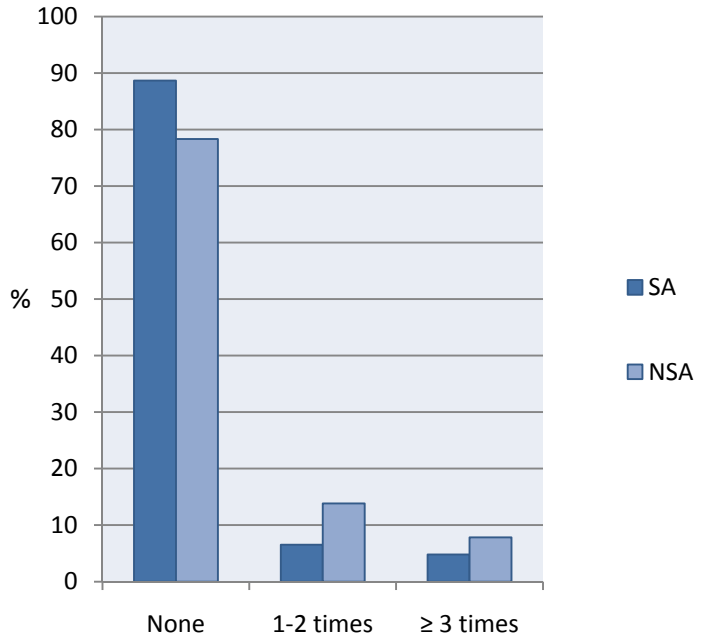
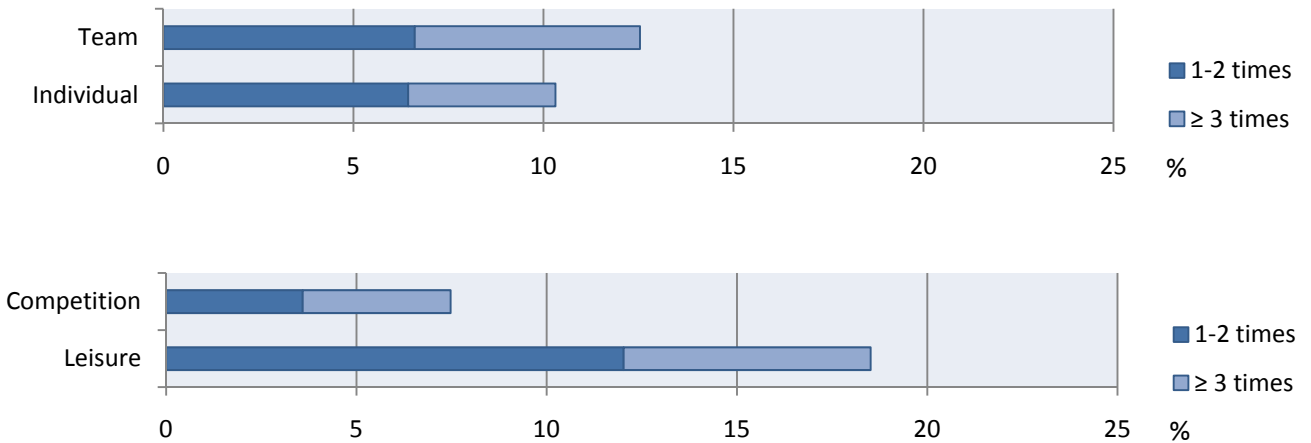


Figure 7. Cannabis use in the last month according to sports type and context



Other illegal psychoactive substances

Cocaine, ecstasy, amphetamines, inhalants and LSD all account for the other psychoactive illegal substances most frequently tried by adolescents in Switzerland(67). Unfortunately, for some adolescents, such experimentation can result in regular use and further addiction.

As seen in *Table 4*, some adolescents in our sample reported having used illegal psychoactive substances other than cannabis in their lifetime. Accordingly, 2.2% of SA and 8.0% of NSA reported so, more than a threefold difference ($p=0.001$). Only 0.9% of SA reported having used cocaine or crack at least once in their lifetime, and 1.0% either ecstasy, speed or other stimulants. In comparison, respectively 5.0% and 5.1% of NSA reported so. SA did not differ on lifetime use of illegal psychoactive substances other than cannabis when compared by sports type or context. Of those not practicing sports, 3.7% reported using illegal psychoactive substances other than cannabis in the previous month. In comparison, only 8 (0.9%) reported the same behavior among the near 900 SA surveyed ($p<0.05$).

Table 4. Use of illegal psychoactive substances other than cannabis according to sportive status

| | SA (n=894) n (%) | NSA (n=353) n (%) | p |
|------------------------------------|---------------------|----------------------|-------|
| Lifetime use | | | |
| Any substances other than cannabis | 20 (2.2%) | 28 (8.0%) | 0.001 |
| Cocaine or crack | 8 (0.9%) | 18 (5.0%) | 0.001 |
| Ecstasy, speed, other stimulants | 9 (1.0%) | 18 (5.1%) | 0.001 |
| Other illegal drugs | 10 (1.2%) | 16 (4.4%) | 0.021 |
| Last month use | | | |
| Any substances other than cannabis | 8 (0.9%) | 13 (3.7%) | 0.019 |
| Cocaine or crack | 1 (0.2%) | 6 (1.7%) | 0.001 |
| Ecstasy, speed, other stimulants | 2 (0.2%) | 2 (0.6%) | 0.176 |
| Other illegal drugs | 6 (0.6%) | 8 (2.2%) | 0.153 |

Key findings – Psychoactive substances

- NSA smoke more than twice more often than their sportive peers. Among SA, those practicing mainly sports as a leisure seemed the most at risk with nearly one fifth of them smoking at least weekly. The lowest rate of daily smoking was found among adolescents in competitive sports.
- Drunkenness episodes are frequent among adolescents, whatever their sportive status. In fact, no significant difference was found between SA and NSA on the global number of drunkenness episodes in the last month. Those practicing team sports, as those in leisure practice, reported drunkenness episodes in higher proportions.
- One SA out of nine reported cannabis use in the month preceding the survey. This proportion is significantly lower than the one seen among NSA. Yet those practicing sports as a leisure have an almost similar use rate than NSA.
- Less common, the use of illegal psychoactive substances other than cannabis by SA is reported in lower proportion than for their non sportive peers, both for lifetime and last month use.

Results : Performance-enhancing substances

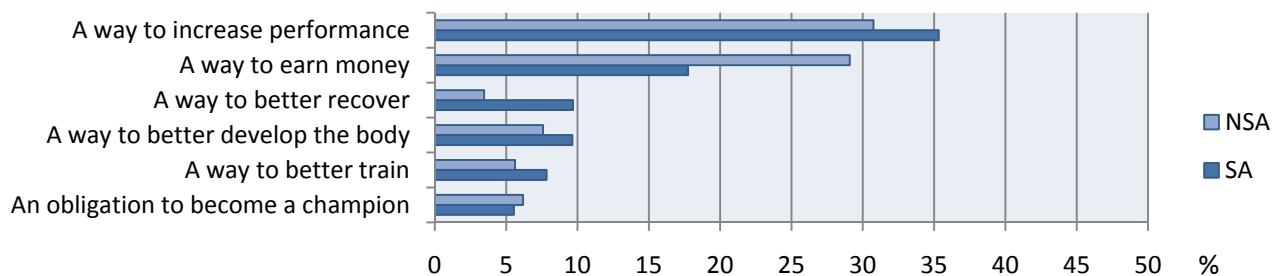
Equity is a fundamental sportive issue and a growing concern for modern societies. Despite public trials and suspensions of professional athletes, doping is reported as a frequent behavior among SA in some countries(41). More globally, a growing trend for excellence in sports, and performance in general, is seen with the large success of products marketed to provide energy or increase strength.

Representations of doping

Individuals using illegal substances or methods to enhance their sports performance undoubtedly perceive some benefits for doing so, even if they probably also know that adverse consequences are inherent to their use. In our survey, adolescents were inquired on several positive and negative statements regarding doping substances and asked to grade their level of agreement using a 4 point Likert scale ranging from totally disagree to totally agree. As a way to portray beliefs that may bring adolescents to use doping substances, only total agreement is reported here.

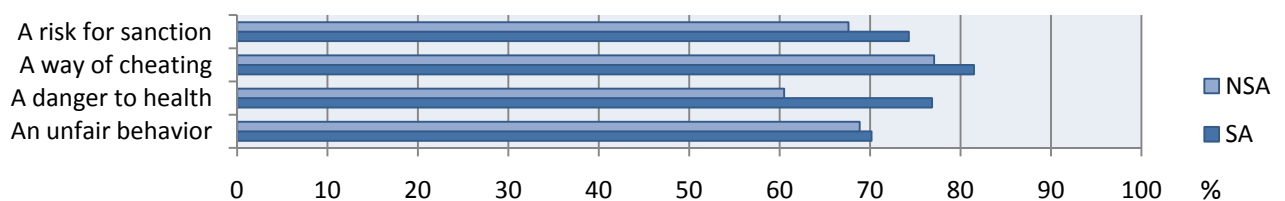
First, even if it is a minority of adolescents who agreed on statements depicting benefits from doping, one third (33.5%) fully viewed doping as a way to increase performance, without significant difference by sportive status (*Figure 8*). However, SA (18.8%) reported less frequently doping as a way to earn money compared to NSA (29.1%; $p<0.05$). Regardless of sportive status, the proportions of adolescents agreeing on the other benefits of doping were all below 10%. Yet, it is worth noting that one out of ten SA perceived doping as a way to better recover, significantly more than among NSA (3.5%; $p<0.01$) and to better develop their body. Utmost, 5.5% of SA and 6.2% of NSA saw doping as an obligation to become a champion.

Figure 8. Benefits of doping according to sportive status (totally agree)



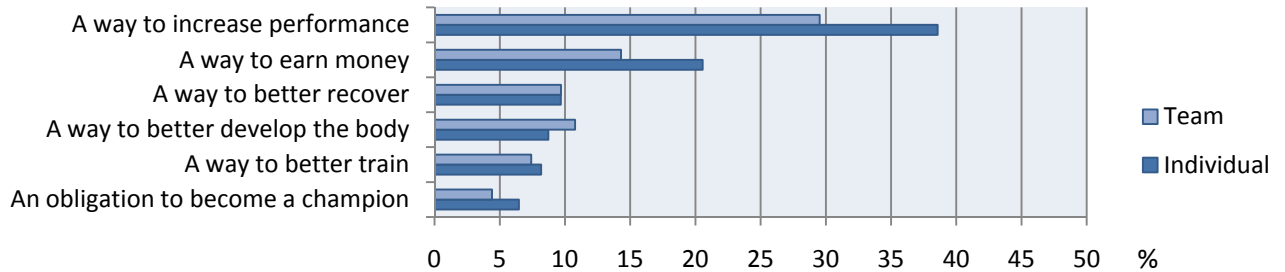
On the other hand, the majority of SA and NSA agreed on the 4 statements depicting adverse consequences of doping (*Figure 9*). More than two thirds of adolescents agreed that doping is an unfair behavior and a risk for sanction. As high as 81.5% reported it as a way of cheating. Significantly more SA saw doping as a danger to health (76.8%) compared to NSA (60.5%; $p<0.001$). No other significant differences were found on those statements according to sportive status.

Figure 9. Adverse consequences of doping according to sportive status (totally agree)



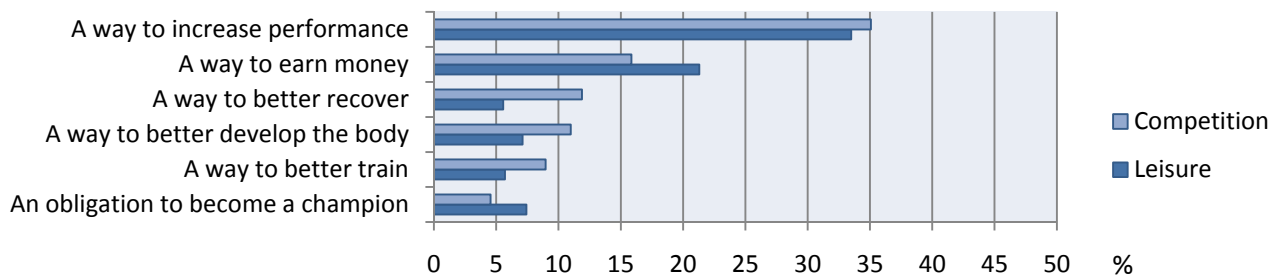
When only the perspective of SA was examined, opinions differed little according to sports type and context. Yet, it is worth noting that 38.6% of individual athletes agreed that using doping substances is a way to increase sports performance compared to 29.5% of those practicing team sports ($p=0.054$) and that 20.6% of those in individual sports reported doping as way to earn money (*Figure 10*).

