

Supplementary Material S1

Supplementary information on methods

Participants

We took advantage of data already collected via C-SURF, a general population-based cohort of young Swiss men aimed to investigate the risk and protective factors for substance use and other reinforcing behaviours across young adulthood. In Switzerland, all young men are evaluated in military recruitment centres to determine their eligibility for military, civil or no service. This evaluation is mandatory for all Swiss men around age 19. C-SURF participants were enrolled in three out of six military recruitment centres (covering 21 of the 26 Swiss cantons) while they were attending the evaluation. There were no exclusion criteria; all young men reporting in these three recruitment centres between August 23 2010 and November 15 2011 were eligible for participation. Thus, contrary to most studies on substance in young adults, consisting mainly of college students, C-SURF sample is non-selective and includes all the social strata of the general population of young men of this age. However, women were not included in the sample because military service is not mandatory for females and the small number who decide to enrol on a voluntary basis do not mirror the general population of women of this age. Questionnaires were sent privately to the participants and confidentiality was assured to avoid influence of the army on their responses. During enrolment in 2010-2011, 7556 young men gave their written consent to participate in the study. Over the past ten years, cohort participants have completed four assessments, i.e. self-reported online or paper and pencil questionnaires covering, substance use, behavioural addictions, psychological, social, friends and family factors, when they were 20, 21.5, 25 and 28 years old. More detailed information on C-SURF design, sampling, participation, questionnaires and publications has been published elsewhere

(Gmel et al., 2015; Studer, Baggio, et al., 2013; Studer, Mohler-Kuo, et al., 2013; <https://www.c-surf.ch/en/1.html>). The fourth wave questionnaire was sent to 5854 (77.5%) cohort members who completed at least one of the first three questionnaires. Silent refusers (n = 1028), i.e. those who did not complete at least one of the first three questionnaires and active refusers (n = 674), i.e. those who completed at least one of the three first questionnaires but did not want to participate to additional questionnaires, were not sent the fourth wave questionnaire. In the year before the COVID-19 outbreak, i.e. between 1 April 2019 and 14 February 2020 (one month before the announcement of the introduction of measures to limit the propagation COVID-19 by the Swiss Federal Council), 5068 (86.6%) participants completed the fourth and final C-SURF questionnaire. Among them, 4407 (86.9%) participants completed this *the pre-COVID-19 assessment* online. All these 4407 participants were invited, by email, to complete an additional online questionnaire (*the COVID-19 assessment*) on the COVID-19 outbreak's impact on substance use and other reinforcing behaviours. The COVID-19 assessment was designed to replicate the C-SURF measurements in the pre-COVID-19 assessment, as well as incorporating additional sociodemographic and work-related measurements. Potential participants received an email invitation and up to two reminders. The first invitation and the second reminder were accompanied by a short telephone text message informing them that an invitation to complete a questionnaire had been sent to their email account. The 18 potential participants whose email address was not available in the contact list were only sent a short text message invitation. The invitation contained a presentation of the study's aims and rationale. Electronic informed consent was required.

The Human Research Ethics Committee of the Canton of Vaud approved the study (Commission cantonale d'éthique de la recherche sur l'être humain, CER-VD), protocol 15/07 (PB_2018-00296).

Between 13 May and 8 June 2020, 2279 (51.7%) of our potential participants fully completed the questionnaire (median time = 16 minutes), 65 (1.5%) only completed the first two-thirds of the questionnaire but including the questions on substance use and other reinforcing behaviours and sociodemographic and work-related characteristics used in the present study, 201 (4.6%) completed less than the first two-thirds of the questionnaire (e.g. not all the questions used in the present study completed), and 1862 (42.3%) did not take part.

Measures

Substance use and other reinforcing behaviours.

Both assessments (pre-COVID-19 and COVID-19) asked participants to answer the same questions about their substance use and other reinforcing behaviours. The only difference between the assessments was the reference period. The reference periods were “in the previous 12 months” for the pre-COVID-19 assessment and “since the start of the COVID-19 measures” for the COVID-19 assessment. This wording was chosen to reflect potential regional differences in measures: some cantons took measures earlier than others and before national measures were enforced. All variables were coded to reflect weekly use. Alcohol use was assessed using questions about quantity (number of standard drinks per drinking day) and frequency (number of days per week with alcohol use, 2–3 times a month [coded 0.58], once a month or less [coded 0.12]). Weekly drinking volume was computed as

the product of quantity and frequency of alcohol use. Weekly frequency of heavy episodic drinking (HED) was assessed by asking participants how often they drank six or more standard drinks on one occasion (never [coded 0], less than monthly [coded 0.12], monthly [coded 0.23], weekly [coded 1], daily or almost daily [coded 6.5]). Participants were provided with a visual aid for standard drinks. A standard drink was defined as containing approximately 10–12 g of pure alcohol, equivalent to drinks served in bars and restaurants in Switzerland.

