

Regular Article

A systematic review of pre-pandemic resilience factors and mental health outcomes in adolescents and young adults during the COVID-19 pandemic

Anna Wiedemann^{1,2,3} , Radhika Gupta⁴, Catherine Okey⁵, Julieta Galante^{1,6} and Peter B. Jones^{1,2,3}

¹Department of Psychiatry, University of Cambridge, UK, ²Cambridgeshire and Peterborough NHS Foundation Trust, UK, ³National Institute for Health Research, Applied Research Collaboration, East of England, UK, ⁴Oxford Health NHS Foundation Trust, UK, ⁵Sussex Partnership Foundation Trust, UK and ⁶Contemplative Studies Centre, Melbourne School of Psychological Sciences, University of Melbourne, Australia

Abstract

Adolescence and young adulthood are sensitive developmental periods to environmental influences. Investigating pre-emptive measures against stressors, such as those associated with the COVID-19 pandemic, on mental health is crucial. We aimed to synthesize evidence on pre-pandemic resilience factors shaping youth mental health outcomes during this period. For this pre-registered systematic review, we searched seven databases for longitudinal studies of youth populations affected by the COVID-19 pandemic, assessing a priori defined resilience factors at the individual, family, or community level before the pandemic. Studies required validated mental health or wellbeing measures collected both before and during the pandemic. Study quality was assessed using the corresponding NIH Quality Assessment Tool. From 4,419 unique records, 32 studies across 12 countries were included, using 46 distinct resilience measures. Due to the heterogeneity of study designs, we applied a narrative synthesis approach, finding that resilience factors were generally associated with better mental health outcomes both prior to and during the pandemic. However, most factors did not mitigate pandemic-related mental health effects. Nonetheless, family-level resilience factors emerged as promising under specific conditions. Study quality was generally fair, with concerns in resilience assessment and sampling quality. Future research should prioritize rigorous study designs and comprehensive resilience assessments.

Keywords: COVID-19; pandemic; mental health; resilience; adolescents; young adults

(Received 17 May 2024; revised 13 September 2024; accepted 27 November 2024)

Introduction

The outbreak of the COVID-19 pandemic focused attention on young people's mental health. It disrupted a critical developmental phase characterized by significant psychosocial changes, identity exploration, and increasing autonomy for adolescents (Steinberg & Morris, 2001) as well as frequent change and exploration of possible life directions in love, work, and worldviews for young adults (Arnett, 2000). However, it is also a period marked by sensitivity to environmental influences, highlighting the need to investigate the effects of potential stressors, such as those associated with the COVID-19 pandemic, on mental health and wellbeing. Amidst the challenges posed by the pandemic, it is perhaps not surprising that there has been a renewed focus on resilience research, with governments seeking evidence and advice to reduce risks and improve the capacity to withstand or bounce back from adversity. The UK government, for instance, emphasized preventive measures and resilience-building strategies, with a particular focus on children and young people, in their COVID-19

mental health and wellbeing recovery action plan in the first year following the pandemic (HM Government, Department of Health and Social Care & Cabinet Office, 2021).

Resilience research diverges from risk research in its emphasis on identifying the assets and resources that enable individuals to overcome the negative effects of risk exposure (Fergus & Zimmerman, 2005). Its roots are closely linked to the history of developmental psychopathology, gaining momentum during the second world war which brought global attention to the challenges faced by children amidst widespread devastation (Masten, 2014). Since then, resilience research has evolved substantially, increasingly recognizing resilience as a dynamic process of adaptation to adversity rather than merely the absence of pathology or the presence of particular traits. This shift in understanding emphasizes the distinction between resilience itself – the outcome of maintaining or quickly regaining good mental health during and after adversity – and resilience factors, which are variables that may increase the probability of a resilient outcome (Kalisch et al., 2017). This distinction is crucial for advancing our understanding of how resilience unfolds in response to adversity, particularly in the context of global challenges like the COVID-19 pandemic.

Although resilience research has advanced considerably over the past decades, opportunities to study its application in global health crises have been limited. The last significant pandemic, the

Corresponding author: Anna Wiedemann; Email: aw778@medschl.cam.ac.uk

Cite this article: Wiedemann, A., Gupta, R., Okey, C., Galante, J., & Jones, P. B. (2025).

A systematic review of pre-pandemic resilience factors and mental health outcomes in adolescents and young adults during the COVID-19 pandemic. *Development and Psychopathology*, 1–14, <https://doi.org/10.1017/S0954579424001901>



Spanish flu of 1918, occurred over a century ago. Consequently, contemporary psychiatry had limited opportunities to assess the impact of infectious disease outbreaks with pandemic potential through its clinical and scientific lens (Huremović, 2019). Between 1894 and 2019, PubMed indexed over 20,000 articles on the intersection of infectious disease outbreaks and mental health; however, in the four years since the COVID-19 pandemic began, over 84,000 articles on this topic have been added. Additionally, PROSPERO has registered nearly 1,500 review protocols specifically focusing on COVID-19 and mental health. Nonetheless, there remains a scarcity of reviews on psychological resilience, especially among young people. Existing resilience reviews have predominantly focused on frontline workers and cross-sectional data, revealing insufficient study quality to draw substantial conclusions (for a meta-review, see Seaborn *et al.*, 2022). This trend is consistent with broader findings; Jung *et al.* (2021) revealed that the methodological rigor of early COVID-19 studies was below average across various research designs.

Our systematic review aims to bridge existing gaps in current literature synthesis efforts. To achieve this, we focus exclusively on compiling longitudinal studies, aiming to draw from the best available evidence. We include studies examining both resilience factors and resilience processes, acknowledging that studies focusing on resilience factors may predominate due to methodological constraints and the unexpected nature of the pandemic. Our review aims to enhance our understanding of resilience during key developmental stages – especially adolescence and young adulthood – within the context of the pandemic. Despite demographic shifts over decades marking young adulthood as a phase of significant change into the mid-twenties, it has often been overlooked in pandemic mental health literature as a distinct developmental phase. By including both adolescents and young adults in our systematic review, we aim to promote positive outcomes and mitigate negative effects within this age group, both presently and in the future.

Method

The present systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Page *et al.*, 2021) guidelines and a structured protocol pre-registered on PROSPERO CRD42023428631 (Wiedemann *et al.*, 2023).

Search strategy

We searched medical as well as multidisciplinary databases including ASSIA, CINAHL, EMBASE, MEDLINE, PsycINFO, Scopus, and Web of Science. We also searched two of the main repositories of medical and biological science preprints, that is, medRxiv and bioRxiv, as part of our MEDLINE search. As both repositories have only been integrated into MEDLINE in 2021, we conducted additional searches directly through medRxiv and bioRxiv looking for any relevant pre-prints from 2020. The publication timeframe was restricted to start in December 2019, when COVID-19 was first identified. The initial search was conducted on 27 June 2023, and subsequently updated on 12 August 2024.

Language was not an exclusion criterion in our review, that is, we included all retrieved records in our screening process, regardless of the language they were written in. For articles written in languages other than those spoken by the team, namely English, French, German, or Spanish, we relied on the assistance of fellow researchers proficient in those languages to facilitate the translation process. Our search strategy combined five superordinate concepts including search terms related to COVID-19,

mental health, resilience, study design, and population of interest. We used the pre-defined search strategy on adolescence and young adults developed by the Canadian Health Libraries Association (CHLA, 2018). We conducted a comprehensive search for each concept by exploring both database-specific subject headings and text word fields. To identify keywords and subject headings, we scrutinized relevant systematic reviews on related or similar topics. The initial search was constructed in MEDLINE and subsequently adapted for the other databases. The keywords were consistent across all databases while subject headings were established for each specific database. The database-specific search strategies and results can be found online on OSF (<https://osf.io/cznyq/>).

