Literature screening report II

Secondary impact of COVID-19 containment measures in children, adolescents and young adults: mental health and recommendations

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Note:	The references listed at the end of this report are uploaded and can be retrieved from the FOPH's COVID-19 Literature database in Citavi. Please contact Marc Wittwer (FOPH) - marc.wittwer@bag.admin.ch

Content

Preamble

A large number of scientific publications become available on a daily basis, reflecting the rapid development of knowledge and progress of science on COVID-19 related issues. Leading authorities should base decisions or policies on this knowledge; hence they need to master the actual state of this knowledge. Due to the large number of publications shared daily, decision makers heavily depend on accurate summaries of these publications, in the different public health domains. Therefore, the authors of this report were mandated by the Swiss School of Public Health plus (SSPH+), on request of the Federal Office of Public Health (FOPH), to inform the FOPH on recent findings from the literature regarding mental health and public health recommendations to cope with secondary health impact caused by the pandemic and containment measures.

Background

The COVID-19 pandemic is an unprecedented global public health crisis touching the whole population in different ways. Since the beginning of the pandemic containment measures and policies have been implemented to curb the epidemics. Driven by the scenario of an exponential epidemic and overburdened health system, the Swiss government ordered different containment policies and hygiene recommendations. Current but still limited evidence indicates that children and adolescents have an equally high attack rate, but luckily are at far less risk to contract severe COVID-19. However, the literature overview provided to the FOPH on health impact of confinement measures in the young population, suggests a considerable secondary health risk and adverse outcomes in children, adolescents, and young adults. Due to the methodological heterogeneity of the studies and geographical variation of the containment measures, it is challenging to draw definitive conclusions about the real impact of the COVID-19 pandemic. Furthermore, the published evidence is of varying quality and strength of evidence, especially limiting is the high number of cross-sectional studies without previous data to compare results to. Irrespectively, the recent review indicates a rather consistent impact on mental health outcomes and impact on access to or state of the art care, while impact on health behaviors and somatic health outcomes varies more across Europe.

The current literature screening report focusses on mental health outcomes and effects, an area of concern, and identifies longitudinal studies in children and youth age 0 – 25 years to be able to deduce causality and/or change over the pandemic period. Mental health is defined broadly, covering mental well-being to mental disorders and psychiatric conditions. The focus is put on direct effects on confinement/containment measures or the pandemic periods on mental health outcomes, and suggestions by authors on solutions, recommendations and best practices in the context.

Questions addressed.

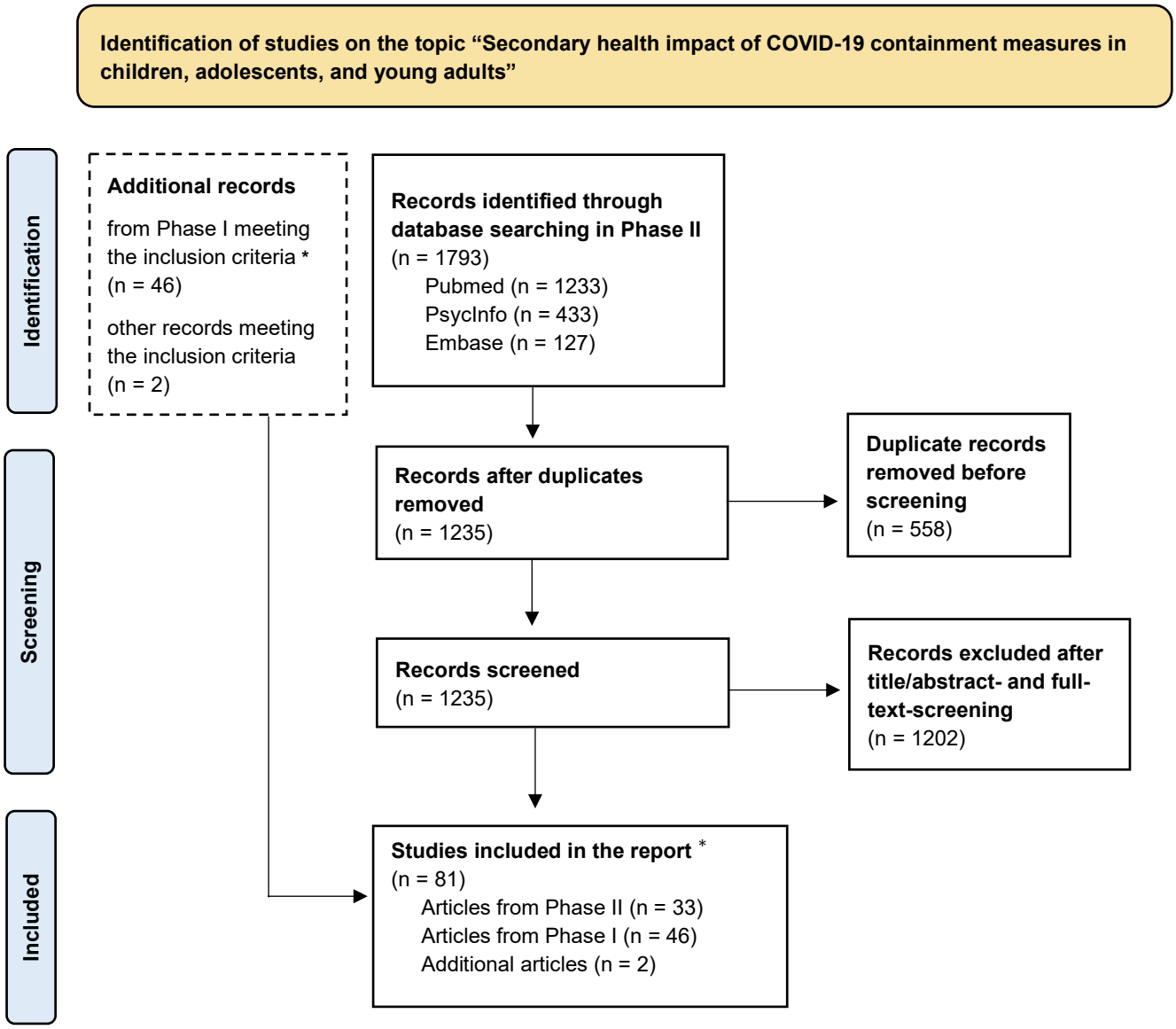
- What are the secondary mental health effects of COVID-19 and the containment measures in children, adolescents, and young adults?
    - What impact do the pandemic and the containment measures have on mental health of children, adolescents and young adults?
    - What impact does the containment measure “school closures” have on mental health?
- Overview and comparison of recommendations and best practice in different countries

Methodology

The current literature search spans the period September 1st, 2021 until the 28th of February 2022. Longitudinal studies from the previous report on secondary mental health impact will be identified and added to provide an overall picture. Three literature data banks were accessed to identify relevant literature: PubMed (biomedical literature), Embase (biomedical), and PsycInfo (psychological literature). A search string was defined and tested based on the study questions and outcomes of interest (see attachment). The search string was adapted to the three literature data banks, which provide different features for selective searching.

Literature was/will be searched at three time points: 1st of September 2021, January 10th 2022, 28th February. Literature was exported into Covidence (www.covidence.org), a systematic literature search software, and screened for inclusion. Inclusion criteria were data on children, age 0 – 25 years, exposure related to pandemic policies or containment measures, outcomes according to study questions, study data from European continent, and a longitudinal study design. Longitudinal study design was defined as any study that analyzed data at two time points in either the same population or using the same instruments in a reference population. Systematic reviews were not included but checked for longitudinal studies. In case of longitudinal studies, they were included, if not already presented in the report I. Relevant results of the included publications were extracted in Covidence by a researcher. All studies included in the narrative review were considered of sufficient quality.

For the in-depth analyses we included all longitudinal studies from the report 5, covering the time-period 1st. Jan. 2020 – 31st Aug. 2021



* Inclusion criteria: data on mental health, age (0-25 years), country (from Europe), longitudinal data

Results and Findings

What are the secondary mental health effects of COVID-19 and the containment measures in children, adolescents, and young adults?

What impact do the pandemic and the containment measures have on mental health of children, adolescents and young adults?

Summary

The following synthesis of the research results on the impact of the pandemic and containment measures mental health in children and youth is based on the literature reported in detail below. Overall the literature supports differential impact on children and youth and trajectories of mental health in children, adolescents, and young adults in line with lockdown restrictions, such that in general their mental health decreased with the onset of the COVID-19 pandemic, and for some outcomes increased over the pandemic, while for others the prevalence decreased with time.

Wellbeing and Quality of life

Studies on well-being/quality of life consistently indicate a deterioration of these outcomes across all age-groups. Partial improvement is correlated to loosening of lockdowns or pandemic measures, respectively worsening with lock-down and epidemiological waves.

Few studies report inconsistent results: One study found no change in cancer patients. It compared Jan – June 2020 data with pre-pandemic data, thus including pre-pandemic data into their pandemic period. Another study in cancer patients investigating the trend from March to September 2020 shows a deterioration of QoL and an increase in procedural and treatment anxiety using a pediatric patient specific QoL. One Swiss study in German-speaking adolescent yield improvement of QoL mainly due to increased free-time and feeling fit and well. They also state an increased feeling of loneliness and missing friends. One study in Germany found no QoL decrease in adolescents relative to pre-pandemic during the lockdown but the small sample size and low prevalence of outcomes may explain these outcomes.

It becomes obvious that there are different vulnerability factors that may play a role, as well as different trajectories of mental health across the pandemic. 5 distinct trajectories have been identified, of which two show a deterioration over the pandemic respective, a low level of QoL after an initial drop. Vulnerability factors, possibly predicting adverse trajectory, are female sex (predominantly, but also male sex), ethnic minorities, previous mental health problems. Studies in general populations ≥18 indicate a higher risk in younger adults as compared to older adults.

Concern about social COVID-19 consequences and sleep duration as well as direct access to outdoor spaces/living in semi-urban homes are identified as a moderator of mental well-being. Keeping schools open may have been a protective factor, given that a study in Sweden showed no relevant decrease of well-being (hope, self-efficacy, and self-esteem).

Scales and instruments used in the well-being and QoL research differed: Kidscreen (10), KINDL-R, PedQoL (3.0), GHQ-12, Warwick Edinburgh Mental Wellbeing Scale, HRQoL, 5-item Satisfaction with Life Scale by Diener et al.. Statistical comparisons across studies are thus limited, but all instruments are validated and reliable, thus the result should be comparable.

Distress

The three longitudinal studies including young adults investigating distress confirm an increase on distress in the initial phase of the pandemic in March/April. There is an indication of a return to pre-pandemic values from one large Study in the UK combining various pre-pandemic data and pandemic data until September 2020. Vulnerability factors were female sex, non-white ethnicity and younger age, as well as frequent COVID-related information -seeking behavior and staying indoors. They indicate a higher risk in younger adults as compared to older adults.

A study with adolescents implies that not all adolescents reacted with distress increase, but those that did showed lower distress in pre-pandemic times. The authors suggest they might have developed less coping mechanisms in the pre-pandemic period. Further vulnerability factors identified by the authors were financial concerns, staying at home and parental stress. One study with adolescents linked higher distress to loneliness. One paper addressed children with intellectual disability and could not find a difference in their stress levels.

Scales and instruments used to measure distress differed less widely than for well-being: PSS-4, GHQ-12 (twice), DASS-12.

Depression

Findings from a broad range of studies consistently found that depression in children as young as seven years as well as in adolescents and young adults significantly increased from pre-pandemic phase to the pandemic phase. Further studies indicate that the burden remained high during the first year of the pandemic even after the end of the lockdown. If at all, the findings point to a slight decrease over the summer when less restrictions were in place.

As exceptions, three studies observed that depression in adolescents did not increase. One has to be interpreted with caution as sample is small. The other two studies were conducted in the specific subgroup of adolescents with pre-existing mental health problems, showing that the COVID-19 pandemic might at least may not necessarily be detrimental for those who have already experienced mental problems prior to the pandemic.

Moderating factors that were associated with increased depression in several studies were female sex, younger age, lower social support, loneliness, and financial household problems. Moderating factors that were associated with increased depression in at least one study were parental stress, perceived stress at school, worries about poorer education or job opportunities and damage to the social network, high COVID-19-information consumption, staying indoors (i.e., being less physically active), and migration status.

Depression was often investigated in combination with other outcomes, particularly anxiety but also QoL, well-being or behavioral problems. All studies were survey studies that used various scales to measure anxiety. The Patient Health Questionnaire (PHQ) was used most often. Other scales were the Center for Epidemiologic Studies Depression scale (CES-D), the Revised Child Anxiety and Depression Scale (RCADS), the State-Trait Depression Scale (STDS), the Hospital Anxiety and Depression Scale (HADS), the Symptom Checklist-90 (SCL-90), the Depression Anxiety Stress Scale (DASS-21), the depressive problems subscale of the Youth Self-Report (YSR) from the

Achenbach System of Empirically Based Assessment (ASEBA) and the COVID-19 specific "Impact Scale of COVID-19 and home confinement on children and adolescents"

Loneliness

Findings on the effects of the pandemic on loneliness are rather scare and inconsistent and should thus be interpreted cautiously. Whereas one study found that loneliness in young adults increased from the pre-pandemic phase to three weeks into the first lockdown of the pandemic phase, another study observed no change. Two further studies indicate that self-reported loneliness in adolescents remained high during the lockdown but that loneliness in young adults tended to decrease over the summer when less restrictions were in place and to rise again in autumn and winter 2020.

A moderating factor that was associated with increased loneliness in two studies was having a lower annual household income. Moderating factors in at least one study were female sex, pre-existing physical and mental health conditions, living alone, being unemployed, not being in school and not having access to outdoor spaces (i.e., not having a garden).

Loneliness was often measured as an additional outcome or process variable. All four studies were survey studies. Whereas one study used three-item UCLA Short Loneliness Scale, three studies used single-items questions such as "in the last 4 weeks, how often did you feel lonely?" which might limit the validity and reliability of the measurement.

Anxiety

Anxiety was measured at different time points in the cited studies. Studies investigating pre-pandemic data with anxiety during the early lockdown in April 2020 tend to identify an increase, partially only slight, and studies investigating the development during the pandemic indicate a reduction late in the first wave or when measures were first loosened. The only study, that did not report an increase in anxiety was a small school sample of children from middle-high SES households. They found an opposite effect of confinement, reduction of anxiety, while none of the values were clinically relevant.

In adolescents' vulnerability factors were high level of parental stress, as well as baseline (previous) anxiety and depression levels. In young adults, female sex, isolation/loneliness or various COVID-19 related worries were reported. Higher resilience was a protective factor in one study.

Anxiety was investigated often in combination with other outcomes, such as well-being or depression. All studies were survey studies relying on various scales to measure anxiety. GAD-7 was used in most, DASS-21 in one, and two further studies used specific Covid (Impact Scale of COVID-19 and home confinement) or national scales (Spanish SENA scales).

Behavioral/emotional (affective) disorders

Findings from a broad range of studies consistently found that behavioral/emotional (affective) problems in children as young as 1.5 years and in adolescents significantly increased from pre-pandemic phase to the pandemic phase. Further studies indicate that the burden remained high or even increased during the first year of the pandemic after the end of the lockdown.

As exceptions, adolescents with mental health problems before COVID-19, children with intellectual disability and children, as well as adolescents, and young adults with autism spectrum disorder (ASD) have been relatively stable. A reduction of external stressors is discussed as potential explanation. Moreover, one study that did not found a decrease referred to the small sample that warranted caution in interpreting the results.

Moderating factors that were associated with increased risk of behavioral/emotional (affective) disorders that were observed in several studies were parental and family stress, parental overreactivity and dysfunctional parenting style as well as financial hardship in the family. Moderating factors that were observed in at least one study were inequality of opportunity in online homeschooling, one-parent, one-child households, adult household members' COVID-19 symptoms and illness, parent/carer with higher self-reported mental health symptoms (of depression, anxiety, and stress) as well as perceived stress, negative coping strategies, unhealthy activities, worsening of the relationships with others, mask wearing, having special education needs, and having neurodevelopmental disorders. Regarding age, results were inconsistent: whereas two studies found that younger age increases the risk of behavioral/emotional problems, two different studies

observed that older age increases the risk. The interplay of the child's, adolescent's or young adult's age and contextual stressors were discussed as potential explanation.

Behavioral/emotional (affective) disorders were investigated with the Strengths and Difficulties Questionnaire (SDQ) in nine of the eighteen studies. Other measures were the System of Evaluation of Children and Adolescents (SENA) scale (emotional regulation, difficulties, attentional difficulties, hyperactivity, and impulsivity), the Impact Scale of COVID-19 and Home Confinement on Children and Adolescents, the Profile of Mood States Scale (POMS), the Positive and Negative Affect Scale for children (PANAS-C), the Face, Legs, Activity Cry and Consolability Scale, the Child Behavior Checklist (CBL-1,5-5 year-old), the Child Behavior Check List questionnaire (6-18), the Youth Self-Report (YSR) from the Achenbach System of Empirically Based Assessment (ASEBA), the Aberrant Behavior Checklist (ABC), and the Adaptive Behavior Assessment System.

Substance and media abuse

Overall, the three articles observed a reduction of alcohol consumption throughout the pandemic. Differences are seen with respect to previous drinking behavior, e.g. regular binge drinkers drank more than irregular binge drinkers, but also showed a decline. In a Spanish study drinking frequency and quantity was associated with level of depression (Vera et al), but not in a college students sample in Portugal (Vasconcelos et al). Acute alcohol intoxications decreased substantially in the first lockdown as compared to the pre-lockdown, but increased again afterwards (Pigeaud et al., 2021). Regarding the use of hypnotics and anxiolytics in adolescents and young adults, a study that used health insurance data observed a shift from a slightly decreasing trend to a high increase while antidepressants, that were already in a slight rising trend, converted into a considerable increase from the pre-pandemic to the pandemic phase. Finally, one study reported reductions of e-cigarette use among 16- to 18-year-olds compared four and two years before the pandemic and that this decrease was greater among boys compared with girls.

Two studies investigated the effects of the COVID-19 pandemic on gaming and social media disorders. One study found that adolescents significantly increased the frequency and time of their game and social media usage from pre-pandemic phase to the pandemic phase. Although they still spend less time on games and social media than at-risk or pathological users, the difference

decreased during the lockdown. A second study observed that children and adolescents with mental health problems increased their media time as well as problem behaviors such as aggressiveness and anger due to media use during the lockdown but decreased it again after the lockdown. Whereas boys increased their gaming time, girls increased their time spend on social media. Increasing game time was associated with a deterioration of psychopathological problems in children but not adolescents. Parents reported a positive relation between the indicated happiness of the child and the media time.

Given the limited number of studies, the small sample sizes and methodological limitations, a cautious interpretation data seems appropriate.

Suicidal behaviour and psychiatric hospitalisations

The results and trends regarding suicide ideation, attempts and non-suicidal self-harm vary by outcome. Highly consistent are studies on suicidal ideation, which indicate an increase compared to pre-pandemic data and, also within the pandemic from early to later waves. Of the two studies yielding the opposite, a reduction of suicidal thoughts, one was limited by sample size, the other explained the observation with overall reduced services and utilization of health services. The only study including Swiss data did not find an increase of suicidal ideation for Swiss young adults, while overall the study finds age-specific increase. The Swiss sample showed higher prevalence in males than females This international study used a one item of the PHQ-9 depression scale, only. A cautious interpretation of the Swiss data should seems appropriate, also given the small sample size and data collection methods.

Suicide attempts decreased during the lockdown in all studies, while non-suicidal self-harm (NSSH) varies by study. One international hospital data study showed an increase, two others during the first lockdown report a decrease, two did not find a change in the prevalence of non-suicidal self-harm during the pandemic or compared to pre-pandemic times prevalence. The studies that found a decrease discuss the potential of a reduction of presenting with self-harm during the lockdown, respectively an under-serving of adolescents during the lockdown.

Survey studies are in adults >18 years, while the hospital data studies in this literature report data on children and adolescents. Vulnerability factors found were female sex, younger vs. older adults, social disadvantage, pre-existing mental health problems or self-harm. A protective factor was a high sense of coherence, and in university students the number of days spent physically on campus, indicating the protective effect of open educational systems.

All studies point to the need to monitor these outcomes throughout the pandemic, as most studied the initial pandemic phase or first wave and changes across all outcomes and over the pandemic development are likely.

Scales used vary widely: Paykel Suicide Scale, Adult Psychiatric Morbidity scale, one item from the Child and Adolescent Self-Harm in Europe study, and hospital emergency data/anamnestic data. With exception of the one-item study, the outcome was assessed with validated tools or by medical staff. The comparison of hospital data is feasible across countries.

Mental health care utilization

In addition to the above hospital studies, further studies investigated the trend of mental health referrals and visits more generally. It seems as if during the lockdown mental health referrals went down, like most referrals and emergency visits for other diagnoses during the lockdown. One study indicates an increase after the lock-down, however, not in <20-year-olds, while another in a adolescent health center observed an increase after the lockdown (May – June 2020).

It is clear from the data presented, that the lockdown had an impact on utilization behavior. The exact reasons are unclear, it could be a reduction of need/indication or conscious decision not to present one-self or refer patients. The current studies cannot answer the question of potential under-serving the needs.

Number of publications: 81

Time period: January 2020 – February 2022

Results

Color legend

Studies written in green have been copied from the November 2021 report (i.e., Phase I).

Studies written in black have been copied from in the January 2022 report (i.e., Phase II).

Studies written in blue have been newly added for the current March 2022 report.

QoL/Life satisfaction

A study from Turkey (Onal et al., 2021) looked at the **change in quality of life (QoL)** and occupational performance in **children with cancer** during the Covid-19 pandemic. For the quantitative part of the study two assessments were carried out on 60 children (M_{age} = 8.9 years; *SD* = 1.5 years) and their families. The first in April of 2020, the second in September 2020. The pediatric quality of life inventory parent proxy-report was used to evaluate the QoL, and the Canadian occupational performance measurement was used to evaluate children's occupational performance (OP) and satisfaction. The results show a significant decrease on QoL during the pandemic: QoL-parameters such as cognitive state, perceived physical appearance and communication skills decreased significantly by 13.7, 7.1, and 22.1 points respectively, $p < .05$. Procedural anxiety and treatment anxiety of children during treatment increased. Furthermore, both the occupational performance and satisfaction of the children decreased significantly in the 6-month period, $p < .01$. The occupational performance score decreased from 5.5 (*SD* = 1.1) points prepandemic to 3.9 (*SD* = 1.3) points. The satisfaction score dropped from 4.8* (*SD* = 1.2) to 2.2 (*SD* = 1.3) points. No statistical change in the pain-related conditions of the children within 6 months of the pandemic was found, $p > .05$. *[* Numbers (M and SD) for satisfaction before COVID-19 are not consistent in text and table. In the text, the mean (standard deviation) for satisfaction before COVID-19 is M = 4.8 (SD = 1.2) and in table it is M = 3.8 (SD = 1.3).]*

Van Gorp et al. (2020) studied the psychosocial impact of the start of the COVID-19 pandemic on Dutch **children with cancer in outpatient care** (pre-COVID-19/COVID-19 period: *n* = 494/438) and their caregivers (*n* = 799). Quality of life data was collected through health-related quality of life (HRQoL) and pediatric quality of life inventory (PedsQL) generic and multidimensional fatigue

scales between January and June 2020. A minimum of parents participated twice. Adjusted analyses show **psychosocial functioning** of children with cancer did not deteriorate in the initial phase of COVID-19. The only observed difference was a decrease in the level of distress in the caregivers (*OR* = 0.59, 95% CI [0.42, 0.83], *p* = .002). [the exact number of participants is not clearly reported, while the N for each outcome is].