Figure 10. Benefits from doping according to sports type (totally agree)



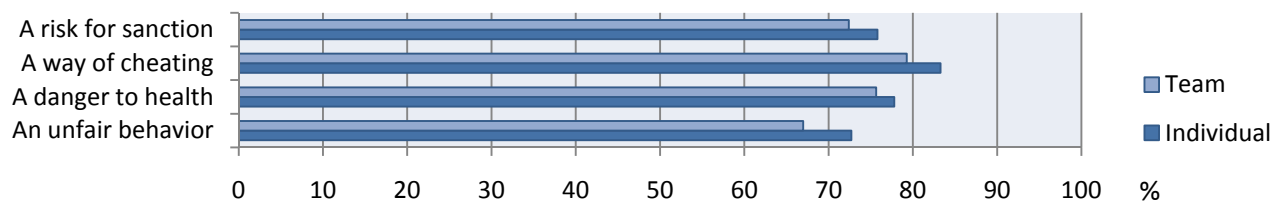
On the other hand, as seen in *Figure 11*, competitive SA significantly differed from leisure SA in reporting in higher proportion doping as a way to better recover (respectively 11.9% and 5.6%; $p<0.05$).

Figure 11. Benefits from doping according to sports context (totally agree)



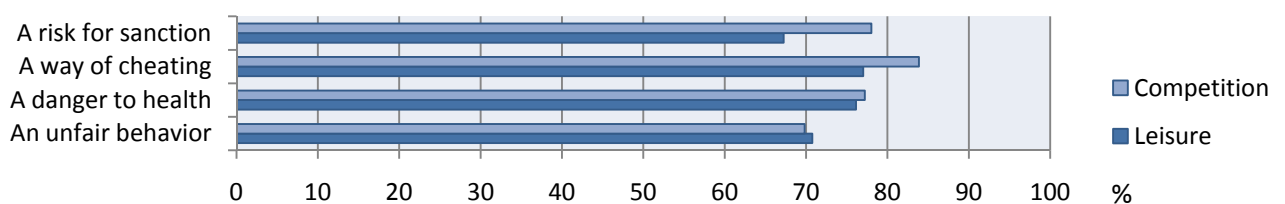
Regarding the adverse consequences from doping, the majority of adolescents in individual and team sports agreed on the four proposed statements, without significant differences between them (*Figure 12*).

Figure 12. Adverse consequences from doping according to sports type (totally agree)



However, as seen in *Figure 13*, significantly more competitive SA recognized doping as a risk for sanction (78.0%) compared to their peers in leisure sports (67.2%; $p<0.05$). Adolescents practicing sport in competition reported the highest proportion (83.9%) of agreement regarding doping as a way of cheating.

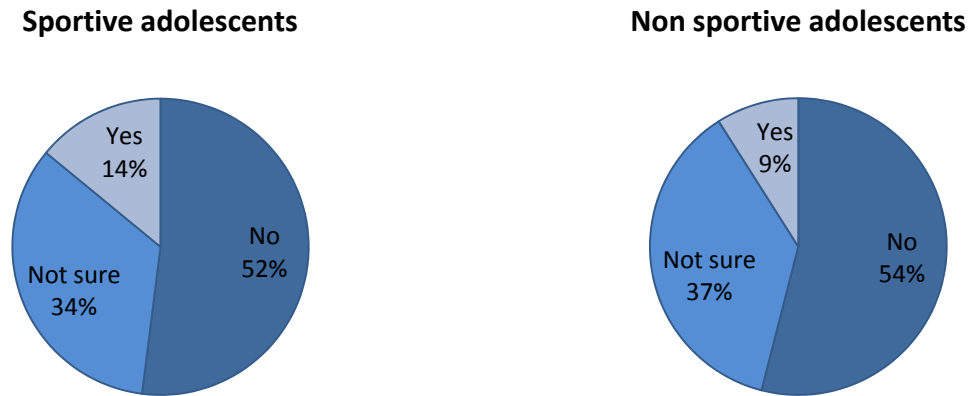
Figure 13. Adverse consequences from doping according to sports context (totally agree)



Are my friends using doping substances?

When asked whether their friends or people they knew used doping substances, SA and NSA had similar perceptions regarding non use (*Figure 14*). In fact, respectively 52.0% and 54.5% responded negatively when inquired. Even if more SA reported that their sportive peers were using doping substances (14% vs. 9%), it did not reach statistical significance. A sizeable proportion, one third of both groups, were not sure about such assumption. No significant differences on this issue were seen among SA according to sports type or context.

Figure 14. Proportions of adolescents reporting that their friends or people they knew used doping substances according to sportive status

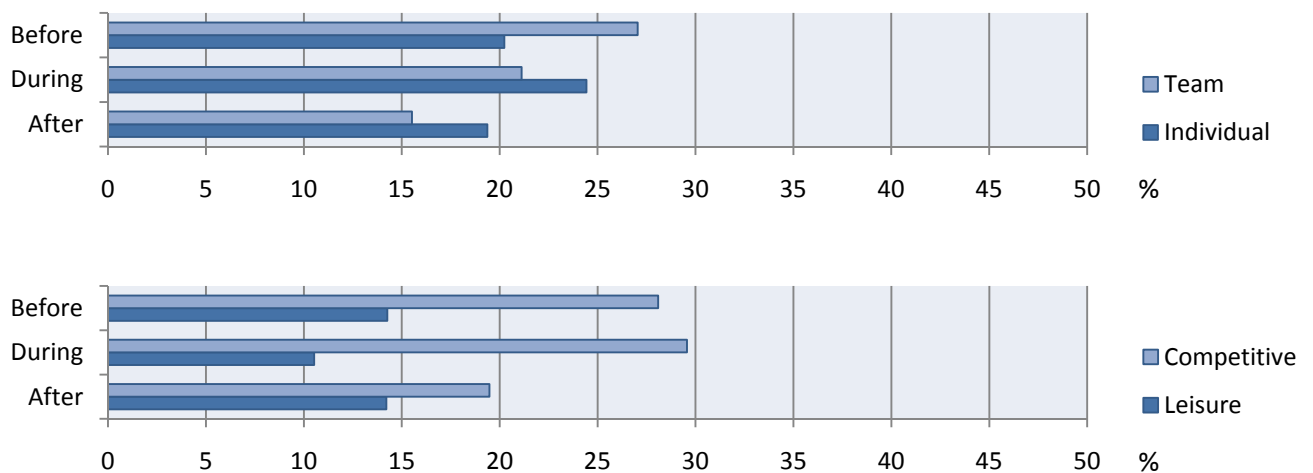


Substances used by sportive adolescents

When asked about the use of any product before, during or after their sportive activities, 34.0% of SA answered positively. This proportion increased to 41.1% among competitive SA, twice the rate of those practicing leisure sports (20.6%; $p < 0.001$).

Accordingly, 23.3% of SA reported taking products before their principal sportive activity, 23.0% during and 17.7% afterwards. As seen in *Figure 15*, competitive SA reported the highest rates of all (before: 28.1%, during: 29.6%, after 19.5%). Significant differences with proportions reported by peers practicing sports as leisure were however only seen for products used before (28.1% vs. 14.3%; $p < 0.05$) and during sportive activities (29.6% vs. 10.5%; $p = 0.001$). No significant differences were seen regarding sports type. Globally, most products reported by adolescents in open-questions were sports drinks and nutritional supplements.

Figure 15. Timing of adolescent's use of sport-related any product according to sports type and context



Substances used to enhance performance were also assessed using close-ended questions. We grouped 24 products or types of products in 7 categories for analysis (*Table 5*).

Overall, three-quarters (73.1%) of SA reported active use of at least one substance to enhance their performance. Among them, 24.4% reported regular use, 28.2% occasional use, and 20.5% seldom use.

Most importantly, as seen in *Figure 16*, 55.1% of SA were using caffeinated products as a way to enhance their performance. Among those caffeinated products, energy drinks were the most reported, with half of SA using them. No significant differences were found on their use according to sports type or context.

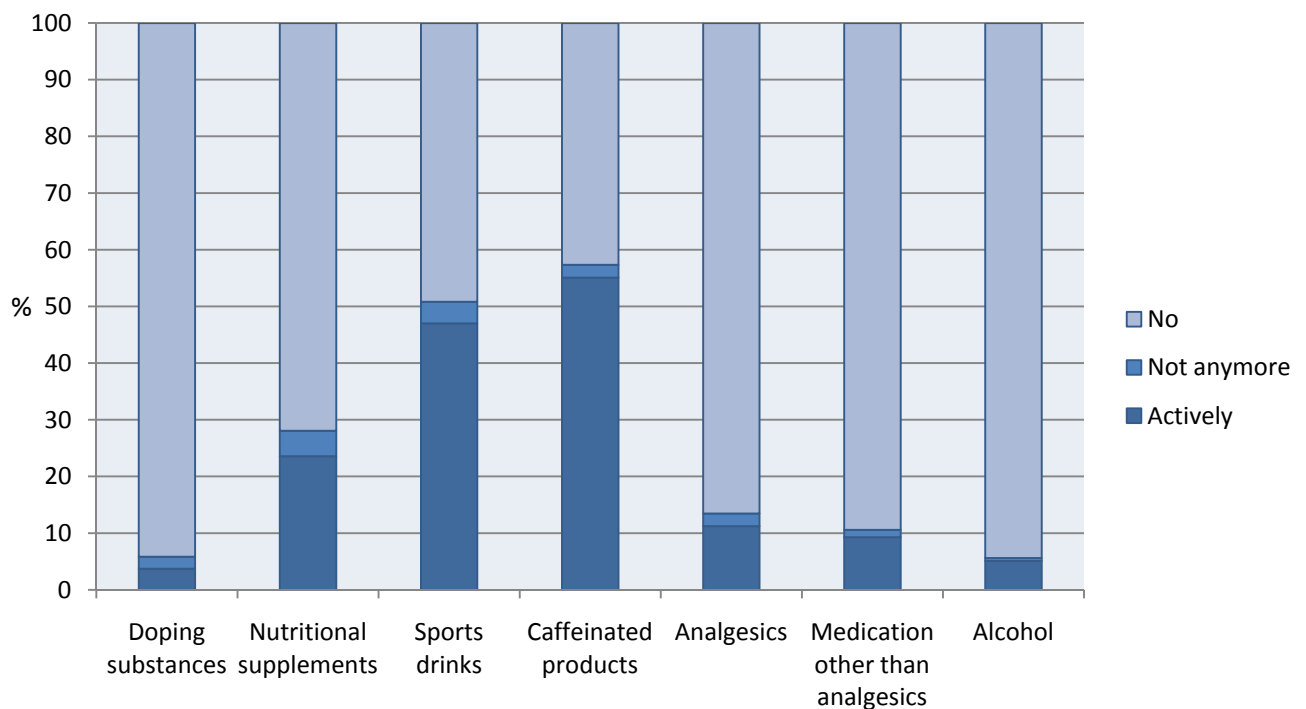
Current use of sports drinks (such as Gatorade®, Powerade® and Isostar®) was reported by nearly half of all SA (47.0%). Here, reports significantly differed according to sports type and context. In fact, more than half of SA involved in competition (54.5%) reported active use, compared to one third (33.0%) of those practicing sports as leisure ($p < 0.001$). Those practicing team sports also showed a higher rate of use (53.2%) than those in individual sports (42.1%; $p < 0.05$).

After caffeinated goods and sports drinks, nutritional supplements were the third highest reported used products. One quarter of SA reported active use of at least one of these substances. Among them, vitamin supplements were the most reported (20.7%). Adolescents practicing sports in competition used nutritional supplements twice more often than those reporting leisure sportive activities (28.4% vs. 14.7%; $p < 0.01$). No difference was found regarding practiced sports type. Nutritional supplements were also the category of substances with the highest percentage of adolescents reporting previous use but having stopped (4.5%).

Table 5.
Products inquired

- Doping substances**
 - Amphetamines
 - Beta-blockers
 - Cocaine
 - Diuretics
 - EPO
 - Growth hormone
 - Cannabis
 - Steroids
- Nutritional supplements**
 - Creatine
 - Mega-muscle type products
 - Other protein supplements
 - Vitamins supplements
- Sports drinks**
- Caffeinated products**
 - Energy drinks
 - Soft drinks
 - Coffee
 - Caffeine pills
- Analgesics**
 - Pills (aspirin, paracetamol, etc.)
 - Local anesthetics
- Medication other than analgesics**
 - Asthma inhalants
 - Allergy medication
 - Decongestants
 - Corticosteroids
- Alcohol**

Figure 16. Performance-enhancing substances used by SA



According to the 2009 WADA listing, the following three groups (analgesics, medications other than analgesics and alcohol) are either considered as legal under certain circumstances (medically prescribed) or considered as illegal in some others (above a certain level for B2-agonists in asthma, or in specific conditions such as alcohol in motorized sports). The proportion of SA reporting active use of those substances ranged between 5.1% (alcohol) and 11.3% (analgesics).