Selection criteria

Our systematic review focused on longitudinal studies of youth populations, including adolescents (aged 10 to 19 years) and young adults (up to 30 years), affected by the COVID-19 pandemic, with an essential requirement for a pre-pandemic baseline prior to December 2019. We included studies that either focused entirely on youth populations, or those that provided relevant separate analyses for these age groups. We allowed for some flexibility in the age criteria, for instance, including studies where only a very small proportion of participants would fall outside of the age criteria. If the age range was unclear, we relied on the reported mean and standard deviation or median and interquartile range, excluding studies where these measures indicated ages below 10 or above 30. For instance, a sample with a mean age of 27 years and a standard deviation of 2 years would have been included, while a sample with a standard deviation of 4 years would have not. We excluded cross-sectional studies (including repeated cross-sectional designs) and any interventions specifically targeting mental health and wellbeing.

We included studies that assessed both resilience factors and resilience processes. Resilience factors were defined as pre-pandemic variables potentially increasing the likelihood of resilient mental health outcome during the pandemic. Resilience processes were conceptualized as dynamic adaptations occurring over time, measured as changes in potential factors over time related to mental health outcomes. We anticipated a prevalence of studies focusing on resilience factors due to the pandemic's unexpected nature and methodological challenges in capturing dynamic processes. All studies needed to assess resilience at least once before the pandemic, examining it at individual, family, or community levels across behavioral, cognitive, emotional, social, or cultural domains. Our criteria for resilience factors were guided by a systematic review by Fritz *et al.* (2018), excluding studies attributing resilience to unchangeable traits like gender or genetic predispositions, or limited resilience to financial or economic advantage. In addition, we excluded studies that equated the absence of risk with resilience; for instance, a study assessing peer bullying instead of peer support would be excluded, even if low bullying is considered protective. Despite using Fritz *et al.*'s framework as a guideline, we dynamically expanded our scope, incorporating resilience factors not covered in their review as they emerged during selection. Decisions on inclusion were made by a team member blinded to study outcomes, ensuring unbiased consideration.

Furthermore, only studies employing validated measures for mental health and wellbeing with baseline and follow-up assessments were included. We focused on common mental health outcomes such as depression and anxiety, while also considering

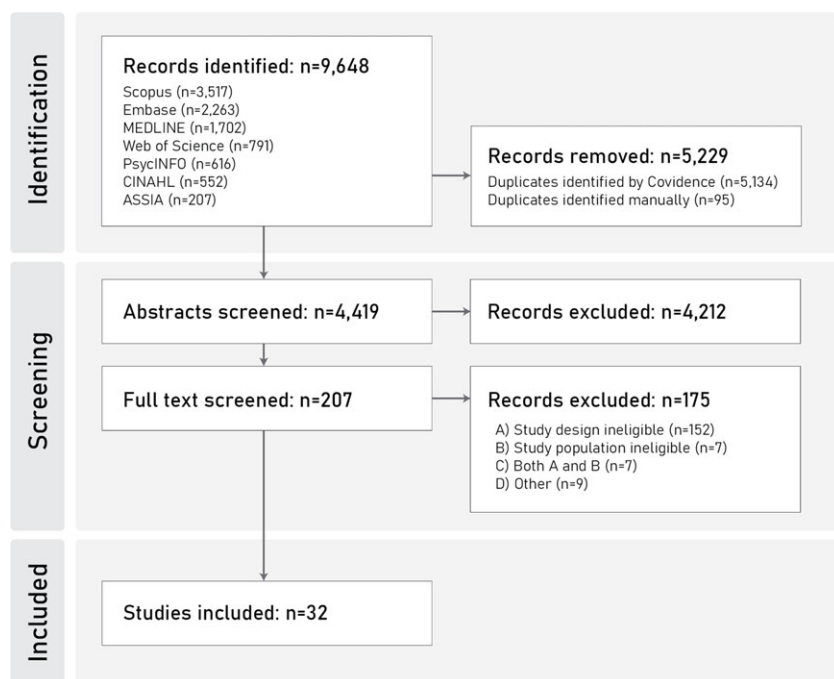


Figure 1. PRISMA diagram.

broader measures such as mental wellbeing or perceived stress. If there were any uncertainties about the eligibility of resilience or mental health measures, a team member blinded to the study's outcome evaluated them for clarification. For a more comprehensive explanation of our selection criteria, please refer to our detailed protocol pre-registered on PROSPERO CRD42023428631 (Wiedemann et al., 2023).

Data screening and extraction

Data screening and extraction was performed using Covidence software. Initial steps included merging search results from multiple databases and removing duplicates to facilitate the screening process. Titles and abstracts of all identified records were independently screened by two reviewers against our pre-defined study selection criteria. Any disagreements between the two reviewers at this stage were resolved through a third reviewer. Following the initial screening, the full texts of potentially eligible studies were then independently assessed for inclusion by two reviewers, again, with a third reviewer resolving any disagreements. Data extraction from studies that met the inclusion criteria was also independently performed by two reviewers using a standardized form. Discrepancies encountered during this process were discussed between the two reviewers to achieve consensus. The extraction form captured key information such as study characteristics, population demographics, outcomes, and findings. The form was pilot-tested and refined and can be found online on OSF (<https://osf.io/cznyq/>).

Quality appraisal

We used the NIH Quality Assessment Tool for Observational Cohort and Cross-Sectional Studies (NIH, 2021) to systematically appraise the methodological rigor and reliability of included studies. This tool facilitates the evaluation of each study against a set of criteria designed to identify potential sources of bias, including selection, measurement, and confounding biases. The appraisal process was conducted by two independent reviewers,

with any discrepancies resolved through discussion or, if necessary, consultation with a third reviewer. We deviated from our initial protocol by adding an additional item to assess if studies included any measures of pandemic impact.

Data synthesis

Due to the heterogeneity of included studies, we conducted a narrative synthesis. This approach allowed us to collate and interpret data across individual, family, and community levels, focusing on the qualitative assessment of study results.

Results

Study characteristics

From a total of 9,648 records identified through database searches, we extracted 4,419 unique records, out of which 32 were included in the review (see Figure 1). Detailed study characteristics are presented in Table 1. The majority of included studies assessed pandemic-related mental health outcomes during the first year of the COVID-19 pandemic, with the median month for the initial assessment being May 2020. Among these studies, 20 conducted two assessments only, one before and one during the pandemic. Twelve studies conducted multiple assessments either before and/or throughout the pandemic. The COVID-19 data collection timeline has been illustrated in Figure 2. Geographically, the United States was the most frequently represented country (n = 12), followed by Australia (n = 3), China (n = 3), Germany (n = 2), Israel (n = 2), the Netherlands (n = 2), and the United Kingdom (n = 2). Further individual studies were conducted in Canada, Italy, Lithuania, Mexico, and Spain, with one additional study including participants from both the United States and China. Data collection primarily relied on schools (n = 11), universities/colleges (n = 8), and communities (n = 8). Four studies used cohort data, while one adopted an experimental approach. Sample sizes showed substantial variability, ranging from 24 to 8,735 (Median = 331, IQR 152 – 807). Nineteen studies