A Swiss study by Ehrler et al. (2021) at the University Children's Hospital Zurich investigated children with increased risk of neurodevelopmental impairment (children with congenital heart disease = 73, children born very preterm = 54) aged 10 to 16 years in comparison to typically developing children (TD = 73) and provides pre- and in pandemic data (April 17th – May on **well-being** and family functioning. They observed a small to medium effect that psychological well-being decreased (*B* = −5.05, 95% CI [-6.63, -3.47], *p* < .001), independent of group. During the pandemic, psychological well-being was significantly lower than the norm (*M* = 45.6, 95% CI [44.01, 47.14], *p* < .001) whereas it had not differed from the norm before the pandemic (*M* = 50.6, 95% CI [49.06, 52.08], *p* = .458). A third of the children lay below the norm threshold compared to 11% prior the pandemic. Parent relationship and autonomy did not differ from the norm at either time point (Ehrler et al., 2021).

The study by Evans et al. (2021) used longitudinal data to characterize effects on mental health and behavior in a UK student sample, measuring **sleep quality** and diurnal preference, **depressio**n and **anxiety symptoms, wellbeing and loneliness**, and **alcohol use**. Self-report data was collected from 254 undergraduates (219 females) at a university at two-time points: autumn 2019 (baseline, prepandemic) and April/May 2020 (under 'lockdown' conditions). Longitudinal analyses showed a significant rise in depression symptoms (*p* < .001) and a reduction in wellbeing (*p* < .001) at lockdown. Over a third of the sample could be classified as clinically depressed at lockdown compared to 15% at baseline. The increase in depression symptoms was highly correlated with worsened sleep quality, *p* < .001.

Albrecht et al. (2022) investigated the association between homeschooling and sleep duration as well as health during the pandemic-related school closures in Swiss high school students. The control sample (*N* = 5308) completed the survey from May to July 2017, and the lockdown sample

(*N* = 3664) completed the survey from May to June 2020 during school closures in Switzerland, in both samples median age was 16 years (IQR, 15–17 years). The Munich Chronotype Questionnaire and KIDSCREEN-10 were used to assess sleep-wake patterns and **health-related quality of life (HRQoL)**. Results show that on scheduled days participants from the lockdown sample slept significantly longer than the control sample (median: 9.00 hours [IQR, 8.25 – 9.75 hours] vs. 7.75 hours [IQR, 7.08 – 8.33 hours]). However, sleep problems were significantly more frequent in the lockdown sample than in the control sample, with difficulties falling asleep and problems sleeping through the night more than 4 times in the previous 2 weeks being more prevalent in the lockdown group (falling asleep: 1237 [33.8%] vs. 1645 [30.9%]; problems sleeping: 437 [11.9%] vs. 439 [8.3%]). On free days, sleep behavior was comparable between the two samples. The lockdown sample reported significantly higher HRQoL scores than the control sample (median, 44.48 [IQR, 40.24, 49.76] vs. 42.27 [IQR, 37.42, 48.29]; $R^2_{\beta*}$, .007; 95% CI [.004, .012]; $p < .001$), with higher values being reported on the items for feeling fit and well, for being full of energy, for having enough time for themselves, as well as for being able to do the things they wanted in their free time. However, participants in the lockdown sample also indicated feeling lonelier and sadder and having less fun with friends. Furthermore, in the lockdown sample a significantly decreased substance use was found compared to the control sample, although only alcohol consumption ($R^2_{\beta*}$, .014; 95% CI [.008, .022]; $p < .001$) and caffeine consumption ($R^2_{\beta*}$, .010; 95% CI [.006, .015]; $p < .001$) stayed significant after correction for multiple comparison. Multilevel regression models analyzing associations of health-related characteristics with sleep revealed that on scheduled days, longer sleep period was associated with better HRQoL ($R^2_{\beta*}$, .027; 95% CI [.020, .034]; $p < .001$) and less caffeine consumption ($R^2_{\beta*}$, .013; 95% CI [.009, .019]; $p < .001$)

Paizan et al. (2021) conducted a two-wave study to examine, among others, **life satisfaction and academic self-efficacy** trajectories among ethnic minority and majority adolescents. The sample consisted of 226 adolescents aged 11-17 years in Germany: 121 ethnic minority (M_{age} = 14.04; *SD* = 1.25) and 105 ethnic majority adolescents (M_{age} = 14.36; *SD* = 1.25), pre-pandemic data was collected from June to October 2019 and the second assessment took place from May to July 2020. The repeated measures ANCOVA on life satisfaction revealed no main effects of time and minority status, indicating that life satisfaction did not generally differ between 2019 and 2020 and between ethnic majority and minority adolescents. However, a significant interaction effect of time and ethnic

group status such emerged such that adolescents from the ethnic minority group reported a significantly higher reduction in life satisfaction than the adolescents from the ethnic majority group, $F(1, 223) = 7.14$, $p = .008$, $\eta_p^2 = .03$. Independent t-tests revealed that life satisfaction in the two groups did not significantly differ at the assessment before the onset of the pandemic, $t(224) = 0.40$, $p = .690$, $d = 0.05$ ($M_{\text{ethnic minority}} = 5.40$; $SD = 1.30$ vs. $M_{\text{ethnic majority}} = 5.34$; $SD = 1.04$), however a small statistically significant difference was observed between the two groups in 2020, $t(224) = -2.16$, $p = .032$, $d = 0.29$ ($M_{\text{ethnic minority}} = 4.94$; $SD = 1.44$ vs. $M_{\text{ethnic majority}} = 5.30$; $SD = 1.04$). These findings suggest that COVID increased the discrepancy in life satisfaction between ethnic majority and minority adolescents.

Bringolf-Isler et al. (2021) measured the difference in the **health-related quality of life** (HRQoL) of primary school children in 2014/15 compared to 2020 in Switzerland. In total, 1'712 Children (aged 5 to 11 years) participated. The baseline assessment of the SOPHYA cohort study (2014/15) comprised 799 children. At the follow-up assessment in 2020, 913 children were newly recruited. The overall scores of the KINDL-R questionnaire (82.4 [81.8; 83.0] vs. 79.6 [79,1; 80.2], $p < .001$), and the emotional well-being scores (85.6 [84.6; 86.6] vs. 83.3 [82.4; 84.2]), were lower during the year of the pandemic (2020), indicating a reduction in children's HRQoL and emotional well-being. The highest decrease between 2014/15 and 2020 in the adjusted models was seen for the youngest age group (85.0 [83.7; 86,2] vs. 81.1 [80.4; 81.8], $p < .001$) and for girls (83.0 [82.1; 83.8] vs. 80.0 [79,1; 80.9] $p < .001$). Children's HRQoL was particularly low during periods with restrictions and at the height of the COVID-19 waves in 2020."

Essler et al. (2021) conducted a study in Germany in 3 to 10 year-old-children with two timepoints (the first at the peak of the lockdown restrictions ($N = 2'921$), the second after restrictions had been majorly loosened ($N = 890$). They used a modified KIDSCREEN and the Strengths and Difficulties Questionnaire (SDQ) to assess changes in **emotional well-being**. Whereas emotional well-being increased ($M = 3.40$ [1.17] vs. $M = 4.29$ [1.12], $p < .001$) and child problem behavior decreased ($M = 3.47$ [1.85] vs. $M = 2.86$ [1.63], $p < .001$), family-related well-being ($M = 4.21$ [1.10] vs. $M = 4.04$ [0.85], $p < .001$) decreased slightly.

In a longitudinal study, Vira and Skoog (2021) assessed changes in Swedish middle class students' **psychosocial well-being** from before to during the COVID-19 pandemic. Data from 849 children in 30 middle schools in western Sweden were collected via self-report surveys between October 2019 and January 2020 ($t1$; age range: 9 to 11 years, M_{age} = 10 years, SD_{age} = .03) and one year later between November 2020 and February 2021 ($t2$, age range: 10 to 12 years, M_{age} = 11, SD_{age} = .05). In Sweden, middle school students attended school as normal throughout the pandemic. Paired t-tests showed that mean-levels significantly decreased in almost all of students' psychosocial factors from $t1$ to $t2$, namely hope, self-efficacy, and self-esteem. However, the effect sizes ranged from negligible to small according to Cohen's d standards. The largest decreases in mean-level were found in students' perceived support from teachers (M_{t1} = 5.32, SD_{t1} = .84, M_{t2} = 5.04, SD_{t2} = .97; p < .001, Cohen's d = 0.29), class and school well-being (M_{t1} = 4.90, SD_{t1} =.80, M_{t2} = 4.65, SD_{t2} = .86; M_{t1} = 5.17, SD_{t1} = .94; M_{t2} = 4.93, SD_{t2} = .95; respectively; Cohen's d both = 0.26; p < .001), and students' self-esteem (M_{t1} = 4.13 SD_{t1} = .93, M_{t2} = 3.82, SD_{t2} = 1.06; Cohen's d = 0.27, p < .001). No significant differences in students' emotional problems (M_{t1} = 1.50, SD_{t1} = .45, M_{t2} = 1.53 , SD_{t2} = .46) and negligible differences in their sense of hope (M_{t1} = 4.77, SD_{t1} = .89, M_{t2} = 4.61, SD_{t2} = .96; Cohen's d = 0.17, p < .001) and self-efficacy (M_{t1} = 72.62, SD_{t1} = 22.95, M_{t2} = 69.75, SD_{t2} = 23.85; Cohen's d = 0.13, p < .01) from before to during the pandemic were found.

Ravens-Sieberer et al. (2021) conducted a nationwide longitudinal population-based study (COPSY) to investigate the impact of COVID-19 on **the quality of life and mental health in children and adolescents** between 7 and 17 years in Germany. In total, 1923 children and adolescents aged 7 to 17 years (M_{age} = 12.67 years, SD_{age} = 3.29 years) and their parents participated across two waves during the pandemic (May/June 2020 and December 2020/January 2021). The families were recruited through a population-based approach from an online panel using quota sampling, n = 1'288 families participated in both waves. To compensate for the drop-outs from wave 1 to 2, new families (n = 337) were recruited using an additional quota sampling. The self-report and parent-proxy surveys assessed health-related quality of life (KIDSCREEN-10), mental health problems (SDQ with the subscales emotional problems, conduct problems, hyperactivity, and peer problems), anxiety (SCARED), depressive symptoms (CES-DC, PHQ-2) and psychosomatic complaints (HBSC-SCL). For comparisons with the pre-pandemic period, population-based data from the BELLA study (Behaviour and Wellbeing of Children and

Adolescents in Germany) and the international HBSC study (Health Behaviour in School-aged Children) was used. In wave 1, 69.4% of the 11- to 17-year-old children and adolescents reported that the pandemic was a burden; with the corresponding proportion in wave 2 being significantly higher, the effect size indicated a small effect for this difference between the two waves (82.6%; $p < .001$; $\phi = .15$). Furthermore, the health-related quality of life (HRQoL) and mental health of children and adolescents significantly decreased during the pandemic, with 47.7% of the 11- to 17-year-olds reporting low HRQoL in wave 2 compared to 40.2% in wave 1 and 15.3% pre-pandemic, though the effect between the two waves during the pandemic remained negligible ($p < .001$; $\phi = .08$). Furthermore, there was a significant increase from pre-pandemic to wave 1 ($p < .001$) in mental health problems such as conduct problems, hyperactivity, peer problems and emotional problems (pre-pandemic: 17.6%, wave 1: 30.4%; wave 2: 30.9%), however, the change in mental health problems from wave 1 to wave 2 was not significant ($p = .706$). A proportion of 30.1% had symptoms of generalized anxiety in wave 2 compared to 24.1% in wave 1 and 14.9% pre-pandemic. The difference between pre-pandemic and wave 1 data was significant, the difference between waves 1 and 2 was significant as well, but negligible due to the effect size ($p = .002$; $\phi = .07$). In wave 2, 15.1% reported depressive symptoms (pre-pandemic: 10.0%, wave 1: 11.3%), however, no significant difference in depressive symptoms was found between pre-pandemic and wave 1. The difference between wave 1 and wave 2 data was significant, but negligible ($p = .010$; $\phi = .01$). Children and adolescents also reported psychosomatic complaints such as irritability (pre-pandemic: 39.8%, wave 1: 53.2%, wave 2: 57.2%), headaches (pre-pandemic: 28.3%, wave 1: 40.5%, wave 2: 46.4%), stomachaches (pre-pandemic: 21.3%, wave 1: 30.5%, wave 2: 36.4%), and feeling low (pre-pandemic: 23.0%, wave 1: 33.8%, wave 2: 43.4%). Comparing wave 1 and wave 2, significant differences indicated higher proportions of children being affected by headaches ($p = .007$), stomachaches ($p = .004$) and feeling low ($p < .001$); with the effect sizes being negligible for headaches and stomachaches ($\phi = .06$ for both), and small for feeling low ($\phi = .10$). Mixed model panel regression analyses showed that the time across wave 2 versus wave 1 was associated with statistically significant lower HRQoL (− 0.77 or − 0.09 SD; 95% CI [− 1.26; − 0.28]; $p < .05$), stronger emotional problems (+ 0.18 or + 0.08 SD; 95% CI [0.09; 0.28]; $p < .05$) and peer problems (+ 0.10 or + 0.05 SD; 95% CI [0.01; 0.18]; $p < .05$), more pronounced symptoms of anxiety (+ 0.45 or + 0.10 SD; 95% CI [0.20; 0.70]; $p < .05$) and depression symptoms (+ 0.46 or + 0.12 SD; 95% CI [0.23;

0.70]; $p < .05$), and stronger psychosomatic complaints such as irritability, headaches and sleeping problems (0.10 or + 0.16 SD; 95% CI [0.07; 0.14]; $p < .05$).

In a two-wave prospective study, Van der Laan et al. (2021) assessed **gender-specific changes in life satisfaction** after the COVID-19 related lockdown in Dutch adolescents and whether changes were associated with concerns about COVID-19 and lockdown measures. Data on mental well-being before the lockdown were collected between March 2019 and March 2020 ($n = 224$) – in the context of an ongoing population-based birth cohort study in the Netherlands called WHISTLER – and a follow-up was conducted 5 to 8 weeks after the first introduction of lockdown measures ($n = 158$; $M_{age} = 15.53$ years, SD = 1.25 years). There was a significant decrease in life satisfaction, $F(1, 153) = 13.195$, $p < .001$, $\eta^2_p = .079$, after the introduction of lockdown measures when compared with the pre-pandemic period. Moreover, a significant interaction between gender and time since lockdown on life satisfaction was observed, $F(1,153) = 6.034$, $p = .015$, $\eta^2_p = .038$, such that boys' life satisfaction at follow-up decreased compared to their life satisfaction assessed before the pandemic, while there was no significant change over time in girls' life satisfaction. The factor "concerned about social consequences of lockdown measures" was significantly associated with a lower life satisfaction (adjusted β: -.25, 95% CI [-.43; -.06], $p = .01$). None of the other factors were significantly associated with a lower life satisfaction: "concerns about health" (adjusted β: -.04, 95% CI [-.23; .14], $p = .64$), "concerns about financial matters" (adjusted β: -.02, 95% CI [-.23; .19], $p = .86$), and "concerns about family relations" (adjusted β: -.15, 95% CI [-.37; .08], $p = .21$). Furthermore, participants did not report more internalizing symptoms after the introduction of lockdown measures, $F(1, 151) = 2.152$, $p = .144$, $\eta^2_p = .014$) when compared with baseline assessments. The factors "concerns about health" (adjusted β: 1.93, 95% CI [.53; 3.33], $p = .01$), "concerns about social consequences of lockdown measures" (adjusted β: 2.39, 95% CI [.96; 3.81], $p = .001$), and "concerns about family relations" (adjusted β: 2.41, 95% CI [.73; 4.08], $p = .01$) were found to be associated with more internalizing symptoms. Adolescents reported significantly better psychosomatic health after the introduction of lockdown, $F(1, 152) = 36.544$, $p < .001$, $\eta^2_p = .194$) compared to the pre-pandemic period. No factor was associated with a worse psychosomatic health ("concerns about health" [adjusted β: -.04, 95% CI [-.12; .04], $p = .30$], "concerns about social consequences of lockdown" [adjusted β: -.08, 95% CI: [-.17; .00], $p = .06$], "concerns about financial

matters" [adjusted β: .08, 95% CI [-.01; .17], *p* = .09], and "concerns about family relations" [adjusted β: .01, 95% CI [-.09; .11], *p* = .88).

Pierce et al. (2021) from the UK Household Longitudinal Study (UKHLS) investigated **the trajectory of mental health and well-being** during April to October of the pandemic 2020 and pre-pandemic data taken from 2018 to 2019. In total 18'321 adults in the UK were included in the study, of which 1'474 (11.8%) were young people aged between 16 and 24. During the first wave of the pandemic in May 2020 the mean score of the General Health Questionnaire (GHQ-12) peaked for the whole population at 12.9 but was most pronounced among those aged 16 to 24 years. In June 2020 an improvement was observed, but the pre-pandemic level was not reached anymore. Initially, enjoyment of day-to-day activities showed the strongest impact of the pandemic. Other items indicating effects of the pandemic were: loss of sleep, feeling under strain, and feeling unhappy and depressed. Five trajectories emerged for mental health in a latent class analysis by using the longitudinal data. For young people aged between 16 and 24, the following five distributions were found in the trajectories: consistently very good (*n* = 532; 7.9%), consistently good (*n* = 627; 13.2%), recovering (*n* = 164; 15.0%), deteriorating (*n* = 99; 16.2%), consistently very poor (*n* = 52; 15.6%). Considered over the entire sample the group with deteriorated mental health were more likely to be women, Asian, younger (aged 16 to 35), without a partner, and with a previous mental illness. Participants in the group with consistently very poor mental health group were more likely than the general population to be of mixed ethnicity, women, seclusion, living in disadvantaged deprived neighborhoods, having no partner, and having previous mental illness. Individuals living in a deprived neighborhood, isolating themselves from others for health reasons, and reporting a prior mental illness were significantly more likely to be affected whose mental health status worsened between April and October 2020. [NOTE: The percentages seems to be weighted and do not match the absolute numbers in the table of the study.]

A population-based study from Iceland (Thorisdottir et al., 2021) assessed **mental wellbeing** with the Short Warwick Edinburgh Mental Wellbeing Scale in a sample of 13- to 18-year-olds. Data was assessed in October or February in 2016 and 2018 (pre-pandemic) and in October 2020 (during the COVID-19 pandemic). A total of 59'701 survey responses were included in the analysis. Results show a worsened mental wellbeing (β = –0.46, 95% CI [-0.49, -0.42]) in 2020 across all age groups

compared to the same-aged peers before the pandemic. These results were significantly worse in female participants compared with male participants (β = 4.16, 95% CI [4.05, 4.28], and β = –1.13, 95% CI [-1.23, -1.03], respectively)

Owens et al. (2022) assessed mental health and wellbeing in a sample of UK university students during the COVID-19 pandemic. The prospective longitudinal study with one month between baseline (T1) in December 2020 and follow up assessment (T2) in January 2021, included 389 young people aged 18–25 (M_{age} = 21.04 years, *SD* = 1.62) and measured a range of facets of mental wellbeing using the Patient Health Questionnaire (PHQ-8), **Warwick Edinburgh Mental Wellbeing Scale (WEMWBS),** Jenkins Sleep Scale (JSS), Ruminative Response Scale (RRS) as well as the Perceived Stress Scale (PSS). Results show that, compared to a reference sample for rates of depression (Kroenke et al.'s, 2009) in which 6.2% of 18–24-year-olds met the criteria for probable depression, in the present sample, 55.5% of the participants at T1 and 52.8% of the participants at T2 had probable depression. A two-sample test of proportion indicated that the large difference between the reference and the present sample was statistically significant ($p < .0001$). However, the decrease in prevalence between T1 and T2 did not reach statistical significance ($p = .54$). The reference sample for rates of poor mental wellbeing derives from previous research reporting levels of approx. 19%. The larger proportion of poor mental wellbeing in the study sample with 40.3% at T1 and 37.2% at T2 was significantly different to the reference sample ($p < .0001$), the reduction from T1 to T2 however, was not statistically significant ($p = .45$). The proportion of participants who reported sleep disturbance was at T1 (30.0%, $p < .0001$) and T2 (21.9%, $p < .0001$) significantly higher than in the reference sample, the reduction from T1 to T2 did also reach statistical significance ($p = .03$). Compared to estimations from previous research (~15%), the proportion of participants reporting high levels of rumination was significantly higher at T1 (36.1%, $p < .0001$) and T2 (29.3%, $p < .0001$), however, the decrease in rumination from T1 to T2 was not statistically significant ($p = .09$). Lastly, the levels of stress were significantly higher than previous estimates (25%) at T1 (76.6%, $p < .0001$) and T2 (84.0%, $p < .0001$), there was also a statistically significant increase in stress from T1 to T2 ($p = .027$). At T1, higher lockdown restrictions were associated with significantly more depression ($B = 2.06$, $SE = 0.61$, $p = .001$), more stress ($B = 0.93$, $SE = 0.28$, $p = .001$) and more rumination ($B = 0.93$, $SE = 0.41$, $p = .023$). There was also a pattern of **less wellbeing** ($B = -2.08$, $SE = 0.45$, $p < .001$) and more sleep disturbance ($B = 1.02$,

SE = 0.53, *p* = .054) being associated with higher lockdown restrictions. At T2, the negative effect of higher lockdown restrictions persisted prospectively for depression (*B* = 2.01, *SE* = 0. 70, *p* = .004), stress (*B* = 0.99, *SE* = 0.37, *p* = .007), and rumination (*B* = 1.23, *SE* = 0.48, *p* = .008), and was also significant for wellbeing (*B* = -2.31, *SE* = 0.58, *p* < .0001) and sleep disturbance (*B* = 1.57, *SE* = 0.60, *p* = .009).

In Denmark 7445 young adults (age range = 18 – 23) participated in a study (Groot et al., 2022) investigating the impact of housing conditions while lockdown (April 2020) on changes in mental health. Unadjusted mean changes in mental well-being scores were highest for those with no access to outdoor spaces. Lower mental well-being and **QoL** and higher levels of **loneliness** were observed in the third week of the lockdown compared to before the lockdown (3 months after 18th birthday), with higher proportions of individuals with scores indicative of possible (19.1% compared to 12.2%) or probable (2.6% compared to 1.3%) depression/anxiety, low QoL (36.6% compared to 15.6%) or being lonely (23.1% compared to 13.8%). A lack of direct access to outdoor spaces was associated with the greatest decreases in mental well-being scores (no access vs. garden: adjusted mean difference (a*MD*) = − 0.75; 95% CI [− 1.14, − 0.36]). Compared to youth living in rural homes, those in urban or semi-urban homes had greater decreases in mental well-being (a*MD* = − 0.20; 95% CI [− 0.39, − 0.02] and − 0.13; 95% CI [− 0.32, 0.06]) and greater odds of onset of low mental well-being (a*OR* = 1.14; 95% CI [0.94, 1.38] and a*OR* = 1.21 [1.00, 1.48]). Decreases in QoL and onset of low QoL were associated with living in a denser household and living alone. Youth living with a partner reported increased QoL compared to youth living with parents (a*MD* = 0.40; 95% CI [0.22, 0.58] and, incident loneliness was associated with living alone and living in a denser household (a*OR* = 2.12; 95% CI [1.59, 2.82] and a*OR* = 1.30; 95% CI [1.14, 1.48]). Overall, living alone, in denser households without direct access to outdoor spaces may be especially vulnerable to mental health declines.

Koenig et al. (2021) compared **emotional and behavior problems** (Strengths and Difficulties Questionnaire (SDQ)) self-reported **health-related quality of life** (KIDSCREEN (KS10)), **depression** (PHQ-A), **suicide thoughts** (Paykel Suicide Scale (PSS)) and eating disorders (Weight Concerns Scale (WCS); Eating Disorder Examination-Questionnaire (EDE-Q)) in a matched sample of adolescents (12- to -20-olds) using pre-pandemic (November 26th, 2018 to

March 13th, 2020) and lockdown data (March 18th, 2020 to August 29th, 2020). This study found no evidence for an increase in emotional and behavioral problems, depression, thoughts of suicide or suicide attempts, eating disorder symptoms, or a decrease in general health-related quality of life, except a decrease in suicide plans (*OR*adj = 0.31, 95% CI [0.13, 0.75], *p* =.009) and conduct problems (b adj = -0.16, 95% CI [-0.31, -0.00], *p* = .045). Family risk-factors did not moderate these findings. The influence of socioeconomic status on emotional and behavioral problems as well as depression decreased during the lockdown. This result does not support other findings from Germany showing an increase of mental health problems during the lockdown. Small sample size and low prevalence of outcomes may be an explanation.