Finally, few SA reported current (3.7%) or previous (2.1%) use of products considered as doping substances. Of nearly 900 SA, none reported active use of EPO or steroids. Actually, in our sample, cannabis was the banned substance the most frequently used by adolescents to enhance their sports performance (3.4%). Regarding previous use, only one adolescent cited growth hormone and 3 reported past use of cocaine. In contrast, one NSA reported active use of EPO without reporting a chronic condition, and one previous use of steroids.

Among all SA, independently of their use of banned products, 7.4% were considering taking a doping substance in the future and 2.6% reported having been offered doping substances. Individuals having made those offers were mainly identified as close friends (15 out of 27 offers made).

Knowledge on doping substances

Using open-ended questions, SA were asked if they ever used a doping substance or a product they were not sure about its legality. Those answering positively had to specify which product they used. Interestingly, only 2 adolescents (0.2%) reported ever having used doping substances. Among their responses, none were truly illegal substances on the WADA listing and one could potentially be considered as a doping product when taken in high doses (asthma inhalant). In comparison, 27 SA (3.0%) were not sure about the substance they had used. Among those, 4 wrote products that could not be identified, 1 cited steroids, 1 Ritalin (Methylphenidate), 1 alcohol and 1 cannabis. Additionally, one adolescent noted a Swiss product containing nicethamide (a banned stimulant by WADA). Accordingly, of all adolescents either thinking or not being sure if they were taking illegal products to enhance their performance, two-thirds cited identifiable substances not recognized as doping by the WADA.

Key findings – Performance-enhancing substances

- The vast majority of adolescents saw several adverse consequences related to doping. However, it is worth noting that nearly one sportive adolescent out of ten totally agreed that doping substances are either a way to better train, to better develop their body or to better recover.
- While one third of adolescents reported not being sure if their friends or people they knew were using doping substances, 14% of SA reported doping use in their entourage.
- When SA consumed products in relation to sport, they mostly did it before or during the activity, rather than after it.
- Caffeinated products, sports drinks and nutritional supplements were the three most reported substances used to enhance performance by SA.
- Adolescents in competitive sport practice used more frequently products to enhance their performance than their peers in leisure sportive activities.
- Few adolescents reported current or previous use of banned substances from the World Anti-Doping Agency listing as a way to enhance their performance.
- Adolescents seem to have a limited knowledge of products considered as banned.

Results: Profile of sportive adolescents using substances

From improvement of cardiopulmonary function, to increased quality of life, much has been said about the benefits of sports(1). Besides an important increase in inactivity seen over the last years(68), sports also appears as an interesting setting for substance use prevention as a majority of adolescents living in Switzerland are still active(69). In order to design effective preventive messages, knowledge on the profile of SA using psychoactive or performance-enhancing substances is therefore mandatory.

In the multivariate analyses performed to determine the profile of SA more likely to use substances, several characteristics were included: age, gender, country of birth (Swiss born vs. elsewhere), place of residence (urban vs. rural), academic track (student vs. other), socioeconomic status (SES; high vs. other), family status (parents together vs. other), sports type (team vs. individual) and sports context (competitive vs. leisure). Accordingly, in *Tables 6* and *7*, the associations of those characteristics with each specific substance used by SA are reported. Illegal substances other than cannabis were not included in the analyses because too few adolescents reported their recreative use in the previous month.

Psychoactive substances

Tobacco

Among all characteristics, only gender (male, Adjusted Odds Ratio [AOR]=0.44) and sports context (competitive, AOR=0.44) were significantly associated to current smoking. In fact, SA reporting either being male or practicing sports in a competitive context were over half less likely to currently smoke.

Alcohol

As for tobacco, SA in a competitive context (AOR=0.57) were less likely to report drunkenness episodes during the month preceding the survey. Inversely, males (AOR=1.67) and those practicing their main sport in a team (AOR=1.74) were more likely to report alcohol misuse. The risk also increased with age (AOR=1.22).

Cannabis

In our sample, SA reporting current cannabis use were twice more likely to be urban (AOR=2.09). As for tobacco use and drunkenness episodes, being in a competitive sportive context (AOR=0.25) conferred protection regarding cannabis use. Yet, such protection was more marked than for tobacco and alcohol as SA with this characteristic were four times less likely to report cannabis use in the previous month (*Table 6*).

Table 6. Adjusted odds ratios [95%CI] for SA' characteristics associated with current psychoactive substance use

| | Tobacco | Alcohol | Cannabis |
|--------------------------------|-------------------------|-------------------------|-------------------------|
| Age | 1.12 [0.91-1.37] | 1.22 [1.06-1.41] | 1.11 [0.91-1.35] |
| Gender – male | 0.44 [0.24-0.83] | 1.67 [1.10-2.55] | 1.37 [0.73-2.60] |
| Country of birth – Switzerland | 1.15 [0.33-4.05] | 2.08 [0.70-6.21] | 0.63 [0.21-1.95] |
| Residence – urban | 1.20 [0.68-2.13] | 1.08 [0.70-1.65] | 2.09 [1.12-3.90] |
| Academic track – student | 0.63 [0.36-1.12] | 0.77 [0.51-1.16] | 0.82 [0.43-1.57] |
| SES – high | 0.67 [0.38-1.20] | 0.78 [0.50-1.24] | 1.33 [0.72-2.43] |
| Parental status – together | 1.44 [0.71-2.90] | 0.96 [0.57-1.61] | 0.79 [0.41-1.54] |
| Sports type – team | 1.29 [0.71-2.33] | 1.74 [1.11-2.71] | 1.87 [0.99-3.52] |
| Sports context – competitive | 0.44 [0.25-0.78] | 0.57 [0.36-0.88] | 0.25 [0.13-0.46] |

Performance-enhancing substances

Doping substances

As for recreational cannabis users, living in an urban area (AOR=5.17) was a risk factor for active use of doping substances among SA, while a competitive sportive context (AOR=0.37) and being a student (AOR=0.19) protected against their use.

Caffeinated products

In our sample, caffeinated products were the most consumed performance-enhancing substances. Being a male (AOR=1.61) or a student (AOR=0.47) were both independently associated with its use, but in opposite ways. Accordingly, males were more likely to use caffeinated products to enhance their sportive performance, while students were less likely to do so. All sportive categories seemed affected as no sports type or context was independently linked with higher use of caffeinated products.

Sports drinks

Sports drinks used to enhance performance were positively associated to male gender (AOR=2.07) and to a competitive sportive context (AOR=1.99).

Nutritional supplements

Interestingly, only adolescents in a competitive sportive context were more likely to use nutritional supplements (AOR=2.36). No other characteristic was associated with their use among SA ([Table 7](#)).

Table 7. Adjusted odds ratios [95%CI] for SA' characteristics associated with current performance-enhancing substance use

| | <i>Doping substances</i> | <i>Caffeinated products</i> | <i>Sports drinks</i> | <i>Nutritional supplements</i> |
|---------------------------------------|--------------------------|-----------------------------|-------------------------|--------------------------------|
| <i>Age</i> | 1.06 [0.72-1.59] | 1.09 [0.95-1.24] | 1.06 [0.93-1.22] | 1.06 [0.91-1.23] |
| <i>Gender – male</i> | 1.11 [0.37-3.34] | 1.61 [1.10-2.34] | 2.07 [1.39-3.09] | 1.00 [0.62-1.61] |
| <i>Country of birth – Switzerland</i> | 4.95 [0.52-46.91] | 0.86 [0.44-1.65] | 1.33 [0.55-3.23] | 0.79 [0.25-2.49] |
| <i>Residence – urban</i> | 5.17 [1.72-15.53] | 1.19 [0.81-1.77] | 1.46 [0.96-2.17] | 1.00 [0.62-1.62] |
| <i>Academic track – student</i> | 0.19 [0.06-0.59] | 0.47 [0.32-0.71] | 1.06 [0.70-1.59] | 1.17 [0.72-1.89] |
| <i>SES – high</i> | 1.16 [0.46-2.93] | 1.17 [0.77-1.78] | 1.21 [0.79-1.87] | 0.77 [0.45-1.32] |
| <i>Parental status – together</i> | 2.24 [0.62-8.05] | 0.65 [0.41-1.03] | 0.81 [0.50-1.32] | 1.12 [0.65-1.95] |
| <i>Sports type – team</i> | 1.96 [0.85-4.53] | 1.28 [0.85-1.93] | 1.06 [0.69-1.64] | 1.10 [0.68-1.76] |
| <i>Sports contexts – competitive</i> | 0.37 [0.14-0.97] | 0.98 [0.64-1.49] | 1.99 [1.28-3.09] | 2.36 [1.36-4.10] |

Key findings – Profile of sportive adolescents using substances

- Male SA were less likely to be smokers but more likely to misuse alcohol, and use sports drinks and caffeinated products to increase their performance.
- Students used less often doping substances and caffeinated products to enhance their sports performance.
- Regarding cannabis, either used recreationally or as a doping substance, SA reporting an urban residence seemed at increased risk.
- Evolving in team sports was associated with alcohol misuse
- A competitive sportive context was associated with the use of most performance-enhancing substances but not with psychoactive ones.

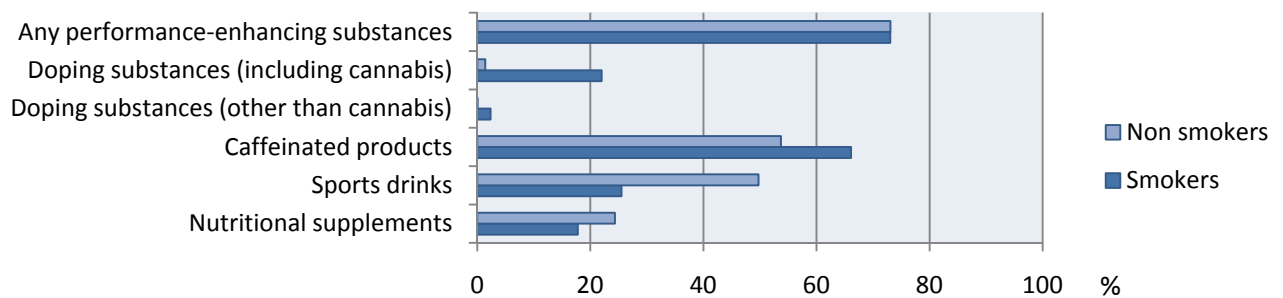
Results: Mixed substance use

Health risk behaviors tend to cluster together. In this chapter, we look at possible associations among SA between their use of psychoactive substances and of performance-enhancing ones.

Tobacco and performance-enhancing substances

When examined as a whole, the use of performance-enhancing substances among SA did not differ according to their current smoking status (*Figure 17*). In fact, 73.0% of both current smokers and non smokers reported active use of at least one substance to enhance their sports performance. Yet, adolescent smokers significantly differed from non smokers regarding their active use of doping substances, with nearly one quarter of them reporting so (22% vs. 1.4%; $p < 0.001$). When only doping substances other than cannabis were examined, groups also differed regarding their use (2.4% vs 0.1%; $p < 0.001$). While a significant difference was found between smokers and non smokers on sports drinks use (25.5% vs. 49.8%; $p < 0.001$), none was found on nutritional supplements (17.8% vs. 24.4%) or caffeinated products (66.1% vs. 53.7%).

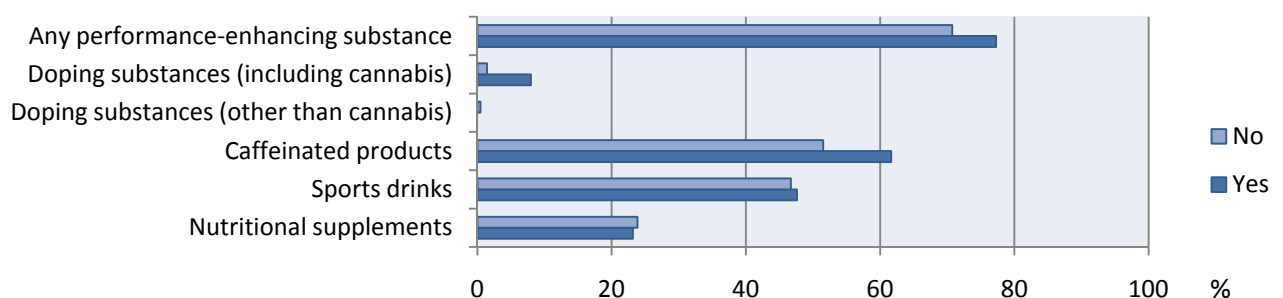
Figure 17. Proportions of SA reporting active use of performance-enhancing substances according to smoking status



Alcohol and performance-enhancing substances

Regarding SA reporting at least one drunkenness episode during the last month (*Figure 18*), their use of any performance-enhancing substance was not statistically different from non heavy drinkers (77.3% vs. 70.8%). However, as for tobacco, SA reporting alcohol misuse were more likely to also report actively using doping substances (8.0% vs. 1.4%; $p < 0.01$), although almost none reported using doping substances other than cannabis. Yet, among those SA reporting drunkenness episodes in the previous month, a trend was seen for more adolescents using caffeinated products (61.7% vs. 51.5%; $p = 0.055$). No differences between heavy and non heavy drinkers were noted regarding sports drinks (47.6% vs. 46.7%) or nutritional supplements (23.2% vs. 23.9%).