Table 1. Study characteristics

Study	Country	Setting	Assessments			N	Age	Gender [Female]	Ethnicity [White]
			Baseline [T1]	COVID-19	Total				
Afriat et al., 2023	Canada	Community	10/2019	05/2020 [T2] 10/2020 [T3]	3	136	16.2 (± 1.0)	54%	92%
Bernasco et al., 2021	The Netherlands	School	Fall 2019	04/2020 [T2]	2	245	11.6 (± 0.5) ^{BL}	50%	NR ^(a)
Boullion et al., 2023	United States	Community	Spring 2017 ^{EST}	Spring 2020 [T3]	3	157	15.22 (± 0.57)	49%	10%
Buist et al., 2023	The Netherlands	School	11/2019	03/2020 [T10] - 10/2020 [T25]	25	192	14.3 (± 1.6) ^{BL}	68%	NR ^(b)
Bussone et al., 2023	Italy	University	2019	04/2020 [T2] 10/2020 [T3] 07/2021 [T4]	4	42	24.3 (± 2.7) ^{EST}	86%	NR
Chen et al., 2024	Australia	School	2018-19	2020-21 [T2]	2	8,735	12-15	NR	NR
Cohen et al., 2021	United States	Community	08/2019	05/2020 [T2]	2	24	14.9 (± 1.1)	58%	63%
Colby et al., 2023	United States	College/University	Winter 2018-19	Fall 2021 [T2]	2	1,042	22 ^{EST}	69%	43%
Daniunaite et al., 2021	Lithuania	School	03/2019	09/2020 [T2]	2	331	15.4 (± 1.6) ^{EST}	57%	NR ^(c)
Deppe & Zapko-Willmes, 2023	Germany	Twin Cohort	2014-20 ^(d)	06/2020 [T2] 11/2020 [T3] 09/2021 [T4]	4	2,434	16-30 ^{EST}	NR	NR
Gupta et al., 2022	United States	Experimental	04/2019	04/2020 [T2]	2	48	16.1 (± 1.07) ^{EST}	74% ^{BL}	73% ^{BL}
Holt-Gosselin et al., 2022	United States	Community	01/2017	05/2020 [T2]	2	85	24.1 (± 3.6)	72%	53%
Houghton et al., 2022	Australia	School	09/2018	03/2020 [T3] 06/2020 [T4]	4	785	14.1 (± 1.3)	58%	NR
Juvonen et al., 2022	United States	Community	Spring 2017	Spring 2021 [T2]	2	1,557	20.5 (± 0.8)	62%	23%
Ke et al., 2023	Australia	University	04/2019	09/2020 [T2]	2	434	21.7 (± 2.9)	68%	NR ^(e)
Liu et al., 2024	China	School	10/2019	10/2020 [T2]	2	1,916	18.49 (± 0.79)	63%	NR
McGuinn et al., 2023	Mexico	Cohort	2019	11/2020 [T2]	2	464	11.1 (± 1.0)	49%	NR
Reim et al., 2024	Germany	Cohort	2018-19	05/2020 [T2]	2	822	17.83 (± 0.84)	57%	NR
Romm et al., 2021	United States	Community	03/2019	03/2020 [T2]	2	208	15.1 (± 0.5)	49%	86%
Royuela-Colomer et al., 2023	Spain	School	10/2019	10/2020 [T2]	2	330	15.6 (± 1.3)	58%	NR
Shoshani, 2024	Israel	School	09/2019	05/2020 [T2] 05/2021 [T3]	4	4,813	13.1 (± 2.01) ^{BL}	50.1%	NR
Shoshani & Kor, 2024	Israel	School	09/2019	05/2020 [T2] 05/2021 [T3]	4	3,473	14.51 (± 1.11) ^{BL}	50%	NR
Smith et al., 2022	United States	Community	2010	05/2020 [T3] 01/2021 [T4]	4	161	14.3 (± 0.5)	62%	65%
Song et al., 2022	United States	College	04/2019	04/2020 [T2]	2	106	19.4 (± 1.1)	69%	31%
Taylor et al., 2022	United States	University	06/2017	04/2020 [T2]	2	54	20.4 (± 0.8)	70%	74%

Tsai & Jung, 2024	United States	School	11/2019	Fall 2020 [T2]	2	43	17.03 (\pm 1.1)	64%	11%
Van Doren et al., 2023	United States	College	Fall 2018	05/2020 [T3]	3	272	NR ^(f)	73%	68%
Wang et al., 2023	United States China	University	11/2019	03/2020 [T2]	2	239	19.5 (\pm 1.3) [US] 18.6 (\pm 0.9) [CN]	75% [US] 57% [CN]	55% [US] NR [CN]
Wang et al., 2024	China	College	09/2019	02/2020 [T2] 04/2020 [T3] 02/2021 [T4]	4	802	19.39 (\pm 0.88) ^{BL}	66%	NR
Widnall et al., 2022	United Kingdom	School	10/2019	05/2020 [T2]	2	603	13-14	60%	82%
Wiedemann et al., 2022	United Kingdom	Cohort	11/2012	05/2020 [T4]	4	632	25.6 (\pm 3.1)	65%	79%
Wong et al., 2022	China (Hong Kong)	Community	04/2019	02/2020 [T2]	2	233	12.2 (\pm 0.4) ^{BL}	61%	NR

Note: Reported sample sizes are based on data collected during the COVID-19 pandemic follow-up(s). In cases of differing sample sizes across longitudinal analyses due to multiple pandemic follow-ups or various sub-samples, the largest relevant pandemic sample size is reported. Age is reported for the initial (first) COVID-19 follow-up; if age data were available only at a single time point, it is estimated and denoted as EST. If age is reported exclusively at baseline and the interval between baseline and the first COVID-19 follow-up is less than one year, we present the baseline age followed by BL. Abbreviations: BL = Baseline, EST = Estimate, NR = Not Reported, T# = Time point (assessment) followed by number, US = United States, CN = China.

(a) Ethnicity data were not reported, but nationality data indicated that 97% of participants were Dutch.

(b) Ethnicity data were not reported, but nationality data indicated that 97% of participants were Lithuanian.

(c) Ethnicity data were not reported, but nationality data indicated that 99% of participants were Lithuanian.

(d) Three pre-pandemic assessments were collapsed into a single pre-pandemic/baseline assessment.

(e) Ethnicity data were not reported, but study focused on Chinese international students.

(f) Age not reported but 84.9% were freshmen (time point unspecified).

primarily focused on adolescent populations, with their combined sample size contributing to over two thirds of the total sample across all included studies. The remaining studies targeted young adults.

A total of 46 different resilience measures have been used. Studies primarily assessed pre-pandemic resilience factors ($n = 26$) rather than *changes* in such factors over time ($n = 6$). The majority of studies assessed these at a single level, focusing either on the individual, family, or community. However, ten studies examined resilience factors across two of these domains, while one study included resilience factors across all three levels. Specifically, factors at the individual level were explored in 17 studies, community-related in 14, and family factors in 13. Both measures of mental health outcomes and resilience measures are specified in Table 2.

Individual factors

Studies evaluating more general individual-level resilience factors and coping abilities found limited evidence of their protective effects during the COVID-19 pandemic when research was restricted to the initial outbreak or first year of the pandemic. For example, Daniunaite et al. (2021) and McGuinn et al. (2023) reported either no protective effect or inconsistent findings regarding the impact of pre-pandemic general resilience on pandemic mental health outcomes in adolescence. Additionally, Holt-Gosselin et al. (2022) found no association between pre-pandemic adaptive coping and pandemic depression or anxiety symptoms in a sample of young adults. Studies including more than one pandemic assessment, however, found some evidence of protective effects. Smith et al. (2022), for instance, assessed pandemic outcomes at two intervals eight months apart, and found that while pre-pandemic coping abilities had no impact on psychopathology during the initial outbreak in a sample of adolescents, they were associated with decreased internalizing symptoms as time progressed. Similarly, Wang et al. (2024) found that higher pre-pandemic coping flexibility as well as subjective resilience was associated with an increased likelihood of following resilient trajectories for both depressive and anxiety symptoms in a sample of college students followed up three times during the pandemic. Bussone et al. (2023) identified a comparable trend, although focusing on a different kind of individual-level resilience factor. They found that despite an overall increase in anxiety symptoms during lockdown, students with secure pre-pandemic attachment styles reported a notable reduction in anxiety symptoms as the pandemic progressed, whereas their counterparts with pre-pandemic insecure attachment styles continued to report elevated levels.