Cigarette use was assessed using quantity (number of cigarettes used per smoking day) and frequency (never [coded 0], once a month or less [coded 0.12], 2–3 days a month [coded 0.58], 1–2 days a week [coded 1.5], 3–4 days a week [coded 3.5], 5–6 days a week [coded 5.5], every day [coded 7]) questions. The weekly number of cigarettes smoked was computed as the product of quantity and frequency of cigarette use.

Weekly frequency of illegal cannabis ($\geq 1\%$ THC) use was assessed by asking participants how often they used it (never [coded 0], once a month or less [coded 0.12], 2–4 times a month [coded 0.69], 2–3 times a week [coded 2.5], 4–5 times a week [coded 4.5], daily or almost daily [coded 6.5]).

Gaming and watching TV series were assessed with quantity (time spent per session gaming or watching TV series) and frequency (never [coded 0], sometimes [coded 0.12], 1–3 times a month [coded 0.46], 1–2 a week [coded 1.5], 3–4 times a week [coded 3.5], daily or almost daily [coded 6]) questions. Weekly times spent gaming and watching TV series were computed as the product of their respective quantity and frequency of use. Watching internet pornography was assessed using questions about quantity (time spent per watching day: almost none [coded 0.17], < one hour [coded 0.5], 1 to < 2 hours [coded 1.5], 2 to < 3

hours [coded 2.5], 3 to < 4 hours [coded 3.5], 4 hours or more [coded 5]) and frequency (number of days watching per month). Weekly time spent watching internet pornography was computed as the product of quantity and frequency of use.

Sociodemographic and work-related characteristics.

The COVID-19 assessment asked participants how many hours a week they spent working before and after the start of the COVID-19 measures. Changes in working hours were computed and recoded into decreased working hours (decrease of more than 4 hours a week), almost no change (change between -4 and +4 hours a week) and increased working hours (increase of more than 4 hours a week). Swiss employment law fixes the maximum working week at 45 or 50 hours (depending on the sector; Swiss Federal Administration, 2018), and the mean number of working hours for full-time jobs is 41 hours a week (Swiss Federal Administration, 2020).

Participants were also asked how many hours a week they spent working from home before and after the start of the COVID-19 measures. Changes in the hours spent working from home were computed and recoded into fewer working hours at home (decrease of more than 4 hours a week), almost no change (change between -4 and +4 hours a week), and more working hours at home (increase of more than 4 hours a week).

Participants were asked how their work situation had been since the start of the COVID-19 measures. Response options were “I was/am unemployed because of COVID-19”, “I was/have been temporarily laid off (i.e. partial/temporary unemployment)”, “I am self-

employed and have lost money because of COVID-19” and “My work situation has not changed much”. Responses were recoded to reflect deterioration in a work situation (being unemployed, temporarily unemployed and losing money were coded 1, no change was coded 0).

Two questions asked whether participants worked in contact with potentially infected people: “Are you currently working as a health worker in contact with potentially infected people?” and “Do you work in regular contact with potentially infected people (e.g. working in a grocery store, in public transportation, as a policeman)?” Response options were “No”, “Yes, and I am often in contact with potentially infected people”, “Yes, and I am sometimes in contact with potentially infected people,” and “Yes, but I am almost never in contact with potentially infected people”. Responses were recoded to dichotomise between being a health worker or another worker in contact with potentially infected people (yes, often and sometimes, coded 1; no, almost never, coded 0,).

Participants were also asked whether they were called up to their military or civil protection units in response to the COVID-19 crisis, as Switzerland mobilised some of these forces to help workers in the healthcare and emergency services sectors.

Participants were also asked whether they had children and whether they were living alone. Participants’ age during COVID-19 crisis and whether they were living in German- or French-speaking regions were also assessed.

References.

- Gmel, G., Akre, C., Astudillo, M., Bähler, C., Baggio, S., Bertholet, N., . . . Wang, J. (2015). The Swiss Cohort Study on Substance Use Risk Factors – Findings of two Waves. *SUCHT*, 61(4), 251-262. doi:10.1024/0939-5911.a000380
- Studer, J., Baggio, S., Mohler-Kuo, M., Dermota, P., Gaume, J., Bertholet, N., . . . Gmel, G. (2013). Examining non-response bias in substance use research—Are late respondents proxies for non-respondents? *Drug and Alcohol Dependence*, 132(1), 316-323. doi:<https://doi.org/10.1016/j.drugalcdep.2013.02.029>
- Studer, J., Mohler-Kuo, M., Dermota, P., Gaume, J., Bertholet, N., Eidenbenz, C., . . . Gmel, G. (2013). Need for Informed Consent in Substance Use Studies—Harm of Bias? *Journal of Studies on Alcohol and Drugs*, 74(6), 931-940. doi:10.15288/jsad.2013.74.931
- Swiss Federal Administration. (2018). Loi fédérale sur le travail dans l'industrie, l'artisanat et le commerce. Retrieved from <https://www.admin.ch/opc/fr/classified-compilation/19640049/index.html>
- Swiss Federal Administration. (2020). Schweizerische Arbeitskräfteerhebung und abgeleitete Statistiken: Arbeitszeit im Jahr 2019. Retrieved from <https://www.bfs.admin.ch/bfs/fr/home/actualites/quoi-de-neuf.assetdetail.12667118.html>