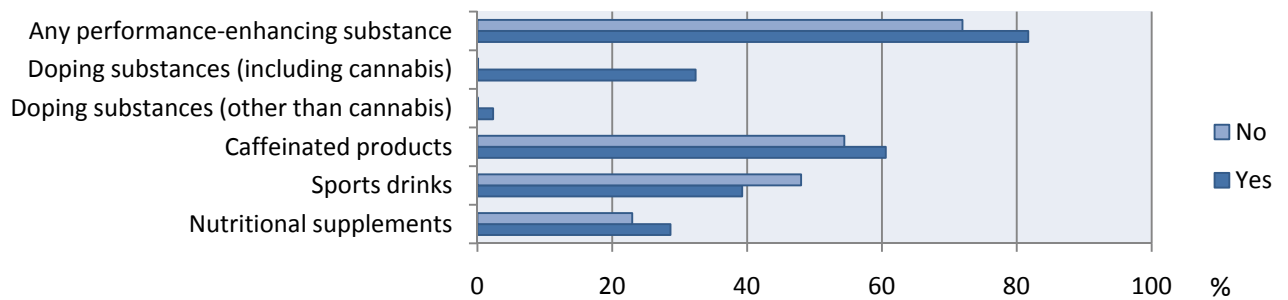
Figure 18. Proportions of SA reporting active use of performance-enhancing substances according to last month drunkenness episodes



Cannabis and performance-enhancing substances

As seen in *Figure 19*, adolescents having used cannabis recreationally in the last month reported the use of performance-enhancing substances more frequently than their non-using peers, but not to a significant level (81.7% vs. 72.0%). Nearly one recreational cannabis user out of three used it also to enhance their sport performance. As a result, 32.4% of recreational cannabis users reported active doping use. Excluding cannabis use to enhance sport performance, this group also reported a higher use of other doping substances (2.3% vs 0.1%; $p < 0.001$). No significant differences were seen between cannabis users and non users regarding caffeinated products (60.6% vs. 54.4%), sports drinks (39.3% vs 48.0%) and nutritional supplements (28.7% vs. 23.0%).

Figure 19. Proportions of SA reporting active use of performance-enhancing substances according to current cannabis use



Key findings – Mixed substance use

- All SA currently smoking, having been drunk in the previous month or using cannabis during the same period, reported in higher proportion active use of doping substances to enhance their performance than respective non users.
- While SA having used cannabis recreationally in the last month reported the highest rate of doping substance use, they used doping substances other than cannabis in a similar proportion than tobacco smokers.
- Regarding caffeinated products, a trend was observed for SA to also report more often drunkenness episodes during the previous month.
- Higher sports drinks use was only seen among a subset of psychoactive substance non users : non smokers.

Results: other factors related to substance use

While sportive status, sports type and sports context seem all to influence substance use in some ways, we were also interested in other relevant sports factors. Indeed, sports can represent a time-consuming activity supposed to reduce the risk of drug use(70). Additionally, the desire to perform can be a powerful motivation to consume doping substances. Accordingly, time dedicated to sportive activities and level of competition were further explored.

Time dedicated to sportive activities

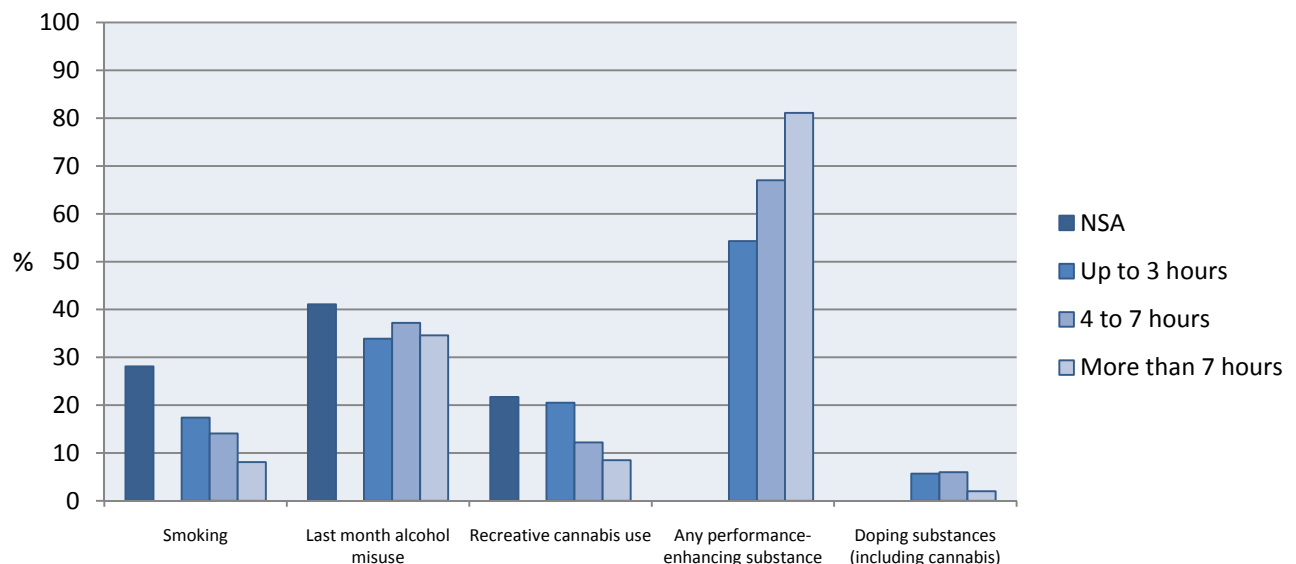
By summing all periods dedicated by adolescents to sportive activities, 28.3% reported never practicing sports outside school (the 353 NSA), 10.2% up to 3 hours per week, 21.5% from 4 to 7 hours, and 40.0% more than 7 hours. Mean time allocated by SA to their sports was 9 hours per week [95%CI: 8.5-9.5]. Although the mean time of sportive activities did not differ between sports type, it did by sports context, with SA reporting competition dedicating more time than those reporting leisure (10.4 vs. 6.6 hours; $p<0.001$). Among SA, time devoted to sports also differed by gender, with fewer females present as sportive time increased (*Table 8*).

Table 8. Characteristics of SA according to weekly time dedicated to sportive activities

| | Up to 3 hours n=127 (14.2%) | 4 to 7 hours n=268 (30.0%) | More than 7 hours n=499 (55.8%) | p |
|------------------------------|--------------------------------|-------------------------------|------------------------------------|------------------|
| Age - mean (SE) | 17.9 (0.1) | 17.7 (0.1) | 17.8 (0.1) | 0.572 |
| Gender - male | 41 (32.6) | 131 (48.7) | 299 (58.9) | <0.001 |
| Place of birth - Switzerland | 112 (88.5) | 251 (93.5) | 477 (95.5) | 0.147 |
| Residence - urban | 54 (42.8) | 124 (46.2) | 215 (43.0) | 0.821 |
| Academic track - student | 46 (36.5) | 132 (49.4) | 263 (52.7) | 0.061 |
| SES - high | 66 (52.0) | 178 (66.4) | 318 (63.7) | 0.173 |
| Parental status - together | 95 (74.7) | 200 (74.6) | 364 (72.9) | 0.924 |

The proportion of SA being smokers or current cannabis users decreased as the time devoted to sportive activities increased (*Figure 20*). Significant differences were found between the 3 groups of dedicated sports time regarding cannabis ($p<0.05$), but not regarding tobacco. It is worth noting that SA practicing up to 3 hours per week consumed cannabis at a quite similar rate than the one seen among their non sportive peers.

Figure 20. Substance use of SA according to weekly time dedicated to sportive activities



In comparison, this trend was not seen regarding current alcohol misuse. Regarding performance-enhancing substances, more time devoted to sports resulted in higher proportions of their use (doping substances included) ($p < 0.001$). Regarding doping substances exclusively, no statistical differences with increasing time were found between groups, even if adolescents practicing sports more than 7 hours a week reported the lowest proportion (up to 3 hours: 5.7%, 4 to 7 hours: 6.0% and more than 7 hours: 2.0%).

Level of competition

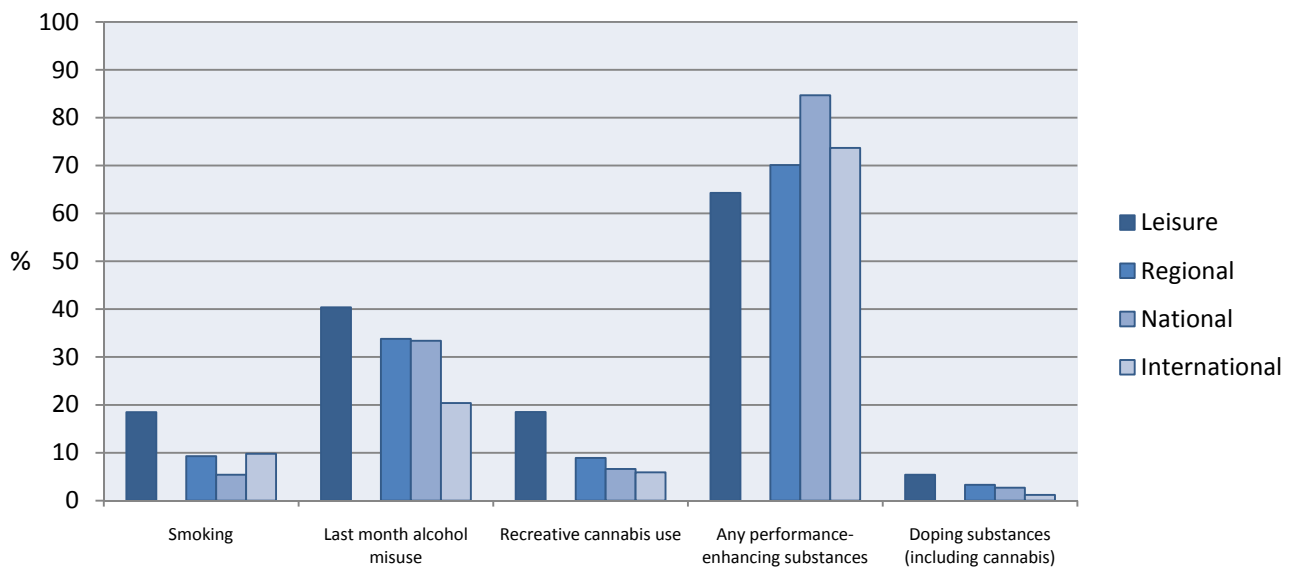
SA reporting competitive sportive activities were further asked to defined at what level they were competing: 42% reported competing at the regional, 50.3% at national and 7.7% at international level. Those 3 groups differed on type of sport practiced, with lesser SA reporting team sports by growing level of competition (respectively 69.6% at the regional, 51.2% at the national, and 21.6% at the international level; $p < 0.001$). Additionally, groups also differed on country of birth and academic track ([Table 9](#)).

Table 9. Characteristics of SA according to competitive level

| | Regional n=245 (42.0%) | National n=294 (50.3%) | International n=45 (5.7%) | p |
|------------------------------|---------------------------|---------------------------|------------------------------|--------------|
| Age - mean (SE) | 17.6 (0.1) | 17.8 (0.1) | 17.6 (0.2) | 0.707 |
| Gender - male | 143 (58.2) | 185 (63.0) | 25 (56.5) | 0.581 |
| Place of birth - Switzerland | 225 (91.7) | 285 (97.1) | 43 (96.5) | 0.020 |
| Residence - urban | 105 (42.8) | 152 (51.5) | 18 (40.6) | 0.232 |
| Academic track - student | 131 (53.4) | 141 (47.9) | 38 (85.2) | 0.003 |
| SES - high | 177 (72.3) | 187 (63.6) | 33 (73.6) | 0.249 |
| Parental status - together | 191 (78.0) | 199 (67.7) | 33 (74.1) | 0.161 |

No statistically significant differences were found regarding the use of psychoactive or doping substances between the 3 levels of competition ([Figure 21](#)). Yet, regarding alcohol and cannabis, higher sports level tended to result in lower proportion of use. On the other hand, SA competing at the national level reported a higher proportion of overall performance-enhancing substance use compared to regional and international ones (respectively 84.7%, 70.1% and 73.7%; $p < 0.01$).

Figure 21. Substance use of SA according to level of competition



Key findings – Other factors related to substance use

- For SA, increasing time devoted to sportive activities either slightly decreased or had no influence on active psychoactive substance use.
- For SA, increasing time devoted to sportive activities added to the already high proportions of performance-enhancing substance use.
- A trend towards lower misuse of alcohol and cannabis among SA according to a higher level of competition was observed.
- SA at the national level showed the highest rate for performance-enhancing substance use, with more than 8 out of 10 using at least one of these products.