Studies examining more specific individual-level resilience factors generally found these factors were associated with better overall mental health outcomes both prior to and during the pandemic. However, they often did not specifically mitigate pandemic-related mental health effects. For example, Wiedemann et al. (2022) reported that young adults with high pre-pandemic self-esteem experienced lower-than-expected (had there been no pandemic) mental wellbeing during the initial outbreak of the pandemic, yet their overall wellbeing remained higher than that of individuals with lower initial self-esteem. The study also found that higher pre-pandemic self-esteem was related to lower-than-expected psychological distress during the pandemic, but the effect size was small. Deppe and Zapko-Willmes (2023) found that pre-pandemic self-esteem and self-efficacy were not associated with

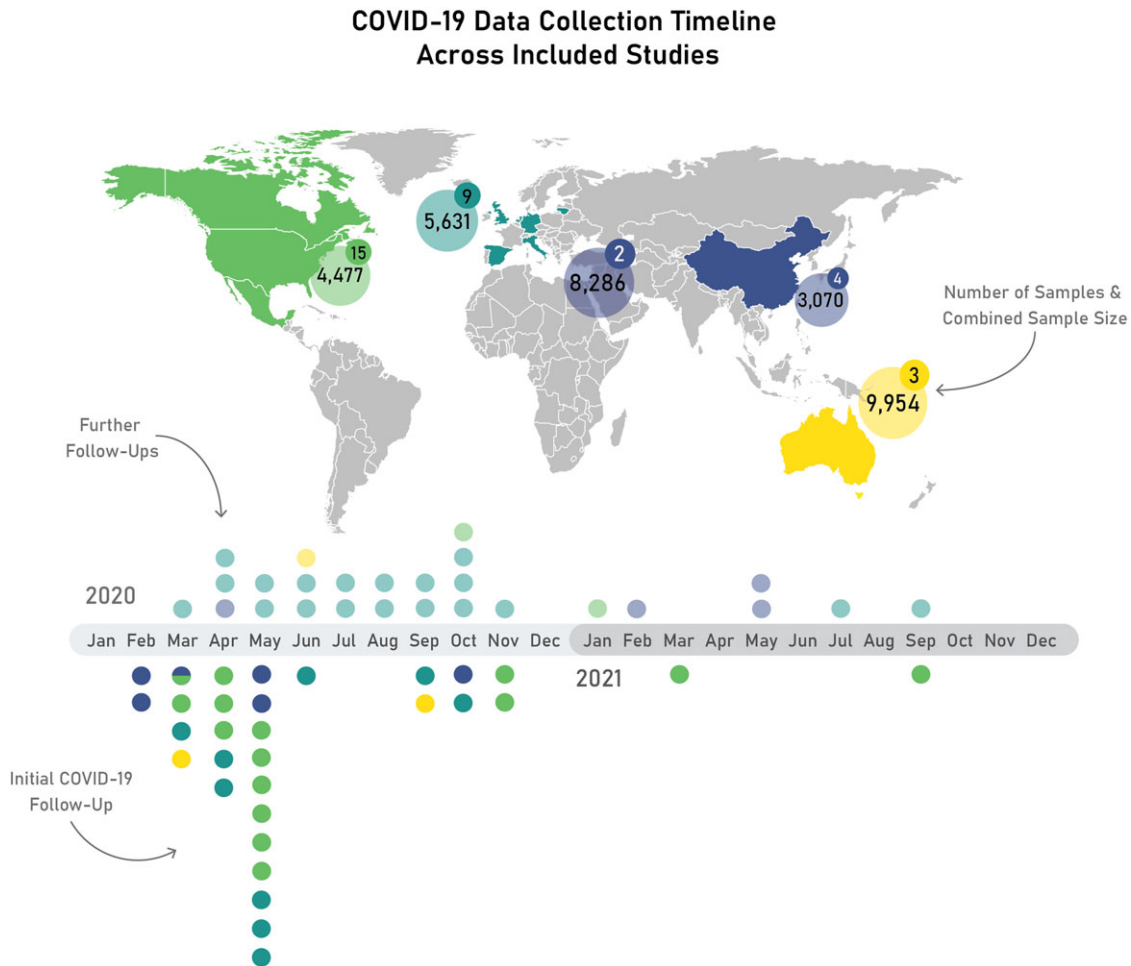


Figure 2. COVID-19 data collection timeline across included studies. Map: color-coded by continent where data were collected. Green = North America, turquoise = Europe, blue = Asia, yellow = Australia/Oceania. Total samples exceed included studies by one due to one study collecting data in two countries. Timeline: spans January 2020 to December 2021. Initial COVID-19 assessments (bottom) and follow-ups (top) shown as colored dots matching continental regions. Estimated dates were used when precise information was unavailable. One study was omitted from this timeline due to providing only the year of data collection.

reduced depression symptoms during the pandemic. However, they were linked to pre-pandemic depression levels, which served as the strongest predictor of depression during the pandemic. Colby et al. (2023) reported that pre-pandemic goal-directedness and social agency were associated with lower stress levels during the pandemic but did not predict changes in stress from one year before the outbreak to about eighteen months into it. Similarly, Royuela-Colomer et al. (2023) found dispositional mindfulness was associated with fewer depression and stress symptoms but did not protect against COVID-19 stress. Van Doren et al. (2023) did not specifically assess COVID-19 stress, but found that higher pre-pandemic mindfulness was generally associated with fewer internalizing symptoms and higher wellbeing during the pandemic. Additionally, pre-pandemic compassion was (weakly) associated with higher wellbeing, but not with internalizing symptoms. Furthermore, Liu et al. (2024) assessed changes in self-compassion from pre- to mid-pandemic in a large sample of young adults and found that those who increased their use of self-compassion from pre-pandemic levels reported fewer depressive symptoms during the pandemic.

Studies assessing emotion regulation strategies reported mixed results. Romm et al. (2021) reported that positive affect regulation, particularly through savoring, was linked to better adolescent

adjustment by minimizing reductions in positive emotions overall but did not specifically buffer against pandemic-related mental health outcomes. They further found that regulating negative affect, such as through cognitive reappraisal, showed no link to pandemic mental health outcomes. Similarly, Taylor et al. (2022) found no evidence for a protective effect from changes in regulating negative affect on internalizing symptoms during the pandemic. Furthermore, Wang et al. (2024) found no support of pre-pandemic cognitive reappraisal predicting resilient trajectories for both depressive and anxiety symptoms in a sample of college students followed up three times during the pandemic. Nonetheless, Buillion et al., (2023) found a marginal relationship between pre-pandemic cognitive reappraisal and pandemic internalizing symptoms. Liu et al. (2024) further found that young adults who increased their use of cognitive reappraisal strategies from pre-pandemic levels reported fewer depressive symptoms during the pandemic. However, their assessment of changes in self-compassion, as mentioned earlier, showed that the link between increased self-compassion and reduced depressive symptoms was stronger than the effect of cognitive reappraisal. Gupta et al. (2022) further reported that those with effective pre-pandemic emotion regulation capabilities demonstrated reduced susceptibility to stress-induced increases in depressive symptoms during the

COVID-19 pandemic. Specifically, the study found that the interaction between neural markers of emotion regulation and COVID-19 related stressors predicted depressive symptoms, indicating that individuals with greater pre-pandemic emotion regulation proficiency were less affected by pandemic-related stress in terms of depressive symptomatology.