Essau and de la Torre-Luque (2021) analyzed adolescent psychopathological profiles and explored its role in predicting the outcome of COVID-19. The sample for this study was drawn from the Millennium Cohort Study (MCS). Between January 2018 to March 2019 and in May 2020, a total of 904 participants completed mental health questions (2018-2019) and a COVID-19 survey (2020). The adolescents were at t1 17 years (*M* = 17.18 years) and at t2 19 years (*M* = 19.17 years) old. As mental health outcomes, **well-being** (Warwick-Edinburgh Mental Wellbeing Scale, WEMWBS), distress (K6 Kessler Distress Scale), depression (Patient Health Questionnaire, PHQ-2) and anxiety (Generalised Anxiety Disorder Scale) have been measured. Based on the MCS sweep 7, four psychopathological profiles were identified. 60.17% of sample belonged to the profile which consisted of adolescents with low levels of psychological symptoms. The second profile included adolescents with the highest risk of showing almost all the psychological symptoms and problematic behaviors (23.01% of sample). 12.03% of sample belonged to the third profile, which comprised adolescents at high risk of substance use and behavioral addictions. Lastly, the fourth profile included adolescents who reported having bad sleep quality and mental health difficulties, and symptoms indicative of poor emotion regulation (4.79% of sample). Adolescents from the second profile reported a rise in mental distress in anxiety symptoms and in depressive symptoms and a reduction in mental well-being. Adolescents from the fourth profile reported a rise in mental distress, in anxiety symptoms and a reduction in mental well-being.

Stress/Distress

In a prospective, observational online study on a representative sample of 1221 German adolescents aged 10 to 17 years and their parents, Paschke et al. (2021) assessed **psychological stress and other psychosocial variables** before the pandemic (baseline: September 13th – September 27th, 2019) and 1 month after the start of lockdown (follow-up: April 20th – April 30th, 2020), using standardized measures like the Perceived Stress (PSS-4) or Difficulties in Emotion Regulation Scale. A total of 731 child-parent dyads were included in the family-based analyses. Before the pandemic, the adolescents showed mean PSS-4 values of 5.53 (*SD* = 3.02), while during the lockdown this value was 6.93 (*SD* = 3.14). A paired t-test indicate a clinically significant increase in psychological stress, $t(823) = 11.44$, $p < .001$, Cohen's *d* for repeated measures (d_{rm}) = 0.41). Furthermore, 252 adolescents (34.47%, 95% CI [31.03, 37.92]) reported a significant increase in psychological stress from the baseline to the follow-up assessment. These adolescents had significantly lower PSS-4 values at baseline (4.36 vs. 6.81, $t(609.54) = 12.79$, $p < .001$, $d = 0.93$) and significantly higher values during lockdown compared with those adolescents without increased psychological stress (9.15 vs. 6.22, $t(537.48) = 14.46$, $p < .001$, $d = 1.10$), with large effect sizes. A logistic regression revealed that significant risk factors for increased psychological stress included financial worries (adjusted *OR* = 2.13, 95% CI [1.29, 3.51]), increased psychological stress of the corresponding parent (adjusted *OR* = 2.33, 95% CI [1.56, 3.49]), procrastination (adjusted *OR* = 2.10, 95% CI [1.27, 3.48]), limited access to emotion regulation strategies (adjusted *OR* = 2.01, 95% CI [1.21, 3.35]) and staying at home during COVID-19 lockdown (adjusted *OR* = 1.65, 95% CI [1.08, 2.50]). Together, all adolescents and their parents reported increases in stress during the pandemic, with about one third reporting particularly large increases in stress. Contextual and internal stressors as well as insufficient strategies to cope with stress were identified as risk factors.

A study from the UK (Niedzwiedz et al., 2021) found that **psychological distress** increased 1 month into lockdown with the prevalence rising from 19.4% (95% CI [18.7, 20.1]) in 2017–2019 to 30.6% (95% CI [29.1, 32.3]) in April 2020 (*RR* = 1.3, 95% CI [1.2, 1.4]). Groups most adversely affected included women, young adults, people from an Asian background and those who were degree educated.

Symptoms of **depression, anxiety and stress**, and the psychological impact of the lockdown situation in Spanish population were longitudinally analyzed using the Depression Anxiety and Stress Scale (DASS-21) and the Impact of Event Scale (IES) by Planchuelo-Gómez et al. (2020). 4724 participants filled in two surveys between March 28th and April 5th, 2020 (t1) and April 28th, 2020, and May 15th, 2020 (t2). Symptomatic scores of anxieties, depression and stress were exhibited by 7.22%, 46.42% and 49.66% of the second survey respondents, showing a significant increase compared to the first survey (32.45%, 44.11% and 37.01%, respectively). Regarding the intrusion and avoidance scores remained on a high level during both timepoints. Authors discussed that consumption of information about COVID-19 and physical activity seemed to have an important role in the evolution of psychological symptoms.

A study by Gagné et al. (2021) investigated long-term trends in mental health among 16–34-year-olds (age groups 16-24 years and 25-35 years). They used all waves from the British Household Panel study (1991-2008) and the UK household Longitudinal Study (2009 - 2020) and the first five UKHLS Covid-19 waves administered in April, May, June, July, and September 2020. Findings are based on the General Health Questionnaire 12 (GHQ-12), clinically significant cases and severe cases for **mental distress**. In April 2020, the risk of becoming a clinically significant case increased across groups by 55% to 80% compared to the 2018–19 baseline. This increase, however, rapidly diminished over time: in July–September 2020, there was only a higher risk of caseness in men aged 25–34 years (prevalence ratio (*PR*) = 1.29, 95% CI [1.01, 1.65]) compared to the 2018–19 baseline. Between April and July-September 2020, the risk of distress significantly decreased in all groups by 21% to 46%. Whereas the increases in April were similar across groups, the decreases in July-September were smaller in men aged 25-35 years (*PR* = 0.79, 95% CI [0.65, 0.97]) compared with women aged 16-24 years (*PR* = 0.54, 95% CI [0.45, 0.65]. Comparing 2018-19 with July- September 2020, there were few differences in the risk of caseness across groups, with significant increases in distress only found in men aged 25-34 years (*PR* = 1.29, 95% CI [1.01, 1.65]). In April 2020, the increase in GHQ scores was largely attributable to the increase in endorsements on “(not) able to enjoy your normal day-to-day activities”, “(not) capable of making decisions…”, and “(not) playing a useful part in things”

Stroud and Gutman (2021) assessed changes in the **mental health** of young adults in the UK during the COVID-19 pandemic using data from the nationally representative, longitudinal panel survey of the Understanding Society COVID-19 survey. The following data on current mental health was measured at six time points (April, May, June, July, September, and November 2020) using the 12-item General Health Questionnaire (GHQ-12), the analyzed sample included 880 young adults (aged 18-25 years in wave 1, M_{age} = 21.80 years, *SD* = 2.28 years). Growth curve modeling was used to examine the trajectory of mental health from April to November 2020. The significant intercept revealed that the mental health scores were the highest in April, which is indicating poorer mental health. "There was a significant negative linear slope indicating an improvement in mental health during the first three months of the pandemic. There was also a significant positive quadratic slope, indicating a worsening of mental health from September onward." Analyzed by gender, results showed that the mental health of the female participants was the lowest in April 2020, but it gradually improved until September 2020, when it started to decrease again, while male participants had a relatively stable trajectory of mental health between April and November 2020. These results imply that trajectory of mental health is in line with lockdown restrictions in the UK, with them gradually easing over the Spring and Summer months and tightening from September onwards.

A longitudinal study from the United Kingdom (Bailey et al., 2021) examined the impact of the lockdown and ongoing social restrictions on families of 5- to 16-year-old-children (*M* = 11.53, *SD* = 2.56) with intellectual disability (ID). They used data from an ongoing UK study of families of children with ID. Wave 1 was 2.5 years prior to data collection for wave 2 (April 9th to July 2nd, 2020). Data were available from 397 primary parental caregivers of children with ID at wave 2 of the study. Parental caregivers who completed their wave 2 surveys pre-lockdown vs. during/immediately post-lockdown did not differ in their change from wave 1 to 2 **in psychological distress** (p = .32), **life satisfaction** (p = .63), caregiving impact (p = .49), or positive gains (p = .95). Also, the results did not differ in externalizing (p = .27), or internalizing (p = .87) behavior of the child with ID; nor for sibling externalizing (p = .86) problems. The study did thus not find any impact of the lockdown as measured by differences in the amount of change between wave 1 and 2 in parental well-being and child/sibling behavior and emotional problems between families who filled in the wave 2 survey either before or during the COVID-19 restrictions.

An Irish study (Ferry et al., 2021) aimed to examine how **reduced working impacted mental health** in the early months of COVID-19. The collected data included pre-pandemic data from January/February 2020 and data from April 2020. 8'708 individuals/employees between 18 and 65 years were analyzed. 42.2% of the employees reported reduced working in April 2020. Whereas reduced working per se was not associated with **psychological distress** in April 2020 (*OR* = 1.06, 95% CI [0.91, 1.23]), employees self-isolating/sick, permanently laid-off or in caregiving roles were more likely than other employees to be distressed (*OR* = 1.67, 95% CI [1.13, 2.47]; *OR* = 4.93, 95% CI [2.24, 10.87]; *OR* = 1.87, 95% CI [1.28, 2.73], respectively). Compared to January/February 2020, psychological distress in April 2020 was increased from 20.1% to 31.8% and reduced working was associated with greater psychological distress (*OR* = 1.30, 95% CI [1.14, 1.49]). Females and those not living in a couple were also more likely to report psychological distress (*OR* = 2.09, 95% CI [1.82, 2.40] and *OR* = 1.70, 95% CI [1.47, 1.96], respectively). Older age (*OR* = 0.44, 95% CI [0.33, 0.59] for those aged 45 to 54 years) and higher baseline weekly household earnings (*OR* = 1.08, 95% CI [1.01, 1.17] appeared to be protective.

In the UK; Cooper et al. (2021) used data from the Covid-19: Supporting Parents, Adolescents and Children during Epidemics (Co-SPACE) study to explore the association between loneliness, social relationships, and mental health in adolescents. Self-reported data from 894 young people (age 11 to 16) were used. The data was collected at two timepoints, baseline (March 30th, 2020, and June 1st, 2020) and one month later the first follow up. Overall being female, $r(867) = .19$, $p < .001$, and being older, $r(867) = .13$, $p < .001$, and lower income, $r(804) = .08$, $p < .05$, was associated with being lonely. Higher loneliness (UCLA Short Loneliness Scale (ULS-4)) was significantly associated with higher scores on all mental health measures (emotional symptoms, conduct problems, hyperactivity-inattention as measured by the SDQ and **psychological stress** as measured by the Kessler-6 Psychological Distress Scale (K6)). Psychological stress and loneliness were strongly associated, $r(866) = .51$, $p < .001$. The time someone spent talking to other people was not related to mental health or loneliness. But there was a small positive association between "texting others" and conduct problems, $r(874) = .15$, $p < .001$, hyperactivity-inattention, $r(874) = .08$, $p < .05$, and psychological distress, $r(869) = .09$, $p < .05$. However, there was no significant association between "texting others" and loneliness. It was "concluded that while loneliness was associated with greater

mental health difficulties at baseline, it did not predict increased mental health difficulties one month later.

Essau and de la Torre-Luque (2021) analyzed adolescent psychopathological profiles and explored its role in predicting the outcome of COVID-19. The sample for this study was drawn from the Millennium Cohort Study (MCS). Between January 2018 to March 2019 and in May 2020, a total of 904 participants completed mental health questions (2018-2019) and a COVID-19 survey (2020). The adolescents were at t1 17 years (*M* = 17.18 years) and at t2 19 years (*M* = 19.17 years) old. As mental health outcomes, well-being (Warwick-Edinburgh Mental Wellbeing Scale, WEMWBS), **distress** (K6 Kessler Distress Scale), depression (Patient Health Questionnaire, PHQ-2) and anxiety (Generalised Anxiety Disorder Scale) have been measured. Based on the MCS sweep 7, four psychopathological profiles were identified. 60.17% of sample belonged to the profile which consisted of adolescents with low levels of psychological symptoms. The second profile included adolescents with the highest risk of showing almost all the psychological symptoms and problematic behaviors (23.01% of sample). 12.03% of sample belonged to the third profile, which comprised adolescents at high risk of substance use and behavioral addictions. Lastly, the fourth profile included adolescents who reported having bad sleep quality and mental health difficulties, and symptoms indicative of poor emotion regulation (4.79% of sample). Adolescents from the second profile reported a rise in mental distress in anxiety symptoms and in depressive symptoms and a reduction in mental well-being. Adolescents from the fourth profile reported a rise in mental distress, in anxiety symptoms and a reduction in mental well-being.

Depression

A longitudinal study in Spain examined the effects of the pandemic and confinement on the mental health of the general population over 18 years. Data was collected from March 21st to June 4th, 2020 at three time points: two weeks after the beginning of the confinement (*N* = 3480), after a month (*N* = 1041) and after two months, when the lockdown was lifted (*N* = 569). The results show that **depressive symptoms** increased significantly throughout the confinement (Z(T0-T1) = 7.06, $p < .001$), slightly decreased (Z(T1-T2) = 1.34, $p = .372$) and were reduced by the third evaluation (Z(T0-T2) = 4.02, $p < .001$). In the regression model for depression in which 42 % of the variance

could be explained, younger age was one of the main predictors, amongst spiritual well-being and loneliness. In the case of anxiety, the model explained 31% of the variance of the fixed effects, with spiritual wellbeing, loneliness, younger age and female gender as the main predictors. This result indicates that younger age is a predictor of depressive symptomatology during the pandemic (González-Sanguino et al., 2021).

A population-based study from Iceland (Thorisdottir et al., 2021) assessed **depressive symptoms** during the Covid-19 pandemic with the Symptom Checklist-90 in a sample of 13- to 18-year-olds. Data was assessed in October or February in 2016 and 2018 (pre-pandemic) and in October 2020 (during the COVID-19 pandemic). A total of 59'701 survey responses were included in the analysis. Results show an increase in depressive symptoms (β = 0.57, 95% CI [0.53, 0.60]) in 2020 across all age groups compared to the same-aged peers before the pandemic. These results were significantly worse in female participants compared with male participants (β = 4.16, 95% CI [4.05, 4.28], and β = –1.13, 95% CI [-1.23, -1.03], respectively)

Symptoms of **depression, anxiety and stress**, and the psychological impact of the lockdown situation in Spanish population were longitudinally analyzed using the Depression Anxiety and Stress Scale (DASS-21) and the Impact of Event Scale (IES) by Planchuelo-Gómez et al. (2020). 4724 participants filled in two surveys between March 28th and April 5th, 2020 (t1) and April 28th, 2020, and May 15th, 2020 (t2). Symptomatic scores of anxieties, depression and stress were exhibited by 7.22%, 46.42% and 49.66% of the second survey respondents, showing a significant increase compared to the first survey (32.45%, 44.11% and 37.01%, respectively). Regarding the intrusion and avoidance scores remained on a high level during both timepoints. Authors discussed that consumption of information about COVID-19 and physical activity seemed to have an important role in the evolution of psychological symptoms.

A longitudinal study (Liang et al., 2021) investigated the **changes in adolescents internalizing symptoms** (anxiety and depression) during the pandemic by administering online surveys at three time points (T1 two weeks after home confinement March 2020; T2 five weeks after confinement; T3 end of home confinement May 2020). A total of 1053 Italian parents participated on behalf of their children aged 11-18 years (M = 14.13, SD = 2.25, 49.1% girls) in at least one of the surveys.

Results show that adolescents anxiety symptoms were significantly different between time points, with small effect sizes ($F(2, 564) = 4.906$, $p = .008$, $\eta_p^2 = 0.017$). Anxiety symptoms increased from T1 to T2 ($p = .016$) and decreased from T2 to T3 ($p = .017$). Difference in depression symptoms was statistically significant between time points ($F(2, 564) = 6.106$, $p = .002$, $\eta_p^2 = 0.021$) and increased from T1 to T2 ($p = .002$), but not to T3. 31.9% of adolescents scored above the cut-off pint for anxiety and 17.7% scored high for depression. After controlling for sociodemographic variables, parental stress was positively associated with anxiety symptoms ($B = 0.140$, $SE = 0.031$, $p = .000$) and depression symptoms ($B = 0.222$, $SE = 0.039$, $p = .000$) of adolescents at T3. The study indicates an increase in adolescents' internalizing symptoms in long-term home confinement, which are increased by high levels of parentals stress.

Giannopoulou et al. (2020) examined the impact of the lockdown on **anxiety and depression** among 459 senior high school students in Greece. The proportion of all respondents who screened positive for anxiety (GAD-7 ≥ 11) increased from 28.3% before the pandemic to 49.5% for the time of home confinement ($p < .0001$). The proportion of all respondents who scored above the Patient Health Questionnaire-9 (PHQ-9) cut off 11 or greater indicating positive screen for depression increased from 48.5% before the pandemic to 63.8% for the time of home confinement ($p < .001$). The proportion of respondents who reported having thoughts that they would be better off dead, or of hurting themselves in some way increased from 25.9% before the pandemic to 29.7% during the lockdown period ($p < .05$). More specifically, the proportion of those who reported having these thoughts nearly every day increased from 6% before the pandemic to 11.1% during the lockdown. The comorbidity, defined as positive screen for depression and anxiety, increased from 24% to 45% ($p < .0001$) and for males from 14.8% to 37.8% ($p < .00001$). After taking sex and baseline levels of depression and anxiety one month prior to the lockdown into account, the level of lockdown experienced distress was predictive of depression and anxiety levels in time of home confinement, accounting for about 30% of variance in symptoms severity scores

The study by Evans et al. (2021) used longitudinal data to characterize effects on mental health and behavior in a UK student sample, measuring **sleep quality** and diurnal preference, **depressio**n and **anxiety symptoms, wellbeing and loneliness**, and **alcohol use**. Self-report data was collected from 254 undergraduates (219 females) at a university at two-time points: autumn 2019 (baseline,

prepandemic) and April/May 2020 (under 'lockdown' conditions). Longitudinal analyses showed a significant rise in depression symptoms ($p < .001$) and a reduction in wellbeing ($p < .001$) at lockdown. Over a third of the sample could be classified as clinically depressed at lockdown compared to 15% at baseline. The increase in depression symptoms was highly correlated with worsened sleep quality, $p < .001$.

Naumann et al. (2021) investigated the **change in mental health** of adolescents in Germany during the first wave of the COVID-19 pandemic and the lockdown. The longitudinal data derived from the nationwide randomly selected anchors of the German family panel pairfam, the age group considered in the analyses were born in 2001 and 2003 ($n = 2465$) and surveyed for the first time in 2018/2019, 854 of those adolescents (aged 16 to 19 years) participated also in the COVID-19 supplementary survey from May to July 2020. Depressiveness assessed using the State-Trait Depression Scale and results are weighted. During the first lockdown in 2020, adolescents showed a significant increase in depressive symptoms: while prior to the lockdown, 10.4% of the adolescents showed clinically relevant depressive symptoms (95% CI [8.4, 12.5]), in spring 2020 the proportion of adolescents with depressive symptoms increased to 25.3% (95% CI [22.4, 28.2], which is a statistically significant increase of 14.9% (95% CI [11.8; 18.0]). Of those adolescents who had already shown clinically relevant depressive symptoms in 2018/2019 ($n = 89$; 10,4%), almost 60% still had elevated scores on the depressive scale in spring 2020, while in 40% ($n = 36$) of the respondents the score had fallen below the threshold value. Of those adolescents who had no clinically relevant depressive symptoms prior to the pandemic ($n = 765$), 21.3% ($n = 163$) developed clinically relevant symptoms between the two surveys. A logistic regression revealed that young women had a significantly higher risk of developing depressive symptoms than men of the same age ($OR = 2.8$, 95% CI [1.7, 4.3], $p < .01$). Immigrant background was also a strong risk factor ($OR = 1.8$, 95% CI [1.06, 3.02], $p < .05$).

The Swiss Corona Stress Study provided insights the distress of adolescents and young adults (Quervain et al., 2021). The last survey of the Swiss Corona Stress Study in November 2020 has shown that the proportion of respondents with moderately severe to **severe depressive symptoms** (PHQ-9) was 18%, with the youngest group of 14- to 24-year-olds being the most affected at 29%. Between March 8th and 24th, 2021, an additional anonymous survey was conducted in the German

speaking part of Northwestern Switzerland among 393 high school students with the majority being between 16 and 19 years old. 27% of the respondents reported moderately severe to severe depressive symptoms. The most significant stressor associated with depressive symptoms was perceived school pressure. 46% of the respondents indicated they were very or extremely stressed because of the pressure of school. Furthermore, the perception that school pressure has increased due to the pandemic (missed material due to closures, quarantine) was strongly correlated with depressive symptoms. Other factors included worries about poorer education or job opportunities and worries about damage to the social network. An additional factor analysis confirmed that stressors related to school build up the factor with the strongest correlation with depressive symptoms (with a large effect size).

A longitudinal UK study in 7 to 11-year-old school children analyzed proxy and child-reported data from before (2018/2019) and during the lockdown (April to June 2020). A significant increase in **depression** symptoms during the UK lockdown was observed, as measured by the Revised Child Anxiety and Depression Scale (RCADS) short form. CIs suggest a medium-to-large effect size (CI [(95% CI 0.46, 1.01]). In addition, regression models yielded non-significant changes in the Strength and Difficulties Questionnaire (SDQ) with respect to emotional problems (*B* = –0.25, 95% CI [−0.54, 0.05]) and the anxiety scores (*B* = −0.06, 95% CI [−0.34, 0.23]) during lockdown compared with before. In contrast, standardized RCADS depression scores were on average 0.74 (95% CI [0.46, 1.01]) higher during lockdown than before. Controlling for demographic factors separately (age, gender and SES) did not strongly alter the effect estimates (Bignardi et al., 2021).

Ertanir et al. (2021) investigated the changes in **Swiss adolescents' mental health**. The mean age was 12.67 (*SD* = 0.68; *N* = 377). The slopes (**depression, anxiety,** home stress, school stress) show whether the mean-level scores increased or decreased from the first timepoint (pre-pandemic score, Sept/Oct 2019) to the second timepoint (Aug/Sept 2020). On average, only the adolescent's depression (slope = 0.117, *p* = .004) and home stress (slope = 0.164, *p* = .005) scores showed a significant increase. There were no significant changes in the adolescent's anxiety (*p* = .841) and school stress (*p* = .007) levels. The inclusion of student's characteristics revealed that the mean-level changes in depression and home stress scores were no more significant. This means that the increase in students' depression and home stress levels were affected by students' characteristics.

students' gender predicted the mean score of depression, anxiety, and home stress levels, indicating that, on average, boys had lower depression, anxiety, and home stress scores than girls. girls had a significantly higher increase in depression and anxiety scores than boys. No significant effect of gender was visible for the changes in home stress, nor for changes in the stress of school student's immigrant status predicted the mean scores of depression symptoms and home stress, but not the mean scores of anxieties and school stress an immigrant status was associated with lower home stress and higher depression scores. Immigrant status had no effects on the intra-individual changes of the scores. age, students with access to a private room at home had significantly lower depression and anxiety scores compared to students who did not have access to a private room at home. Students who reported burdens other than COVID-19 had, on average, significantly higher anxiety, and depression scores (intercepts) compared to students who reported COVID-19 as a burdening factor. Moreover, students who were burdened by other factors also had significantly higher mean-level changes (slopes) in depression symptoms. These results indicate that, except for school stress, reporting a COVID-19 burden was not a significant predictor of general changes in student' mental health. On the contrary, other types of burdens seemed to have more impact on the adolescent's mental health status.