Results: Inactivity

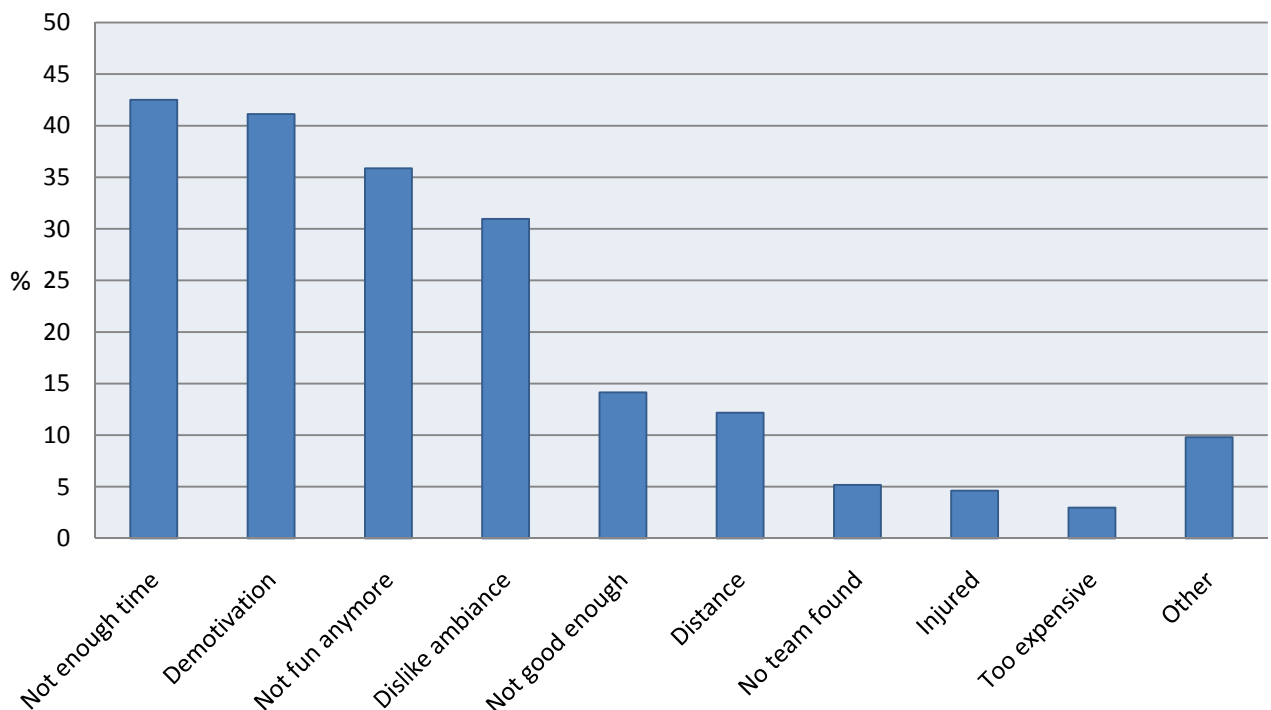
In Switzerland, at age 12, 8% of students report no sportive activity in the prior week(69). This rate increases markedly in both boys and girls between ages 13 and 17, with adolescent females being at increased risk(69). Most importantly, from 1993 to 2002, rates of adolescents being inactive have almost doubled in some age groups(68). As a way to prevent inactivity, special attention should therefore be attributed to the reasons why adolescents give up sports and stay inactive. Differences regarding substance use of adolescents having stopped practicing sports and those reporting never having had a regular sportive activity are also addressed in this chapter.

Reasons for having given up sports

Among the 353 NSA surveyed, 269 had stopped practicing a regular sportive activity during adolescence, having done so on average in the last 3 years [95%CI: 2.6-3.9]. With the requirement to give at least one reason to have given up sports during that period, 2 were noted in average [95%CI: 1.7-2.3], and 3 reasons or more were reported by more than one third of adolescents (35.2%).

Among the most cited reasons to have given up sports (*Figure 22*), nearly the same proportion of adolescents answered that they did not have enough time because of work or school (42.5%), or that they were just demotivated (41.1%). Nearly one third reported not having fun anymore with such activity (35.9%), or that they disliked the team or club atmosphere (31.0%). In much lower prevalence, other reported reasons were: not being good enough (14.2%), distance (12.2%), absence of a team for their age or sport (5.2%), having been injured (4.6%) and their sport being too expensive to be continued (3.0%). One tenth of adolescents having given up sports gave other reasons than those proposed, none of them being frequent enough to be reported.

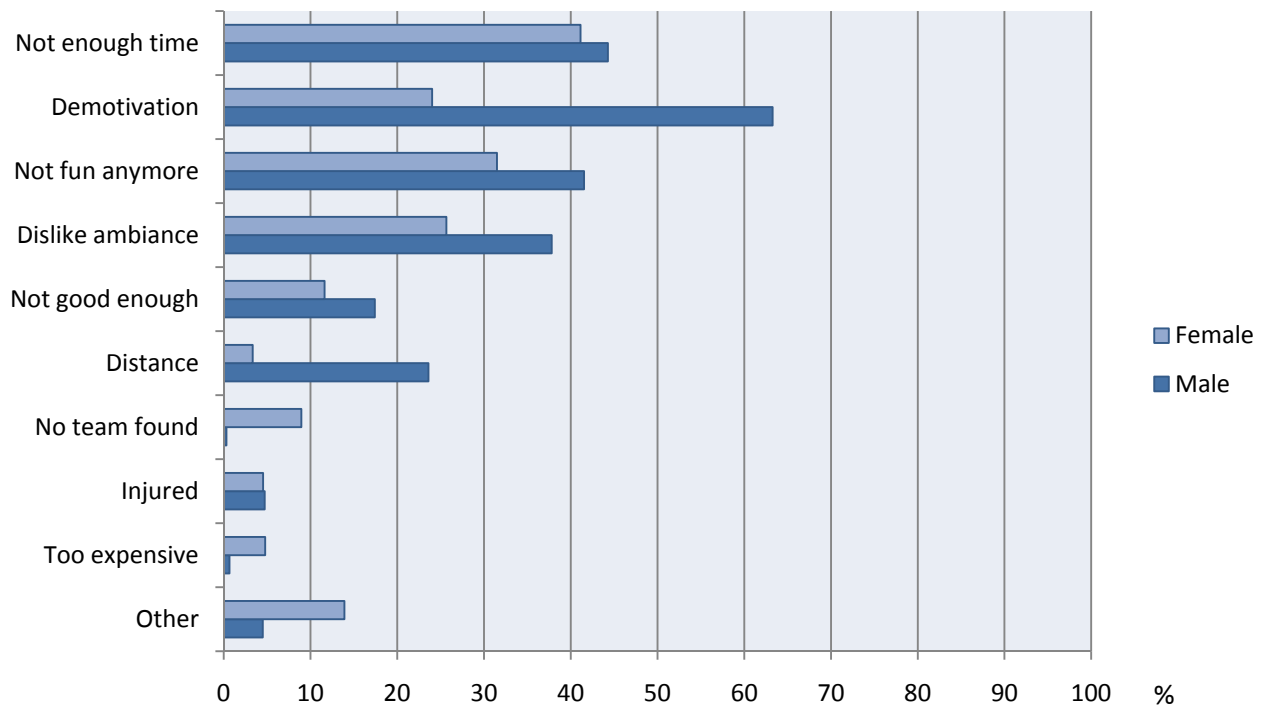
Figure 22. Reasons given by adolescents for having given up sports



When answers were examined by gender, males reported on average a higher number of reasons (2.4 vs. 1.7; $p=0.001$). It is worth noting that the majority of adolescent females (55.8%) reported only one reason, while more than half of boys gave 3 reasons or more (56.6%).

The most important gap between genders on a reason for having stopped practicing sport (*Figure 23*) was seen on demotivation, with 63.3% of male adolescents compared to only 24.0% of females reporting it ($p<0.001$). Yet, distance, with seven times more males reporting it (23.6% vs. 3.3%; $p=0.006$), was also a reason where an important difference was seen. Most strikingly, females were several times more likely to report not having found a team to practice their sport (8.9% vs. 0.3%; $p<0.001$). At a lower level, more females also reported their sport as being too expensive to be continued (4.8% vs. 0.7%; $p<0.05$). On this last reason, it must be noted that several female adolescents reported horse riding as the sport they had stopped.

Figure 23. Reasons given by adolescents for having given up sports according to gender

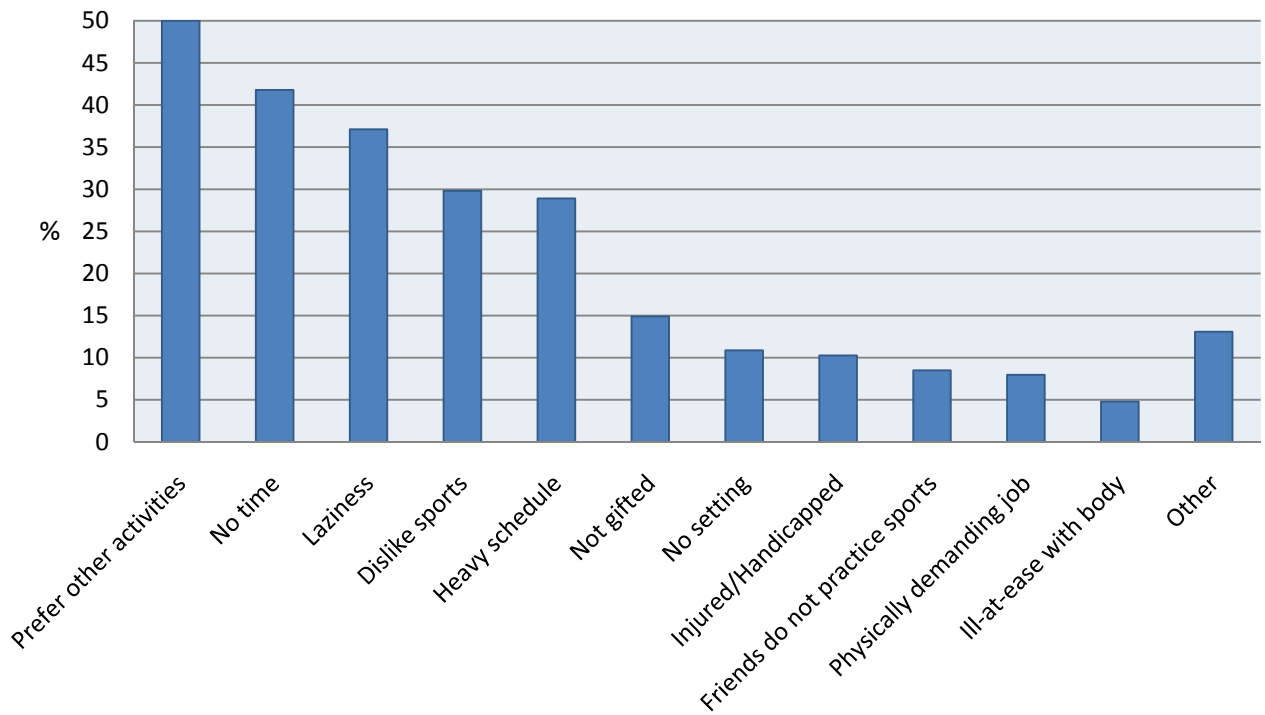


Reasons for not currently practicing sports

In addition to the reasons given for having given up practicing sports, we assessed all inactive adolescents (NSA; $n=353$) about the reasons for not currently being active. With the requirement to give at least one, 31.7% gave 2 and 41.8% gave 3 reasons or more.