Family factors

Studies evaluating family-level resilience factors generally found positive impacts on pandemic mental health under certain conditions. For example, Afriat et al. (2023) reported that the quality of pre-pandemic relationships with parents had no impact on changes in mental health symptoms during the pandemic. However, adolescents reporting improvements in their relationships with parents during the pandemic experienced fewer depression and stress symptoms. In contrast, those with deteriorating relationship quality saw an increase in mental health issues. Similarly, Song et al. (2022) found that parental attachment security among young adults remained stable from before the pandemic to the initial months of its outbreak; however, this stability alone did not offer protection against pandemic-related mental health issues. In contrast, those reporting positive changes in their parental attachment security were protected against pandemic-related mental health effects observed in the broader sample. Moreover, Tsai and Jung (2024) found that changes in self-reported parental support from pre- to mid-pandemic were associated with changes in perceived stress among adolescents, with increases in parental support related to decreases in perceived stress during the pandemic. However, they found no association between self-reported changes in family emotional security and changes in mental health outcomes. Shoshani (2024) and Shoshani and Kor (2024) conducted longitudinal studies tracking large, likely overlapping samples of adolescents before and during the COVID-19 pandemic. Both studies found that higher social support from family (and friends) was associated with fewer mental health symptoms throughout the pandemic. Shoshani (2024) additionally found an interaction between social support and time, indicating that the effect of social support on mental health outcomes varied across the pandemic period, though this interaction was not analyzed in further detail. Further support comes from studies assessing family-level resilience factors at baseline only. For example, Wong et al. (2022) reported that high pre-pandemic family life satisfaction offered protection against adolescent adjustment problems during the pandemic, but only when parental stress did not increase during this period. Moreover, Bussone et al. (2023) found that the protective effect of high pre-pandemic parental care only emerged as the pandemic progressed.

A few studies evaluating family-level resilience factors found more limited evidence for their protective effects during the COVID-19 pandemic. For example, Buist et al. (2023) found that higher pre-pandemic levels of family support were associated with lower mean levels of depressive and anxiety symptoms across the entire study period. However, it was not associated with changes in internalizing problems during the pandemic or reopening phase. Wiedemann et al. (2022) found that better general family functioning and positive and involved parenting prior to the pandemic was related to lower-than-expected (had there been no pandemic) distress during the initial outbreak of COVID-19. However, the effect size was small. Further, Deppe and Zapko-Willmes (2023) found that pre-pandemic parental emotional support was not predictive of pandemic depression symptoms but

was linked to pre-pandemic depression which was the strongest predictor for depression symptoms during the pandemic. Two studies found no significant association between pre-pandemic family-level resilience factors and pandemic mental health outcomes. Buillion et al., (2023) reported no direct relationship between pre-pandemic warm and affectionate parenting and internalizing symptoms during the pandemic. Similarly, Reim et al. (2024) found that self-reported pre-pandemic adolescent-mother relationship was not related to changes in perceived stress from pre- to mid-pandemic.

Community factors

Studies evaluating community-level resilience factors, predominantly focusing on relationships with peers, generally found these factors were associated with better overall mental health outcomes, but not necessarily protective in the pandemic context. For example, Buist et al. (2023) reported that higher pre-pandemic levels of best friend support were associated with lower mean levels of depressive and anxiety symptoms across the entire study period. However, best friend support was not associated with changes in internalizing problems during the pandemic or reopening phase. Both Bernasco et al. (2021) and Houghton et al. (2022) found that adolescents with stronger pre-pandemic friendship quality and support experienced fewer mental health symptoms at the onset of the pandemic. However, Bernasco et al. (2021) additionally illustrated that greater pre-pandemic friendship support did not mitigate the impact of pandemic-related stress. Likewise, Song et al. (2022) reported that changes in peer attachment among young adults did not serve as a buffer against the impact of stressors on adjustment problems. Correspondingly, Afriat et al. (2023) found that improvements in the quality of adolescent-peer relationships were not associated with mental health outcomes during the pandemic. Widnall et al. (2022) did not find an association between pre-pandemic peer connectedness and pandemic mental health outcomes at all. In contrast, Cohen et al. (2021) found that despite an overall decline in peer trust and communication, adolescents who sustained trust and communication in their peers experienced better outcomes during the pandemic. Additionally, Wiedemann et al. (2022) reported that higher pre-pandemic friendship quality was associated with lower-than-expected (had there been no pandemic) psychological distress in young adults during the initial outbreak, albeit with a minimal effect size. Similarly, Juvonen et al. (2022) found an association between the quality and quantity of friendships and pandemic mental health among young adults; however, it was relatively modest.

Few studies assessed broader community-level resilience factors, with mixed findings. For example, Widnall et al. (2022) found that adolescents who reported medium-to-high school connectedness appeared to exhibit greater resilience, experiencing fewer changes in their mental health and wellbeing. Similarly, Chen et al. (2024) found that more positive pre-pandemic school climate and stronger school identification were associated with lower levels of depression and anxiety, and higher levels of positive affect during the pandemic in a large sample of adolescents. However, students with more positive pre-pandemic school experiences showed greater increases in depression and greater decreases in positive affect from pre- to pandemic periods compared to those with less positive school experience. Colby et al. (2023) found that young adults who reported more positive pre-pandemic relationships and a sense of belonging to college

Table 2. Study measures

Study	Mental health outcome(s) Measures	Time	Resilience factor(s)			Measure	Time	IND	FAM	COM
			ANX	DEP	OTH					
Afriat et al., 2023	Multidimensional Anxiety Scale for Children Children's Depression Inventory [AD] Perceived Stress Scale	T1, T2	X	X	X	Inventory of Parent and Peer Attachment	T1-T3		X	X
Bernasco et al., 2021	Revised Child Anxiety and Depression Scale Child Behaviour Checklist [PR]	T1, T2	X	X	X	Network of Relationships Inventory [SF,SS] Friendship Quality Scale [SI]	T1, T2			X
Boullion et al., 2023	Youth Self Report	T1-T3	X	X	X	Emotion Regulation Questionnaire Parental Acceptance and Rejection Questionnaire [SF]	T1, T2 ^(a)	X	X	
Buist et al., 2023	Screen for Child Anxiety related Emotional Disorders [SS] Reynolds Adolescent Depression Scale [SF]	T1-T25	X	X		Network of Relationships Inventory [SI]	T1		X	X
Bussone et al., 2023	Symptom Checklist-90 item revised State-Trait Anxiety Inventory [SS] Perceived Stress Scale	T1-T4	X	X	X	Relationship Questionnaire Parental Bonding Instrument	T1	X	X	
Chen et al., 2024	Screen for Child Anxiety related Emotional Disorders Centre for Epidemiological Studies Depression Scale Mental Health Inventory [SS]	T1, T2	X	X		Australian School Climate and School Identification Measurement Tool	T1			X
Cohen et al., 2021	PROMIS Anxiety PROMIS Depression	T1, T2	X	X		Family Environment Scale [SS] Inventory of Parent and Peer Attachment	T1, T2		X	X
Colby et al., 2023	Perceived Stress Scale [SF]	T1, T2			X	Goal Orientation Scale [AD] The Stanford Purpose Assessment [AD] Social Agency Scale [SI] Belonging to College Scale [AD] Positive Relationships with Others Scale [AD]	T1	X		X
Daniunaite et al., 2021	Strengths and Difficulties Questionnaire	T1, T2			X	The Resilience Scale	T1	X		
Deppe & Zapko-Willmes, 2023	Beck Depression Inventory [SF; T1] Patient Health Questionnaire [SF; T2-T4]	T1-T4		X		Rosenberg Self-esteem Scale [AD] Self-efficacy Scale [SF] Parental Emotional Support [SI]	T1	X	X	
Gupta et al., 2022	Mood and Feelings Questionnaire	T1, T2		X		Emotion Regulation Task	T1	X		
Holt-Gosselin et al., 2022	Screen for Child Anxiety-Related Emotional Disorders [AD] Beck Depression Inventory [AD]	T1, T2	X	X		Connor-Davidson Resilience Scale	T1	X		
Houghton et al., 2022	Children's Depression Inventory-2 Strength and Difficulties Questionnaire Warwick-Edinburgh Mental Wellbeing Scale	T1-T4		X	X	Perth A-loneness Scale - Friendship Quality	T1-T4			X
Juvonen et al., 2022	Social Anxiety Scale for Adolescents [SI] Center for Epidemiologic Studies Depression Scale [SI]	T1, T2	X	X		Friendship Quality and Quantity	T1, T2			X
Ke et al., 2023	Generalized Anxiety Disorder Questionnaire [SF] Patient Health Questionnaire [SF]	T1, T2	X	X		Medical Outcome Study Social Support Survey	T1, T2			X