Knowles et al. (2022) examined the impacts of the COVID-19 pandemic and related social restrictions and school closures on adolescent mental health, particularly among disadvantaged, marginalized, and vulnerable groups in two socially and ethnically diverse boroughs in London, UK. They analyzed four waves of data: 3 pre-pandemic (2016-2019) and 1 mid-pandemic (May-August 2020; *N* = 1074; age range: 12–18 years) from the REACH study (Resilience, Ethnicity, and AdolesCent Mental Health). No evidence of an overall increase in the (weighted) prevalence of mental distress mid-pandemic (15.9%, 95% CI [13.0, 19.4]) compared with pre-pandemic (ranging from 17.1% to 18.3%) was found. This same pattern was observed for **depression,** anxiety, and self-harm. However, there were differences in changes in distress across the subgroups: A modest variation by gender, with a small increase in distress among the female participants (*B* [unstandardized beta coefficient] = 0.42, 95% CI [-0.19, 1.03]), mainly in internalizing scores, and a small reduction among male participants (*B* = -0.59; 95% CI [-1.25, 0.18]; *p* (interaction) = .007), primarily in externalizing scores was found. Analyses of variation in within-person change pre-COVID to mid-COVID revealed a strong evidence of variation by prior mental health problems (i.e.,

SDQ scores ≥18), with a modest decrease in overall distress among those with prior mental health problems (*B* = -1.04 [-1.88, 0.20]; *p* (interaction) = .002) and some evidence for variation by household affluence, with a small decrease in distress among young people from less affluent households pre-pandemic (*B* = -1.12 [-1.89, -0.36]; *p* (interaction) = .016). Further, there was evidence of an increase in distress among those who reported household financial problems (*B* = 1.27; 95% CI [-0.04, 2.58]), but no change among those who did not (*B* = -0.36 95% CI [-0.96, 0.24]; *p* (interaction) = .008).

The cohort-study from Burdzovic and Brunborg (2021) examined aspects of self-reported mental and physical health among adolescents (grade 10-11, 16-18 years old) from the longitudinal MyLife study in Norway before (October to December 2018 and 2019) and during the pandemic (October to December 2020), including the role of pandemic-associated anxiety. The COVID-19 cohort consists of students entering high school in 2020, students entering high school in 2019 and 2018 were combined into the single pre–COVID-19 cohort. **Depression** Symptoms were assessed with the 9-item Patient Health Questionnaire (PHQ-9) and the pandemic-associated anxiety with the Pandemic **Anxiety** Scale. A total of 2975 adolescents were included in the analysis (1621 adolescences assessed before and 915 during the pandemic). The COVID-19 cohort was subdivided in the HPA (high pandemic anxiety) or LPA (low pandemic anxiety) group. Results revealed no significant differences in depression symptoms. However, sub-analyses comparing adolescents with high anxiety during the COVID-19 pandemic with adolescents in the pre-pandemic cohort, showed that clinical-level depression symptoms (*aOR* = 2.17; 95% CI [1.39, 3.30]; *p* = .001) were significantly more common in the HPA group from the COVID-19 cohort than in the Pre–COVID-19 cohort.

Owens et al. (2022) assessed mental health and wellbeing in a sample of UK university students during the COVID-19 pandemic. The prospective longitudinal study with one month between baseline (T1) in December 2020 and follow up assessment (T2) in January 2021, included 389 young people aged 18–25 (M_{age} = 21.04 years, *SD* = 1.62) and measured a range of facets of mental wellbeing using the **Patient Health Questionnaire (PHQ-8),** Warwick Edinburgh Mental Wellbeing Scale (WEMWBS), Jenkins Sleep Scale (JSS), Ruminative Response Scale (RRS) as well as the Perceived Stress Scale (PSS).

Results show that, compared to a reference sample for rates of **depression** (Kroenke et al.'s, 2009) in which 6.2% of 18–24-year-olds met the criteria for probable depression, in the present sample, 55.5% of the participants at T1 and 52.8% of the participants at T2 had probable depression. A two-sample test of proportion indicated that the large difference between the reference and the present sample was statistically significant ($p < .0001$). However, the decrease in prevalence between T1 and T2 did not reach statistical significance ($p = .54$). The reference sample for rates of poor mental wellbeing derives from previous research reporting levels of approx. 19%. The larger proportion of poor mental wellbeing in the study sample with 40.3% at T1 and 37.2% at T2 was significantly different to the reference sample ($p < .0001$), the reduction from T1 to T2 however, was not statistically significant ($p = .45$). The proportion of participants who reported sleep disturbance was at T1 (30.0%, $p < .0001$) and T2 (21.9%, $p < .0001$) significantly higher than in the reference sample, the reduction from T1 to T2 did also reach statistical significance ($p = .03$). Compared to estimations from previous research (~15%), the proportion of participants reporting high levels of rumination was significantly higher at T1 (36.1%, $p < .0001$) and T2 (29.3%, $p < .0001$), however, the decrease in rumination from T1 to T2 was not statistically significant ($p = .09$). Lastly, the levels of stress were significantly higher than previous estimates (25%) at T1 (76.6%, $p < .0001$) and T2 (84.0%, $p < .0001$), there was also a statistically significant increase in stress from T1 to T2 ($p = .027$). At T1, higher lockdown restrictions were associated with significantly more depression ($B = 2.06$, $SE = 0.61$, $p = .001$), more stress ($B = 0.93$, $SE = 0.28$, $p = .001$) and more rumination ($B = 0.93$, $SE = 0.41$, $p = .023$). There was also a pattern of less wellbeing ($B = -2.08$, $SE = 0.45$, $p < .001$) and more sleep disturbance ($B = 1.02$, $SE = 0.53$, $p = .054$) being associated with higher lockdown restrictions. At T2, the negative effect of higher lockdown restrictions persisted prospectively for depression ($B = 2.01$, $SE = 0.70$, $p = .004$), stress ($B = 0.99$, $SE = 0.37$, $p = .007$), and rumination ($B = 1.23$, $SE = 0.48$, $p = .008$), and was also significant for wellbeing ($B = -2.31$, $SE = 0.58$, $p < .0001$) and sleep disturbance ($B = 1.57$, $SE = 0.60$, $p = .009$).

In Denmark 7445 young adults (age range = 18 – 23) participated in a study (Groot et al., 2022) investigating the impact of housing conditions while lockdown (April 2020) on changes in mental health. Unadjusted mean changes in mental well-being scores were highest for those with no access to outdoor spaces. Lower **mental well-being** and QoL and higher levels of loneliness were observed in the third week of the lockdown compared to before the lockdown (3 months after 18th

birthday), with higher proportions of individuals with scores indicative of possible (19.1% compared to 12.2%) or probable (2.6% compared to 1.3%) depression/anxiety, low QoL (36.6% compared to 15.6%) or being lonely (23.1% compared to 13.8%). A lack of direct access to outdoor spaces was associated with the greatest decreases in mental well-being scores (no access vs. garden: adjusted mean difference (a*MD*) = − 0.75; 95% CI [− 1.14, − 0.36]). Compared to youth living in rural homes, those in urban or semi-urban homes had greater decreases in mental well-being (a*MD* = − 0.20; 95% CI [− 0.39, − 0.02] and − 0.13; 95% CI [− 0.32, 0.06]) and greater odds of onset of low mental well− being (a*OR* = 1.14; 95% CI [0.94, 1.38] and a*OR* = 1.21 [1.00, 1.48]). Decreases in QoL and onset of low QoL were associated with living in a denser household and living alone. Youth living with a partner reported increased QoL compared to youth living with parents (a*MD* = 0.40; 95% CI [0.22, 0.58] and, incident loneliness was associated with living alone and living in a denser household (a*OR* = 2.12; 95% CI [1.59, 2.82] and a*OR* = 1.30; 95% CI [1.14, 1.48]). Overall, living alone, in denser households without direct access to outdoor spaces may be especially vulnerable to mental health declines.

A German study by Alt et al. (2021) hypothesized a **detrimental effect of extraversion** during lockdown conditions **on adolescents' depressiveness** (State-Trait Depression Scale, STDS). Inspecting change, higher extraversion at *t*1 predicted a greater increase in negative mood (*b* =.14, *p* =.003, *r* =.19, 95% CI [0.11,0.29]), more anhedonia (*b* =.15, *p* = .002, *r* = .20, 95% CI [0.11, 0.32]), and a higher increase of **loneliness** (*b* = .15, *p* < .001, *r* = .20, 95% CI [0.13,0.29]). A higher rise in loneliness predicted a stronger increase of both negative mood (*b* = .44, *p* < .001, *r* = .49, 95% [0.39, 0.54]) and anhedonia (*b* = .38, *p* < .001, *r* = .43, 95% CI [0.37, 0.54]). Inspecting pre-pandemic associations at *t*1, extraversion was negatively correlated with anhedonia (*r* = .39, *p* < .001, 95% CI [0.45,0.33]) and negative mood (*r* = .26, *p* < .001, 95%CI [0.31,0.19]). Females showed a higher increase in negative mood (*b* = .09, *p* = .005, *r* = .14, 95% CI [0.07,0.20]) and anhedonia (*b* = .08, *p* = .024, *r* = .13, 95% CI [0.06, 0.20]). Change in loneliness was not predicted by gender (*b*= .05, *p* = .143, *r* = .10, 95% CI [0.06, 0.17]). At *t*1, being female was correlated with higher extraversion (*r* = .13, *p* = .002, 95% CI [0.06, 0.19]), more negative mood (*r* = .25, *p* < .001, 95% CI [0.18, 0.31]) and more anhedonia (*r* = .09, *p* = .022, 95% CI [0.02, 0.15]).

This Dutch study from Koelen et al. (2021) measured mental health changes in at-risk university students (N = 685, M_{age}= 22.5, SD = 5.5; range 17-67). **Depression, Generalized Anxiety Disorder, Insomnia, alcohol use, loneliness, happiness, stress and subjective health** was measured at two timepoints (T1 = January 2019 and T2 = April 16th – May 13th, 2020) "Overall, mental complaints increased from T1 to T2. At T2, 55.3% scored above threshold for likely clinical depression, compared to 48.7% at T1 (X^2 [1, n = 671] = 209.60; p < .001). Roughly 3% more participants experienced clinically significant generalized anxiety during COVID (X^2 [9, n = 683] = 296.37; p < .001). At T2, 2.1% of the participants experienced clinically severe insomnia compared to none at T1 (X^2 [6, n = 680] = 263.16; p < .001). Roughly 5% more people experienced social anxiety at T2 compared to T1 (X^2 [1, n = 679] = 272.95; p < .001). Loneliness increased with 7% (X^2 [9, n = 679] = 394.45; p < .001). Interestingly, social avoidance and alcohol use decreased (social avoidance: X^2 [1, n = 683] = 181.67; p < .001; alcohol use, men: X^2 [1, n = 207] = 32.56; p < .001; alcohol use, women: X^2 [1, n = 504] = 140.61; p < .001)." (Koelen et al. 2021, p. 4).

Koenig et al. (2021) compared **emotional and behavior problems** (Strengths and Difficulties Questionnaire (SDQ)) self-reported **health-related quality of life** (KIDSCREEN (KS10)), **depression** (PHQ-A), **suicide thoughts** (Paykel Suicide Scale (PSS)) and eating disorders (Weight Concerns Scale (WCS); Eating Disorder Examination-Questionnaire (EDE-Q)) in a matched sample of adolescents (12- to -20-olds) using pre-pandemic (November 26th, 2018 to March 13th, 2020) and lockdown data (March 18th, 2020 to August 29th, 2020). This study found no evidence for an increase in emotional and behavioral problems, depression, thoughts of suicide or suicide attempts, eating disorder symptoms, or a decrease in general health-related quality of life, except a decrease in suicide plans (ORadj = 0.31, 95% CI [0.13, 0.75], p =.009) and conduct problems (b adj = -0.16, 95% CI [-0.31, -0.00], p = .045). Family risk-factors did not moderate these finding. The influence of socioeconomic status on emotional and behavioral problems as well as depression decreased during the lockdown. This result does not support other findings from Germany showing an increase of mental health problems during the lockdown. Small sample size and low prevalence of outcomes may be an explanation.

In a longitudinal study, Bouter et al. (2022) investigated the effect of the pandemic on adolescents' mental health in the Netherlands in a prospective cohort of 1022 adolescents (with a 2.5:1 ratio

oversampling of adolescents on their emotional and behavioral problems). As part of the iBerry (Investigating Behavioral and Emotional Risk in Rotterdam Youth) Study, **depressive,** anxiety, stress, and oppositional defiant problems as well as psychotic experiences and suicidality were assessed before the pandemic, using several subscales of the Youth Self-Report (YSR) from the Achenbach System of Empirically Based Assessment (ASEBA) ($M_{\text{age at baseline}}$ = 15.0 years). 445 and 333 of these 1022 participants completed an online questionnaire during the first lockdown in April 2020 ($M_{\text{age at first lockdown assessment}}$ = 17.7 years, *SD* = 0.67), and during the second lockdown in January 2021, respectively. Between the baseline and first lockdown assessment, an increase in depressive problems was observed (*B*: 0.93, 95% CI [0.43, 1.42]). However, there was a decrease in anxiety problems (*B*: −0.58, 95% CI [−0.94, −0.21]) and psychotic experiences (*B* = −0.147, 95% CI [−0.23, −0.07]), whereas stress problems (*B* = 0.05, 95% CI [−0.48, 0.59]), oppositional defiant problems (*B* = 0.30, 95% CI [−0.18, 0.24]), and suicidality (*B* = −0.05, 95% CI [−0.13,0.03]) did not change. Between the first and second lockdown assessment there was an increase in depressive problems (*B* = 2.20, 95% CI [1.71, 2.70]) and stress problems (*B* = 0.96, 95% CI [0.43, 1.50]). In contrast, psychotic experiences (*B* = −0.13, 95% CI [−0.21, −0.05]) decreased, and anxiety problems (*B* = −0.03, 95% CI [−0.40, 0.34]), oppositional defiant problems (*B* = −0.13, 95% CI [−0.34, 0.08]), and suicidality (*B* = 0.03, 95% CI [−0.04, 0.11]) remained unchanged. Further analysis showed that participants who scored in the clinical range at baseline had the largest decrease in problem scores between baseline and first lockdown for anxiety problems (Cohen's *d* = .22), depressive problems (*d* = .12), oppositional defiant problems (*d* = .12), stress problems (*d* = .19), psychotic symptoms (*d* = .15), and suicidality (*d* = .11). The scores for these participants increased slightly between first and second lockdown assessment, with small effect sizes (Cohen's *d* ranging from .01 to .11). Participants who scored in the borderline range at baseline showed a similar pattern (although all effect sizes being small, with Cohen's *d* ranging from .00 to .07). Participants who scored in the normal range at baseline had an increase in scores between baseline and first lockdown assessment and again between first and second lockdown assessment, but all effect sizes were negligible (Cohen's *d* ranging from .00 to .04). Thus, majority of the participating adolescents reported having emotional and behavioral symptoms that were within the normal range. Among adolescents with high clinical severity prior to the pandemic, the mean symptom scores for all six outcomes decreased significantly.

Essau and de la Torre-Luque (2021) analyzed adolescent psychopathological profiles and explored its role in predicting the outcome of COVID-19. The sample for this study was drawn from the Millennium Cohort Study (MCS). Between January 2018 to March 2019 and in May 2020, a total of 904 participants completed mental health questions (2018-2019) and a COVID-19 survey (2020). The adolescents were at t1 17 years (*M* = 17.18 years) and at t2 19 years (*M* = 19.17 years) old. As mental health outcomes, well-being (Warwick-Edinburgh Mental Wellbeing Scale, WEMWBS), distress (K6 Kessler Distress Scale), **depression** (Patient Health Questionnaire, PHQ-2) and anxiety (Generalised Anxiety Disorder Scale) have been measured. Based on the MCS sweep 7, four psychopathological profiles were identified. 60.17% of sample belonged to the profile which consisted of adolescents with low levels of psychological symptoms. The second profile included adolescents with the highest risk of showing almost all the psychological symptoms and problematic behaviors (23.01% of sample). 12.03% of sample belonged to the third profile, which comprised adolescents at high risk of substance use and behavioral addictions. Lastly, the fourth profile included adolescents who reported having bad sleep quality and mental health difficulties, and symptoms indicative of poor emotion regulation (4.79% of sample). Adolescents from the second profile reported a rise in mental distress in anxiety symptoms and in depressive symptoms and a reduction in mental well-being. Adolescents from the fourth profile reported a rise in mental distress, in anxiety symptoms and a reduction in mental well-being.

Loneliness

A study by Hu and Gutman (2021) in the UK investigated the **trajectory of loneliness in young adults** (aged 18 to 25 years) from June to November 2020 and its association with emotional support as well as demographic and health factors. The analytic sample included 419 young adults (296 females; 123 males). "The final growth curve model, with coefficient estimates of the intercept and slopes accounting for the self-reported loneliness trajectory from June to November 2020. On average, those aged 18 to 25 experienced a decrease in self-reported loneliness from June through July and then an increase from September to November 2020. The positive quadratic trend for time was highly significant, indicating a U-shape trajectory of self-reported loneliness over time. Several covariates revealed significant main effects at the intercept only. Being employed, being in school, as well as having a higher annual household income were all associated with lower levels of self-

reported loneliness. Pre-existing physical and mental health conditions were associated with higher levels of self-reported loneliness. A significant interaction between gender and self-reported emotional support was found at the intercept only. Males who reported receiving a higher level of emotional support also reported lower levels of loneliness compared to males who reported receiving a lower level of emotional support. Females, however, reported similar levels of loneliness regardless of the amount of emotional support they reported.

A study from the UK (Niedzwiedz et al., 2021) found that **loneliness** remained stable overall (*RR* = 0.9, 95% CI [0.6, 1.5]) but repeated cross-sectional analyses revealed that there were differences by age group, with younger people experiencing higher overall levels of loneliness, as well as a large increase in loneliness, from 13.3% (95% CI [11.6, 15.3] to 20.2% (95% CI [16.0, 25.2]) during lockdown.

In Denmark 7445 young adults (age range = 18 – 23) participated in a study (Groot et al., 2022) investigating the impact of housing conditions while lockdown (April 2020) on changes in mental health. Unadjusted mean changes in mental well-being scores were highest for those with no access to outdoor spaces. Lower mental well-being and QoL and higher levels of **loneliness** were observed in the third week of the lockdown compared to before the lockdown (3 months after 18th birthday), with higher proportions of individuals with scores indicative of possible (19.1% compared to 12.2%) or probable (2.6% compared to 1.3%) depression/anxiety, low QoL (36.6% compared to 15.6%) or being lonely (23.1% compared to 13.8%). A lack of direct access to outdoor spaces was associated with the greatest decreases in mental well-being scores (no access vs. garden: adjusted mean difference (a*MD*) = − 0.75; 95% CI [− 1.14, − 0.36]). Compared to youth living in rural homes, those in urban or semi-urban homes had greater decreases in mental well-being (a*MD* = − 0.20; 95% CI [− 0.39, − 0.02] and − 0.13; 95% CI [− 0.32, 0.06]) and greater odds of onset of low mental well− being (a*OR* = 1.14; 95% CI [0.94, 1.38] and a*OR* = 1.21 [1.00, 1.48]). Decreases in QoL and onset of low QoL were associated with living in a denser household and living alone. Youth living with a partner reported increased QoL compared to youth living with parents (a*MD* = 0.40; 95% CI [0.22, 0.58] and, incident loneliness was associated with living alone and living in a denser household (a*OR* = 2.12; 95% CI [1.59, 2.82] and a*OR* = 1.30; 95% CI [1.14, 1.48]). Overall, living

alone, in denser households without direct access to outdoor spaces may be especially vulnerable to mental health declines.

In the UK; Cooper et al. (2021) used data from the Covid-19: Supporting Parents, Adolescents and Children during Epidemics (Co-SPACE) study to explore the association between **loneliness,** social relationships, and mental health in adolescents. Self-reported data from 894 young people (age 11 to 16) were used. The data was collected at two timepoints, baseline (March 30th, 2020, and June 1st, 2020) and one month later the first follow up. Overall being female, $r(867) = .19$, $p < .001$, and being older, $r(867) = .13$, $p < .001$, and lower income, $r(804) = .08$, $p < .05$, was associated with being lonely. Higher **loneliness** (UCLA Short Loneliness Scale (ULS-4)) was significantly associated with higher scores on all mental health measures (emotional symptoms, conduct problems, hyperactivity-inattention as measured by the SDQ and psychological stress as measured by the Kessler-6 Psychological Distress Scale (K6)). Psychological stress and loneliness were strongly associated, $r(866) = .51$, $p < .001$. The time someone spent talking to other people was not related to mental health or loneliness. But there was a small positive association between "texting others" and conduct problems, $r(874) = .15$, $p < .001$, hyperactivity-inattention, $r(874) = .08$, $p < .05$, and psychological distress, $r(869) = .09$, $p < .05$. However, there was no significant association between "texting others" and loneliness. It was "concluded that while loneliness was associated with greater mental health difficulties at baseline, it did not predict increased mental health difficulties one month later.

Anxiety

A longitudinal study (Liang et al., 2021) investigated the **changes in adolescents internalizing symptoms** (anxiety and depression) during the pandemic by administering online surveys at three time points (T1 two weeks after start of home confinement March 2020; T2 five weeks after start of confinement; T3 end of home confinement May 2020). A total of 1053 Italian parents participated on behalf of their children aged 11-18 years ($M = 14.13$, $SD = 2.25$, 49.1% girls) in at least one of the surveys. Results show that adolescents anxiety symptoms were significantly different between time points, with small effect sizes, $F(2, 564) = 4.906$, $p = .008$, $\eta_p^2 = 0.017$. Anxiety symptoms increased from T1 to T2 ($p = .016$) and decreased from T2 to T3 ($p = .017$). Difference in depression

symptoms was statistically significant between time points, $F(2, 564) = 6.106$, $p = .002$, $\eta_p^2 = 0.021$) and increased from T1 to T2 ($p = .002$), but not to T3. 31.9% of adolescents scored above the cut-off pint for anxiety and 17.7% scored high for depression. After controlling for sociodemographic variables, parental stress was positively associated with anxiety symptoms ($B = 0.140$, $SE = 0.031$, $p = .000$) and depression symptoms ($B = 0.222$, $SE = 0.039$, $p = .000$) of adolescents at T3. The study indicates an increase in adolescents' internalizing symptoms in long-term home confinement, which are increased by high levels of parentals stress.

Symptoms of **depression, anxiety and stress**, and the psychological impact of the lockdown situation in Spanish population were longitudinally analyzed using the Depression Anxiety and Stress Scale (DASS-21) and the Impact of Event Scale (IES) by Planchuelo-Gómez et al. (2020). 4724 participants filled in two surveys between March 28th and April 5th, 2020 (t1) and April 28th, 2020, and May 15th, 2020 (t2). Symptomatic scores of anxieties, depression and stress were exhibited by 37.22%, 46.42% and 49.66% of the second survey respondents, showing a significant increase compared to the first survey (32.45%, 44.11% and 37.01%, respectively). Regarding the intrusion and avoidance scores remained on a high level during both timepoints. Authors discussed that consumption of information about COVID-19 and physical activity seemed to have an important role in the evolution of psychological symptoms.