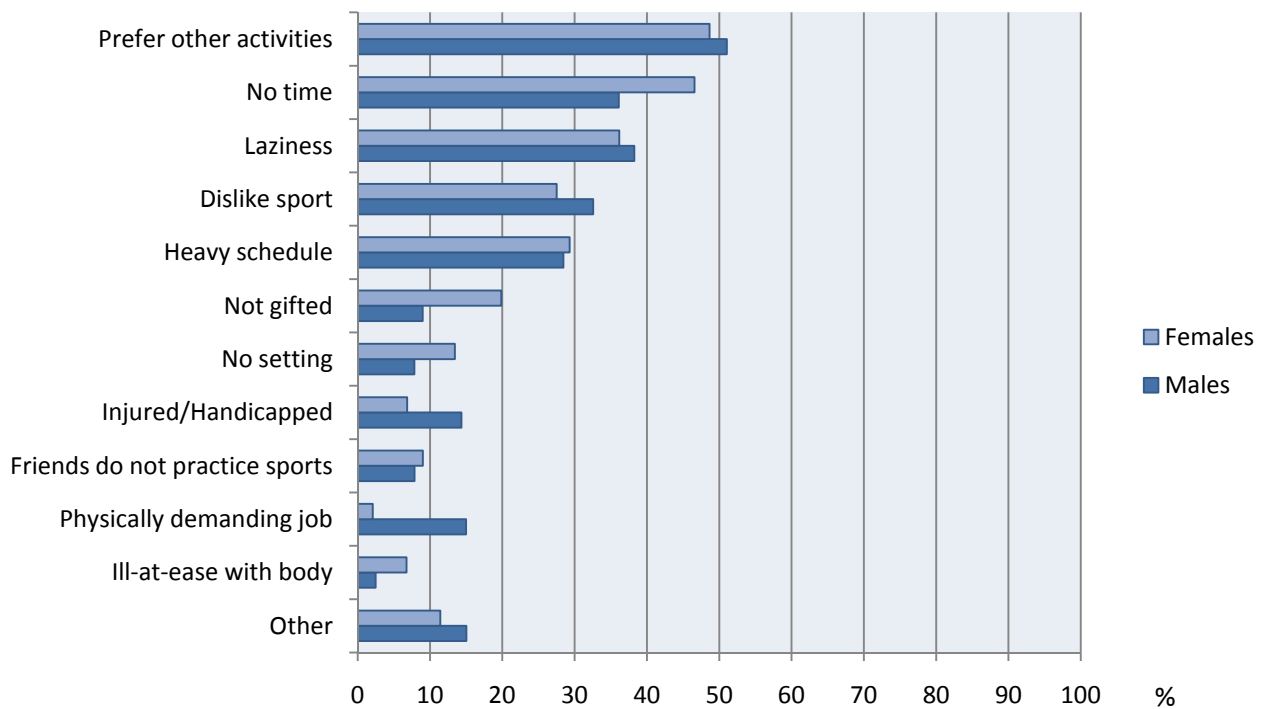
The most cited reason for being inactive (*Figure 24*) was that adolescents preferred to do other activities (50.0%), while 41.8% reported having no time to devote to sports. Laziness was reported by 37.1% of them and one third either admitted that they disliked sports or that their working or schooling schedule prevented them from practicing one. Only one adolescent out of every 8 reported that they were not gifted enough. No sportive settings for the sport they would like to practice, being injured or disabled, their friends not practicing sports or having already a physically demanding job were reported in lower proportions. Being ill-at-ease with their body was cited only by 4.8% of adolescents, and 13.1% of NSA gave other responses than those proposed.

Figure 24. Reasons given by adolescents for not practicing sports



No difference on the mean number of reasons for not currently practicing sports was found between genders. However, as seen in *Figure 25*, more females reported not being gifted compared to their male peers (19.9% vs. 9.0%; $p < 0.05$). On the other hand, more males reported having already a physically demanding job (15.0% vs. 2.1%; $p < 0.01$).

Figure 25. Reasons given by adolescents for not practicing sports according to gender



Recent inactivity and psychoactive substance use

Even if separated by several percentage points, no significant differences regarding smoking status, current cannabis use or alcohol misuse were found between adolescents having never practiced sports and those having given up recently. Analyses were done separately by gender (*Tables 10 and 11*).

Table 10. Proportions of male NSA reporting current psychoactive substance use according to ever having practiced sports

| <i>Females</i> | <i>Never practiced n=40 (%)</i> | <i>Recently stopped n=152 (%)</i> | <i>p</i> |
|----------------------------------|-------------------------------------|---------------------------------------|----------|
| <i>Tobacco use</i> | 14 (34.6) | 34 (22.1) | 0.205 |
| <i>Last month alcohol misuse</i> | 12 (29.4) | 51 (33.5) | 0.695 |
| <i>Current cannabis use</i> | 9 (22.4) | 24 (15.7) | 0.447 |

Table 11. Proportions of female NSA reporting current psychoactive substance use according to ever having practiced sports

| <i>Males</i> | <i>Never practiced n=44 (%)</i> | <i>Recently stopped n=117 (%)</i> | <i>p</i> |
|----------------------------------|-------------------------------------|---------------------------------------|----------|
| <i>Tobacco use</i> | 16 (37.3) | 36 (30.3) | 0.602 |
| <i>Last month alcohol misuse</i> | 22 (49.6) | 61 (51.7) | 0.894 |
| <i>Current cannabis use</i> | 11 (26.1) | 32 (27.5) | 0.904 |

Key findings – Inactivity

- The reasons for having given up sports or not currently practicing one are usually multiple.
- The most cited reasons for having given up sports were not having enough time, preferring other activities and poor ambiance.
- The top reasons cited for not currently practicing sportive activities were having other interests, limited time and laziness.
- Male and female adolescents differed on the reasons for having given up sports, both on the number of reasons and the ones reported, while few differences were found on reasons for not currently practicing one.
- With the limitation of a relatively small subsample, no differences were found between adolescents having recently given up sports and those never having practiced one regarding the use of psychoactive substances.

Conclusions

Psychoactive substances

Overall, the protective effect of sports practice against the use of psychoactive substances depended on the substance.

- NSA were more likely to smoke than SA, and, among the latter, those in leisure contexts were more likely to smoke than those in competition. It seemed that youths were well aware of the deleterious effect that tobacco can have on their sportive performance.
- On the contrary, no differences in alcohol misuse were observed between SA and NSA adolescents, indicating that sports practice is not a protective factor against alcohol misuse.
- Although NSA were twice more likely to be current cannabis users than SA, one out of every 9 of the latter had nevertheless used it in the last month. Moreover, the difference between NSA and leisure SA was minimal. Whether cannabis is not considered by adolescents as affecting sportive performance (or at least to a lower degree than tobacco) remains to be explored.
- The percentage of youth using other illegal substances than cannabis was low, and the rate among SA was about one quarter of the one observed among NSA.

Performance-enhancing substances

The growing trend for using substances to enhance performances among SA seems to be confirmed within our sample. In fact, three quarter of sportive adolescents surveyed in the French-speaking part of Switzerland reported active use of such products, with caffeinated products, sports drinks and nutritional supplements being the most cited.

- Even though most adolescents agreed on the negative consequences of using doping substances, almost 10% of SA believed that they were either a way to better train, to better develop their body or to better recover.
- One third of youths indicated not being sure if their friends or other people they knew were using doping substances. However, one out of every seven SA reported the use of such substances in their entourage.
- Among the substances used to enhance performance, caffeinated products, sports drinks and nutritional supplements were the three most reported.
- Few SA reported using substances from the WADA listing. Cannabis was the most reported of such banned products.
- Among SA, those in competitive practice were more likely to use performance-enhancing products than those practicing sports for leisure purposes.
- However, youths seemed to be little informed about which products are considered as banned.

Profile of sportive substance users

Although SA in competitive sport practice are associated to the use of performance-enhancing substances, the same is not true regarding psychoactive ones.

- While males were less likely to smoke tobacco, they were more likely to use alcohol.
- Alcohol use also increased with age and was more likely among those in team sports.
- Being in a competitive sports context was a protective factor against tobacco, alcohol and cannabis use.
- SA living in urban areas were also more likely to use doping substances and to use cannabis outside sports contexts.
- While males were more likely to use caffeinated products and sports drinks, students were less likely to use doping substances and caffeinated products.
- Although SA in competitive contexts were less likely to use doping substances, they were more likely to use both sports drinks and nutritional supplements.

Mixed substance use

A link between psychoactive and performance-enhancing substances seems to exist as all adolescents reporting either smoking, having misused alcohol recently or currently using cannabis reported higher proportions of doping substance consumption.

- SA using cannabis reported the highest rates of doping substances' use (higher than among smokers or alcohol misusers). The use of cannabis as a way to enhance sports performance among recreational users seemed to account for most of that difference.
- Although caffeinated products seemed to be used in higher proportion by those also using tobacco, alcohol or cannabis, it was not so clear for sports drinks and nutritional supplements.

Other influences on substance use

Both the weekly time dedicated to sport practice and the level of competition were somehow related to substance use.

- Overall, as the time dedicated to sport practice increased, there were significantly more males. A trend for students to devote more time to sports was also observed.
- While smoking and cannabis use decreased as the time devoted to sports increased, there were virtually no differences for alcohol misuse.
- On the contrary, performance-enhancing substances increased with time dedicated to sport.
- The higher the competition level, the more likely SA were to be Swiss-born and students. SA at the national competitive level were older than their peers involved in other competition levels.
- The use of psychoactive substances was higher among those practicing sport as leisure than among those competing.
- Among sportive adolescents, those competing at the international level showed lower rates of alcohol misuse and cannabis use, but compared to those competing at the regional level, not of tobacco smoking.
- The use of performance-enhancing substances was higher among those competing at the national level, describing an inverted U-shaped curve.

Inactivity

Reasons given by adolescents for not practicing or having stopped practicing sports were multiple. Yet, the most cited reasons for both situations were lack of time and lower interest.

- Not having enough time and not being motivated were the two main reasons cited for having given up sports. However, lack of motivation was much more frequent among males than among females while there was virtually no gender difference for not having enough time.
- Males outnumbered females in all reasons for having given up sports except for not having found a team and finding it too expensive.
- Preferring other activities and lack of time were the most frequently reported reasons for not practicing sport. Lack of time was more cited by females than by males.
- Among those not practicing sports, the percentages reporting each reason varied little between genders except for not being gifted, being more often reported by females, and already having a physically demanding job, more reported by males.
- There were no differences in the use of psychoactive substances between those who had recently given up sport and those who had never practiced.

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Annex 1. Questionnaire

Identifiant

Question 1

S'il ne vous a pas été remis, veuillez vous créer un identifiant anonyme en utilisant, à la suite, les 2 dernières lettres de votre prénom, la dernière de votre nom de famille, le mois et l'année de votre naissance, ainsi que votre NPA. Par exemple: Jérémy Cardin, né en mars 92, habitant Lausanne 1012: MYN03921012

Question 2

Avec l'aide de quel médium avez-vous été contacté pour compléter ce questionnaire?

- Enveloppes
- Facebook
- Myspace
- Messagerie électronique personnelle (hotmail, gmail, etc...)
- Autre

Formulaire de consentement

Question 3

S'il vous plaît, cochez ce qui correspond à votre décision, suivant la lecture des informations contenues dans la section INFOS COMPLEMENTAIRES, et ce avant d'accéder au questionnaire :

- Je suis d'accord pour participer à cette enquête en sachant que :

Elle est confidentielle

Je peux interrompre ma participation à n'importe quel moment

- Je ne veux pas participer à cette enquête

Questionnaire

Question 4

Quel est votre sexe ?

- Féminin
- Masculin

Question 5

Quel est votre âge ?

_____ ans

Question 6

Êtes-vous né en Suisse ?

- Oui
- Non

Question 7

Depuis combien de temps vivez-vous en Suisse ?

_____ année(s)

Question 8

Où habitez-vous (vous même) ?

- À la montagne, à la campagne ou dans un village
- Dans une ville ou en banlieue d'une ville

Question 9**Dans quel canton habitez-vous ?**

- Fribourg
- Genève
- Valais
- Vaud
- Jura
- Neuchâtel
- Autre canton (veuillez préciser votre réponse dans l'encadré ci-bas)

Autre canton (précisez): _____

Question 10**Quelle est votre taille ?**

_____ cm

Question 11**Quel est votre poids ?**

_____ kg

Question 12**Avez-vous une maladie chronique, c'est à dire une maladie qui dure longtemps (au moins 12 mois) et qui peut nécessiter des soins réguliers (ex: diabète, asthme, scoliose) ?**

- Oui
- Non

Question 13**Comment se nomme cette maladie ?**

Question 14**Quelle est la situation actuelle de vos parents ?**

- Ils vivent ensemble
- Ils sont séparés ou divorcés
- Votre père est décédé
- Votre mère est décédée
- Votre père et votre mère sont décédés
- Autre situation (veuillez préciser votre réponse dans l'encadré ci-bas)

Autre situation (précisez): _____

Chez vos parents/vos tuteurs ...