Liu et al., 2024	Symptom Checklist-90	T1, T2		X		Emotion Regulation Questionnaire Self-compassion Scale	T1, T2	X		
McGuinn et al., 2023	Revised Children's Manifest Anxiety Scale [SF] Children's Depression Inventory [SF]	T1, T2	X	X		Behavioral Assessment System for Children [PR; SS]	T1	X		
Reim et al., 2024	Perceived Stress Questionnaire [SI]	T1, T2			X	Adolescent-Mother Relationship	T1		X	
Romm et al., 2021	Child Depression Inventory Positive and Negative Affect Schedule [SF]	T1, T2		X	X	Emotion Regulation Questionnaire Positive Affect and Response Survey	T1		X	
Royuela-Colomer et al., 2023	Depression, Anxiety and Stress Scale [SF]	T1, T2	X	X	X	Mindful Attention Awareness Scale-Adolescents	T1, T2		X	
Shoshani, 2024	The Brief Symptom Inventory-18 The Positive and Negative Affect Schedule for Children	T1-T4	X	X	X	The Multidimensional Scale of Perceived Social Support	T1-T4		X	X
Shoshani & Kor, 2024	The Brief Symptom Inventory-18	T1-T4	X	X		The Multidimensional Scale of Perceived Social Support	T1-T4		X	X
Smith et al., 2022	Youth Self-Report [T2] Child Behavior Checklist [PR;T2] Strengths and Difficulties Questionnaire [T3,T4]	T2-T4	X	X	X	Children's Coping Strategies Checklist "What I Felt" Scale	T2		X	
Song et al., 2022	Generalized Anxiety Disorder Questionnaire Beck Depression Inventory [AD]	T1, T2	X	X		Inventory of Parent and Peer Attachment [AD]	T1, T2		X	X
Taylor et al., 2022	Mood and Anxiety Symptoms Questionnaire [AD] PROMIS Emotional Distress Anxiety and Depression [SF, AD] Penn State Worry Questionnaire [AD]	T1, T2	X	X	X	Cognitive Emotion Regulation Questionnaire [SF]	T1, T2		X	
Tsai & Jung, 2024	Profile of Mood States [SI] Perceived Stress Scale	T1, T2	X	X	X	Security in the Interparental Subsystem [SS] Parental Support	T1, T2		X	
Van Doren et al., 2023	Generalized Anxiety Disorder Questionnaire Patient Health Questionnaire Pemberton Happiness Index	T1-T3	X	X	X	Five-facet Mindfulness Questionnaire [SF] Interpersonal Reactivity [SS]	T1-T3		X	
Wang et al., 2023	Patient Health Questionnaire [AD]	T1, T2			X	Social Connectedness Scale	T1		X	
Wang et al., 2024	Self-reported Depression Scale State-Trait Inventory	T1-T4	X	X		Coping Flexibility Scale Emotion Regulation Questionnaire Resilience Scale	T1		X	
Widnall et al., 2022	Hospital Anxiety and Depression Scale Warwick and Edinburgh Mental WellBeing Scale	T1-T3	X	X	X	Psychological Sense of School Membership Scale [SI] School Connectedness Scale [SI] Peer Connectedness	T1			X
Wiedemann et al., 2022	Kessler Psychological Distress Scale [SF] Warwick-Edinburgh Mental Wellbeing Scale [SF]	T1-T4		X	X	Rosenberg Self-esteem Scale Alabama Parenting Questionnaire McMaster Family Assessment Device [SS] Cambridge Friendship Questionnaire [SI]	T1		X	X
Wong et al., 2022	Depression Anxiety Stress Scale [SF] Strength and Difficulties Questionnaire [PR]	T1, T2	X	X	X	Family Connectedness Questionnaire	T1		X	

Abbreviations: ANX = Anxiety, DEP = Depression, OTH = Other, IND = Individual, FAM = Family, COM = Community, T# = Time point (assessment) followed by number, AD = Adapted, SF = Short-Form, SI = Selected Items, SS = Subscale, PR = Parent-Report.

^(a) Both measures were assessed only once pre-pandemic; the Parental Acceptance and Rejection Questionnaire at T1 and the Emotion Regulation Questionnaire at T2.

	Afriat et al., 2023	Bernasco et al., 2021	Bouillon et al., 2023	Bulst et al., 2023	Bussone et al., 2023	Chen et al., 2024	Cohen et al., 2021	Colby et al., 2023	Daniunaitė et al., 2021	Deppe & Zapko-Williams, 2023	Gupta et al., 2022	Holt-Gosselin et al., 2022	Houghton et al., 2022	Juvonen et al., 2022	Ke et al., 2023	Liu et al., 2024	McGuinn et al., 2022	Reim et al., 2024	Romm et al., 2021	Royuela-Colomer et al., 2022	Shoshani, 2023	Shoshani & Kor, 2024	Smith et al., 2022	Song et al., 2022	Taylor et al., 2022	Tsai & Jung, 2024	Van Doren et al., 2023	Wang et al., 2023	Wang et al., 2024	Widhall et al., 2022	Wiedemann et al., 2022	Wong et al., 2022		
Clearly stated research question or objective	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clearly specified and defined population	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✗	✗	✓	✓	✓	✓
Participation rate of eligible persons at least 50%	?	?	?	?	?	✗	?	?	?	✗	?	?	?	?	✗	?	?	✗	?	?	?	?	?	?	?	✗	?	?	?	?	?	✗	?	?
Consistent recruitment & predefined inclusion criteria	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Provided sample size justification	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Resilience measured prior to outcome(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sufficient timeframe for association	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Examined different levels of resilience	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Valid and reliable resilience measure	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Resilience assessed more than once over time	✓	✓	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✓	✓	✓	✓	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✗	✗	✗	✗
Valid and reliable outcome measure(s)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Blinded outcome(s) assessment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Loss to follow-up less than 20%	✓	✓	✗	✓	✗	?	✓	✗	?	?	✗	✗	?	✗	✗	✗	?	?	✗	✗	✓	✓	✗	?	✗	✗	✗	✗	✗	✗	✗	✗	✗	?
Adjusted for key confounders	✓	✓	✓	✓	✗	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓	✓
Pandemic impact assessment	✗	✓	✓	✗	✗	✗	✓	✓	✗	✓	✓	✗	✗	✗	✓	✓	✗	✓	✓	✗	✓	✓	✗	✓	✓	✗	✗	✗	✓	✓	✗	✗	✗	✗

Figure 3. Quality appraisal of included studies. Green circles indicate criteria met, yellow circles indicate criteria partially met or borderline cases, red crosses indicate criteria not met, and question marks indicate insufficient information to assess the criterion. NA = not applicable.

experienced lower stress levels during the pandemic. However, these pre-pandemic indicators did not predict changes in stress from one year before the outbreak to approximately eighteen months into it. Both Ke et al. (2023) and Wang et al. (2023) did not find support for an association between pre-pandemic social connectedness or support and pandemic mental health outcomes. However, Ke et al. (2023) did find that higher social support during the pandemic was associated with better pandemic mental health outcomes.