Supplementary Material S2.

Differences between respondents (n = 2344) and non-respondents (n = 2063) to the COVID-19 assessment

	Respondents (n = 2344)		Non-respondents (n = 2063)		Difference
	M	SD	M	SD	M (95% BCI)
Substance use					
Drinking volume (weekly number of standard drinks)	6.83	12.45	6.58	8.88	-0.25 (-0.92, 0.35)
Heavy episodic drinking (weekly frequency)	0.26	0.57	0.28	0.66	0.02 (-0.01, 0.06)
Cigarettes (weekly number)	16.51	38.35	21.64	44.18	5.12 (2.58, 7.61)
Illegal cannabis use (weekly frequency)	0.33	1.23	0.48	1.50	0.15 (0.07, 0.23)
Other reinforcing behaviours					
Gaming (hours per week)	4.10	7.42	3.84	7.71	-0.26 (-0.71, 0.18)
Watching TV series (hours per week)	4.73	6.02	4.51	6.15	-0.22 (-0.56, 0.12)
Watching internet pornography (hours per week)	4.60	7.09	4.65	8.48	0.05 (-0.39, 0.50)

Note. M = Mean. SD = Standard deviation. BCI = bias-corrected bootstrap confidence intervals. Means in bold

are significant according to 95% bootstrap confidence intervals.

Supplementary Material S3. Estimated change in substance use and other reinforcing behaviours from before to during the COVID-19 crisis, based on a latent change score model (including non-respondents, n = 4407)

Change in	Estimate	Bias-corrected percentile bootstrap confidence intervals	
		2.5%	97.5%
Weekly drinking volume (n standard drinks)	-0.98	-1.34	-0.66
Weekly frequency of heavy episodic drinking	-0.05	-0.08	-0.03
Weekly number of cigarettes	-1.10	-2.18	-0.05
Weekly frequency of illegal cannabis use	0.02	-0.01	0.06
Weekly hours spent gaming	3.06	2.73	3.40
Weekly hours spent watching TV series	3.60	3.28	3.92
Weekly hours spent watching internet pornography	0.23	-0.05	0.52

Note. Coefficients in bold are significant according to bias-corrected 2.5% and 97.5% percentile bootstrap confidence intervals.

Supplementary Material S4. Sensitivity analysis of correlations between changes in substance use and other reinforcing behaviours, based on a latent change score model (including non-respondents, n = 4407)

	2. Weekly frequency of heavy episodic drinking	3. Weekly number of cigarettes	4. Weekly frequency of illegal cannabis use	5. Weekly hours spent gaming	6. Weekly hours spent watching TV series	7. Weekly hours spent watching internet pornography
1. Weekly drinking volume	0.33	0.13	0.08	-0.01	0.02	0.09
2. Weekly frequency of heavy episodic drinking		0.05	0.09	-0.01	0.01	0.07
3. Weekly number of cigarettes			0.00	0.01	0.11	0.01
4. Weekly frequency of illegal cannabis use				0.01	0.09	0.05
5. Weekly hours spent gaming					0.09	0.08
6. Weekly hours spent watching TV series						0.01
7. Weekly hours spent watching internet pornography						

Note. Correlations in bold are significant according to bias-corrected 2.5% and 97.5% percentile bootstrap confidence intervals (not shown).

Supplementary Material S5. Sensitivity analysis of sociodemographic and work-related characteristics predicting change in substance use and other reinforcing behaviours, based on a latent change score model (including non-respondents, n = 4407)

