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The psychological impact of the COVID-19 crisis on young Swiss men participating in a cohort study

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Summary

AIMS: The COVID-19 pandemic caused many disturbances to daily life worldwide and may also have significantly affected people's psychological well-being. The present study aimed to describe the psychological impact of the crisis on our sample of young Swiss men and to examine differences due to their linguistic region, experiencing COVID-19 symptoms and living arrangements.

METHODS: Based on an ongoing cohort study, we assessed a general-population sample of young Swiss men (n = 2345; average 29 years old) shortly before (from April 2019) and early on during the COVID-19 crisis (between 13 May and 8 June 2020). This was a unique opportunity to estimate the crisis' psychological impact in the form of depression, perceived stress and sleep quality (assessed before and during COVID-19), and any crisis-induced fears, isolation or psychological trauma. Associations of psychological impact with living arrangements, experiencing COVID-19 symptoms and linguistic region (German-speaking vs French-speaking) were investigated using linear regression models.

FINDINGS: By the time participants responded to our questionnaire, less than 1% had been tested positive for COVID-19, 2.6% had been tested negative and 14.7% had had some COVID-19 symptoms but had not been tested. About 8.2% of the sample reported at least some symptoms of psychological trauma (≥24 points on the Impact of Event Scale). On average, participants reported higher levels of fear for others (43.6% at least moderate) and economic fear (12.7% at least moderate) than fear for themselves (5.8% at least moderate). Those living alone and those who reported having COVID-19 symptoms themselves, or knowing someone with symptoms, reported higher overall psychological impact in the form of depression, perceived stress, sleep quality, psychological trauma, fear and isolation. Associations with linguistic region varied by outcome, with higher levels of depression and fear in French-speaking regions and higher levels of perceived stress and isolation in German-speaking regions.

INTERPRETATION: The crisis had a considerable impact on the psychological well-being of our sample of young Swiss men, and some groups were more affected than others: those living alone and those who had shown COVID-19 symptoms themselves or had known someone with symptoms may have felt a greater psychological impact from the crisis. Supporting those at a higher risk of psychological consequences in such crises, whether through structural measures or via individual support, should be an important aspect of crisis management and could help reduce the overall impact of the current pandemic on Switzerland's population.

Introduction

The SARS-CoV-2 (COVID-19) pandemic is causing many disturbances to daily life, in Switzerland and worldwide. Most obviously, these disturbances have come in the form of the risks to physical health due to possible infection. However, they have also manifested themselves in reduced psychological well-being due to fear for one's own health and that of others, as well as in the stress caused because of measures taken to slow the spread of the coronavirus and the ensuing economic uncertainty. The present study aimed to investigate the psychological impact of the first wave (winter/spring 2020) of the COVID-19 crisis on a sample of young men (mean age 29) from the German- and French-speaking regions of Switzerland. Furthermore, it sought to examine which subgroups (according to linguistic region, living arrangements and experiencing COVID-19 symptoms) were most affected by the crisis' psychological impact. Participants were part of a cohort study that started in 2010, when they were about 19 years old, and data collection for the fourth assessment was ongoing until the beginning of the crisis. The cohort study thus offered a unique opportunity to recontact participants during the COVID-19 crisis in order to analyse its psycho-

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logical impacts on young Swiss men in general and on specific subgroups.

In February 2020, the coronavirus was spreading rapidly among Switzerland's neighbours, especially Italy, which was then the European country most affected by the coronavirus. Italy was the first European country to enter a partial lockdown on 23 February 2020 and a nationwide lockdown on 9 March 2020 [1]. This situation caused great concern about the virus spreading to Switzerland. At the beginning of March 2020, case numbers started to increase in Switzerland, with 3747 confirmed cases and 43.9 cases per 100,000 inhabitants reported by 16 March [2]. Despite its relatively small population, Switzerland was among the ten countries worldwide with the highest cumulated case numbers [3]. On 16 March, Switzerland's government took drastic measures to halt the spread of the coronavirus (henceforth called "COVID measures"), such as closing schools, restaurants, non-essential shops, tourism sites and others, and it introduced social/physical distancing measures (maintaining 2 metres' distance and limiting groups to no more than five people). In line with Switzerland's political culture, more severe restrictions on individual freedoms were not made obligatory, but staying at home, working from home and avoiding public transport were strongly recommended. Therefore, Switzerland was never subject to a stay-at-home order. Nevertheless, Switzerland's COVID measures had, and continue to have, a massive impact on the economy and on the population's daily life.

Given experiences of earlier crises, the COVID-19 pandemic is expected to affect the population's mental health negatively [4-6]. A systematic review of studies published up until May 2020 estimated the prevalence of stress during the COVID-19 crisis to have been 29.6%, with a 31.9% prevalence of anxiety and 33.7% for depression [7]. An umbrella review summarising the evidence from the COVID-19 crisis so far found that social isolation caused by the measures used to counter the pandemic was associated with depression, anxiety, psychological distress, post-traumatic stress disorder, insomnia, fear and other adverse mental health outcomes [8]. A number of studies have also reported a high psychological impact in Europe: a study in Portugal reported high levels of anxiety and depression during the early pandemic [9], and a study in Spain reported that 72.0% of participants were at risk of psychiatric morbidity or distress [10]. A study at the end of Italy's lockdown also reported prevalence rates of 24.7% for depression and 23.2% for anxiety [1]. In Austria, symptoms of depression and anxiety were estimated to be 21% and 19%, respectively, higher than in epidemiological data collected before the crisis [11]. In the Swiss Corona Stress study, 49.6% of participants reported a subjective increase in their stress levels during the lockdown, and 57% also reported an increase in depressive symptoms [12].