Quality appraisal

The results of our quality appraisal are presented in Figure 3. The overall quality assessment was conducted by two independent reviewers, finding a consistent quality level across all studies with a clear consensus. Only three of the studies achieved the highest quality rating “good” (Liu et al., 2024; Shoshani and Kor, 2024; Shoshani, 2024). The remaining articles were rated as “fair” in quality, with three approaching the threshold between “fair” and “poor.” Generally, each study clearly stated its research question or objective. Similarly, the majority clearly defined their study population, with most providing detailed information on recruitment and selection of participants. However, nearly all studies omitted information on participation rate for eligible participants, particularly at baseline. Only nine studies provided enough

information or references to assess whether the participation rate reached the recommended 50% threshold, with just three meeting this criterion. Notably, only four studies offered a justification for sample size or described the statistical power needed for their planned analysis. We weighted the absence of this information more heavily in the overall quality rating for studies with particularly small sample sizes.

All selected studies were required to use validated and reliable outcome measures (i.e., mental health or wellbeing), leading to consistently good quality in this aspect. Nonetheless, there were a few exceptions. One study used a significantly condensed version of a validated mental health scale, and two studies used different validated mental health scales across assessments, which were considered conceptually similar in measuring outcomes and therefore included. However, these modifications could have influenced the overall reliability of results from these studies. Furthermore, most studies used validated and reliable measures for assessing resilience factors, yet modifications to existing scales were common (please note that using validated and reliable resilience measures was not a requirement for inclusion in this review). These ranged from minor changes, such as removing one item, to more significant adjustments such as selecting and combining individual items from various validated scales. Seven included studies made amendments that we considered to be more than minor or negligible. However, only one study used a

self-constructed, non-validated resilience measure. Nearly all studies assessed resilience factors as continuous (or categorical with more than two categories) rather than binary variable. Furthermore, around 40% of included studies conducted repeated measurements of resilience over time, although the extent of inclusion in their analyses varied. The majority measured resilience factors once, specifically pre-pandemic, as set out in our inclusion criteria.

Most studies measured and adjusted for key potential confounders in their analyses. However, attrition was high among most studies. Notably, a considerable number of studies provided insufficient information to accurately assess loss to follow-up. Finally, we added one additional item in our quality appraisal to assess whether studies included some measure on pandemic impact. Fourteen studies incorporated such measures, yet the specific aspects assessed and how these were integrated into the analyses varied significantly. Some studies focused on government restrictions and adherence to these measures, while others examined perceived threat, lifestyle changes, or direct health impacts. The diversity in assessment methods ranged from single items to multi-dimensional scales, and from objective measures to subjective perceptions. For instance, while some studies used dichotomous indicators of COVID-19 infection or quarantine experiences, others employed adapted versions of existing stress questionnaires or developed study-specific measures to capture a broader range of pandemic-related stressors.

Discussion

The aim of our systematic review was to identify resilience-enhancing factors measured before the outbreak of the COVID-19 pandemic and assess their association with mental health and wellbeing in adolescents and young adults during the pandemic. We reviewed 32 longitudinal studies from 12 countries which collectively used 46 different measures of resilience. In summary, while many of the investigated resilience factors were associated with better overall mental health both before and during the pandemic, they did not necessarily mitigate pandemic-related mental health effects. Notably, the evidence presented primarily relates to the initial outbreak and subsequent months, with limited follow-ups as the pandemic progressed. Moreover, the included studies were predominantly conducted in developed nations, particularly in North America, Europe, Israel, and Australia which may limit their applicability to other youth populations. Nonetheless, our findings suggest that certain resilience factors, particularly on a family level, may positively impact pandemic mental health outcomes under specific conditions.

The COVID-19 pandemic has resulted in increased time spent at home for many adolescents due to school closures and restrictions, while similarly prompting many young adults to return to their parents' home (Prattley et al., 2023; Preetz et al., 2022). In this context, it is perhaps unsurprising that our review highlights family-level resilience factors as the most promising in mitigating pandemic-related mental health effects (Afriat et al., 2023; Bussone et al., 2023; Shoshani and Kor, 2024; Shoshani, 2024; Song et al., 2022; Tsai and Jung, 2024; Wiedemann et al., 2022; Wong et al., 2022). For instance, adolescents and young adults experiencing improvements in their relationships with parents reported fewer mental health symptoms during the pandemic compared with those whose parent relationship remained stable (or deteriorated), demonstrating the importance of adaptation to changing circumstances (Afriat et al., 2023; Song et al., 2022). In contrast, we did not find evidence supporting community-level

resilience factors such as quality of friendships in a similar manner. Although associated with better overall mental health outcomes, such factors did not necessarily provide protection against pandemic-related mental health effects (Afriat et al., 2023; Bernasco et al., 2021; Buist et al., 2023; Chen et al., 2024; Song et al., 2022). This may be due to various potential reasons, but most likely attributable to the shift in the nature of interactions between adolescents, young adults, and their peers during the pandemic, which led to fewer community-level interactions.

The finding that most resilience factors, particularly at an individual and community level, were associated with better overall mental health but not necessarily protective against pandemic-related mental health effects, may result from the timing of data collection rather than definitively suggesting that these factors lack extended protective benefits. The majority of included studies focused on the early phases of the pandemic. The median month of initial COVID-19 data collection was May 2020, just two months after COVID-19 was declared a pandemic. We now know that these initial months saw an increase in mental health symptoms across the general population, which took several months to revert to pre-pandemic levels (Robinson et al., 2022). By late April 2020, for example, a quarter of the population in the United Kingdom reported considerable mental distress, with the most pronounced increase compared to pre-pandemic levels observed in those aged 18-34 (Pierce, Hope, et al., 2020). It is reasonable to assume that resilience-enhancing factors might demonstrate their full protective effect after the initial shock subsided and the pandemic progressed. However, only a handful of studies included in our systematic review conducted multiple COVID-19 follow-ups and employed a study design that could answer such an important question. For instance, Smith et al. (2022) assessed pandemic outcomes at two intervals eight months apart, and found that while pre-pandemic coping abilities had no impact on psychopathology during the initial outbreak, they were associated with decreased internalizing symptoms as time progressed. Bussone et al. (2023) reported similar findings, however, their study lacked methodological robustness. Nonetheless, additional evidence is provided by Deppe and Zapko-Willmes (2023) through their genetic analyses of a large twin cohort. Although our review only addressed their behavioral analysis, as their genetic analyses lacked resilience factors meeting our inclusion criteria, it offers valuable insight into the question of adaptation. The authors identified large time-specific unique environmental effects, that is, unexplained variance, influencing pandemic youth depression symptoms. Yet, as the pandemic progressed, the explanatory power of the investigated predictors grew, mirroring pre-pandemic levels, suggesting that young people adapted to the pandemic and key individual and social characteristics regained their protective function. This would support findings from smaller-scale behavioral studies; however, this needs further investigation. It is likely to be several more years before sufficient evidence becomes available to fully address the question at hand.