Giannopoulou et al. (2020) examined the impact of the lockdown on **anxiety and depression** among 459 senior high school students in Greece. The proportion of all respondents who screened positive for anxiety (GAD-7 ≥ 11) increased from 28.3% before the pandemic to 49.5% for the time of home confinement ($p < .0001$). The proportion of all respondents who scored above the Patient Health Questionnaire-9 (PHQ-9) cut off 11 or greater indicating positive screen for depression increased from 48.5% before the pandemic to 63.8% for the time of home confinement ($p < .001$). The proportion of respondents who reported having thoughts that they would be better off dead, or of hurting themselves in some way increased from 25.9% before the pandemic to 29.7% during the lockdown period ($p < .05$). More specifically, the proportion of those who reported having these thoughts nearly every day increased from 6% before the pandemic to 11.1% during the lockdown. The comorbidity, defined as positive screen for depression and anxiety, increased from 24% to 45% ($p < .0001$) and for males from 14.8% to 37.8% ($p < .00001$). After taking sex and baseline levels of

depression and anxiety one month prior to the lockdown into account, the level of lockdown experienced distress was predictive of depression and anxiety levels in time of home confinement, accounting for about 30% of variance in symptoms severity scores

Giménez-Dasí et al. (2021) conducted an assessment on the effect of **anxiety** levels of children (*N* = 215 ,6 – 11 years old) using the SENA scales developed for evaluation of Spanish children and adolescents. The age groups were divided into two groups: younger (6 – 7 years of age) and older (8 – 11 years old), in accordance with SENA scales. Preliminary analyses did not indicate differences in anxiety among the age groups, either in T1 or T2 (all the *p* values > 0.20). In T3, a univariate test revealed significant differences between the younger and older children ($F(2, 65) = 1.64$, $p = .04$, $\eta^2 = 0.8$) with a mean size effect. The differences according to gender were also significant. At T1. the comparisons show statistically significant differences between girls and boys only in the 6-year-old group with a mean size effect ($M_{Boy} = 2.32$, $SD = 0.62$; $M_{Girl} = 2.62$, $SD = 0.61$), $F(1.72) = 4.47$, $p = .04$, $d = 0.48$). No significant gender differences were found for older children at either time (all the *p*-values > .14). To compare the average mean scores of children of 6 years of age in T1 and T3, they executed a repeated measures ANCOVA with gender as a co-variable. On introducing this co-variable, the differences were not significant ($F(1, 66) = 0.10$, $p = .75$). For the group of older children (without gender differences), they compared T1 and T3 using a student's *t*-test of repeated measures (with an alpha = 0.01 to avoid type I Errors). The results indicated that the reduction in T3 was statistically significant ($M_{T1} = 2.31$, $SD = 0.68$; $M_{T3} = 2.15$, $SD = 0.69$; $t(128) = 2.62$, $p = .01$), but with a small effect size ($d = 0.24$).

The study by Amendola et al. (2021) investigated the level of generalized **anxiety** (GAD-7) in university students in Switzerland (ZHAW) (M = 26.67 years, *SD* = 5.83). Participants were recruited via their university e-mail. Repetitive participation was possible. *N* = 676 participated in both T0 (baseline, April 3rd – 14th) and T1 surveys (April 30th – May 14th 2020). Prevalence of moderate-to-severe anxiety were 20.2% and 15.6% at T0 and T1, respectively. Baseline anxiety was considered higher compared to other pre-pandemic studies. Anxiety decreased from lockdown to post-lockdown. The following positively predicted anxiety: older age, female gender, non-Swiss nationality, loneliness, participants' concern about their own health, and interaction between time

and participants' concern about their own health. Resilience and social support negatively predicted anxiety.

Elmer et al. (2020) compared data from university students collected April 2020 and September 2019, as well as with previous students' data from 2016 and 2017. They investigated change in mental health using the German version of the Center for Epidemiologic Studies Depression scale (CES-D), the Generalized Anxiety Disorder scale (GAD-7), Perceived Stress Scale (PSS), and the UCLA Loneliness Scale. The analyses within the same students (2020 vs. Sept. 2019) showed significant that students became more depressed (M_{diff} = 4.44, *SE* = 0.50, $p < .001$), slightly more anxious (M_{diff} = 0.60, *SE* = 0.24, $p = .014$), more stressed (M_{diff} = 2.67, *SE* = 0.40, $p < .001$), and more lonely (M_{diff} = 0.13, *SE* = 0.02, $p < .001$). Similar negative trends were also observed for comparisons with data collected one year earlier in April 2019, with exception of anxiety. The within-person comparisons indicate that students on average report lower levels of mental health during the COVID-19 crisis than before the crisis. COVID-19 specific worries were related to increased depression or stress, isolation in social networks and less interaction with others with increased anxiety, while isolation of friendship-networks related to increased loneliness, as did living alone. More emotional support was protective for depression, as was the number of friends for loneliness. Female sex was associated with negative mental health trajectories for all outcomes.

Ertanir et al. (2021) investigated the changes in **Swiss adolescents' mental health**. The mean age was 12.67 (*SD* = 0.68; *N* = 377). The slopes (**depression, anxiety, home stress, school stress**) show whether the mean-level scores increased or decreased from the first timepoint (pre-pandemic score, Sept/Oct 2019) to the second timepoint (Aug/Sept 2020). On average, only the adolescent's depression (slope = 0.117, $p = .004$) and home stress (slope = 0.164, $p = .005$) scores showed a significant increase. There were no significant changes in the adolescent's anxiety ($p = .841$) and school stress ($p = .007$) levels. The inclusion of student's characteristics revealed that the mean-level changes in depression and home stress scores were no more significant. This means that the increase in students' depression and home stress levels were affected by students' characteristics. students' gender predicted the mean score of depression, anxiety, and home stress levels, indicating that, on average, boys had lower depression, anxiety, and home stress scores than girls. girls had a significantly higher increase in depression and anxiety scores than boys. No significant

effect of gender was visible for the changes in home stress, nor for changes in the stress of school student's immigrant status predicted the mean scores of depression symptoms and home stress, but not the mean scores of anxieties and school stress an immigrant status was associated with lower home stress and higher depression scores. Immigrant status had no effects on the intra-individual changes of the scores. age, students with access to a private room at home had significantly lower depression and anxiety scores compared to students who did not have access to a private room at home. Students who reported burdens other than COVID-19 had, on average, significantly higher anxiety, and depression scores (intercepts) compared to students who reported COVID-19 as a burdening factor. Moreover, students who were burdened by other factors also had significantly higher mean-level changes (slopes) in depression symptoms. These results indicate that, except for school stress, reporting a COVID-19 burden was not a significant predictor of general changes in student' mental health. On the contrary, other types of burdens seemed to have more impact on the adolescent's mental health status.

In a longitudinal study, Bouter et al. (2022) investigated the effect of the pandemic on adolescents' mental health in the Netherlands in a prospective cohort of 1022 adolescents (with a 2.5:1 ratio oversampling of adolescents on their emotional and behavioral problems). As part of the iBerry (Investigating Behavioral and Emotional Risk in Rotterdam Youth) Study, depressive, **anxiety,** stress, and oppositional defiant problems as well as psychotic experiences and suicidality were assessed before the pandemic, using several subscales of the Youth Self-Report (YSR) from the Achenbach System of Empirically Based Assessment (ASEBA) ($M_{\text{age at baseline}}$ = 15.0 years). 445 and 333 of these 1022 participants completed an online questionnaire during the first lockdown in April 2020 ($M_{\text{age at first lockdown assessment}}$ = 17.7 years, *SD* = 0.67), and during the second lockdown in January 2021, respectively. Between the baseline and first lockdown assessment, an increase in depressive problems was observed (*B*: 0.93, 95% CI [0.43, 1.42]). However, there was a decrease in anxiety problems (*B*: −0.58, 95% CI [−0.94, −0.21]) and psychotic experiences (*B* = −0.147, 95% CI [−0.23, −0.07]), whereas stress problems (*B* = 0.05, 95% CI [−0.48, 0.59]), oppositional defiant problems (*B* = 0.30, 95% CI [−0.18, 0.24]), and suicidality (*B* = −0.05, 95% CI [−0.13,0.03]) did not change. Between the first and second lockdown assessment there was an increase in depressive problems (*B* = 2.20, 95% CI [1.71, 2.70]) and stress problems (*B* = 0.96, 95% CI [0.43, 1.50]). In contrast, psychotic experiences (*B* = −0.13, 95% CI [−0.21, −0.05]) decreased, and anxiety problems (*B* =

−0.03, 95% CI [−0.40, 0.34]), oppositional defiant problems (*B* = −0.13, 95% CI [−0.34, 0.08]), and suicidality (*B* = 0.03, 95% CI [−0.04, 0.11]) remained unchanged. Further analysis showed that participants who scored in the clinical range at baseline had the largest decrease in problem scores between baseline and first lockdown for anxiety problems (Cohen's *d* = .22), depressive problems (*d* = .12), oppositional defiant problems (*d* = .12), stress problems (*d* = .19), psychotic symptoms (*d* = .15), and suicidality (*d* = .11). The scores for these participants increased slightly between first and second lockdown assessment, with small effect sizes (Cohen's *d* ranging from .01 to .11). Participants who scored in the borderline range at baseline showed a similar pattern (although all effect sizes being small, with Cohen's *d* ranging from .00 to .07). Participants who scored in the normal range at baseline had an increase in scores between baseline and first lockdown assessment and again between first and second lockdown assessment, but all effect sizes were negligible (Cohen's *d* ranging from .00 to .04). Thus, majority of the participating adolescents reported having emotional and behavioral symptoms that were within the normal range. Among adolescents with high clinical severity prior to the pandemic, the mean symptom scores for all six outcomes decreased significantly.

Knowles et al. (2022) examined the impacts of the COVID-19 pandemic and related social restrictions and school closures on adolescent mental health, particularly among disadvantaged, marginalized, and vulnerable groups in two socially and ethnically diverse boroughs in London, UK. They analyzed four waves of data: 3 pre-pandemic (2016-2019) and 1 mid-pandemic (May-August 2020; *N* = 1074; age range: 12–18 years) from the REACH study (Resilience, Ethnicity, and AdolesCent Mental Health). No evidence of an overall increase in the (weighted) prevalence of mental distress mid-pandemic (15.9%, 95% CI [13.0, 19.4]) compared with pre-pandemic (ranging from 17.1% to 18.3%) was found. This same pattern was observed for **depression, anxiety, and self-harm**. However, there were differences in changes in distress across the subgroups: A modest variation by gender, with a small increase in distress among the female participants (*B* [unstandardized beta coefficient] = 0.42, 95% CI [-0.19, 1.03]), mainly in internalizing scores, and a small reduction among male participants (*B* = -0.59; 95% CI [-1.25, 0.18]; *p* (interaction) = .007), primarily in externalizing scores was found. Analyses of variation in within-person change pre-COVID to mid-COVID revealed a strong evidence of variation by prior mental health problems (i.e., SDQ scores ≥18), with a modest decrease in overall distress among those with prior mental health

problems (*B* = -1.04 [-1.88, 0.20]; *p* (interaction) = .002) and some evidence for variation by household affluence, with a small decrease in distress among young people from less affluent households pre-pandemic (*B* = -1.12 [-1.89, -0.36]; *p* (interaction) = .016). Further, there was evidence of an increase in distress among those who reported household financial problems (*B* = 1.27; 95% CI [-0.04, 2.58]), but no change among those who did not (*B* = -0.36 95% CI [-0.96, 0.24]; *p* (interaction) = .008).

The cohort-study from Burdzovic Andreas & Brunborg (2021) examined aspects of self-reported mental and physical health among adolescents (grade 11) from the longitudinal MyLife study in Norway before and during the pandemic, including the role of pandemic-associated anxiety. The COVID-19 cohort consists of students entering high school in 2020, students entering high school in 2019 and 2018 were combined into the single pre–COVID-19 cohort. **Depression** Symptoms were assessed with the 9-item Patient Health Questionnaire (PHQ-9) and the pandemic-associated anxiety with the Pandemic **Anxiety** Scale. A total of 2975 adolescents were included in the analysis (1621 adolescences assessed before and 915 during the pandemic). The COVID-19 cohort was subdivided in the HPA (high pandemic anxiety) or LPA (low pandemic anxiety) group. Results revealed no significant differences in depression symptoms. However, sub-analyses comparing adolescents with high anxiety during the COVID-19 pandemic with adolescents in the pre-pandemic cohort, showed that clinical-level depression symptoms (*aOR* = 2.17; 95% CI [1.39, 3.30]; *p* = .001) were significantly more common in the HPA group from the COVID-19 cohort than in the Pre–COVID-19 cohort.

O'Connor (2021) investigated the trajectory of **mental health and well-being** during the first 6 weeks of lockdown in 3077 adults in the UK. **Suicidal ideation** increased over time, with respondents at wave 2 (9.2%; *OR* = 1.17, 95% CI [1.01, 1.34], *p* = .031) and wave 3 (9.8%; *OR* = 1.24, 95% CI [1.07, 1.44], *p* = .005) reporting higher levels than at wave 1 (8.2%). The difference between waves 2 and 3 was not statistically significant. 21% of the participants was above the cut-off point for moderate or severe levels of **symptoms of anxiety** at wave 1. However, these symptoms decreased across waves, with wave 2 (18.6%; *OR* = 0.89, 95% CI [0.81, 0.97], *p* = .012) and wave 3 (16.8%; *OR* = 0.82, 95% CI [0.74, 0.90], *p* < .0001) being lower than wave 1 (21%). Again, sig. between wave 2 and 3 not. sign. subgroup analyses showed that women, young people

(18–29 years), those from more socially disadvantaged backgrounds and those with pre-existing mental health problems have worse mental health outcomes during the pandemic across most factors.

A longitudinal study in Italy, Spain, and Portugal (Orgilés et al., 2021) investigated the psychological reactions to the pandemic two, five, and eight weeks after the lockdown in 2020. Parents completed the “Impact Scale of COVID-19 and Home Confinement on Children and Adolescents”. Country differences were found, but overall **anxiety** (*OR* = 3.78; 95% CI [2.90, 4.91]; $p \leq .001$), mood symptoms (*OR* = 1.95; 95% CI [1.61, 2.35]; $p = .005$), sleep disturbances (*OR* = 1.49; 95% CI [1.30, 1.70]; $p \leq .001$) and behavioral disturbances (*OR* = 1.17; 95% CI [1.08, 1.27]; $p \leq .001$) and cognitive disturbances (*OR* = 1.45; 95% CI [1.21, 1.73]; $p \leq .001$) significantly increased from two weeks after the lockdown (Time 1) to five weeks (Time 2). From five to eight weeks (Time 3), almost all psychological reactions decreased except for anxiety. Parental stress was related to all children´s psychological symptoms, except for eating disturbances

This Dutch study from Koelen et al. (2021) measured mental health changes in at-risk university students ($N = 685$, $M_{age} = 22.5$, $SD = 5.5$; range 17-67). **Depression, Generalized Anxiety Disorder, Insomnia, alcohol use, loneliness, happiness, stress and subjective health** was measured at two timepoints (T1 = January 2019 and T2 = April 16th – May 13th, 2020) "Overall, mental complaints increased from T1 to T2. At T2, 55.3% scored above threshold for likely clinical depression, compared to 48.7% at T1 (X^2 [1, $n = 671$] = 209.60; $p < .001$). Roughly 3% more participants experienced clinically significant generalized anxiety during COVID (X^2 [9, $n = 683$] = 296.37; $p < .001$). At T2, 2.1% of the participants experienced clinically severe insomnia compared to none at T1 (X^2 [6, $n = 680$] = 263.16; $p < .001$). Roughly 5% more people experienced social anxiety at T2 compared to T1 (X^2 [1, $n = 679$] = 272.95; $p < .001$). Loneliness increased with 7% (X^2 [9, $n = 679$] = 394.45; $p < .001$). Interestingly, social avoidance and alcohol use decreased (social avoidance: X^2 [1, $n = 683$] = 181.67; $p < .001$; alcohol use, men: X^2 [1, $n = 207$] = 32.56; $p < .001$; alcohol use, women: X^2 [1, $n = 504$] = 140.61; $p < .001$)." (Koelen et al. 2021, p. 4)

Essau and de la Torre-Luque (2021) analyzed adolescent psychopathological profiles and explored its role in predicting the outcome of COVID-19. The sample for this study was drawn from the

Millennium Cohort Study (MCS). Between January 2018 to March 2019 and in May 2020, a total of 904 participants completed mental health questions (2018-2019) and a COVID-19 survey (2020). The adolescents were at t1 17 years (*M* = 17.18 years) and at t2 19 years (*M* = 19.17 years) old. As mental health outcomes, well-being (Warwick-Edinburgh Mental Wellbeing Scale, WEMWBS), distress (K6 Kessler Distress Scale), **depression** (Patient Health Questionnaire, PHQ-2) and anxiety (Generalised Anxiety Disorder Scale) have been measured. Based on the MCS sweep 7, four psychopathological profiles were identified. 60.17% of sample belonged to the profile which consisted of adolescents with low levels of psychological symptoms. The second profile included adolescents with the highest risk of showing almost all the psychological symptoms and problematic behaviors (23.01% of sample). 12.03% of sample belonged to the third profile, which comprised adolescents at high risk of substance use and behavioral addictions. Lastly, the fourth profile included adolescents who reported having bad sleep quality and mental health difficulties, and symptoms indicative of poor emotion regulation (4.79% of sample). Adolescents from the second profile reported a rise in mental distress in anxiety symptoms and in depressive symptoms and a reduction in mental well-being. Adolescents from the fourth profile reported a rise in mental distress, in anxiety symptoms and a reduction in mental well-being.

Behavioral/emotional (affective) disorders

Caviezel Schmitz and Krüger (2020) conducted a study in Switzerland to analyze the effects of the Pandemic on children and adolescents (Age range: 2-17 years) on their **emotional and physical changes**. Parents answered an online survey for their children (*N* = 245; M_{age} = 7 years old). Outcomes were measured at two different time points with two different groups (April 20th to May 10th, 2020 [lockdown] and May 11th to June 7th, 2020 [lifting of restrictions]). The results of the Strengths and Difficulties Questionnaire (SDQ) indicate that 40% of the children experienced **some sort of difficulties**. At both time points, 40% of the 4-8 year-old and 50% of the 9-14 years-old children and adolescents had at least light difficulties. 50% of the 15 year-old adolescents had difficulties during the first wave, this increased to 70% at the second time point. Together, most of the Children worried little. Children older than 9 years worrying more often than younger ones and especially older children and adolescents did not look positive in to the future during June 2020 (lifting of restriction).

A longitudinal study from the Netherlands (Achterberg et al., 2021) examined **externalizing behavior** and whether perceived stress mediated the lockdown effects on children. A total of 106 parents and 151 children (aged 10- 13 years) filled in questionnaires during lockdown and data were combined with data of previous years. Children's externalizing behavior (measured by the Strength and Difficulties Questionnaires (SDQ)) during the lockdown was significantly predicted by prior externalizing behavior ($p < .001$). However, longitudinal child measures showed a gradual decrease in internalizing and externalizing behavior, which seemed decelerated by the COVID-19 lockdown. Overall, relatively few parents (19%) and children (21%) reported stress in the last two weeks of lockdown. Stress measured with the Perceived Stress Scale (measured on a 0–4 scale) ranged between 0 and 2.4 in parents and between 0 and 2.8 in children. Perceived stress of children and parents were not significantly correlated ($p = .209$). However, changes in parental negative feelings and children's externalizing behavior were mediated by perceived stress: higher scores prior to the lockdown were related to more stress during the lockdown, which in turn was associated with an increase in parental negative feelings and children's' externalizing behavior. Perceived stress in parents and children was associated with negative coping strategies. Additionally, children's stress levels were influenced by prior and current parental over reactivity

Lehmann et al. (2022) found an increased Strengths and Difficulties Questionnaire (SDQ) total scale mean scores (t1 = 11.1; t2 = 11.7; $p < .001$) from t1 (27th of April – 12th of May 2020) to t2 (16th of December 2020 – 10th of January 2021) in Norwegian children (age range: 12 – 19). The highest increase was observed for internalizing problems (t1 = 5.6, t2 = 6.2; $p < .001$), emotional symptoms (t1 = 3.4, t2 = 3.9; $p < .001$), and peer problems (t1 = 2.2, t2 = 2.3; $p = .002$). No statistical difference was observed for externalizing subscales or prosocial behavior.

Hu and Qian (2021) examined the mental health impact of the COVID-19 pandemic on adolescents (10- to 16-year-olds) in the United Kingdom in July 2020. The study is part of a longitudinal study. Regression models showed an overall increase in **emotional problems** ($B = .23$; 95% CI [.09, .38]; $p = .002$) and **peer relationship problems** ($B = .27$; 95% CI [.15, .40]; $p < .000$) and a decrease in **conduct problems** ($B = -.18$, 95% CI [-.30, -.07]; $p = .002$). Adolescents with better-than-median mental health before the pandemic have experienced an increase in their emotional problems ($B = 1.05$; 95% CI [.88, 1.22]; $p < .001$), conduct problems ($B = .28$; 95% CI [.16, .39]; $p < .001$),

hyperactivity (*B* =.64; 95% CI [.46, .82]; *p* < .001), and peer relationship problems (*B* = .94; 95% CI [.79, 1.08]; *p* < .001), and they have also become less prosocial (*B* = -.89; 95% CI [-1.03, -.75]; *p* < .001). In contrast, adolescents with worse-than-median mental health before the pandemic have experienced opposite changes in each Strengths and Difficulties Questionnaire domain. Boys have experienced a smaller increase in emotional problems but a greater decrease in prosocial tendency. The negative mental health impact is particularly prominent among adolescents in one-parent, one-child, and low-income households. Adult household members' COVID-19 symptoms and illness have undermined adolescents' peer relationships.

A Spanish study by Ezpeleta et al. (2020) investigates the life conditions of adolescents during lockdown and the association with **psychological problems** (SDQ). 226 parents (117 girls/109 boys, M_{age} = 13.9, *SD* = 0.28) answered an online survey about their children. After the lockdown, the following problems increased significantly: **conduct problems** (*p* = .006, small effect size**), peer problems** (*p* < .001, moderate effect size), **prosocial behavior problems** (*p* < .001, large effect size) and **total difficulties** (*p* = .005, small effect size). There was no significant change in hyperactivity-inattention problems after the lockdown. Higher emotional problems were associated with sleep problems, feelings of frustration, a low quality of the adolescent's relationships (lack of online communication with friends, worsened family relationships), adolescents' activities (not keeping up daily routines, (parents overburdened with helping with homework, not doing joint activities with the family, boredom, excessive screen time), and with behaviors of the adults (parents giving up enforcing the rules and more discussions/stress than usual in the family at home) as well as their own concern about contagion. Higher conduct problems scores were mainly associated with adolescents' relationships, how the adults in the household behaved, and the adolescents' activities. Higher hyperactivity–inattention problems scores and peer problems were mostly associated with the adolescents' activities. Higher prosocial problems scores were mostly associated with the behavior of the adults. Higher total problems scores were associated with the adolescents' activities, followed by the adolescents' relationships, the adults' behavior, and last changes in weight (4.3%). Effect sizes ranged from small (0.04) to large (0.36).

A study by Raw et al. (2021) that is part of the longitudinal Co-SPACE study in the UK focused on mental health effects during the lockdown. Parents and caregivers from 4 to 16-year-olds filled in a

Strengths and Difficulties Questionnaire (SDQ) at baseline and at least one follow-up questionnaire. Growth cure analyses showed an increase between April and July 2020 in **hyperactivity/inattention**, while **conduct problems** and **emotional symptoms** remained relatively stable. Although many children maintained stable low symptoms, other children showed elevated symptoms in July. Predictors of such elevated symptoms were parent/carer with higher self-reported mental health symptoms (of depression, anxiety, and stress), having special education needs or neurodevelopmental disorders, and to be younger in age. Moreover, different types of symptom trajectories were identified

In the UK; Cooper et al. (2021) used data from the Covid-19: Supporting Parents, Adolescents and Children during Epidemics (Co-SPACE) study to explore the association between loneliness, social relationships, and mental health in adolescents. Self-reported data from 894 young people (age 11 to 16) were used. The data was collected at tow timepoints, baseline (March 30th, 2020, and June 1st, 2020) and one month later the first follow up. Overall being female, $r(867) = .19$, $p < .001$, and being older, $r(867) = .13$, $p < .001$, and lower income, $r(804) = .08$, $p < .05$, was associated with being lonely. Higher loneliness (UCLA Short Loneliness Scale (ULS-4)) was significantly associated with higher scores on all mental health measures (**emotional symptoms, conduct problems, hyperactivity-inattention** as measured by the SDQ and psychological stress as measured by the Kessler-6 Psychological Distress Scale (K6)). Psychological stress and loneliness were strongly associated, $r(866) = .51$, $p < .001$. The time someone spent talking to other people was not related to mental health or loneliness. But there was a small positive association between “texting others” and conduct problems, $r(874) = .15$, $p < .001$, hyperactivity-inattention, $r(874) = .08$, $p < .05$, and psychological distress, $r(869) = .09$, $p < .05$. However, there was no significant association between “texting others” and loneliness. It was “concluded that while loneliness was associated with greater mental health difficulties at baseline, it did not predict increased mental health difficulties one month later.