The impact of a crisis can be different among different demographic groups. The French-speaking regions of Switzerland had about three times more confirmed COVID-19 cases per 100,000 inhabitants than its German-speaking regions at the beginning of the pandemic [2]; thus they may have been more psychologically affected by the crisis. A study in the United States found that fears and worries about COVID-19 were concentrated in places with the largest number of cases [13]. However, measures to reduce the spread of COVID-19 were the same across Switzerland, and spreading the virus across the short distances from one part of a relatively small country to another was likely; therefore, differences in the psychological impact on linguistic regions may have been smaller than one might expect from the difference in case numbers.

As the COVID-19 measures mostly confined people to home, including, for many, working from home, people with different living arrangements may have experienced things very differently. For example, those living alone may have had very few regular real-life contacts and thus experienced more feelings of isolation. Those with children, however, may have faced additional childcare and home-schooling responsibilities and may thus have experienced more stress. A study in the United States found that families with children under 18 years old reported higher levels of fear and worry during COVID-19 [13], whereas a study in Italy found that having children was associated with less depression and anxiety than not having children [14]. Those who personally experienced COVID-19 symptoms, or knew someone who had, might also be more affected [14], as might those who went into the pandemic with a pre-existing disease that might increase their chances of a more severe course of COVID-19 [14].

Aims

This study's primary aim was to describe participants' experiences of COVID-19 symptoms and the psychological impact of the crisis, which was investigated as consequences with no mention of COVID-19 as a potential cause (depression, perceived stress and sleep quality) and consequences with specific mention of COVID-19 as a cause (psychological trauma, worry and isolation). The secondary aim was to test differences in the psychological impact of the COVID-19 crisis according to participants' experiences of COVID-19 symptoms, being in an at-risk group for COVID-19, and their living arrangements. We hypothesise the psychological impact to be greatest in those that experienced COVID-19 symptoms, in those that were in the risk group, and in those living alone. The third aim was to test differences in the experience of COVID-19 symptoms and psychological impact between Switzerland's linguistic regions (German-speaking vs French-speaking). Our hypothesis was that French-speaking participants would experience somewhat greater psychological impact because the case numbers were higher in the French-speaking region. Nevertheless, given that the measures to combat the pandemic were the same across Switzerland, we would not expect large differences between the French and the German-speaking region.

Method

Sample

The sample used for the present study was based on two assessments — before and during the COVID-19 crisis — drawn from the Cohort Study on Substance Use Risk Factors (C-SURF). This cohort study was designed to examine substance use patterns and related factors among young Swiss men [15, 16]. Participants were about 19 years old when they were recruited, and data collection for the fourth assessment (the pre-COVID assessment) was

ongoing at the beginning of the COVID-19 crisis. Enrolment for the baseline assessment took place in 2010 during the mandatory recruitment procedures, which test all young Swiss men's fitness for military service [17], with rare exceptions for those with a severe disability. Thus, the sample can be considered representative of its source population. Young men were enrolled at three of the six national military recruitment centres (in Lausanne, Windisch and Mels), which cover 21 of Switzerland's 26 cantons.

The questionnaire was filled out either in French or German based on the linguistic region of the participants. The Human Research Ethics Committee of the Canton of Vaud approved the research protocol for the C-SURF parent study (whose fourth assessment was the pre-COVID assessment) as well as the present COVID study (protocol 15/07 PB_2018-00296). A total of 4407 participants replied to the pre-COVID assessment questionnaire online between April 2019 and 14 February 2020, and they were invited to participate in the COVID study by e-mail and SMS on 13 May. Data collection was open until 8 June. Data were collected using the LimeSurvey online survey tool [18]. Participants had to renew their informed consent to participate in the COVID study. A total of 2548 (57.8%) participants agreed to participate in the COVID study, of whom 2415 completed at least the first section about their experiences of COVID-19 symptoms and their personal situation. These 2415 young men formed the base sample for the present study. Participants who had missing values on one of the predictor variables were excluded from the sample, leaving an effective sample of 2345. The effective numbers for the regression analyses were lower (from 2212 for perceived stress to 2260 for fear; see table 2) due to missing values among the dependent variables, which were mainly because outcome variables were noted towards the end of the questionnaire and some participants only partially completed the questionnaire. Participants were assigned a five-digit identification number at the baseline assessment, which was used to identify and match their questionnaires in later assignments.

The psychological impact of the COVID-19 crisis (outcome variables)

Psychological consequences with no mention of COVID-19 as the cause (measured before and during COVID-19)

These questions were asked in the same form in the pre-COVID assessment and COVID assessment questionnaires and did not explicitly mention COVID-19 as a cause.

Major depression symptoms in the previous two weeks were measured based on the 12-item Major Depression Inventory (WHO–MDI) [19, 20], which was recoded into ten criteria to create a score ranging from 0 to 50. Two criteria (reduced or increased appetite and feeling restless or subdued/slowed down) were measured with two items each and the value of the highest score was used. A cut-off of 21 was used for at least mild symptoms of major depression [19, 20]. Cronbach's alpha for this scale was 0.906 at the pre-COVID assessment and 0.914 during COVID-19.

Perceived stress in the previous month was measured using the four-item short version of the Perceived Stress Scale [21], with item responses ranging from 0 ("never") to 6 ("very often"). For descriptive purposes, we report the prevalence of feeling on average "sometimes" stressed across the four items (which corresponds to a cut-off of 8). Cronbach's alpha for the perceived stress scale was 0.659 at the pre-COVID assessment and 0.656 during COVID.

Sleep quality in the previous month was measured using one question about the overall quality of sleep from the Pittsburgh Sleep Quality Index [22]. Response options ranged from 0 ("very bad") to 3 ("very good"). A cut-off at 1 ("bad") was used.