	Weekly drinking volume	Weekly frequency of heavy episodic drinking	Weekly number of cigarettes	Weekly frequency of illegal cannabis use
	b (2.5%, 97.5% BCI)	b (2.5%, 97.5% BCI)	b (2.5%, 97.5% BCI)	b (2.5%, 97.5% BCI)
Change in working hours (ref. almost no change ^a)				
Increase ^b	-0.56 (-1.70, 0.60)	-0.02 (-0.08, 0.04)	-2.19 (-6.47, 1.52)	0.04 (-0.13, 0.21)
Decrease ^c	0.83 (-0.11, 1.73)	0.05 (-0.01, 0.12)	1.74 (-0.43, 4.15)	0.01 (-0.06, 0.08)
Change in time spent working at home (ref. almost no change ^a)				
Increase ^b	0.03 (-0.72, 0.83)	0.02 (-0.04, 0.08)	-0.63 (-2.54, 1.32)	0.01 (-0.06, 0.08)
Decrease ^c	1.03 (-0.35, 2.44)	0.01 (-0.16, 0.17)	3.64 (-0.70, 7.82)	-0.07 (-0.22, 0.05)
Deterioration in work situation (ref. no)	0.71 (-0.32, 1.66)	0.03 (-0.03, 0.08)	2.79 (-0.01, 6.01)	0.02 (-0.06, 0.11)
Healthcare worker in contact with potentially infected people (ref. no)	-0.51 (-1.73, 0.67)	0.01 (-0.05, 0.07)	3.64 (1.03, 6.87)	-0.01 (-0.21, 0.18)
Other worker in contact with potentially infected people (ref. no)	0.39 (-0.32, 1.15)	-0.03 (-0.09, 0.02)	-0.02 (-2.40, 2.13)	-0.05 (-0.13, 0.02)
Called up for military or civil service (ref. no)	0.41 (-0.59, 1.38)	-0.01 (-0.08, 0.09)	0.22 (-3.11, 2.98)	0.01 (-0.10, 0.13)
Being a father (ref. no)	-0.11 (-1.75, 1.47)	-0.01 (-0.09, 0.06)	1.80 (-1.21, 4.90)	-0.05 (-0.17, 0.05)
Living alone (ref. no)	-0.15 (-1.21, 0.81)	-0.01 (-0.08, 0.07)	0.70 (-2.23, 3.20)	0.01 (-0.06, 0.09)
German-speaking regions (ref. French-speaking)	0.33 (-0.41, 1.09)	0.03 (-0.03, 0.09)	-2.96 (-4.82, -1.07)	0.03 (-0.03, 0.09)
Age before start of COVID-19 measures	0.19 (-0.22, 0.50)	0.02 (-0.01, 0.03)	0.42 (-0.37, 1.10)	-0.01 (-0.05, 0.02)

Supplementary Material S5. continued

	Weekly hours spent gaming	Weekly hours spent watching TV series	Weekly hours spent watching internet pornography
	b (2.5%, 97.5% BCI)	b (2.5%, 97.5% BCI)	b (2.5%, 97.5% BCI)
Change in working hours (ref. almost no change ^a)			
Increase ^b	0.25 (-1.02, 1.57)	-1.02 (-2.17, 0.08)	0.77 (-0.33, 2.05)
Decrease ^c	1.37 (0.61, 2.19)	1.40 (0.65, 2.18)	0.36 (-0.30, 1.05)
Change in time spent working at home (ref. almost no change ^a)			
Increase ^b	-0.45 (-1.14, 0.20)	-0.32 (-0.97, 0.32)	-0.36 (-0.90, 0.18)
Decrease ^c	1.12 (-0.57, 3.24)	0.58 (-0.95, 2.50)	-0.60 (-2.22, 1.08)
Deterioration in work situation (ref. no)	1.45 (0.55, 2.43)	2.11 (1.24, 3.11)	0.20 (-0.58, 1.06)
Healthcare worker in contact with potentially infected people (ref. no)	-0.73 (-2.09, 0.93)	-0.66 (-2.11, 0.82)	-0.30 (-1.34, 0.74)
Other worker in contact with potentially infected people (ref. no)	-0.80 (-1.60, 0.09)	0.13 (-0.69, 0.95)	0.29 (-0.40, 1.02)
Called up for military or civil service (ref. no)	-0.87 (-1.85, 0.16)	0.16 (-0.85, 1.26)	-0.17 (-1.19, 0.87)
Being a father (ref. no)	-1.64 (-2.41, -0.81)	-0.67 (-1.69, 0.40)	-0.12 (-0.90, 0.66)
Living alone (ref. no)	0.72 (-0.13, 1.62)	0.42 (-0.44, 1.26)	0.99 (0.26, 1.77)
German-speaking regions (ref. French-speaking)	-1.76 (-2.40, -1.08)	-0.80 (-1.44, -0.15)	0.74 (0.16, 1.33)
Age before start of COVID-19 measures	0.11 (-0.13, 0.38)	0.12 (-0.15, 0.41)	-0.26 (-0.52, -0.01)

Note. Ref. = reference. B = coefficient of association. BCI = bias-corrected percentile bootstrap confidence intervals. Coefficients in bold are significant according to BCI.

^abetween -4 and +4 hours a week. ^b, ^c> 4 hours a week.