A longitudinal study from the United Kingdom (Bailey et al., 2021) examined the impact of the lockdown and ongoing social restrictions on families of 5- to 16-year-old-children ($M = 11.53$, $SD = 2.56$) with intellectual disability (ID). They used data from an ongoing UK study of families of children with ID. Wave 1 was assessed in winter 2018, Wave 2 was partly pre-lockdown and partly

during/immediately post-lockdown (April 9th to July 2nd,2020). Overall data were available from 397 primary parental caregivers of children with ID at wave 2 of the study. The results did not differ in **externalizing** (p = .27), or **internalizing** (p = .87) **behavior** of the child with ID; nor for sibling externalizing (p = .86) problems. The study did thus not find any impact of the lockdown on child/sibling behavior and emotional problems.

The objective of the Spanish study by Giménez-Dasí et al. (2020) was to investigate the **psychological effects** that the confinement measures have had on **the externalizing and internalizing behavior of a sample of children aged 3–11 years** from Madrid. A total of 167 families with children participated. The parents evaluated the children through the System of Evaluation of Children and Adolescents (SENA) scale in the months of February and April. The results show significant changes over time in most of the indicators evaluated in the older children of the sample (6–11-year-old) with increases in attention problems (p = .02), emotional regulation problems (p = .01), and hyperactivity and impulsivity (p < .001). There were no significant changes over time on the same indicators in the younger children of the sample (3-6-year-olds; p = .19). However, in their overall ratings, more than two-thirds of parents of primary school children and more than half of the parents with preschool children reported that the psychological state of their child has worsened.

A longitudinal study in Italy, Spain, and Portugal (Orgilés et al., 2021) investigated the psychological reactions to the pandemic two, five, and eight weeks after the lockdown in 2020 in 3 to 18 year-old children. Parents completed the “Impact Scale of COVID-19 and Home Confinement on Children and Adolescents”. Country differences were found, but overall anxiety (*OR* = 3.78; 95% CI [2.90, 4.91]; $p \leq .001$), **mood symptoms** (*OR* = 1.95; 95% CI [1.61, 2.35], p = .005), sleep disturbances (*OR* = 1.49; 95% CI [1.30, 1.70]; $p \leq .001$) and **behavioral disturbances** (*OR* = 1.17; 95% CI [1.08, 1.27]; $p \leq .001$) and **cognitive disturbances** (*OR* = 1.45; 95% CI [1.21, 1.73]; $p \leq .001$) significantly increased from two weeks after the lockdown (Time 1) to five weeks (Time 2). From five to eight weeks (Time 3), almost all psychological reactions decreased except for anxiety. Parental stress was related to all children´s psychological symptoms, except for eating disturbances

A longitudinal study in the Netherlands (Green et al., 2021) investigated **mood fluctuation** during the pandemic in adolescents (10- to 20-year-olds) and young adults (21 to 25 years) that were recruited via high schools and college. Relative to older adolescents, the results of the Profile of Mood States Scale (POMS) indicated that younger adolescents report higher levels of vigor and lower levels of tension and depression in both May 2020 and November 2020. From May to November 2020 feelings of vigor decreased (p = .021), while feelings of tension (p < .001) and depression (p = .006) increased, particularly among younger adolescents. Furthermore, the analyzes yielded evidence for a link between vulnerability factors (i.e., family stress and inequality of opportunity in online homeschooling) and instability in negative affect (i.e., tension and depression fluctuations) during the first months of the pandemic. These findings demonstrates that during the COVID-19 pandemic, young people' s vulnerability with respect to their mood and emotional reactivity increased, particularly for adolescents who experienced more stressors.

A longitudinal study from Italy (Alivernini et al., 2021) assessed **positive and negative affect in 14 to 19 year-olds**, using the Positive and Negative Affect Scale for children (PANAS-C) as a standardized instrument. Affects was measured one year before the COVID-19 pandemic as well as at the end of the lockdown in May and June 2020. The results indicated a reduction of levels of positive affect and increases in the levels of negative affect (both p < .001)

Romeo et al. (2021) investigated the impact of the **use of a surgical mask on the affective behaviour in 40 infants** aged 2–9 months (study group) from April 2020 to December 2020 in Italy by using the Face, Legs, Activity Cry and Consolability Scale (FLACC) which is assessing pain and distress among pediatric patients. They compared the data to 40 infants with the same ages and characteristics assessed before the onset of the COVID-19 pandemic in 2019 (control group).
The infants assessed during the pandemic had significantly higher scores (p < .001) in the FLACC scale than those assessed before the COVID-19 onset (infants aged 2-5 months: study group: 3 (0-10) vs. control group: 0.2 (0-1); infants aged 6-9 months: 6.7 (2-10) vs. 1.2 (0-5)). 37 out the 40 infants from the study group showed some signs of discomfort and appeared irritable and less prone to be engaged by the health operator wearing a mask, with a different pattern of responses depending on age of the infants. In the study group, in 19 out of 22 infants aged 2-5 months, an initial difficulty in obtaining full visual attention was observed, with frequent gaze aversion reactions

and initial irritability. All 18 infants assessed between 6-9 months showed an increased irritability and often inconsolable crying and in some cases expressions of fear to consolation attempts. In 14 infants (78%) parental intervention was needed and in more than half of the cases (56%) the assessment had to be postponed. In the control group from 2019, irritability was reported in no-one of the infants assessed between 2-5 months and in 2 infants assessed between 6-9 months. Thus, surgical mask wearing health operators significantly increased distress in infants up to 9 months.

An exploratory study from Italy (Cerniglia et al., 2021) examined the influence of the pandemic on the **quality of mother-child exchanges during feeding** in a sample of mothers and children (*N* = 359), along **with children's' emotional behavior**. The Child Behavior Checklist (CBL-1,5-5) was administered at 18 (T1; May 2019) and 36 months (T2; November 2020) to assess mothers' perceptions of the children's emotional behavior. Results show that children's emotional/behavioral functioning was rated by mothers as more maladaptive at T2, especially in the subscales of Withdrawn (η^2 = .69, p < .001), Anxious/Depressed (η^2 = .75, p < .001 and Aggressive Behaviour (η^2 = .65, p < .001). Children also showed significantly higher scores in the Internalizing (η^2 = .62, p < .001) and Externalizing (η^2 = .71, p < .001) subscales from T1 to T2. The study results indicate that the quality of mother-child interactions decreased significantly from the pre-pandemic period to the current period and that children's scores become more maladaptive during the pandemic.

Conti et al. (2020) conducted an observational longitudinal study at the Fondazione Stella Maris (FSM) in Italy to investigate lockdown-related **emotional and behavioral changes** in the pediatric neuropsychiatric population. 141 families with children aged 1.5-18 years filled in two online questionnaires. For the population aged 1.5-5 years, anxiety and somatic problems increased as indicated by differences from pre-lockdown to lockdown in the Syndrome Scale Score in the Somatic Complaints (p < .10) and in the DSM-Oriented Anxiety Scale (p < .05). Younger age in the 1.5–5 years subpopulation resulted as "protective" factor. For the subgroup aged 6-18 years, obsessive-compulsive, post-traumatic and thought problems increased as indicated by the Child Behavior Check List questionnaire that showed differences in the Syndrome-Scale-Score-Thought problems (p < .05) as well as in the Obsessive scale (p < .05) and the post-traumatic stress disorder scale (p < .10). Increases in psychiatric symptoms were associated with financial hardship experienced by the families during lockdown.

Koenig et al. (2021) compared **emotional and behavior problems** (Strengths and Difficulties Questionnaire (SDQ)) self-reported **health-related quality of life** (KIDSCREEN (KS10)), **depression** (PHQ-A), **suicide thoughts** (Paykel Suicide Scale (PSS)) and eating disorders (Weight Concerns Scale (WCS); Eating Disorder Examination-Questionnaire (EDE-Q)) in a matched sample of adolescents (12- to -20-olds) using pre-pandemic (November 26th, 2018 to March 13th, 2020) and lockdown data (March 18th, 2020 to August 29th, 2020). This study found no evidence for an increase in emotional and behavioral problems, depression, thoughts of suicide or suicide attempts, eating disorder symptoms, or a decrease in general health-related quality of life, except a decrease in suicide plans (*OR*adj = 0.31, 95% CI [0.13, 0.75], *p* =.009) and conduct problems (b adj = -0.16, 95% CI [-0.31, -0.00], *p* = .045). Family risk-factors did not moderate these finding. The influence of socioeconomic status on emotional and behavioral problems as well as depression decreased during the lockdown. This result does not support other findings from Germany showing an increase of mental health problems during the lockdown. Small sample size and low prevalence of outcomes may be an explanation.

In a longitudinal study, Bouter et al. (2022) investigated the effect of the pandemic on adolescents' mental health in the Netherlands in a prospective cohort of 1022 adolescents (with a 2.5:1 ratio oversampling of adolescents on their emotional and behavioral problems). As part of the iBerry (Investigating Behavioral and Emotional Risk in Rotterdam Youth) Study, depressive**,** anxiety, stress, and **oppositional defiant problems** as well as psychotic experiences and suicidality were assessed before the pandemic, using several subscales of the Youth Self-Report (YSR) from the Achenbach System of Empirically Based Assessment (ASEBA) ($M_{\text{age at baseline}}$ = 15.0 years). 445 and 333 of these 1022 participants completed an online questionnaire during the first lockdown in April 2020 ($M_{\text{age at first lockdown assessment}}$ = 17.7 years, *SD* = 0.67), and during the second lockdown in January 2021, respectively. Between the baseline and first lockdown assessment, an increase in depressive problems was observed (*B*: 0.93, 95% CI [0.43, 1.42]). However, there was a decrease in anxiety problems (*B*: −0.58, 95% CI [−0.94, −0.21]) and psychotic experiences (*B* = −0.147, 95% CI [−0.23, −0.07]), whereas stress problems (*B* = 0.05, 95% CI [−0.48, 0.59]), oppositional defiant problems (*B* = 0.30, 95% CI [−0.18, 0.24]), and suicidality (*B* = −0.05, 95% CI [−0.13,0.03]) did not change. Between the first and second lockdown assessment there was an increase in depressive problems (*B* = 2.20, 95% CI [1.71, 2.70]) and stress problems (*B* = 0.96, 95% CI [0.43, 1.50]). In contrast,

psychotic experiences (*B* = −0.13, 95% CI [−0.21, −0.05]) decreased, and anxiety problems (*B* = −0.03, 95% CI [−0.40, 0.34]), oppositional defiant problems (*B* = −0.13, 95% CI [−0.34, 0.08]), and suicidality (*B* = 0.03, 95% CI [−0.04, 0.11]) remained unchanged. Further analysis showed that participants who scored in the clinical range at baseline had the largest decrease in problem scores between baseline and first lockdown for anxiety problems (Cohen's *d* = .22), depressive problems (*d* = .12), oppositional defiant problems (*d* = .12), stress problems (*d* = .19), psychotic symptoms (*d* = .15), and suicidality (*d* = .11). The scores for these participants increased slightly between first and second lockdown assessment, with small effect sizes (Cohen's *d* ranging from .01 to .11). Participants who scored in the borderline range at baseline showed a similar pattern (although all effect sizes being small, with Cohen's *d* ranging from .00 to .07). Participants who scored in the normal range at baseline had an increase in scores between baseline and first lockdown assessment and again between first and second lockdown assessment, but all effect sizes were negligible (Cohen's *d* ranging from .00 to .04). Thus, majority of the participating adolescents reported having emotional and behavioral symptoms that were within the normal range. Among adolescents with high clinical severity prior to the pandemic, the mean symptom scores for all six outcomes decreased significantly.

Mutluer et al. (2020) conducted a cross-sectional study in Turkey to investigate how individuals with ASD responded to COVID-19 in terms of comprehension and adherence to implemented measures; changes in their behavioral problems; and how their caregivers' anxiety levels relate with these behavioral changes. 87 individuals with diagnosed ASD – age ranged from 3–29 years – were included according to DSM-5 criteria by child psychiatrists. When asked about the changes in their child during the pandemic period, 55% of the parents said that their child got more aggressive, 26% said their child's tics increased or new tics emerged, 29% said their child's communication skills deteriorated, and 44% and 33% of the parents reported reduced sleep and appetite changes, respectively. All subscales of Aberrant Behavior Checklist differed significantly between before and after the pandemic conditions, indicating a worsening of the ASD individuals' functioning ($p < .001$, $\eta^2 = 0.26$).

This study from the UK (Morris et al., 2021) investigates the impact of the pandemic, the lockdown and subsequent return to school, on the **social development and communication of autistic**

children from their parents' perspective and to examine whether associations exist between social-communicative behaviours and the variables affected by the lockdown or return to school period. Parents from 176 autistic children answered the questionnaire at T1 (after the lockdown when children returned to school) and 54 follow-up questionnaires were returned at T2 after the first half term. During the lockdown, only 10.2% of children regularly attended school, suggesting that the school routine was disrupted for a great majority of children in the sample. The results indicate that self-regulation skills ($p < .05$) and cooperation skills ($p < .05$) were most affected over the course of the lockdown. Logistic regressions showed, that children whose parents felt supported by their schools were reported to show an improvement in their social communication skills (i.e. social-communicative skills got a little bit better, or got a lot better) over the course of the lockdown ($p = .007$) and children who continued to see friends and family outside of school and the household were perceived to also show a slight improvement in their overall social-communicative behaviours in comparison to those who did not ($p = .002$). Children's physical activity levels were perceived to significantly increase during the return to school ($p < .0001$), which was associated with better social-communication outcomes ($p < .05$).

Sergi et al. (2021) considered a sample of 88 children who had been diagnosed with **autism spectrum disorder** (ASD), aged between 18 and 30 months. They all took part in a "principles and procedures of Applied Behavior Analysis"-based (ABA) intervention funded by the Local Health Authority of the province of Caserta in Italy. Authors aimed to evaluate how children's behavior with ASD changed during complete lockdown and during the three months after the resumption of activities. Results show that during the lockdown children experienced significant improvements in **communication** (F (1.175) = 3999.877; $p < .05$), **socialization** (F (1175) = 34.912; $p < .05$), and **personal autonomy** (F (1175) = 72.268; $p < .05$).

Siracusano et al. (2021) investigated the impact of lockdown due to COVID-19 pandemic on the **adaptive functioning, problematic and repetitive behaviors** of 85 **Italian preschoolers and schoolers with autism spectrum disorder**. Within the Preschooler group, after the lockdown, a significant improvement emerged in almost all domains of the Adaptive Behavior Assessment System, (General Adaptive Composite, $p = .014$; Conceptual Adaptive Domain, $p = .031$; Practical Adaptive Domain, $p = .047$). Whereas, in the Schooler group, no significant result was found

between baseline and T1, in all the adaptive domains investigated. Participants whose parents underwent an online parental support during lockdown had a significant improvement in the Practical Adaptive Domain (p = .027) in comparison to the individuals with ASD whose parents did not receive such support. These findings underline the importance of parent care in ASD treatment, pertaining to involvement in the intervention and time spent at home with children

Substance and media use

Levaillant et al. (2021) conducted a historic cohort study to assess the impact of the COVID-19 pandemic and lockdown on the **consumption of anxiolytics, hypnotics, and antidepressants** by extracting and analyzing data from the French health insurance database between January 1st and February 28th, 2021. During the pandemic, a high increase in the number of new consumers of antidepressants, and hypnotics and anxiolytics per week was observed in adolescents aged 12-18 years as compared with the trend from 2015 to 2020. The use of hypnotics and anxiolytics shifted from a slightly decreasing trend to a high increase (from -0.49; 95% CI [-0.65, -0.32] to +18.46; 95% CI [17.08, 19.85] new consumers weekly; p < .001, respectively from -0.9; 95% CI [-2.53, 0.73]; p = .279, to +35.72; 95% CI [22.28, 49.15]; p < .001), while antidepressants, that were already in a slight rising trend, converted into a considerable increase (from +6.03; 95% CI [5.07, 6.99], to +34.48; 95% CI [26.59, 42.38] new consumers weekly; p < .001). The same increase in all three drug categories studied was observed among young adults aged 19 to 25 years, with a higher increase trend after March 2020 for anxiolytics (from +1.71; 95% CI [-0.67, 4.1]; p = .159, to +55.92; 95% CI [36.31, 75.54] new consumers weekly; p < .001) and antidepressants (from +14.98; 95% CI [13.01, 16.95] to +87.12; 95% CI [70.91, 103.33] new consumers weekly; p < .001) and a shift from a slight decrease to an increase for hypnotics (from -5.87; 95% CI [-6.45, -5.28] to +15.08; 95% CI [10.27, 19.9] new consumers weekly; p < .001). This increase in the use of substances was higher for children, adolescents and young adults compared to the people older than 26.

This Dutch study from Koelen et al. (2021) measured mental health changes in at-risk university students (N = 685, M_{age}= 22.5, SD = 5.5; range 17–67). Depression, Generalized Anxiety Disorder, Insomnia, **alcohol use**, loneliness, happiness, stress and subjective health was measured at two timepoints (T1 = January 2019 and T2 = April 16th – May 13th, 2020) "Overall, mental complaints

increased from T1 to T2. At T2, 55.3% scored above threshold for likely clinical depression, compared to 48.7% at T1 (X^2 [1, *n* = 671] = 209.60; *p* < .001). Roughly 3% more participants experienced clinically significant generalized anxiety during COVID (X^2 [9, *n* = 683] = 296.37; *p* < .001). At T2, 2.1% of the participants experienced clinically severe insomnia compared to none at T1 (X^2 [6, *n* = 680] = 263.16; *p* < .001). Roughly 5% more people experienced social anxiety at T2 compared to T1 (X^2 [1, *n* = 679] = 272.95; *p* < .001). Loneliness increased with 7% (X^2 [9, *n* = 679] = 394.45; *p* < .001). Interestingly, social avoidance and **alcohol use** decreased (social avoidance: X^2 [1, *n* = 683] = 181.67; *p* < .001; alcohol use, men: X^2 [1, *n* = 207] = 32.56; *p* < .001; alcohol use, women: X^2 [1, *n* = 504] = 140.61; *p* < .001)." (Koelen et al. 2021, p. 4)

Albrecht et al. (2022) investigated the association between homeschooling and sleep duration as well as health during the pandemic-related school closures in Swiss high school students. The control sample (*N* = 5308) completed the survey from May to July 2017, and the lockdown sample (*N* = 3664) completed the survey from May to June 2020 during school closures in Switzerland, in both samples median age was 16 years (IQR, 15–17 years). The Munich Chronotype Questionnaire and KIDSCREEN-10 were used to assess sleep-wake patterns and health-related quality of life (HRQoL). Results show that on scheduled days participants from the lockdown sample slept significantly longer than the control sample (median: 9.00 hours [IQR, 8.25 – 9.75 hours] vs. 7.75 hours [IQR, 7.08 – 8.33 hours]). However, sleep problems were significantly more frequent in the lockdown sample than in the control sample, with difficulties falling asleep and problems sleeping through the night more than 4 times in the previous 2 weeks being more prevalent in the lockdown group (falling asleep: 1237 [33.8%] vs. 1645 [30.9%]; problems sleeping: 437 [11.9%] vs. 439 [8.3%]). On free days, sleep behavior was comparable between the two samples. The lockdown sample reported significantly higher HRQoL scores than the control sample (median, 44.48 [IQR, 40.24, 49.76] vs. 42.27 [IQR, 37.42, 48.29]; $R^2_{\beta^*}$, .007; 95% CI [.004, .012]; *p* < .001), with higher values being reported on the items for feeling fit and well, for being full of energy, for having enough time for themselves, as well as for being able to do the things they wanted in their free time. However, participants in the lockdown sample also indicated feeling lonelier and sadder and having less fun with friends. Furthermore, in the lockdown sample a significantly decreased **substance use** was found compared to the control sample, although only alcohol consumption ($R^2_{\beta^*}$, .014; 95% CI [.008, .022]; *p* < .001) and caffeine consumption ($R^2_{\beta^*}$, .010; 95% CI [.006, .015]; *p* < .001) stayed

significant after correction for multiple comparison. Multilevel regression models analyzing associations of health-related characteristics with sleep revealed that on scheduled days, longer sleep period was associated with better HRQoL ($R^2_{\beta^*}$, .027; 95% CI [.020, .034]; $p < .001$) and less caffeine consumption ($R^2_{\beta^*}$, .013; 95% CI [.009, .019]; $p < .001$)

With respect to **alcohol abuse** (AUDIT-C), a study from the UK (Niedzwiedz et al., 2021) observed that in 18- to 24-year-olds binge drinking remained unchanged but that the proportion of those who are drinking four or more times per week increased. With respect to smoking, they observed that current smoking declined.

In a population-based study from Iceland (Thorisdottir et al., 2021), the frequency of **substance use** in 13- to 18-year-olds was assessed in the years 2016, 2018, and 2020. A total of 59'701 survey responses were included in the analysis. Results show significant decreases in **cigarette smoking** (*OR* = 2.61, 95% CI [2.59, 2.66]) and **alcohol intoxication** (*OR* = 2.59, 95% CI [2.56, 2.64]) among the 15- to 18-year-olds in 2020, as well as a reduction of e-cigarette use (*OR* = 2.61, 95% CI [2.59, 2.64]) among 16- to 18-year-olds compared with 2016 and 2018.

In a longitudinal study conducted by Vasconcelos et al. (2021), the effects of the COVID-19 mitigation measures on **alcohol consumption, and binge drinking** in college students were assessed. A convenience sample of 146 Portuguese college students was recruited at a University in Portugal in October 2019 (age range: 17-26 years, M_{age} = 19.5, *SD* = 1.5 years) consisting of regular binge drinkers (regular BDs), infrequent binge drinkers (infrequent BDs) and non-binge drinkers (non-BDs) who were surveyed at three time points: pre-lockdown (Fall 2019), during lockdown (April–May 2020) and 6 months after (post-lockdown: October–November 2020). Results revealed that during lockdown, almost half of the participants (48%) decreased their alcohol use, while 15% had a higher consumption of alcohol, and 37% did not change their alcohol intake. Compared to pre-lockdown, during post-lockdown 57% of participants decreased their alcohol intake, while 9% showed an increased alcohol use, and 34% drank the same. When lockdown and post-lockdown moments were compared, they found that slightly more than half of respondents (51%) kept drinking the same amount, while 28% decreased alcohol intake and 21% increased it. Furthermore, an estimated linear mixed-effects model indicated that all college students decreased

their alcohol consumption over the course of the pandemic. Regular BDs decreased alcohol consumption from pre-lockdown (M = 10.9) to lockdown (M = 4.8, p < .001) and to post-lockdown (M = 2.2, p < .001), not differing significantly between lockdown and post-lockdown (p = .215). Infrequent BDs diminished their alcohol consumption in the post-lockdown (M = 0.8) compared to the pre-lockdown period (M = 5.5, p = .010), on the other hand alcohol craving increased from Lockdown to Post-Lockdown (p = .012). There was an association between the moment of assessment and stress (β = 3.18, p < .001), depression (β = 2.55, p < .001) and anxiety (β = 2.36, p < .001) with the scores of all those three affective states being higher during post-lockdown compared with lockdown. There was no significant association between stress, depression and anxiety and alcohol consumption.