Psychological consequences with mention of COVID-19 as the cause (measured only during the COVID-19 crisis)

These measurements assigned COVID-19 as the cause of the psychological consequences through formulations such as "due to COVID, I experienced…"

Psychological trauma due to COVID-19 was measured using the 22-item Impact of Event Scale (IES, [23]) as perceived over the previous 7 days. Response options went from 0 ("not at all") to 4 ("extremely"), and the sum for the total scale ranged from 0 to 88. A cut-off of 24 points was used as a proxy for "at least some symptoms of psychological trauma" [24], and a cut-off of 33 was used as a proxy for "probable psychological trauma" [25]. Cronbach's alpha for the total scale was .919.

Three different domains of fear due to COVID-19 were assessed: fear for oneself (two items), fear for others (three items), and economic fear (two items). Items were adapted from questions from the Swiss Corona Stress Study [26], and asked participants the degree to which they had been afraid of the negative consequences of the COVID-19 crisis since the beginning of Switzerland's COVID measures. Response options ranged from 0 ("not at all") to 4 ("extremely"). Cronbach's alpha for the total fear scale was 0.731. Isolation due to COVID-19 was measured using three questions asking how often participants had felt isolated since the beginning of Switzerland's COVID measures. Response options ranged from 0 ("never") to 3 ("very often"), and ≥2 ("often" or "very often") was used as a cut-off. These questions were adapted from [27]. Cronbach's alpha for the isolation scale was 0.773.

Consequences used only for descriptive statistics

Difficulties in coping with the COVID-19 situation were measured using seven items. Questions asked to which degree participants found the COVID-19 situation difficult for them, for example, social distancing and limitations on freedom of movement. These questions were adapted from the Swiss Corona Stress Study [26]. Response options ranged from –2 ("totally disagree") to +2 ("totally agree"), and +1 ("agree") or more was used as cut-off. Boredom due to COVID-19 measures was measured using two questions asking how often participants had felt bored since the beginning of the COVID-19 situation. These questions were adapted from [27]. Response options ranged from 0 ("never") to 3 ("very often"), and 2 ("often") or more was used as a cut-off.

Predictors of psychological impact

Participants' living arrangements were assessed using one question, and response options were recoded to living

alone, living with a partner, living with a partner and children, and living with other family members or other people. These questions were adapted from [27].

Participants were also asked about their experiences of COVID-19 symptoms (no symptoms, symptoms but no test, tested negative, tested positive), the severity of their COVID-19 symptoms and the COVID-19 symptoms experienced by others in their household or social circle. They were also asked whether they were part of an at-risk group with respect to severe COVID-19 because they suffered from one of the following diseases that were believed to increase risk for severe COVID-19 disease at the time: cancer, diabetes, immune system weakness, hypertension, cardiovascular disease, chronic respiratory disease. These questions were adapted from [27].

Linguistic regions were defined by the language (German or French) in which participants filled in the C-SURF study questionnaires. In the present study, age was only used as a covariate and was defined as the age, in years, when participants replied to the COVID study.

Statistical analysis

For our main analysis, continuous scores of the measures were used, however, we report plausible cut-offs for descriptive purposes to give a better overview of the results and to provide the reader with a better idea what the scales meant in terms of impact on our sample. For categorical variables, the absolute (n) and relative frequency (in %) per category is reported and for continuous variables, the number of respondents (n), mean and standard deviation (SD) are reported. For table 3, median and interquartile range are additionally reported. Paired t-tests were used to test for mean differences between the pre-COVID and COVID assessments in outcomes which had no mention of COVID-19 as a cause.

Linear regression models were used to assess associations of consequences which had no mention of COVID-19 as a cause (depression, perceived stress, sleep quality) and consequences for which COVID-19 was mentioned as a cause (psychological trauma, fears and isolation) with predictors from the COVID assessment (linguistic region, living arrangements, experiencing COVID-19 symptoms, being in an at-risk group). Outcomes were z-standardised (mean = 0, SD = 1) before the analysis to allow for better comparability of coefficients' effect sizes: coefficients correspond to the differences in SDs of the outcome between an exposure group and a reference group. Separate models were calculated for each predictor. All regressions were adjusted for a participant's age and linguistic region. Models for consequences which had no mention of COVID-19 as a cause (depression, perceived stress, sleep quality) and were measured at the pre-COVID assessment and during COVID were tested with additional adjustments for their respective levels in the pre-COVID assessment questionnaire (baseline adjustment). Analyses without baseline adjustment for consequences which had no mention of COVID-19 as a cause are presented in the appendix

Tests for non-normality (Kolmogorov-Smirnov and Shapiro-Wilk) indicated significant non-normality for all outcomes. However, we decided to use a linear model for all outcome variables in order to have comparable coefficients across outcomes. As a result of the central limit theorem, violations of normality do not cause major problems when using parametric tests with sample sizes that are large enough (>40) [28, 29]. Furthermore, Gaussian models have been found to be robust to violations of the normality assumption, and even if assumptions are violated, they may often be preferable to more sophisticated approaches, which are relatively error prone [30, 31]. The French-speaking region had proportionally more COVID-19 cases than German-speaking regions in the general population [2], and multinomial regressions were used to test whether the French-speaking region was associated with experiencing symptoms of COVID-19 also in our sample. Differences between participants and non-participants in the COVID-19 assessment on variables that were measured at the pre-COVID assessment are reported in the appendix. Participants in the COVID assessment were significantly more likely to be from the French-speaking region and had lower levels of stress, compared with non-participants. For all statistical tests, a significance level of $p < .05$ was used, and 95% confidence intervals.

Results

Experiencing COVID-19 symptoms and psychological impact across the total sample

Descriptive statistics describing the sample are presented in table 1. Only 19 participants (0.8%) reported having tested positive for the coronavirus. Many more (14.7%) reported that they had had symptoms of COVID-19 but had not been tested.