Si vous ne vivez pas chez vos parents/tuteurs, répondez aux questions suivantes par rapport à la situation chez eux

Question 15**Avez-vous une chambre pour vous seulement ?**

- Oui
- Non

Question 16**Est-ce que votre famille a une voiture, un minibus et/ou une camionnette ?**

- Non
- Oui, une
- Oui, 2 ou plus

Question 17**Combien d'ordinateurs votre famille possède-t-elle ?**

- Aucun
- Un
- Deux
- Plus de deux

Question 18**Au cours des 12 derniers mois, combien de fois avez-vous voyagé avec votre famille pour des vacances ?**

- Jamais
 Une fois
 2 fois
 Plus de 2 fois

Question 19**Quelle est votre situation actuelle ?**

- Je suis en apprentissage ou en école de métier
 Je suis principalement aux études (gymnase ou université)
 Je travaille et je n'étudie pas (j'ai terminé mes études ou je n'en ai pas fait)
 Je fais un semestre de motivation (SEMO, OPTI, etc.)
 Je n'étudie pas ni ne travaille

Question 20**Face à vos résultats scolaires actuels, que pensez-vous de ces affirmations ?**

| | Tout à fait d'accord | Assez d'accord | Pas tellement d'accord | Pas du tout d'accord |
|--|-----------------------|-----------------------|------------------------|-----------------------|
| J'ai de bons résultats à l'école | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Je suis sûr d'arriver à terminer une formation | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Je suis sûr de trouver un travail plus tard | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Question 21**Au cours des deux dernières semaines...**

| | Tout le temps | La plupart du temps | Plus de la moitié du temps | Moins de la moitié du temps | De temps en temps | Jamais |
|--|-----------------------|-----------------------|----------------------------|-----------------------------|-----------------------|-----------------------|
| Je me suis senti bien et de bonne humeur | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Je me suis senti calme et tranquille | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Je me suis senti plein d'énergie et vigoureux | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Je me suis réveillé en me sentant frais et dispos | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Ma vie quotidienne a été remplie de choses intéressantes | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Question 22**Par rapport à votre vie en général, vous vous sentez ?**

- Très satisfait
 Plutôt satisfait
 Plutôt insatisfait
 Très insatisfait

Question 23**Actuellement, est-ce que vous fumez des cigarettes ?**

- Non
 Oui, chaque jour
 Oui, au moins chaque semaine

Question 24**Nombre de cigarettes fumées chaque jour**

_____ cigarette(s) par jour

Question 25**Nombre de cigarettes fumées par semaine**

_____ cigarette(s) par semaine

Question 26**À partir de quel âge avez-vous commencé à fumer ?**

_____ ans

Question 27

Pouvez-vous quantifier le nombre d'épisodes où vous avez pris une "cuite" (être vraiment soûl ou ivre en consommant de l'alcool)...

| | Jamais | 1 à 2 fois | 3 à 9 fois | 10 fois ou plus |
|--------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Au cours des 30 derniers jours | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Au cours des 12 derniers mois | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Au cours de votre vie | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Question 28

Au cours de votre vie avez-vous déjà consommé du cannabis (ou marijuana, haschisch, herbe) ?

- Oui
 Non

Question 29

À quel âge avez-vous consommé pour la première fois du cannabis (ou marijuana, haschisch, herbe) ?

_____ ans

Question 30

Au cours de votre vie avez-vous déjà consommé de la cocaïne ou du crack ?

- Oui
 Non

Question 31

À quel âge avez-vous consommé pour la première fois de la cocaïne ou du crack ?

_____ ans

Question 32

Au cours de votre vie avez-vous déjà consommé de l'ecstasy, du thaï, du speed, des designer drugs ou d'autres stimulants ?

- Oui
 Non

Question 33

À quel âge avez-vous consommé pour la première fois de l'ecstasy, du thaï, des designer drugs ou d'autres stimulants ?

_____ ans

Question 34

Au cours de votre vie avez-vous déjà consommé d'autres drogues illégales non-décrites précédemment ?

- Oui
 Non

Question 35

À quel âge avez-vous consommé pour la première fois de ces autres drogues illégales ?

_____ ans

Question 36

Au cours des 30 derniers jours, vous est-il arrivé de prendre l'une de ces substances ?

| | Jamais | 1 ou 2 fois | 3 à 9 fois | Plus souvent | Tous les jours |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Cannabis (ou marijuana, haschisch, herbe) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Cocaïne ou crack | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Ecstasy, thaï, speed, designer drugs, autres stimulants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Autres drogues illégales | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Question 37

Connaissez-vous le programme de prévention COOL & CLEAN ?

- Oui
 Non

Question 38**Avez-vous déjà participé à une activité du programme COOL & CLEAN ?**

- Oui
- Non

Question 39**Pratiquez-vous actuellement un sport en dehors du contexte scolaire obligatoire ?**

- Oui
- Non

Question 40**Quel sport pratiquez-vous principalement ? (un seul sport seulement)**

Question 41**À quel âge avez-vous commencé à pratiquer ce sport ?**

 ans**Question 42****Vous pratiquez ce sport...**

- Dans une association (club)
- En dehors d'une association

Question 43**Vous pratiquez ce sport...**

- En loisir
- En compétition

Question 44**Vous pratiquez ce sport à quel niveau ?**

- Régional (cantonal)
- National (Suisse)
- International

Question 45**Combien de fois pratiquez-vous ce sport par semaine ? (compétitions et entraînements inclus)**

- 4 fois par semaine ou plus
- 2-3 fois par semaine
- 1 fois par semaine
- Moins d'une fois par semaine

Question 46**Combien d'heures consacrez-vous à ce sport par semaine ?**

 heure(s)**Question 47****Comment évaluez-vous votre niveau de performance dans ce sport ?**

- Très bon
- Bon
- Moyen
- Mauvais

Prenez-vous des produits (compléments alimentaires, boissons pour l'effort ou la récupération, gel, poudre, pilules, injections, créatine...) dans le cadre de votre pratique sportive principale...**Question 48****AVANT la compétition ?**

- Jamais
- De temps en temps
- Souvent
- Toujours

Question 49**AVANT la compétition - Veuillez préciser de quel(s) produit(s) il s'agit ?**

Question 50**PENDANT la compétition ?**

- Jamais
 De temps en temps
 Souvent
 Toujours

Question 51**PENDANT la compétition - Veuillez préciser de quel(s) produit(s) il s'agit ?**

Question 52**APRÈS la compétition ?**

- Jamais
 De temps en temps
 Souvent
 Toujours

Question 53**APRÈS la compétition - Veuillez préciser de quel(s) produit(s) il s'agit ?**

Question 54**Dans votre pratique sportive principale, quelqu'un vous a-t-il déjà proposé d'avoir recours à des produits dopants pour améliorer votre performance athlétique ?**

- Oui
 Non

Question 55**Pouvez-vous indiquer la ou les personnes qui vous ont fait cette suggestion ?****Plusieurs choix possibles**

- Entraîneur
 Ami
 Coéquipier
 Quelqu'un d'autre dans un centre sportif
 Parent
 Autre personne (veuillez préciser votre réponse dans l'encadré ci-bas)

Autre personne (précisez): _____

Question 56**Dans le cadre de votre pratique sportive principale, avez-vous déjà pris des produits dopants ?**

- Oui
 Je ne suis pas sûr si les produits étaient dopants
 Non

Question 57**Pourriez-vous un jour prendre des produits dopants ?**

- Oui
 Non

Question 58**À propos de quel(s) produit(s) avez-vous des doutes ?**

Question 59**Quel(s) produit(s) dopant(s) avez-vous pris ?**

Question 60**Comment avez-vous pris ces substances ?****Plusieurs choix possibles**

- Sous forme de comprimés, sachets, gouttes
 Sous forme de spray inhalé
 Sous forme de gel pommades
 Sous forme de piqûres
 Autre (veuillez préciser votre réponse dans l'encadré ci-bas)

Autre (précisez): _____

DANS LE CADRE DE VOTRE PRATIQUE SPORTIVE PRINCIPALE...**Question 61****Au cours des 12 derniers mois, avez-vous utilisé les substances, méthodes et produits suivants dans l'intention d'améliorer vos performances DANS****LE CADRE DE VOTRE PRATIQUE SPORTIVE PRINCIPALE ?**

| | Non | Oui, mais je ne l'utilise plus | Oui, mais je ne l'utilise que très rarement | Oui, je l'utilise à l'occasion | Oui, je l'utilise régulièrement |
|---|-----------------------|--------------------------------|---|--------------------------------|---------------------------------|
| Alcool | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Amphétamines | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Analgésiques (aspirine, panadol, paracétamol, ibuprofen...) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Anesthésiques locaux | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Bétabloquants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Boissons gazeuses (Coca-cola, Pepsi) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Boissons de récupération (Gatorade, Powerade, Isostar) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Boissons énergisantes (Red bull, energy drinks...) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Café | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Cocaïne | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Comprimés de caféine ou de nicotine | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Corticostéroïde | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Créatine | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Diurétiques | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Érythropoïétine (EPO) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Hormone de croissance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Marijuana (cannabis, haschisch, herbe) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Médicaments contre les allergies/asthme | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Médicaments décongestionnants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Stéroïdes anabolisants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Substances de type Méga-muscle | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Suppléments de protéines | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Suppléments de vitamines | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Autre substance (précisez ci-bas) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Autre substance (précisez nom et fréquence): _____

Question 63**Pour vous, le dopage sportif représente...**

| | Pas du tout | Plutôt non | Plutôt oui | Tout à fait |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| Un moyen d'augmenter les performances | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un comportement malhonnête | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un moyen de mieux s'entraîner | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un danger pour la santé | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Une tricherie | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un risque de sanction | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Une obligation pour devenir un champion | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un moyen de mieux récupérer | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un moyen de mieux développer son corps | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un moyen de gagner de l'argent | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Question 64**Avez-vous des connaissances/amis qui prennent des produits dopants dans le cadre de leur pratique sportive ?**

- Non
 Oui
 Je ne sais pas

Question 65**Est-ce que vous pratiquez d'autres sports en plus de votre sport principal ?**

- Oui
 Non

Question 66**Si oui, le(s)quel(s) ?**

Question 67**Combien d'heures consacrez-vous à cet/ces autre(s) sport(s) par semaine ?**

_____ heure(s)

Question 68**Avez-vous déjà subi une/des blessure(s) sportive(s) nécessitant l'interruption de vos activités sportives ?**

- Oui
 Non

Question 69**Pouvez-vous alors préciser la plus longue durée d'arrêt consécutif secondaire à cet/ces blessure(s) sportive(s) ?**

- Moins de 10 jours
 De 10 jours à 3 mois
 Plus de 3 mois

Question 70**Lequel des énoncés suivants décrit le mieux votre situation ?**

- La plupart des fois que je sors, c'est avec les gens avec qui je fais du sport
 Je sors tant avec les amis avec qui je fais du sport qu'avec d'autres amis
 La plupart des fois que je sors, ce n'est pas avec les gens avec qui je fais du sport

Question 71**Quel est l'implication de vos parents face aux sports ?****Plusieurs choix possibles**

- Mon père fait du sport
 Ma mère fait du sport
 Ma soeur/mon frère font du sport
 Mes parents sont présents et me soutiennent dans ma pratique sportive
 Mes parents m'ont incité à faire du sport mais ne sont pas ou que peu impliqués
 Mes parents n'ont jamais influencé ma pratique sportive
 Aucune de ces réponses

Question 72**Diriez-vous que vous faites du sport...**

| | Pas du tout | Plutôt non | Plutôt oui | Tout à fait |
|---------------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Pour le plaisir | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pour la performance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pour la santé | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pour les rencontres, les amis | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pour la compétition | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pour vous dépenser | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pour maigrir | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pour éprouver des sensations | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pour développer votre corps | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pour gagner de l'argent | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Pour une première place sur le podium | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Car vos parents faisaient du sport | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Autre raison (précisez ci-bas) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Autre raison (veuillez préciser): _____

Question 73**Par le passé, avez-vous pratiqué un sport dans un club/une association ?**

- Oui
 Non

Question 74**Quel sport avez-vous pratiqué antérieurement dans un club/association ? (votre sport principal)**

Question 75**À quel âge avez-vous cessé de pratiquer ce sport dans un club/une association ?**

_____ ans

Question 76**Pouvez-vous indiquer la ou les raison(s) pour laquelle/lesquelles vous avez abandonné la pratique de ce sport ?****Plusieurs choix possibles**

- Je n'étais pas assez bon
 Il n'y avait pas d'équipe pour mon âge/je n'ai pas trouvé d'équipe
 Je n'avais plus de plaisir à le pratiquer
 Je n'aimais pas l'ambiance du club/association/équipe
 Je n'avais plus le temps à cause de mes études/mon travail
 J'étais démotivé
 J'ai eu une blessure qui m'a empêché de continuer
 C'était trop cher
 C'était trop loin de chez moi/j'ai déménagé
 Autre raison (veuillez préciser votre réponse dans l'encadré ci-bas)

Autre raison (précisez): _____

Question 77**Pouvez-vous indiquer la ou les raison(s) expliquant que vous ne participez pas à une pratique sportive régulière actuellement ?****Plusieurs choix possibles**

- Je souffre d'une blessure ou d'un handicap physique
 Je me sens mal à l'aise avec mon corps
 Je ne suis pas doué
 Je n'aime pas le sport
 Mes horaires de travail m'empêchent de m'inscrire à un cours ou un club de sport
 J'ai déjà un travail physiquement dur
 J'ai trop à faire et je n'ai pas le temps
 Je manque d'occasions ou il n'y a pas de club/de salle pour le sport qui me plairait
 Je n'ai pas envie/par paresse
 Je préfère faire d'autres choses
 Mes amis ne font pas de sport non plus
 Autre raison (veuillez préciser votre réponse dans l'encadré ci-bas)

Autre raison (précisez): _____

DANS UN CONTEXTE SPORTIF...