In a retrospective cohort study, Pigeaud et al. (2021) investigated the association between the lockdown due to COVID-19 and acute alcohol intoxication (AAI) among adolescents in the Netherlands. Between January 1st and December 31st, 2020, 482 adolescents under 18 years (median age: 16 years) were admitted for AAI to one of the 12 participating hospitals. To estimate the effect of the lockdown measures on the admission for AAI, different time periods were compared: pre-lockdown (January 1st - March 15th, 2020), during the first lockdown (March 16th - May 31st, 2020), after the first lockdown (June 1st - October 14th, 2020), and the beginning of the second lockdown (October 15th - December 31st, 2020). As a reference group, the same periods in 2019 were used. A Poisson regression model revealed a decrease in the prevalence of adolescents admitted for AAI by 70% (p = .002, 95% CI [.14, .63] between the pre-lockdown and the first lockdown period. Comparing the first lockdown phase and the period after the first lockdown (reopening phase), the prevalence of adolescents admitted for AAI significantly increased (p = .047, 95% CI [1.01, 4.88]), however it did not significantly differ from the same period in 2019 (p = .758, 95% CI [.50, 1.66]). There was also no significant difference between the reopening phase and the second lockdown period (p = .074, 95% CI [.23, 1.07]).

A longitudinal study from Vera et al. (2021) compared changes in alcohol consumption before and after the COVID-19 outbreak and the impact of sociodemographic and mental health variables on such changes in young adults in Spain. Data were collected through a targeted sampling procedure as part of a larger, ongoing longitudinal study. The sample consisted of 305 young adults from

Spain aged between 18 and 26 years (M_{age} = 21.27, *SD* = 2.21), who completed a first questionnaire from November 2019 and February 2020 (T1) and second follow-up questionnaires in March 2021 (T2). Linear mixed-effects models with time as the only fixed predictor to estimate changes in drinking quantity and frequency revealed that there was an average decrease in the quantity of alcohol consumption of 6.44 Standard Drink Units (SDU) between pre- and post-COVID-19 period and an average decrease in frequency of 3.16 days drinking (during the past two months) between pre- and post-COVID-19 outbreak. Participants with a relatively high depression level at the pre-COVID assessment (*b* = -1.10, *p* = .306) did not show a decline in drinking frequency, while those with a relatively low (*b* = -2.91, *p* = .014) or moderate depression level (*b* = -2.18, *p* = .039) showed significant decreases in drinking frequency. Furthermore, decreases in quantity of alcohol use were less pronounced among those participants with a relatively high level of depression (*b* = -4.71, *p* = .003) and more pronounced for those with a relatively low (*b* = -8.32, *p* < .001) or moderate (*b* = -7.29, *p* < .001) level of depression.

Paschke et al. (2021) investigated screen time and problematic media usage patterns over the course of the pandemic. Therefore they used pre-pandemic data from the forsa.omninent panel (Germany). 1221 children/adolescents provided data for the baseline (September 13th to 17th, 2019) and 67.49% also for the first follow-up (April 20th to 30th, 2020). Most of the adolescents (*N* = 862) showed uncritical gaming behavior (71.48 %; (95 % CI [68.93, 74.02]).10.03 % adolescents with at-risk Gaming (RG) and 2.74% with Gaming Disorder (GD) boys were affected significantly more often than girls. A proportion of 9.44 % (95 % CI [7.80, 11.09]) adolescents did not use Social Media (SM) or used them only irregularly (*n* = 114). An uncritical SM usage pattern before the pandemic was shown by 79.2 % (95 % CI [76.92, 81.49]; *n* = 956). The criteria of at-risk Social Media Use (RSMU) were fulfilled by 8.2 % (*n* = 99) and of Social Media Disorder (SMD) by 3.15 % (*n* = 38) of the adolescents. A significant gender difference in favor of the boys was found for RSMU but not for SMD. A combined pattern of a problematic use of games and SM was shown for 5.67 % of the adolescents (*n* = 68). The criteria of GD and SMD was fulfilled by 1.33 % of the adolescents (*n* = 16) including a higher proportion of boys. The frequencies of regular and daily gamers and SM users significantly increased from September 2019 to April 2020. Weak to moderate increases in mean screen times on days during the week (i.e., school days) and at weekends (i.e., spare days) were found for both usage of games and SM. A one-factorial ANOVA on the time spent on

gaming/SM depending on the three gaming patterns revealed significant effects at both measurement points (gaming: baseline: $F(2, 977) = 31.12$, $p < .001$; follow-up: $F(2, 607) = 9.91$, $p < .001$; SM: baseline: $F(2, 1056) = 13.33$, $p < .001$; follow-up: $F(2, 672) = 5.09$, $p = .006$). Before the COVID-19 pandemic, screen times of uncritical gamers and SM users were significantly shorter than those of at-risk and pathological users. During the lockdown, screen times of un-critical gamers were significantly shorter than those of at-risk and pathological gamers. Uncritical SM users screen was significantly shorter than those of pathological but not of at-risk users. At-risk users did not significantly differ from pathological users at baseline and first follow-up but showed small to medium effect sizes. At baseline, the symptom severity of problematic usage behavior was significantly associated with mean screen times: gaming time explained 23.05 % of the variance of symptom severity (standardized $n^2 = 0.48$, 95 % CI [0.43, 0.53], $p < .001$, Nagelkerkes $R^2 = 0.23$) and SM time a smaller but significant proportion of 7.44 % (standardized $n^2 = 0.27$, 95 % CI [0.22, 0.33], $p < .001$, Nagelkerkes $R^2 = 0.07$). The predictive value decreased for the mean screen times assessed under the lockdown to 8.46 % for games (standardized $n^2 = 0.29$, 95 % CI [0.22, 0.36], $p < .001$, Nagelkerkes $R^2 = 0.08$) and to 2.92 % for SM (standardized $n^2 = 0.17$, 95 % CI [0.10, 0.25], $p < .001$, Nagelkerkes $R^2 = 0.03$).

Werling, Walitza, Grünblatt, Drechsler (2021) wanted to investigate the impact of the COVID-19 lockdown on **screen media behavior in a clinically referred sample** in child and adolescent psychiatry. They asked parents of children and adolescents (10-18 years) who had been in treatment in the last two years at one of the eight outpatient clinics of the Department of Child and Adolescent Psychiatry and Psychotherapy of the University of Zurich (CAPP) to participate in the online survey between May 30th and July 4th, 2020. The participants ($N = 477$) had to answer questions regarding the media use based on a paper-and-pencil screening questionnaire (PUI-Screening Questionnaire for Children and Adolescents, PUI-SQ) as well as questions regarding the treatment and the well-being of the children and adolescents. Each item was rated three times: retrospectively before the COVID-19 outbreak (January 2020), during the lockdown (March/April 2020) and during the last two weeks (June 2020/first week of July 2020). As hypothesized the results show an increased media time during and a decrease after lockdown. The repeated measures showed a significant main effect of time ($F = 200.375$, $p < .001$) as well as an interaction of time by gender ($F = 3.211$, $p = .044$). Gender-specific preferences showed an increase of gaming

along boys (35% vs 4%) and social media in the female group (43% vs 17%). The main effect for gaming across time and the interaction of gaming by gender were significant (time: $F = 56.877$, $p < .001$; interaction $F = 23.570$, $p < .001$) as well as the effect across time for social media time ($F = 63.239$, $p < .001$) and a significant time by gender interaction ($F = 6.077$, $p < .003$). The analyses of the media time concern subscale score across the three time points showed a significant main effect for the changes over time ($p < .001$) while interactions of time by gender ($p = .070$) and time by gender by age ($p = .077$) were only significant by trend. In regard to the negative impact of media use on everyday life had been observed, that there was only a small increase of concern by the parents during lockdown (21–24% while approximately 5–10% of raters indicated a decrease) and then a subsequent return to pre-COVID-19 levels. The concern about the problem behaviors like aggressiveness and anger due to media use increased during lockdown in 18.8% and after the lockdown this concern normalized again. The analysis about the effect of the lockdown on specific media-related problem behaviors and risks seemed to have very little effect according to parents' perception. Furthermore, parents had to indicate the changes of the main psychopathological problem since January. “The majority indicted no change (41.10%, $N = 196$), while an improvement of problems was reported by 37.7% of parents ($N = 180$), and a deterioration only by 21.2% ($N = 99$).” In the children group (10–13 years) the total media time was significantly more in those group with a deterioration than in those with no change or with an improvement of the psychopathological problem. Whereas in the adolescents’ group (≥14 years) this effect was not found. Further must be noted that there was a significant positive relation between the indicated happiness of the child and the media time.

Suicidal thoughts/Suicide

Sivertsen et al. (2022) examined changes and prevalence of mental health problems, suicidal ideation and suicidal behaviour as well as their associations with COVID-19-related restrictions. As part of the SHoT-study (Students’ Health and Well-being Study) in Norway, 62’498 students ($M_{age} = 24.1$, $SD = 5.2$) completed an online questionnaire in March 2021. These data were compared with previous waves from the SHoT-Study conducted in 2010, 2014 and 2018. Mental health problems were assessed with the Hopkins Symptoms Checklist, suicidal ideation, suicide attempts and non-

suicidal self-harm (NSSH) with items from the Adult Psychiatric Morbidity Survey, and thoughts of NSSH with one item from the Child and Adolescent Self-Harm in Europe study.
Results revealed a significant increase in mental health problems from 2010 to 2021 (total sample, T1-2010: *M* = 1.75, *SD* = 0.69; T2-2014: *M* = 1.87, *SD* = 0.71; T3-2018: *M* = 2.00, *SD* = 0.79; T4-2021: *M* = 2.27, *SD* = 0.78; $p < .001$), and especially from 2018 (with 27% of the male participants and 45% of the female participants scoring above the 2.0 cut-off on the HSCL-5) to 2021 (men = 41%; women = 62%, $p < .001$). Furthermore, a significant increase in participants reporting "suicidal thoughts in the past two weeks" from 2010 to 2021 in both male participants (from 8.1% to 15.7%) and female participants (from 7.3% to 14.7%) was observed. The prevalence of NSSH within the past 12 months increased from 2018 to 2021 significantly for male (from 2.1% to 2.4%, $p < .05$), but not for female participants (4.9% to 4.8% 2.4%, $p < .49$). For NSSH thoughts, the same pattern was observed: there was an increase in male (from 4.5% to 5.0%, $p < .05$), but no change in female participants (from 10.8% to 10.5%, $p = .18$). No significant change in suicide attempts in the last 12 month was found. Further analysis indicated that there were large geographical differences in the prevalence of mental health problems: students studying in a region with higher number of COVID-19 cases and therefore stricter containment measures reported significantly more mental health problems. In addition, students who spend 7+ days physically on campus in the last 14 days reported significantly fewer mental health problems compared to students who were not allowed on campus. A similar effect of days spent on campus was observed for recent NSSH, suicidal thoughts and suicide attempts.

Schluter et al. (2022) conducted a study to estimate and compare country-specific prevalence of suicide ideation at 2 different time points, overall and by gender and age groups, and (2) to investigate the influence of sociodemographic and infodemic variables on suicide ideation on two timepoint in varies countries (England, Belgium, and Switzerland). Comparing age-standardized rates of suicide ideation between T1 (May 29th to June 12th, 2020) and T2 (November 6th to 18th, 2020), significant increases were observed for participants in Belgium (mean difference .052, 95% CI [.017, .087]; $p = .004$), but not for participants in England ($p = .07$), Switzerland ($p = .86$). Overall, among women, those aged 18-24 years had the highest estimated proportion of indications at both timepoints (mean .389 and .458, respectively) and the greatest increase between timepoints (mean change .069). In Switzerland, men showed higher prevalence than women at both waves with

decreasing prevalence by age for both gender with exception of 26-35 year-olds, who the highest prevalence at both timepoints (mean .414 and .468, respectively) and somewhat higher than 18-24 year-olds (mean .398 and .467, respectively). However, like female participants, the greatest increase in suicide ideation indications between Timepoints occurred for those aged 18-24 years. Crude ORs were adjusted by gender, age group, country, and measurement wave main effects together with interaction terms age group × gender, country × gender, age group × country, and age group × measurement wave identified in the previous analyses. In these analyses, both the main effect and interaction by measurement wave terms were significant for variables corresponding to self-isolation/quarantine ($p < .001$ and $p = .02$, respectively), financial losses ($p < .001$ and $p = .003$, respectively), and threat perceived for oneself and/or family ($p < .001$ and $p = .008$, respectively). However, significant main effect and nonsignificant interactions by measurement wave terms were identified for variables corresponding to being an essential worker ($p < .001$ and $p = .66$, respectively), being a victim of stigma ($p < .001$ and $p = .09$, respectively), trust in authorities score ($p < .001$ and $p = .49$, respectively), internet-based social media as a regular source of information ($p < .001$ and $p = .13$, respectively), friends/family/co-worker as a regular source of information ($p < .001$ and $p = .33$, respectively), and SOC ($p < .001$ and $p = .24$, respectively). This implies that these variables have a significant relationship with suicide ideation, which did not change between timepoints. A key finding was the rise and significance of internet-based social media as a regular source of information associated with suicide ideation in the adjusted analyses. Moreover, with social media appearing to have an increasingly negative influence, it is critical for countries and health agencies to squarely redress rampant misinformation and disinformation communications.

A Study in Italy (Gatta et al., 2022) compared the population of patients admitted to a Neuropsychiatric Hospital one year before and through-out the pandemic, age 0 – 17 years. Half of inpatients showed psychiatric familiarity; 84% of inpatients of both groups had previously accessed neuropsychiatric services or had received other forms of help (e.g., psychological, psychotherapeutic, and/or psychiatric support). Suicidal ideation increased significantly from 45.1% to 53.8%, and a decrease in suicide attempts from 24.5% to 18.9% was found. Non-suicidal self-harm (NSSH) showed a non-significant small increase from 36.3% to 37.5%. All three outcomes increased significantly from wave 1 to wave 2. The variation in suicidal methods: in the COVID-19 year, there was an increase of suicidal attempts through drug or substance poisoning (from 40.0%

to 66.7%) and through wrist cutting (from 4.0% to 11.1%) compared to the pre-COVID-19 year; while there was a reduction, from 56.0% to 22.2%, in suicidal methods classified in “other” (defenestration, falling from height, choking, and being hit by fast vehicles). Substance use increased from 7.9 to 9.7%, alcohol use 5 to 10.6%, and tobacco use statistically significant (X^2 = 5.47, *df* = 1, *p* = .019) from 5 to 14.9%. Relating to usage time of devices, in the pre-COVID-19 year 40% of inpatients used them less than four hours per day, while 60% of inpatients used them more than four hours per day. In the COVID-19 year the percentages were equally distributed (50% of inpatients used devices less than four hours per day and 50% more than four hours per day). Statistically significant differences between the two years (X^2 = 14.0, *df* = 5, *p* = .015) were also found in post-discharge admission to territorial mental health services: territorial outpatient treatments decreased both in public and in private services (from 70% in the pre-COVID-19 year to 46% in the COVID-19 year); an increase from 20% in the pre-COVID-19 year to 29% in the COVID-19 year was observed for residential and semi-residential care (e.g., residential therapeutic centers, daily centers, and eating disorders centers); an increase in intensive monitoring interventions by hospital and by social and family services (from 10% in the pre-COVID-19 year to 25% in the COVID-19 year.

"O'Connor (2021) investigated the trajectory of mental health and well-being during the first 6 weeks of lockdown in 3077 adults in the UK. **Suicidal ideation** increased over time, with respondents at wave 2 (9.2%; *OR* = 1.17, 95% CI [1.01, 1.34], *p* = .031) and wave 3 (9.8%; *OR* = 1.24, 95% CI [1.07, 1.44], *p* = .005) reporting higher levels than at wave 1 (8.2%). The difference between waves 2 and 3 was not statistically significant. 21% of the participants was above the cut-off point for moderate or severe levels of symptoms of anxiety at wave 1. However, these symptoms decreased across waves, with wave 2 (18.6%; *OR* = 0.89, 95% CI [0.81, 0.97], *p* = .012) and wave 3 (16.8%; *OR* = 0.82, 95% CI [0.74, 0.90], *p* < .0001) being lower than wave 1 (21%). Again, sig. between wave 2 and 3 not. sign. Subgroup analyses showed that women, young people (18–29 years), those from more socially disadvantaged backgrounds and those with pre-existing mental health problems have worse mental health outcomes during the pandemic across most factors."

A retrospective cohort study from Ougrin et al. (2021) analyzed the **self-harm behavior of children and adolescents** during lockdown in 10 different countries. The analysis included a total of 2073

acute hospital presentations by 1795 <18 years old children and adolescents. Data was compared from t1: March–April 2020 (*n* = 834) and t2: March–April 2019 (*n* = 1239). In 2020, there were significant more hospital visits due to self-harm than in 2019 (*p* = .009; *OR* = 1.33, 95% CI [1.07, 1.64]). Children and adolescents with a previous history of self-harm showed an increase in 2020 (from 29 to 36%, and from 63 to 71%). Among patients with an additional disorder, the emotional disorders increased significant with an estimated odds ratio (*OR*) of 1.58, 95% CI [1.06, 2.36]; *p* = .025.

Koenig et al. (2021) compared **emotional and behavior problems** (Strengths and Difficulties Questionnaire (SDQ)) self-reported **health-related quality of life** (KIDSCREEN (KS10)), **depression** (PHQ-A), **suicide thoughts** (Paykel Suicide Scale (PSS)) and eating disorders (Weight Concerns Scale (WCS); Eating Disorder Examination-Questionnaire (EDE-Q)) in a matched sample of adolescents (12- to -20-olds) using pre-pandemic (November 26th, 2018 to March 13th, 2020) and lockdown data (March 18th, 2020 to August 29th, 2020). This study found no evidence for an increase in emotional and behavioral problems, depression, thoughts of suicide or suicide attempts, eating disorder symptoms, or a decrease in general health-related quality of life, except a decrease in suicide plans (*OR*adj = 0.31, 95% CI [0.13, 0.75], *p* =.009) and conduct problems (b adj = -0.16, 95% CI [-0.31, -0.00], *p* = .045). Family risk-factors did not moderate these finding. The influence of socioeconomic status on emotional and behavioral problems as well as depression decreased during the lockdown. This result does not support other findings from Germany showing an increase of mental health problems during the lockdown. Small sample size and low prevalence of outcomes may be an explanation.

Regarding self-harm, a study on hospital presentations in England by Hawton et al. (2021) showed that during the first 12 weeks following the introduction of lockdown (23.03.2020 – 14.06.2020), the average **weekly number of self-harm presentations** was 30.6% lower than in the pre-lockdown period (06.01.2020 – 22.03.2020) and 37% lower during the equivalent period in 2019 (23.03.2019 – 14.06.2019). Compared pre-post-lockdown 2020, the reduction appeared to be more marked for presentations involving self-poisoning compared with self-injury. Furthermore, the reduction was greater in females than males, and with it was greater in 18- to 34-year-olds (presentations were reduced by 43.8% in that age group) than in older adults.

Knowles et al. (2022) examined the impacts of the COVID-19 pandemic and related social restrictions and school closures on adolescent mental health, particularly among disadvantaged, marginalized, and vulnerable groups in two socially and ethnically diverse boroughs in London, UK. They analyzed four waves of data: 3 pre-pandemic (2016-2019) and 1 mid-pandemic (May-August 2020; *N* = 1074; age range: 12–18 years) from the REACH study (Resilience, Ethnicity, and AdolesCent Mental Health). No evidence of an overall increase in the (weighted) prevalence of mental distress mid-pandemic (15.9%, 95% CI [13.0, 19.4]) compared with pre-pandemic (ranging from 17.1% to 18.3%) was found. This same pattern was observed for depression**,** anxiety, and **self-harm**. However, there were differences in changes in distress across the subgroups: A modest variation by gender, with a small increase in distress among the female participants (*B* [unstandardized beta coefficient] = 0.42, 95% CI [-0.19, 1.03]), mainly in internalizing scores, and a small reduction among male participants (*B* = -0.59; 95% CI [-1.25, 0.18]; *p* (interaction) = .007), primarily in externalizing scores was found. Analyses of variation in within-person change pre-COVID to mid-COVID revealed a strong evidence of variation by prior mental health problems (i.e., SDQ scores ≥18), with a modest decrease in overall distress among those with prior mental health problems (*B* = -1.04 [-1.88, 0.20]; *p* (interaction) = .002) and some evidence for variation by household affluence, with a small decrease in distress among young people from less affluent households pre-pandemic (*B* = -1.12 [-1.89, -0.36]; *p* (interaction) = .016). Further, there was evidence of an increase in distress among those who reported household financial problems (*B* = 1.27; 95% CI [-0.04, 2.58]), but no change among those who did not (*B* = -0.36 95% CI [-0.96, 0.24]; *p* (interaction) = .008).

In a longitudinal study, Bouter et al. (2022) investigated the effect of the pandemic on adolescents' mental health in the Netherlands in a prospective cohort of 1022 adolescents (with a 2.5:1 ratio oversampling of adolescents on their emotional and behavioral problems). As part of the iBerry (Investigating Behavioral and Emotional Risk in Rotterdam Youth) Study, depressive**,** anxiety, stress, and oppositional defiant problems as well as psychotic experiences and **suicidality** were assessed before the pandemic, using several subscales of the Youth Self-Report (YSR) from the Achenbach System of Empirically Based Assessment (ASEBA) ($M_{\text{age at baseline}}$ = 15.0 years). 445 and 333 of these 1022 participants completed an online questionnaire during the first lockdown in April 2020 ($M_{\text{age at first lockdown assessment}}$ = 17.7 years, *SD* = 0.67), and during the second lockdown in January

2021, respectively. Between the baseline and first lockdown assessment, an increase in depressive problems was observed (*B*: 0.93, 95% CI [0.43, 1.42]). However, there was a decrease in anxiety problems (*B*: −0.58, 95% CI [−0.94, −0.21]) and psychotic experiences (*B* = −0.147, 95% CI [−0.23, −0.07]), whereas stress problems (*B* = 0.05, 95% CI [−0.48, 0.59]), oppositional defiant problems (*B* = 0.30, 95% CI [−0.18, 0.24]), and suicidality (*B* = −0.05, 95% CI [−0.13,0.03]) did not change. Between the first and second lockdown assessment there was an increase in depressive problems (*B* = 2.20, 95% CI [1.71, 2.70]) and stress problems (*B* = 0.96, 95% CI [0.43, 1.50]). In contrast, psychotic experiences (*B* = −0.13, 95% CI [−0.21, −0.05]) decreased, and anxiety problems (*B* = −0.03, 95% CI [−0.40, 0.34]), oppositional defiant problems (*B* = −0.13, 95% CI [−0.34, 0.08]), and suicidality (*B* = 0.03, 95% CI [−0.04, 0.11]) remained unchanged. Further analysis showed that participants who scored in the clinical range at baseline had the largest decrease in problem scores between baseline and first lockdown for anxiety problems (Cohen's *d* = .22), depressive problems (*d* = .12), oppositional defiant problems (*d* = .12), stress problems (*d* = .19), psychotic symptoms (*d* = .15), and suicidality (*d* = .11). The scores for these participants increased slightly between first and second lockdown assessment, with small effect sizes (Cohen's *d* ranging from .01 to .11). Participants who scored in the borderline range at baseline showed a similar pattern (although all effect sizes being small, with Cohen's *d* ranging from .00 to .07). Participants who scored in the normal range at baseline had an increase in scores between baseline and first lockdown assessment and again between first and second lockdown assessment, but all effect sizes were negligible (Cohen's *d* ranging from .00 to .04). Thus, majority of the participating adolescents reported having emotional and behavioral symptoms that were within the normal range. Among adolescents with high clinical severity prior to the pandemic, the mean symptom scores for all six outcomes decreased significantly.

Mental Health Care Utilization

"In the UK a controlled interrupted time series study by Chen, She et al. (2020) using data from Cambridgeshire and Peterborough NHS Foundation Trust (CPFT), UK (catchment population _0.86 million) found an instantaneous drop in **mental healt**h referrals but then a longer-term acceleration in the referral rate (by 1.21 referrals per day per day, 95% CI [0.41, 2.02]. This acceleration was

primarily for urgent or emergency referrals (acceleration 0.96, 95% CI [0.39, 1.54]), including referrals to liaison psychiatry (0.68, 95% CI [0.35, 1.02]) and mental health crisis teams (0.61, 95% CI [0.20, 1.02]) in adults age 20 – 65 year old but was not seen in children and adolescents nor elderly. Authors discuss a potential insufficient of these vulnerable age groups to access mental health services."