Descriptive statistics of the potential psychological impacts of the COVID-19 crisis for which it was not mentioned as a cause table 2 (measured before and during COVID-19) and in of psychological consequences of COVID-19 with mention of it as a cause in table 3. For the consequences with explicit mention of COVID-19 as a cause, 4.7% of participants showed some symptoms (score ≥24) and 3.5% showed probable psychological trauma (score ≥33). Participants reported relatively low levels of fear for themselves (only 5.8% felt at least moderate fear) and their financial situation (12.7% at least moderate; table 3), but 43.6% reported at least moderate fear for others.

Associations of the psychological impact of the COVID-19 crisis with linguistic region, living arrangements, experiencing COVID-19 symptoms and being in an at-risk group for COVID-19

Table 4 shows the associations of psychological consequences of the COVID-19 crisis without mention of it as a cause (depression, perceived stress and sleep quality), with the predictors linguistic region, living arrangements, COVID-19 symptoms felt by participants and people in their entourage, and being in an at-risk group for COVID-19. These analyses were adjusted for baseline values, and supplementary table S1 (in the appendix) presents these analyses without baseline adjustment. Table 5 shows differences in psychological consequences (fear, psychological trauma, and isolation) mentioning COVID-19 as a cause with regards to the same predictors.

Differences due to experiencing COVID-19 symptoms and being in an at-risk group

Compared with participants reporting no symptoms, those who were tested positive for COVID-19 showed significantly higher levels of fear for others (see tables 4 and 5, not significant for other outcomes), whereas those who had symptoms but were not tested reported significantly worse levels on all psychological outcomes except depression (also higher but not significantly, tables 4 and 5). Having someone in one's social circle who was tested positive for COVID-19, who was hospitalised or who died due to COVID-19 was associated with higher levels of fear for others, but not with fear for oneself or economic fear (table 5). Being in the at-risk group was associated with higher levels of fear only, mainly fear for oneself, which was reported as the greatest fear (table 5).

Differences due to demographic characteristics

With regard to living arrangements, living with a partner and/or children was associated with lower levels of depression, psychological trauma and feelings of isolation than living alone (tables 4 and 5). Compared with living alone, living with a partner and without children was associated with better sleep quality, living with other family members was associated with greater levels of fear for oneself and economic fear, and participants living with other people in any arrangement reported lower levels of isolation.

Differences in experiences of COVID-19 symptoms due to linguistic region

In order to test whether differences in experience of the crisis between linguistic regions in Switzerland's general population (more cases in the French-speaking region [2]) were also present in our sample, we conducted multinomial regression. Compared with German-speaking participants, French-speaking participants were significantly

Table 1:
Demographic characteristics of the sample (total n = 2345).

		Mean ± SD / n (%)
Age at the time of the COVID-19 questionnaire (n = 2345) mean ± SD		29.07 ± 12.8
Linguistic region, n (%)	German-speaking	984 (42.0%)
	French-speaking	1361 (58.0%)
Living arrangements, n (%)	Alone	513 (21.9%)
	With other people	266 (11.3%)
	With other family members	314 (13.4%)
	With children (and most often with a partner)	273 (11.6%)
	With a partner, but no children	979 (41.7%)
Experience of COVID-19 symptoms		
Personal experience of COVID-19 symptoms, n (%)	Had no symptoms and was not tested	1921 (81.9%)
	Had symptoms but was tested negative	60 (2.6%)
	Had symptoms but was not tested	345 (14.7%)
	Was tested positive	19 (0.8%)
Severity of COVID-19 symptoms, n (%)	No symptoms and not tested	1921 (81.9%)
	Slight	262 (11.2%)
	Moderate	101 (4.3%)
	Significant	49 (2.1%)
	Extreme	11 (0.5%)
Experience of COVID-19 symptoms in household and entourage (one or more people), n (%)	Had no symptoms and not tested	942 (40.2%)
	Had symptoms but tested negative	163 (7.0%)
	Had symptoms but not tested	503 (21.4%)
	Was tested positive	525 (22.4%)
	Was hospitalised	141 (6.0%)
	Died of COVID-19	71 (3.0%)
Being in an at-risk group (any condition posing increased risk, such as respiratory or heart diseases), n (%)	No	2226 (94.9%)
	Yes	119 (5.1%)

SD: standard deviation

Table 2:
Descriptive statistics of the psychological consequences of COVID-19 without mention of it as a cause, measured before and during COVID-19.

	Before COVID-19		**During COVID-19**		**t-test for mean differences between pre-COVID and during-COVID assessments**	
	Continuous, mean ± SD	**Prevalence, n (%)**	**Continuous, mean ± SD**	**Prevalence, n (%)**	**t-value**	**p-value**
Major depression score (n = 2228; range 0–50)	9.07 ± 7.69	203 (8.6%)	7.6 ± 7.79	156 (6.7%)	8.66	<0.001
Perceived stress (n = 2212; range 0–16)	4.86 ± 2.94	505 (21.5%)	4.73 ± 2.98	459 (20.8%)	1.96	<0.05
Sleep quality (n = 2223; range 0–3)	2.00 ± 0.7	484 (20.6%)	2.01 ± 0.68	420 (18.9%)	–0.78	0.431

SD: standard deviation

The cut-off for major depression was ≥21 for at least mild major depression [19, 20]. The cut-off for perceived stress was ≥8 points (corresponding to at least "sometimes" feeling stressed), and the cut-off for sleep quality was 2 (corresponding to participants with rather bad or bad sleep quality).

more likely to have had symptoms of COVID-19 but not be tested (multinomial regression odds ratio [OR] 1.83, 95% CI 1.42, 2.37; results not shown in tables), and they were non-significantly more likely to have had symptoms but be tested negative (OR 1.45,95% CI 0.83, 5.51) and to have tested positive (OR 1.82, (0.67, 4.93).