Question 78

Au cours des 12 derniers mois, avez-vous utilisé les substances, méthodes et produits suivants DANS UN CONTEXTE SPORTIF ?

| | Non | Oui, mais je ne l'utilise plus | Oui, mais je ne l'utilise que très rarement | Oui, je l'utilise à l'occasion | Oui, je l'utilise régulièrement |
|---|-----------------------|--------------------------------|---|--------------------------------|---------------------------------|
| Alcool | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Amphétamines | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Analgésiques (aspirine, panadol, paracétamol, ibuprofen...) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Anesthésiques locaux | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Bétabloquants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Boissons gazeuses (Coca-cola, Pepsi) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Boissons de récupération (Gatorade, Powerade, Isostar) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Boissons énergisantes (Red bull, energy drinks...) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Café | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Cocaïne | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Comprimés de caféine ou de nicotine | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Corticostéroïde | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Créatine | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Diurétiques | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Érythropoïétine (EPO) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Hormone de croissance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Marijuana (cannabis, haschisch, herbe) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Médicaments contre les allergies/asthme | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Médicaments décongestionnants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Stéroïdes anabolisants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Substances de type Méga-muscle | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Suppléments de protéines | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Suppléments de vitamines | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Autre substance (précisez ci-bas) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Autre substance (précisez nom et fréquence): _____

EN DEHORS D'UN CONTEXTE SPORTIF...

Question 80

Au cours des 12 derniers mois, avez-vous utilisé les substances, méthodes et produits suivants EN DEHORS D'UN CONTEXTE SPORTIF ?

| | Non | Oui, mais je ne l'utilise plus | Oui, mais je ne l'utilise que très rarement | Oui, je l'utilise à l'occasion | Oui, je l'utilise régulièrement |
|---|-----------------------|--------------------------------|---|--------------------------------|---------------------------------|
| Alcool | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Amphétamines | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Analgésiques (aspirine, panadol, paracétamol, ibuprofen...) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Anesthésiques locaux | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Bétabloquants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Boissons gazeuses (Coca-cola, Pepsi) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Boissons de récupération (Gatorade, Powerade, Isostar) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Boissons énergisantes (Red bull, energy drinks...) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Café | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Cocaïne | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Comprimés de caféine ou de nicotine | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Corticostéroïde | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Créatine | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Diurétiques | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Érythropoïétine (EPO) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Hormone de croissance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Marijuana (cannabis, haschisch, herbe) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Médicaments contre les allergies/asthme | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Médicaments décongestionnants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Stéroïdes anabolisants | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Substances de type Méga-muscle | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Suppléments de protéines | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Suppléments de vitamines | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Autre substance (précisez ci-bas) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Autre substance (précisez nom et fréquence): _____

Question 82**Pour vous, le dopage sportif représente...**

| | Pas du tout | Plutôt non | Plutôt oui | Tout à fait |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| Un moyen d'augmenter les performances | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un comportement malhonnête | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un moyen de mieux s'entraîner | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un danger pour la santé | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Une tricherie | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un risque de sanction | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Une obligation pour devenir un champion | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un moyen de mieux récupérer | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un moyen de mieux développer son corps | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Un moyen de gagner de l'argent | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Question 83**Avez-vous des connaissances/amis qui prennent des produits dopants dans le cadre de leur pratique sportive ?**

- Non
 Oui
 Je ne sais pas

Appréciation**Question 84****Veillez préciser votre opinion face à ces affirmations concernant le questionnaire que vous avez complété :**

| | Tout à fait d'accord | | | | Pas du tout d'accord |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Ce questionnaire m'a paru trop long | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Le sujet de ce questionnaire m'a paru pertinent | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| J'ai bien compris toutes les questions | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| J'ai pris plaisir à répondre à ce questionnaire | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Vous avez terminé le questionnaire

Plus qu'une question avant de quitter...

Question 85**S'il vous plaît, cochez ce qui vous convient dans les options suivantes :****Plusieurs choix possibles**

- Je voudrais recevoir les résultats de cette étude
 Je désire participer au tirage au sort des bons cadeaux de 25 CHF
 J'aimerais répondre à un second questionnaire dans 6-12 mois sous les mêmes condition que l'actuel
 Aucune de ces réponses

Question 86**Pour pouvoir répondre à vos choix, nous vous demandons de préciser ici une adresse électronique où nous pourrions vous rejoindre en lien avec cette étude:**

Non participation**Question 87****Veillez nous préciser la/les raison(s) pour laquelle/lesquelles vous ne désirez pas participer à notre questionnaire :****Plusieurs réponses possibles**

- Je n'en ai pas le temps
 Je déteste répondre à des questionnaires
 Je doute de la confidentialité de ce questionnaire
 Les compensations secondaires proposées ne sont pas assez élevées
 Je ne vois pas l'intérêt du sujet de ce questionnaire
 Autre(s) raison(s) - voir l'encadré

Autre raison (précisez): _____

Annex 2. Sample weighting procedure

The procedure used to recruit the sample did not control for important socio-demographic characteristics such as gender, age, or academic track. Consequently, some categories of these characteristics are overrepresented in the sample, while others are underrepresented. Even though this situation is not automatically a problem for the comparison of prevalence between sportive and non-sportive adolescents, results cannot be generalized to the whole adolescent population of the French-speaking part of Switzerland. Weights were then computed to solve this issue.

We retained five socio-demographic characteristics which appeared to have a potential impact on the results of the study:

- age in years (16 to 20)
- gender (female/male)
- canton of residence (Fribourg, Geneva, Neuchatel, Vaud, Valais, Jura, Bern)
- academic track (student/other)
- place of residence (rural/urban)

Considering the first four characteristics, cross-classified data (*Table 12*) were obtained from Swiss Statistics. Data were provided by the *Section Démographie et migration (population résidante permanente au milieu de l'année 2008, âge en années révolues)* regarding age, gender and Canton of residence. For educational status (*élèves par canton, niveau, sexe et âge, année scolaire 2007-2008*), data were provided by the *Section Processus de formation*.

Table 12. Crosstable of sociodemographic characteristics of adolescents aged 16-20 according to their Canton of residence (2008)

| | | Male | | | | | Female | | | | |
|-----------|---------|------|------|------|------|------|--------|------|------|------|------|
| | | Age | | | | | Age | | | | |
| | | 16 | 17 | 18 | 19 | 20 | 16 | 17 | 18 | 19 | 20 |
| Bern | student | 2779 | 1289 | 820 | 501 | 739 | 3042 | 1792 | 1307 | 1017 | 1329 |
| | other | 3006 | 4564 | 4949 | 5263 | 4921 | 2362 | 3630 | 4119 | 4459 | 4068 |
| | Total | 5785 | 5853 | 5769 | 5764 | 5660 | 5404 | 5422 | 5426 | 5476 | 5397 |
| Fribourg | student | 857 | 459 | 388 | 416 | 457 | 1042 | 686 | 693 | 784 | 824 |
| | other | 1004 | 1413 | 1431 | 1343 | 1300 | 869 | 1169 | 1129 | 1023 | 928 |
| | total | 1861 | 1872 | 1819 | 1759 | 1757 | 1911 | 1855 | 1822 | 1807 | 1752 |
| Vaud | student | 2794 | 1912 | 1744 | 1434 | 1564 | 3364 | 2520 | 1842 | 1532 | 1579 |
| | other | 1628 | 2573 | 2676 | 2921 | 2722 | 1009 | 1769 | 2351 | 2729 | 2650 |
| | total | 4422 | 4485 | 4420 | 4355 | 4286 | 4373 | 4289 | 4193 | 4261 | 4229 |
| Valais | student | 656 | 432 | 446 | 388 | 300 | 963 | 810 | 693 | 505 | 472 |
| | other | 1278 | 1514 | 1500 | 1609 | 1716 | 835 | 1010 | 1183 | 1394 | 1464 |
| | total | 1934 | 1946 | 1946 | 1997 | 2016 | 1798 | 1820 | 1876 | 1899 | 1936 |
| Neuchatel | student | 409 | 337 | 270 | 239 | 267 | 564 | 615 | 386 | 366 | 396 |
| | other | 682 | 745 | 825 | 830 | 748 | 525 | 501 | 741 | 744 | 687 |
| | total | 1091 | 1082 | 1095 | 1069 | 1015 | 1089 | 1116 | 1127 | 1110 | 1083 |
| Geneva | student | 1775 | 1432 | 1212 | 818 | 707 | 2136 | 1734 | 1547 | 1247 | 1215 |
| | other | 901 | 1275 | 1404 | 1761 | 1731 | 430 | 743 | 884 | 1183 | 1222 |
| | total | 2676 | 2707 | 2616 | 2579 | 2438 | 2566 | 2477 | 2431 | 2430 | 2437 |
| Jura | student | 162 | 108 | 60 | 35 | 23 | 239 | 149 | 105 | 53 | 31 |
| | other | 331 | 377 | 425 | 429 | 418 | 223 | 285 | 319 | 389 | 396 |
| | total | 493 | 485 | 485 | 464 | 441 | 462 | 434 | 424 | 442 | 427 |

The cantons of Vaud, Neuchatel, Geneva and Jura belonging entirely to the French-speaking part of the country, their data were directly entered in the computation of weights. On the other hand, for the three other cantons, we only considered the proportion of French-speaking inhabitants as given by Swiss Statistics for the year 2000 (<http://www.bfs.admin.ch/bfs/portal/fr/index/themen/01/05/blank/key/sprachen.html>), accessed March 1st 2010): Bern (7.6%), Fribourg (63.2%), Valais (62.8%). After correcting the data of these cantons in the preceding table by computing the percentage of French-speaking inhabitants, weights were computed for each category by dividing the observed proportion in the population by the corresponding sample proportion. We obtained this way a first weighting variable called `p_casa`.

Data for the last socio-demographic characteristic (place of residence) were not available from Swiss Statistics. We chose then to rely on data from the SMASH02 survey, a nationally representative sample of adolescents living in Switzerland in 2002. Among this sample 53.6% of the adolescents of the French-speaking part of the country were living in a rural area and 46.4% in an urban area. A second weighting variable called `p_hab` was obtained by dividing these percentages by the corresponding figures obtained from our sample.

The final weights were then computed by multiplying the two preceding weighting variables `p_casa` and `p_hab`. By doing so, we implicitly considered that place of residence was independent from the four other characteristics. All analyses were subsequently performed using these final weights. This procedure does not insure that our sample is perfectly representative of the whole adolescent population of the French-speaking part of Switzerland, but at least the distributions of the five socio-demographic characteristics used during the weighting procedure are statistically identical in the population and in the sample.

It is worth to note that the weighting procedure does not affect the total sample size. It only modifies the respective importance of each subject in the sample. Due to the procedure used for weighting, subjects with missing data on at least one of the five socio-demographics characteristics had to be excluded. Consequently, 1247 weighted subjects were finally available for statistical analyses.

Annex 3. Sports type

| Sport | Type | Sport | Type |
|--------------------------------|-------------|------------------------------|-------------|
| Aikido | Individual | Mountain biking | Individual |
| Air Soft | Team | Mountaineering | Individual |
| Alpine Skiing | Individual | Muai thai | Individual |
| American Football | Team | Nanbudo | Individual |
| Aqua Gym | Individual | Orienteering | Individual |
| Athletics | Individual | Parachute | Individual |
| Badminton | Individual | Paragliding | Individual |
| Basketball | Team | Petanque | Individual |
| Beach Volleyball | Team | Pilates / Yoga | Individual |
| Bowling | Individual | Rollerblading | Individual |
| Boxing | Individual | Rowing | Individual |
| Brazilian Jiu-jitsu | Individual | Rugby | Team |
| Broomball | Team | Running | Individual |
| Capoeira | Individual | Scuba Diving | Individual |
| Cheerleading / Twirling | Team | Sealskin | Individual |
| Circus | Individual | Shooting | Individual |
| Climbing | Individual | Skateboarding | Individual |
| Cycling | Individual | Skiing | Individual |
| Dancing | Individual | Snowboarding | Individual |
| Diving | Individual | Spinning | Individual |
| Fencing | Individual | Squash | Individual |
| Figure Skating | Individual | Surfing | Individual |
| Fitness / Bodybuilding | Individual | Swimming | Individual |
| Floor Ball | Team | Synchronized Swimming | Individual |
| Foot Tennis | Team | Table Tennis | Individual |
| Football | Team | Taekwondo | Individual |
| Golf | Individual | Tchouk ball | Team |
| Gymnastics | Individual | Tennis | Individual |
| Handball | Team | Trampoline | Individual |
| Horse Riding | Individual | Triathlon | Individual |
| Ice Hockey | Team | Sailing | Individual |
| Inline Hockey | Team | Vo Vietnam | Individual |
| Judo | Individual | Volleyball | Team |
| Karate | Individual | Wakeboarding | Individual |
| Kayak | Individual | Wakeskating | Individual |
| Kendo | Individual | Walking | Individual |
| Kenpo | Individual | Water Polo | Team |
| Kick Boxing | Individual | Water Skiing | Individual |
| Krav Maga | Individual | Wind Surfing | Individual |
| Kung-Fu | Individual | Yoseikan Budo | Individual |
| Motocross | Individual | | |