Kose et al. (2021) analyzed the effects of the COVID-19 pandemic on child and **adolescent psychiatry emergency admissions**. Electronic patient records from a total of 427 patients presenting to the ED were retrospectively collected from the periods March 11th – June 11th, 2020 (*n* = 66), December 11th, 2019 – March 10th, 2020 (*n* = 140) and the same three-month periods in the previous year (March 11th – June 11th, 2019 (*n* = 128) and December 11th, 2018 – March 10th, 2019 (*n* = 93). A poisson regression analysis revealed that during the pandemic period, the total number of psychiatric admissions to the emergency department **was significantly reduced** during the first wave (reference) as compared to the same period in the previous year (March 2019 – June 2019, IRR (95% CI) of 1.94 (1.44 – 2.80, *p* = .000), and the preceding period of December 2019 – March 2020, IRR = 2.12 (1.47 – 3.05, *p* = .000) which is corresponding to a 48.45% respectively 52.83% reduction in admission rates. A significant 70.58% reduction was observed in low-risk suicide attempts during the first wave compared to December 2018 – March 2019 (IRR = 3.40 (1.39 – 8.31, *p* = .07), the pre-pandemic period in the same year (IRR = 5.6 (2.39 – 13.13, *p* < .000) and the same period in the previous year IRR = 4.0 (1.66 – 9.62, *p* = .002), respectively. Furthermore, “a significant increase in incidence rate ratio in March 2019 - June 2019 IRR = 3.50 (1.25 – 9.82, *p* = .017) and December 2019 - March 2020 IRR = 4.75 (1.75 – 12.93, *p* = .002) was detected for patients presenting with alcohol or substance intoxication compared to the pandemic period of March 2020 - June 2020; translating to a 71.42% reduction from the previous year and a 78.94% reduction from the preceding pre-pandemic period.”

Tromans et al. (2020) analyzed **secondary mental health service utilization** pre-lockdown and during lockdown within Leicestershire, UK. Registry data was collected retrospectively from electronic records for both, 8 weeks pre-lockdown and the first 8 weeks of the lockdown. There were no significant changes within hospitals admissions for children and adolescents (pre: *n* = 14,

in: *n* = 17) but a significant decrease in referrals to mental health services for children and adolescents from pre-lockdown to lockdown (pre: *n* = 2193, in: *n* = 1081, *p* = .001).

A retrospective cohort study from Ougrin et al. (2021) analyzed the **self-harm behavior of children and adolescents** during lockdown in 10 different countries. The analysis included a total of 2073 acute hospital presentations by 1795 <18 years old children and adolescents. Data was compared from t1: March–April 2020 (n = 834) and t2: March–April 2019 (*n* = 1239). In 2020, there were significant more hospital visits due to self-harm than in 2019 (*p* = 0,009; *OR* = 1.33, 95% confidence interval 1.07–1.64). Children and adolescents with a previous history of self-harm showed an increase in 2020 (from 29 to 36%, and from 63 to 71%). Among patients with an additional disorder, the emotional disorders increased significant with an estimated odds ratio (*OR*) of 1.58, 95% confidence interval 1.06–2.36; *p* = 0.025.

Regarding self-harm, a study on hospital presentations in England by Hawton et al. (2021) showed that during the first 12 weeks following the introduction of lockdown (23.03.2020 – 14.06.2020), the average **weekly number of self-harm presentations** was 30.6% lower than in the pre-lockdown period (06.01.2020 – 22.03.2020) and 37% lower during the equivalent period in 2019 (23.03.2019 – 14.06.2019). Compared pre-post-lockdown 2020, the reduction appeared to be more marked for presentations involving self-poisoning compared with self-injury. Furthermore, the reduction was greater in females than males, and with it was greater in 18- to 34-year-olds (presentations were reduced by 43.8% in that age group) than in older adults

A study in the South of France (Davin-Casalena et al., 2021) resorted to regional insurance data to investigate **health care utilization in primary care**. It indicates that the initial stage of the lockdown was characterized by a decline in medical care, with a marked decrease in pediatrics (20%) and a small decrease in psychiatry (1.8%, includes adults psychiatrist), as well as a peak provisioning for drugs (no differentiation by age), whereas vaccination strongly declined. Vaccination of preventable childhood diseases dropped by 5% in under one - year-olds (900 Children), by 39% in under five-year old (4100 children) and Human Papiloma virus vaccination by 54% in 10 -14-year-olds (1200 girls). While vaccination numbers increased again after the lockdown, there is no evidence of a catch-up vaccination.

Carretier et al. (2021) report on the adaptation of care provision and consultations frequency in a "Maison de adolescents" which addresses different needs of adolescents and their families including **ambulatory consultations, day hospital and an in-patient unit** during the first half of 2020. They report a drop compared to 2019 in overall and mental health specific consultations in Jan/Feb (ca. 5 - 15%) and an increase in Mars to June (ca. 5 - 20%).

Mourouvaye et al. (2021) measured in a French pediatric hospital (retrospective observational study) the number of admissions for suicide behavior (*N* = 234), before and during the early pandemic (March 16th – May 10th, 2020). The number of admissions for suicide behavior was 2.5 (*SD* = 1.7) and 1.25 (*SD* = 1.28) per week during period 1 and period 2, respectively. The incidence of admissions for suicidal behavior was also lower during summer breaks (0.88, *SD* = 1.45 per week). In Poisson univariate regression, there was a significant association between the lockdown and the average number of admissions for suicidal behaviors (crude IRR 0.51, 95% CI [0.27, 0.95], *p* = .034). This association remained significant in multivariate Poisson regression adjusted for the effect of summer breaks (adjusted IRR 0.46, 95% CI [0.24, 0.86], *p* = .016). In 2018–2019, rates of admissions per week did not differ between March and May compared with the rest of the year (2.75, *SD* = 1.54; vs 2.275, *SD* = 1.68), respectively; Poisson IRR 1.21, 95% CI [0.91, 1.60]; *p* = .19). Together, the number of admissions of children and adolescents with suicide behaviors decreased during the lockdown by 50 percent. The processes underlying these changes and the question whether they were rebounds after the end of the lockdown are not clear yet.

Rømer et al. (2021) conducted a time-trend study to assess patterns in psychiatric admissions, referrals, and suicidal behavior before and during the COVID-19 pandemic using data from hospital and Emergency Medical Services (EMS) health records covering 46% of the Danish population (*n* = 2'693'924). They compared data on the number of psychiatric in-patients, referrals to mental health services as well as suicidal behavior (such as self-harm, suicide attempts, and suicide) in the years before the COVID-19 pandemic to data during the first lockdown from March 11th and May 17th, 2020), the inter-lockdown period from May 18th – December 15th, 2020), and the second lockdown from December 16th, 2020 – February 28th, 2021. In the age group <18, the annual number of in-patient at psychiatric clinics increased by 3.2% from 2018 to 2019 (744 vs. 768) and further by 7.4%

from 2019 to 2020 (768 vs. 825). The rate of psychiatric hospitalizations among children and adolescents was increased by 11% during the pandemic (*RR* = 1.11, 95% CI [1.07; 1.15], $p < .01$), however, this increase did not significantly exceed the pre-pandemic, upwards trend in psychiatric hospitalizations among this age group ($p = 0.78$). The rate of referrals to mental health services during the pandemic were not significantly different among children and adolescents after adjusting for multiple testing ($p = .07$), nor was it significantly different from the pre-pandemic trend (Ratio = 1.37, CI = 0.97 –1.93, $p = 0.28$). Hospital-recorded suicidal behavior decreased by 4.4% from 2019 to 2020 (295 vs. 282 events); however, it reached 124 events by February 28th, 2021, accounting for 46.1% of total suicidal behavior events in that period across all the age groups. In the EMS data, the age group <18 accounted for 5.2% of suicidal behavior events in 2019, 5.9% in 2020 and 9.0% in 2021 (January and February only). The weekly number of EMS-registered suicidal events was low (range = 0–8), therefore monthly counts were used and revealed no significant change in suicidal behavior after adjusting for multiple testing ($p = .06$) among the age group <18.

What impact does the containment measure "school closures" have on mental health?

Summary

There is limited research on the impact of school closures on mental health. One large study in Switzerland showed that primary school pupils' learning gains slowed down during the eight weeks of school closures in Switzerland compared to regular in-person school attendance and that differences in learning between children increased. Findings from a study in Germany are consistent with these findings. For pupils from the secondary school, however, the same study observed that school closures did not significantly impair the learning gains in the same timeframe. Another Swiss study highlighted that the perceived pressure at school increased (e.g., missed material due to closures, quarantine) and that stressors with school had the strongest correlation with depressive symptoms (with a large effect size).

A study from Sweden – where schools have not been closed – did not find differences in stress, psychosomatic symptoms and levels of happiness between adolescents who have been exposed to the pandemic compared to those who have not been exposed, supporting the assumption that keeping schools open protects adolescents' mental health. Finally, a study with children with autism spectrum disorder found that school closures impaired their self-regulation and cooperation skills and that their physical activity levels increased after the return to school.

Number of publications: 5

Time period: January 2020 – February 2022

Results

In a natural experiment, Tomasik, Helbling and Moser (2021) compared the **learning gains** in the 8 weeks of **school closures** in Switzerland with the learning gains in the 8 weeks before the school closures with regular in-person school attendance. Data from all active users of the MINDSTEPS system (a computer-based formative feedback system developed at the Institute for Educational Evaluation in Zurich) who completed at least one teacher-generated assessment between January 19th, 2020 and May 11th, 2020 were included in the statistical analyses. A total of 28'685 pupils

participated from primary school (N = 13'134) and secondary school (N = 15'551). They compared the slope of the learning progress before and after the school closures in the subjects Mathematics, German, French and English. A highly significant difference in the learning slope was found for the primary school pupils, with the in-person learning slope being more than twice as high as during school closures ($\Delta\chi^2(1) = 8.86$, $p < .001$), while in secondary school pupils the difference in the two learning slopes was not significant ($\Delta\chi^2(1) = 1.01$, $p = .31$). A significant difference in the variance of the two learning slopes was found in the primary school pupils [missing p-value] but not for the secondary school pupils ($\Delta\chi^2(1) = 0.99$, $p = .32$). These results indicate that primary school pupils' learning slowed down and the interindividual variance in learning gains increased, while pupils from the secondary school were largely unaffected by school closures in their learning gains.

The Swiss Corona Stress Study provided insights the distress of adolescents and young adults (Quervain et al., 2021). The last survey of the Swiss Corona Stress Study in November 2020 has shown that the proportion of respondents with moderately severe to **severe depressive symptoms** (PHQ-9) was 18%, with the youngest group of 14- to 24-year-olds being the most affected at 29%. Between March 8th and 24th, 2021, an additional anonymous survey was conducted in the German speaking part of Northwestern Switzerland among 393 high school students with the majority being between 16 and 19 years old. 27% of the respondents reported moderately severe to severe depressive symptoms. The most significant stressor associated with depressive symptoms was perceived school pressure. 46% of the respondents indicated they were very or extremely stressed because of the pressure of school. Furthermore, the perception that school pressure has increased due to the pandemic (missed material due to closures, quarantine) was strongly correlated with depressive symptoms. Other factors included worries about poorer education or job opportunities and worries about damage to the social network. An additional factor analysis confirmed that stressors related to school build up the factor with the strongest correlation with depressive symptoms (with a large effect size).

A study from Quenzer-Alfred et al. (2021) examined how p**reschoolers' basic school skills in language and math developed** during the nursery shutdown due to the COVID-19 pandemic in Germany. The sample consisted of 49 children (aged between 5 and 6 years) who were evaluated in a single-group pre-posttest design with five subtests of the Intelligence and Development Scales

2 (IDS-2) before and after the closure of nurseries and semi-structured group conversations. Furthermore, guided interviews with professionals and parents were conducted. The results showed that the children's basic school skills differed significantly before and after the shutdown. There is a highly significant decrease of the overall basic school skills between pre- and post-data medians (Δr = .64). Comparing changes over time, language skills showed the most significant overall effect (Δr = .72), characterized by strong effects in expressing language skills (Δr = .67), phoneme analysis (Δr = .58), and a medium effect in phoneme-grapheme correspondence (Δr = .47). Only language comprehension ability did not change significantly over time (Δr = .03). With respect to mathematical thinking, a medium effect between pre- and post-data collection was observed (Δr = .41). Consistent with the quantitative results, children's perceptions of school show fear of not being able to learn to read and write, fear of punishment for failure, fear of teachers in general, fear of disciplinary action, fear of poor school performance, and fear of not being able to make (enough) new friends. Focusing on the interviews with nursery professionals and parents, the data shows a positive view of the situation. The general perception of the nursery professionals is that the closure had no real negative impact on the children or on their learning progress, experiences, and social development.

The study by Chen, Osika et al. (2021) measured the impact of COVID-19 on 15-year-old adolescents (baseline age 13.6 ±0.4 years) in Sweden. Within the 2-year follow-up examination of the Study of Adolescence Resilience and Stress in January and February 2021, they compared 1316 youth who were reexamined in January 2020 and thus not exposed to the COVID-19 pandemic with 584 youth reexamined after February 2021 and thus exposed. Compared to the baseline data from 2018, both, adolescents who have been exposed as well as those who have not been exposed, reported higher levels of stress and psychosomatic symptoms and lower levels of happiness in 2020. In both groups, there was no deterioration in peer relations or relations with parents. There were also no significant differences between groups regarding sleep duration and physical activity.

A study from the UK (Morris et al., 2021) investigated the impact of the pandemic, the lockdown and subsequent return to school, on the **social development and communication of autistic children** from their parents' perspective and to examine whether associations exist between social-

communicative behaviours and the variables affected by the lockdown or return to school period. Parents from 176 autistic children answered the questionnaire at T1 (after the lockdown when children returned to school) and 54 follow-up questionnaires were returned at T2 after the first half term. During the lockdown, only 10.2% of children regularly attended school, suggesting that the school routine was disrupted for a great majority of children in the sample. The results indicate that self-regulation skills ($p < .05$) and cooperation skills ($p < .05$) were most affected over the course of the lockdown. Logistic regressions showed, that children whose parents felt supported by their schools were reported to show an improvement in their social communication skills (i.e. social-communicative skills got a little bit better, or got a lot better) over the course of the lockdown ($p = .007$) and children who continued to see friends and family outside of school and the household were perceived to also show a slight improvement in their overall social-communicative behaviours in comparison to those who did not ($p = .002$). Children's physical activity levels were perceived to significantly increase during the return to school ($p < .0001$), which was associated with better social-communication outcomes ($p < .05$).

Overview and comparison of recommendations and best practice in different countries

Summary

The aim is to identify recommendations and best practice examples in the literature on COVID-19 and secondary mental health impact. To categorize the findings, we used the Behaviour Change Wheel from Michie et al. (2014), which defines different policy categories, intervention functions and sources of behavior relevant to successful interventions. The data highlight what is already receiving attention in the literature. We found the most recommendations for the policy categories Service provision, Guidelines, and Marketing/Communication. For the other four categories (Legislation, Environmental/Social planning, Fiscal measures and Regulation) only few recommendations were made.

The COVID-19 literature indicates not only the relevant outcomes and trends, but also points to possible deficits and opportunities for change. The recommendations underline the relevance to not only strive for quick, short-term changes but for long-term, sustainable improvements of mental health.

Number of publications: 18
Time period: January 2020 – February 2022

Short introduction to the Behaviour Change Wheel

The Behaviour Change Wheel from Michie et al., (2014, see Figure 1) can be used as a framework for conceptualizing the design and implementation of interventions.

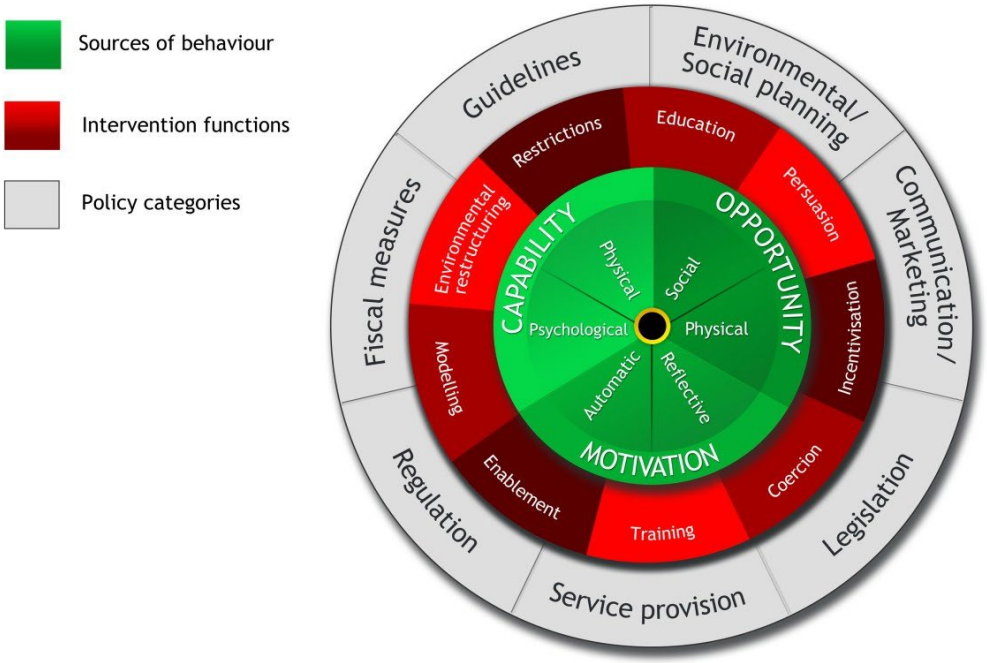


Figure 1. The Behaviour Change Wheel (Michie et al., 2014)

This integrative model considers elements and conditions of interventions, e.g., motivation, enablement, or financial incentives, which are relevant to initiate or support interventions. It involves different steps across the three layers of the wheel: in the middle, sources of behavior are identified, which could be targets for intervention. The second layer consists of nine intervention functions, which can lead to a change in behavior (e.g., “Enablement”, “Training” or “Environmental restructuring”). The seven different policy categories “Environmental/Social planning”, Communication/Marketing”, “Legislation”, “Service provision”, “Regulation”, “Fiscal measures” and “Guidelines” are placed in the outer layer of the wheel. They can be used to enable or deliver the intervention (Michie et al., 2014, see Figure 2). When developing an intervention, all three levels should be considered.

Policy Category	Definition
Communication/marketing	Using print, electronic, telephonic or broadcast media
Guidelines	Creating documents that recommend or mandate practice. This includes all changes to service provision
Fiscal measures	Using the tax system to reduce or increase the financial cost
Regulation	Establishing rules or principles of behaviour or practice
Legislation	Making or changing laws
Environmental/social planning	Designing and/or controlling the physical or social environment
Service provision	Delivering a service

Figure 2. Policy Categories according to Michie et al.'s (2014) Behaviour Change Wheel

To give an overview of the individual recommendations on future steps for improved mental health and policy decisions, we have grouped the recommendations from the various scientific articles into the 7 policy categories of the Behaviour Change Wheel (see appendix). It is well apparent that most of the recommendations are in "Service provision, Guidelines and Marketing/Communication" while we encountered fewer recommendations in the areas of "Environmental/social planning, Legislation, Regulation", and just one in "Fiscal measures".

Service provision:

We could divide the service provision recommendations into three sub-categories: a) Use of targeted intervention, b) Expansion of low-threshold mental health services, and c) Intervention in educational setting/context. Regarding "Use of targeted interventions," the focus should be on lower-income residents, with-pre-existing mental health conditions (Stroud & Gutman 2021) and on children from low socioeconomic backgrounds (Ravens-Sieberer et al., 2021; Neumann et al., 2021). Under "Expansion of low-threshold (digital) mental health services" the expansion of psychological counseling centers and family education centers is recommended, to increase low-

threshold services for parents and children. (Liang et al., 2021; Bringolf-Isler et al., 2021). "Interventions in educational setting/context) includes the importance of sleep. Regarding educational settings, it was recommended that educational programs for parents should enable them to take care of a healthy sleep of their children (Cellini et al., 2021; Ravens-Sieberer et al., 2021). It is further suggested that day care centers/kindergartens must work out didactic and organizational models for keeping them functional in case of a new lockdown (Quenzer-Alfred et al., 2021).

Guidelines

In the areas of guidelines, authors advocated for a greater focus on mental health. For example, provisions of digital mental health services should be scaled up besides existing facilities available on campuses (Sivertsen et al., 2022).

Communication/Marketing

We often accommodated recommendations in the area of Communication/Marketing. Recommendations ranged from "Use positive communication", specifically, avoiding the use of coercive strategies based on eliciting emotions (Alivernini et al., 2020) to "Targeted communication for all generations". Here authors suggested an expansion of low-threshold, digital support services. Certainly, a measure that could be used to reach young people directly (Neumann et al.,2021) and stronger "Destigmatizations of mental health support" (Ravens-Sieberer et al., 2021).

Environmental/social planning

In the area of "Environmental/social planning" there is a call for more "space for youth". Authors point out that adolescents need private spaces for completing homework and spending time alone. It improves learning gains and strengthens their mental health (Ertanir et al, 2021).

Legislation

Here the focus was laid on the importance of alcohol prevention and "Access to protective factors". Children should be enabled to benefit from protective factors such as leisure activities, physical activity and social contact. This includes avoiding the closure of schools (Bringolf-Isler et al. 2021).

Regulation

In order to be prepared for further pandemics, changes must also be made in the area of "Regulation". It is recommended that "Risk Criteria" for delivery of care and considerations of risk population are changed, e.g., for the delivery of vaccinations. Psychological and developmental vulnerabilities must also be included for early vaccination access (Alt et al., 2021).

Fiscal measures

Finally, "Fiscal measures". Faster and better financial support for children from low socioeconomic backgrounds is needed (Ravens-Sieberer et al., 2021). While few studies pointed to the need for fiscal measures, the suggested interventions or structural changes do of course have fiscal consequences.

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All references: .ris file

Appendix 1

Literature Search string:
(lockdown[tiab] OR social distanc*[tiab] OR social isolation[tiab] OR quarantine[tiab] OR school closure[tiab] OR public health[tiab] OR community[tiab] OR anxiety[tiab] OR depress*[tiab] OR loneliness[tiab] OR suicid* [tiab] OR mental health[tiab] OR stress[tiab] OR child abuse[tiab] OR neglect[tiab] OR disorder*[tiab] OR school[tiab] OR education[tiab] OR delay[tiab] OR learning[tiab] OR secondary pandem*[tiab] OR consequence*[tiab] OR impact[tiab] OR effect*[tiab] OR implicat*[tiab]) AND ("Coronavirus"[Mesh] OR corona[tiab] OR coronavirus[tiab] OR covid-19[tiab]) AND ("Adolescent"[Mesh] OR "Child"[Mesh] OR "Infant"[Mesh] OR child*[tiab] OR adolescen*[tiab] OR infant*[tiab] OR pediatric[tiab] OR paediatric[tiab] OR maternal[tiab] OR paternal[tiab] OR “young adult*”[tiab]) AND ("Cohort studies"[MeSH] OR "cohort stud*"[All Fields] OR "longitudinal studies"[MeSH] OR "longitudinal stud*"[All Fields] OR longitud*[All Fields] OR "prospective studies"[MeSH] OR "prospective stud*"[All Fields] OR "follow-up studies"[MeSH] OR "follow-up stud*"[All Fields] OR follow-up[All Fields] OR "retrospective studies"[MeSH] OR "retrospective stud*"[All Fields] OR "repeated cross-sectional"[All Fields] OR "repeatedly cross-sectional"[All Fields] OR "trend stud*"[All Fields])