Discussion

Experiencing COVID-19 symptoms and the psychological impact of the crisis

At the time of the study, about 18% of our sample of young Swiss men had had some symptoms potentially of COVID-19, but less than 1% had tested positive for the

Table 3:
Descriptive statistics of the psychological consequences of COVID-19 with mention of it as a cause.

	Mean ± SD	Median (interquartile range)	% at cut-off
Psychological trauma due to COVID-19 (n = 2240; sum of items; range 0 to 88)	7.98 ± 10.23	4.00 (11.00)	4.7% some symptoms (24+)
			3.5% probable trauma (33+)
Fears due to COVID-19 (n = 2260; range from not at all (0) to extremely (4))			**At least moderate (2+)**
Fear for their own health	0.45 ± 0.65	0.00 (0.50)	5.8%
– I have been afraid of contracting a severe form of COVID-19	0.65 ± 0.84	0.00 (1.00)	15.0%
– I have been afraid of dying of COVID-19	0.25 ± 0.60	0.00 (0.00)	5.0%
Fear for others health	1.68 ± 1.05	1.67 (1.67)	43.6%
– I have been afraid of infecting another person with COVID-19	1.68 ± 1.16	2.00 (2.00)	55.6%
– I have been afraid that a person close to me contracts a severe form of COVID-19	1.82 ± 1.14	2.00 (2.00)	58.9%
– I have been afraid that a person close to me dies of COVID-19	1.56 ± 1.23	1.00 (1.00)	46.8%
Economic fear	0.59 ± 0.93	0.00 (1.00)	12.7%
– I have been afraid to lose my income or not have enough money	0.60 ± 1.00	0.00 (1.00)	15.7%
– I have been afraid to lose my job or to not find a new job	0.58 ± 1.02	0.00 (1.00)	15.8%
Total mean fear (all items)	1.02 ± 0.68	1.00 (0.86)	10.6%
Isolation and boredom due to COVID-19 (n = 2211; range from 0 (“never”) to 3 (“very often”)			**2+ (at least “often”)**
Feel isolated *due to COVID-19*	0.65 ± 0.64	0.67 (1.00)	6.0%
– I missed the company of others	0.97 ± 0.86	1.00 (1.00)	23.0%
– I felt excluded	0.36 ± 0.65	0.00 (1.00)	6.0%
– I felt isolated	0.63 ± 0.78	0.00 (1.00)	12.2%
Feel boredom *due to COVID-19*	0.70 ± 0.68	0.50 (1.00)	8.6%
– I felt bored	0.83 ± 0.78	1.00 (1.00)	16.6%
– I had difficulty finding activities to do	0.57 ± 0.71	0.00 (1.00)	9.3%
Difficulties to cope with the COVID-19-situation (n = 2260; range from –2 (“totally disagree”) to +2 (“totally agree”)			**1+ (at least “agree”)**
– Not spending time with people privately has been difficult to cope with	0.67 ± 1.18	1.00 (1.00)	69.4%
– Always maintaining a 2-metre safety distance has been difficult to cope with	0.10 ± 1.28	0.00 (2.00)	45.8%
– Abstaining from cultural events has been difficult to cope with	0.50 ± 1.27	1.00 (1.00)	62.6%
– Limitations on my freedom have been difficult to cope with	0.24 ± 1.29	0.00 (2.00)	48.9%
– Changes in my working environment have been difficult to cope with	–0.58 ± 1.31	–1.00 (3.00)	26.2%
– Changes at school, in my studies or training have been difficult to cope with	–0.66 ± 1.25	0.00 (2.00)	17.4%
– Thoughts about the future (mine or my close entourage) stress me	–0.57 ± 1.32	–1.00 (3.00)	26.2%

SD: standard deviation

coronavirus, 2.6% had tested negative, and the majority had no symptoms and had not been tested. The low rate of positive tests was probably related to the fact that there was a shortage of tests at the beginning of the pandemic and that the population under study was generally not among those considered a high priority for testing. Those who had had symptoms reported low-to-moderate overall symptom severity, with only relatively few reporting more than moderate symptoms. More than a fifth of participants had someone in their social circle who had tested positive for COVID-19, and 9.0% had someone who was hospitalised or who had even died of COVID-19.

Participants reported only relatively low levels of overall fear with respect to the COVID-19 crisis. Their greatest fears regarding the COVID-19 crisis were not related to their own health but were rather that a relative or friend's health would be seriously affected, and this including also fear about infecting others with the virus should they become infected themselves. On average, participants only reported relatively low levels of fear for themselves, maybe because COVID-19 was perceived as not being very dangerous for young people. On average, participants also reported relatively low levels of social isolation and boredom. Many found it difficult to not be able to spend much time with other people privately, to have to abstain from cultural events and to be limited in their freedoms. The potential for the virus to infect them and people in their social circle the risk of a financial impact, and the restrictions on their freedom of movement and social activities may have led to considerable overall psychological effects for some individuals. As measured using the Impact of Event Scale, about 4.7% of participants reported some symptoms of psychological trauma (IES score ≥24 points) related to the COVID-19 crisis, and 3.5% even reported scores indicative of a probable psychological trauma (≥33 points). These rates are rather lower than findings from an early meta-analysis, which estimated the prevalence of post-traumatic stress disorders due to the COVID-19 crisis to be 23.88% in the general population [32]. We conclude that there was a considerable overall psychological impact on the young men in our sample, in the form of fear, isolation and psychological trauma due to COVID-19. However, as regards outcomes without mention of COVID-19 as a cause, measured before and during the crisis, there was overall no increase in these outcomes, and levels of depression and stress even somewhat decreased across the whole sample. One possible explanation for this is that the current pandemic situation overshadows personal problems and allows young men to attribute them to an external cause rather than to a personal one. This suggests that comparing absolute levels of reported depression during a time of crisis with levels beforehand may not be very telling — people's psychological state during a crisis may not compare very well with their earlier everyday normality. Thus, the remainder of the discussion focuses on differences between subgroups, with adjustment for their pre-existing differences in depression, stress and sleep quality.

Table 4:
Associations of the psychological consequences of the COVID-19 crisis with mention of it as a cause, measured during COVID-19 and adjusted for pre-COVID-19 levels, with linguistic region, living arrangements, experiencing COVID-19 symptoms and being in an at-risk group

		Depression b (95% CI)	Perceived stress b (95% CI)	Sleep quality b (95% CI)
Linguistic region (ref: German-speaking; n = 984)	French-speaking (n = 1361)	**0.08 (0.00, 0.16)***	**–0.23 (–0.31, –0.16)*****	–0.05 (–0.13, –0.02)
Living arrangements (ref: alone; n = 513)	With other people (n = 266)	0.00 (–0.13, 0.14)	–0.01 (–0.14, 0.13)	–0.01 (–0.15, 0.13)
	With other family members (n = 314)	–0.02 (–0.14, 0.11)	0.12 (–0.01, 0.25)	–0.02 (–0.15, 0.10)
	With children (and most often with a partner) (n = 273)	**–0.26 (–0.40, –0.13)*****	–0.07 (–0.21, 0.07)	0.10 (–0.03, 0.24)
	With partner, but no children (n = 979)	**–0.18 (–0.28, –0.09)*****	–0.06 (–0.16, 0.04)	**0.10 (0.00, 0.20)***
Personal experience of COVID-19 symptoms (ref: no symptoms and not tested; n = 1921)	Had symptoms but was tested negative (n = 60)	0.04 (–0.20, 0.28)	0.04 (–0.19, 0.28)	0.09 (–0.15, 0.33)
	Had symptoms but was not tested (n = 345)	0.10 (0.00, 0.21)	**0.20 (0.10, 0.31)*****	**–0.16 (–0.27, –0.06)****
	Was tested positive (n = 19)	–0.14 (–0.55, 0.27)	–0.22 (–0.63, 0.19)	0.04 (–0.37, 0.45)
Experience of COVID-19 symptoms in household and entourage (ref: no symptoms and not tested; n = 942	Had symptoms but were tested negative (n = 163)	–0.13 (–0.28, 0.03)	–0.14 (–0.29, 0.01)	0.13 (–0.02, 0.29)
	Had symptoms but were not tested (n = 503)	–0.06 (–0.16, 0.04)	–0.06 (–0.16, 0.04)	0.08 (–0.02, 0.18)
	Were tested positive (n = 525)	0.05 (–0.05, 0.15)	–0.01 (–0.11, 0.09)	–0.03 (–0.13, 0.07)
	Were hospitalised (n = 141)	0.03 (–0.14, 0.19)	–0.05 (–0.21, 0.12)	–0.01 (–0.17, 0.15)
	Died of COVID-19 (n = 71)	0.09 (–0.13, 0.30)	0.12 (–0.10, 0.34)	–0.05 (–0.27, 0.17)
Being in an at-risk group (ref: no; n = 2226)	Yes (n = 119)	0.08 (–0.09, 0.24)	0.08 (–0.08, 0.25)	–0.05 (–0.22, 0.12)

95% CI = 95% confidence interval of b. b represents the difference in standard deviation of the outcome in the respective category of the predictor variable with respect to the reference group. Adjusted for age and linguistic region (except analysis for linguistic region which was adjusted for age only) and for the pre-COVID-19 levels of the outcomes. Models were computed separately for each predictor. ref = reference category of the predictor variable. * significant at p <0.05. ** significant at p <0.01. *** significant at p <0.001.

Differences due to experiencing COVID-19 symptoms and being in an at-risk group

Having experienced symptoms potentially due to COVID-19 was associated with an overall increase in levels of fear and of isolation, possibly because those with symptoms had to reduce their social contacts more and perceived the pandemic's threat as more immediate. Having experienced symptoms without getting tested was also associated with higher levels of perceived stress, lower quality of sleep and psychological trauma. Thus, uncertainty about infection status may have been an additional source of stress. Being in an at-risk group for COVID-19 owing to a pre-existing disease (such as lung or heart conditions) that could be associated with a worse clinical course of COVID-19 was also associated with higher levels of fear, especially about one's own health. Thus, perceiving a direct personal threat due to COVID-19, either because of symptoms or being in an at-risk group, was associated with a greater psychological impact. However, knowing someone in one's broader social circle who tested positive for COVID-19, or who was even hospitalised or died, was associated with higher overall levels of fear for others, but not with a greater overall psychological impact for oneself. These findings were partly consistent with a study from Italy, which reported that having a history of disease and an acquaintance infected with COVID-19 was associated with a greater psychological impact [14].

Differences due to living arrangements

Living with a partner or children appeared to be protective factors against the psychological impacts of the crisis, despite the potential additional work due to all-day childcare at home when schools were closed. Psychological effects were especially high among those living alone, who perhaps unsurprisingly also showed the highest levels of isolation as they sometimes found themselves with very little social contact after the closure of many workplaces and public spaces. Promoting the replacement of in-person social activities, both in private and work life, with virtual interactions or other safe options, may thus be especially important for people living alone. These findings were somewhat at odds with earlier findings from the United States, where people with families with children and married people had higher levels of fear and depression than

Table 5:
Associations of the psychological consequences of the COVID-19 crisis for which it was mentioned as a cause, measured during COVID-19 only, with linguistic region, living arrangements, experiencing COVID-19 symptoms and being in an at-risk group,

		Fear for oneself	Fear for others	Economical fear	Psychological trauma	Isolation
		b (95% CI)	b (95% CI)	b (95% CI)	b (95% CI)	b (95% CI)
Linguistic region (ref: German-speaking; n = 984)	French-speaking (n = 1361)	**0.22 (0.13, 0.30)*****	**0.52 (0.43, 0.60)*****	**0.13 (0.04, 0.22)****	0.00 (–0.09, 0.09)	**–0.46 (–0.55, –0.38)***
Living arrangements (ref: alone; n = 513)	With other people (n = 266)	–0.06 (–0.21, 0.09)	0.11 (–0.03, 0.26)	0.05 (–0.10, 0.20)	–0.02 (–0.17, 0.13)	**–0.19 (–0.33, –0.04)***
	With other family members (n = 314)	**0.20 (0.06, 0.34)****	0.12 (–0.02, 0.26)	**0.21 (0.07, 0.35)****	–0.06 (–0.21, 0.08)	**–0.25 (–0.39, –0.11)*****
	With children (and most often with a partner) (n = 273)	**0.15 (0.00, 0.31)***	0.01 (–0.13, 0.16)	–0.04 (–0.19, 0.11)	**–0.25 (–0.40, -0.09)****	**–0.52 (–0.67, –0.37)*****
	With partner, but no children (n = 979)	0.05 (–0.05, 0.16)	0.06 (–0.04, 0.17)	–0.10 (–0.21, 0.01)	**–0.24 (–0.35, –0.13)*****	**–0.46 (–0.56, –0.35)*****
Personal experience of COVID-19 symptoms (ref: no symptoms and not tested; n = 1921)	Had symptoms but was tested negative (n = 60)	**0.42 (0.16, 0.68)****	0.16 (–0.10, 0.41)	0.09 (–0.17, 0.35)	0.26 (–0.01, 0.52)	**0.34 (0.08, 0.60)****
	Had symptoms but was not tested (n = 345)	**0.18 (0.06, 0.29)****	**0.25 (0.14, 0.36)*****	**0.18 (0.06, 0.30)****	**0.25 (0.14, 0.37)*****	**0.24 (0.12, 0.35)*****
	Was tested positive (n = 19)	0.38 (–0.07, 0.82)	**0.51 (0.08, 0.95)***	0.10 (–0.35, 0.55)	–0.13 (–0.58, 0.32)	0.17 (–0.28, 0.62)
Experience of COVID-19 symptoms in household and entourage (ref: no symptoms and not tested; n = 942)	Had symptoms but were tested negative (n = 163)	–0.07 (–0.24, 0.10)	0.03 (–0.13, 0.19)	–0.11 (–0.28, 0.06)	0.01 (–0.16, 0.18)	–0.02 (–0.19, 0.14)
	Had symptoms but were not tested (n = 503)	–0.03 (–0.14, 0.08)	**0.12 (0.02, 0.23)***	–0.04 (–0.15, 0.07)	0.05 (–0.06, 0.16)	0.09 (–0.02, 0.19)
	Were tested positive (n = 525)	0.03 (–0.08, 0.14)	**0.25 (0.15, 0.36)*****	0.04 (–0.07, 0.15)	0.02 (–0.09, 0.13)	0.09 (–0.02, 0.20)
	Were hospitalised (n = 141)	0.13 (–0.05, 0.31)	**0.50 (0.32, 0.67)*****	0.13 (–0.05, 0.31)	**0.23 (0.05, 0.41)***	0.16 (–0.02, 0.33)
	Died of COVID-19 (n = 71)	0.24 (–0.01, 0.48)	**0.50 (0.26, 0.73)*****	0.12 (–0.12, 0.37)	0.20 (–0.05, 0.44)	0.23 (–0.01, 0.47)
Being in an at-risk group (ref: no; n = 2226)	Yes (n = 119)	**0.81 (0.63, 0.99)*****	**0.24 (0.06, 0.42)****	**0.23 (0.04, 0.41)***	0.17 (–0.02, 0.35)	0.08 (–0.11, 0.26)

95% CI = 95% confidence interval of b. b represents the difference in standard deviation of the outcome in the respective category of the predictor variable with respect to the reference group. Adjusted for age and linguistic region (except analysis for linguistic region which was adjusted for age only). Models were computed separately for each predictor. ref= reference category of the predictor variable. * significant at p <0.05. ** significant at p <0.01. *** significant at p <0.001.

those without children and unmarried people, respectively [13]. These results from the United States were possibly more driven by threats to people's health and financial situations, whereas in our sample of young men social aspects (i.e. less isolation among those living with a partner or children) were more important. Our findings were, however, in line with findings from Italy that not having children was associated with higher levels of anxiety and depression [14].

Differences due to linguistic region (German-speaking vs French-speaking)

Regarding differences between linguistic regions, French-speaking participants showed considerably higher levels of fear and slightly higher levels of depression than German-speaking participants. However, German-speaking participants reported higher levels of perceived stress and isolation. There were no regional differences in sleep quality and psychological trauma levels. The higher levels of fear among French-speaking participants may be because Switzerland's French-speaking regions had experienced far more cases of COVID-19 than its German-speaking regions up to the time of data collection [2], numbers which were mirrored in our sample. However, measures taken to limit the spread of COVID-19 were the same across regions and, therefore, impacts on participants' social lives were comparable, explaining why the effects of the linguistic region were small and inconsistent overall. Furthermore, measures against the spread of COVID-19 may have been perceived as more appropriate in French-speaking regions and thus were less stressful. This may reveal the importance of adapting measures against the pandemic to regional or cantonal situations in order to maximise their acceptance and minimise the stresses related to them.

Limitations

The C-SURF sample consisted only of young men, and generalising these findings to broader population groups should be done with care. All the questionnaire responses were self-reported, which includes a certain risk of bias, and self-reporting on mental health cannot reach the level of accuracy of a clinical assessment. The pre-COVID-19 questionnaire responses were spread across 9 months and the COVID-19 questionnaire was also spread across 4 weeks, so there were differences in the periods between questionnaires, and the situation during the crisis was constantly evolving. However, these issues should not have systematically affected our results. Finally, the COVID study was conducted early in the pandemic and thus any long-term psychological effects could not yet be assessed. One of the study's strengths, however, was its inclusion of a measurement point shortly before the crisis, combined with its large sample recruited using a non-selective strategy.

Conclusion

The COVID-19 crisis had a considerable impact on the psychological well-being of our sample of young men. Participants living alone and those who had symptoms of COVID-19, or knew someone who had had symptoms, reported greater psychological effects of the pandemic. Supporting those at a higher risk of psychological consequences in such times of crisis, whether by using structural measures or individual assistance, is an important aspect of crisis management. That support could help to prevent crises from further increasing disparities in mental health [33] and reduce the overall impact of the crisis on the population. Differences between French-speaking and German-speaking participants were inconsistent across measures of COVID-19's psychological impact, despite proportionally higher number of cases in Switzerland's French-speaking regions. This showed that infection rates are only one of the factors influencing psychological impact. The present study analysed some of the short-term mental health consequences of the COVID-19 crisis — whether the COVID-19 crisis will result in long-term psychological problems, and for whom, remains an important question to answer.

Conflict of interest

The authors declare no conflict of interest in respect to this manuscript.

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Appendix: Supplementary tables

Table S1:
Associations of the psychological consequences of the COVID-19 crisis without mention of it as a cause with linguistic region, living arrangements, experiencing COVID-19 symptoms and being in an at-risk group, without baseline adjustment.

		Depression without baseline adjustment	Perceived stress without baseline adjustment	Sleep quality without baseline adjustment
		b (95%CI)	**b (95%CI)**	**b (95%CI)**
Linguistic region (ref: German-speaking; n = 984)	French-speaking (n = 1361)	0.18 (0.09, 0.27)	–0.32 (–0.41, –0.24)	–0.12 (–0.21, –0.04)
Living arrangements (ref: alone; n = 513)	With other people (n = 266)	0.01 (–0.14, 0.16)	–0.01 (–0.17, 0.14)	–0.01 (–0.16, 0.14)
	With other family members (n = 314)	0.04 (–0.10, 0.18)	0.20 (0.06, 0.34)	–0.04 (–0.18, 0.10)
	With children (and most often with a partner) (n = 273)	–0.39 (–0.55, –0.24)	–0.18 (–0.34, –0.03)	0.18 (0.03, 0.34)
	With partner, but no children (n = 979)	–0.28 (–0.39, –0.18)	–0.16 (–0.27, –0.05)	0.19 (0.08, 0.30)
Personal experience of COVID–19 symptoms (ref: no symptoms and not tested; n = 1921)	Had symptoms but was tested negative (n = 60)	0.25 (–0.01, 0.51)	0.23 (–0.03, 0.49)	–0.08 (–0.34, 0.19)
	Had symptoms but was not tested (n = 345)	0.25 (0.13, 0.36)	0.29 (0.18, 0.41)	–0.28 (–0.40, –0.16)
	Was tested positive (n = 19)	–0.11 (–0.57, 0.35)	–0.09 (–0.55, 0.36)	–0.22 (–0.68, 0.24)
Experience of COVID -19 s ymp toms in household and entourage (ref: no symptoms and not tested; n = 942)	Had symptoms but were tested negative (n = 163)	–0.14 (–0.31, 0.03)	–0.15 (–0.32, 0.02)	0.15 (–0.03, 0.32)
	Had symptoms but were not tested (n = 503)	–0.03 (–0.14, 0.08)	–0.07 (–0.18, 0.04)	0.02 (–0.10, 0.13)
	Were tested positive (n = 525)	0.05 (–0.06, 0.16)	0.00 (–0.11, 0.11)	–0.05 (–0.16, 0.06)
	Were hospitalised (n = 141)	0.09 (–0.09, 0.27)	0.00 (–0.18, 0.18)	0.00 (–0.18, 0.18)
	Died of COVID-19 (n = 71)	0.26 (0.02, 0.50)	0.27 (0.02, 0.51)	–0.21 (–0.46, 0.03)
Being in an at–risk group (ref: no; n = 2226)	Yes (n = 119)	0.31 (0.12, 0.49)	0.21 (0.02, 0.39)	–0.21 (–0.39, –0.02)

95% CI = 95% confidence interval of b. Adjusted for age and linguistic region (except analysis for linguistic region which was adjusted for age only). Models were computed separately for each predictor.

Table S2:
Differences in the variables measured at the pre-COVID assessment in non–respondents and respondents in the COVID–19 assessments.

		Not included in study	Included in study	t–value or OR (multinomial regression)	p-value
n		2062	2345		
Age		28.17	28.21	–0.97	0.330
Linguistic region	French-speaking	53.4%	58.0%	1.205	0.002
	German-speaking	46.6%	42.0%	ref.	
Mental health	Major depression score	9.54	9.10	1.86	0.063
	Perceived stress score	5.46	4.89	6.51	<0.001
	Sleep quality	2.98	3.00	-0.84	0.402

t-tests were used to test differences in continuous variables and multinomial regressions for categorical variables (with % indicators). Non-respondents did not reply at all or only partially and were excluded from the study.