The findings of our systematic review further raise important questions about how we assess resilience. Even though resilience research has long highlighted the importance of considering several resilience factors at once, acknowledging that factors often interact rather than operate independently, many of the studies included in our systematic review examined potential resilience factors in isolation or with limited scope. Even among studies that assessed resilience factors at two levels, most still examined these factors in isolation, often using separate models for each level of impact. Only one study assessed resilience factors across all three

levels simultaneously and considered their interactions using a psychological network approach (Wiedemann et al., 2022). However, as an isolated example, this is insufficient to draw broad conclusions about how these levels of resilience factors interact. This persistent limitation in examining resilience factors across multiple levels reflects a broader, long-standing issue in resilience research, as highlighted by Fergus and Zimmerman almost two decades ago (2005). More recent research by Fritz et al. (2018) has further confirmed that studying resilience factors in isolation remains common, highlighting the enduring nature of this limitation in the field. Likewise, many of the included studies assessed resilience only once. Yet, a comprehensive understanding of resilience processes can only be attained by evaluating (multiple) potential factors over time. Although some studies included in this systematic review assessed resilience factors more than once, only a small number evaluated how *changes* in these factors impacted pandemic mental health outcomes (Afriat et al., 2023; Cohen et al., 2021; Liu et al., 2024; Song et al., 2022; Taylor et al., 2022; Tsai & Jung, 2024). These studies are particularly valuable as they allow us to examine resilience as a dynamic process of adaptation to adversity, which provides a more comprehensive understanding compared to solely assessing the probability of a resilient outcome. Moreover, it is equally important to evaluate exposure to risk, as resilience implies encountering factors that increase the likelihood of adverse outcomes, a core tenet of resilience theory (Fergus & Zimmerman, 2005). Understandably, the pandemic has presented methodological challenges, as there is no agreed-upon approach how to precisely assess its impact on mental health. This is evident in the variability of pandemic impact assessments across studies. Many studies did not include such assessments, instead referring to the pandemic's indirect effects on their overall sample rather than assessing individual-level exposure and stress. Studies that did include pandemic impact measures showed considerable variation in approaches and analytical integration. This diversity in methods highlights the challenges in standardizing the evaluation of the pandemic's effects across studies, making direct comparisons and broader conclusions about the pandemic's impact on resilience factors difficult. These methodological issues reflect a broader challenge in resilience research. As Fergus and Zimmerman (2005) argued nearly two decades ago, a comprehensive understanding of resilience requires the assessment of cumulative risks, assets, and resources over time. The majority of studies included in our systematic review fall short of this standard.

This leads us to further consider the quality of the included studies. Overall, studies showed generally fair quality, with insufficient high-quality ratings and absence of important details regarding participation rates, sample size justification, and attrition. Despite the use of validated measures, albeit often with modifications, and the addressing of key potential confounders, there was considerable variability in whether and how pandemic impact was assessed. Importantly, studies with larger sample sizes did not necessarily result in better quality. For example, one of the larger studies included used different outcome measures across assessments, likely affecting the overall reliability of the results. However, the biggest concern remains the quality of the samples themselves. Included studies largely relied on non-probability and convenience samples and the lack of sufficient information to assess participation rates of eligible individuals is alarming. Employing rigorous population-wide sampling methods is important to reduce bias and reduce erroneous conclusions, as emphasized by Matthias Pierce in the *Lancet Psychiatry* early in the pandemic: "*Cutting corners to provide quick, cheap answers will result in poorer quality*

evidence, poorer policy, and wasted resources in the longer term. We can and must do better" (Pierce, McManus, et al., 2020).

In addition to these quality considerations, we acknowledge a potential limitation in our review process itself. As our resilience framework evolved during the screening phase, there is a possibility that some relevant studies may have been overlooked. While we implemented strategies to mitigate this risk, including an inclusive approach at the title and abstract screening stage and regular team discussions during the full-text screening, we cannot entirely rule out this possibility. However, it is worth noting that one of the most common reason for exclusion at the full-text stage was lack of pre-pandemic data, rather than issues related to our resilience framework. This gives us additional confidence that our evolving criteria did not substantially impact study inclusion.

Future directions in resilience research

In light of the overall quality concerns raised by the included studies in our systematic reviews, we propose five recommendations for advancing resilience research in both pandemic and non-pandemic contexts. Firstly, researchers should consider adopting a multi-level perspective, acknowledging the dynamic and complex nature of resilience and exploring its interactions across various levels. Secondly, incorporating repeated measurements is essential to accurately capture the evolving nature of resilience. Thirdly, prioritizing individual-level impact assessments, particularly in future pandemic contexts, will enhance our understanding of the effects of risk exposure on resilience and mental health outcomes. Retrospectively validating existing pandemic impact scales would be a first step. Fourthly, emphasizing research quality over quantity is crucial, focusing on meaningful sampling methods, robust statistical analyses, and transparent reporting practices. Lastly, the ongoing conduct and periodic updates of systematic reviews is paramount. This would enable us to navigate the vast landscape of COVID-19 literature, derive meaningful insights, and expand our understanding of resilience in the pandemic context and beyond.

Conclusions

Our systematic review offers an important examination of pre-pandemic resilience factors and their impact on mental health outcomes during the COVID-19 pandemic among adolescents and young adults. While family-level resilience factors emerged as promising in mitigating pandemic-related mental health effects, the protective role of individual and community-level factors was less evident. The timing of data collection, mainly restricted to the initial outbreak and subsequent months in the included studies, may have influenced these findings. Consequently, the evidence included in the review that provides data as the pandemic progressed is limited. The resilience factors investigated were generally associated with better mental health and wellbeing overall. Yet, we found considerable limitations in how resilience was assessed, including a tendency for studies to examine resilience factors in isolation, lacking longitudinal evaluation (i.e., assessing how *changes* in resilience factors impact mental health outcomes over time), or failing to adequately assess risk exposure. Our review highlights the critical need for a standardized definition of resilience to enhance research clarity and comparability in mental health studies. Additionally, we identified quality concerns, particularly regarding sample quality, with the majority of studies relying on non-probability and convenience samples. Moving forward we need to adopt a multi-level perspective of resilience, integrating repeated measurements, prioritizing individual-level

impact assessments, and emphasizing research quality. These efforts are essential to advance resilience research in both pandemic and non-pandemic settings.

Acknowledgements. The authors would like to thank the medical librarians at the University of Cambridge, School of Clinical Medicine, particularly Mrs Eleanor Barker, for their help in reviewing the search strategies for this review.

Author contribution. AW, JG, and PBJ conceived the study and developed the study protocol. All authors participated in screening eligible studies, with AW, RG, and CO taking the lead in screening and conducting the quality appraisal. AW led the analysis and interpretation of the results and drafted the manuscript with important contributions from JG and PBJ. All authors reviewed and approved the final manuscript.

Funding statement. The Department of Psychiatry at the University of Cambridge benefits from support by the NIHR ARC East of England and the Cambridge Biomedical Research Centre. AW and PBJ received support from the NIHR ARC East of England at Cambridgeshire and Peterborough NHS Foundation Trust. The views expressed in this review are those of the authors and do not necessarily represent the views of the NIHR or the NHS. The funding bodies played no role in the study design, analysis, interpretation, writing of the report, or decision to submit the paper.

Competing interests. The authors declare that they have no conflict of interest.

References

- Afriat, M., De France, K., Stack, D. M., Serbin, L. A., & Hollenstein, T. (2023). Relationship quality and mental health implications for adolescents during the COVID-19 pandemic: A longitudinal study. *Journal of Child and Family Studies*, 32(2), 544–554. <https://doi.org/10.1007/s10826-022-02519-3>
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, 55(5), 469–480. <https://doi.org/10.1037//0003-066x.55.5.469>
- Bernasco, E. L., Nelemans, S. A., van der Graaff, J., & Branje, S. (2021). Friend support and internalizing symptoms in early adolescence during COVID-19. *Journal of Research On Adolescence*, 31(3), 692–702. <https://doi.org/10.1111/jora.12662>
- Boullion, A., Linde-Krieger, L. B., Doan, S. N., & Yates, T. M. (2023). Parental warmth, adolescent emotion regulation, and adolescents' mental health during the COVID-19 pandemic. *Frontiers in Psychology*, 14, 1216502. <https://doi.org/10.3389/fpsyg.2023.1216502>
- Buist, K. L., Boele, S., Bülow, A., Reitz, E., Verhoeven, M., & Keijsers, L. (2023). Quaranteens: Prepandemic relationship quality and changes in adolescent internalizing problems during the COVID-19 pandemic. *Journal of Research on Adolescence*, 33(4), 1164–1178. <https://doi.org/10.1111/jora.12867>
- Bussone, S., Pesca, C., Carola, V., & Tambelli, R. (2023). Longitudinal evaluation of psychological health issues in young adults during the COVID-19 pandemic. *Psychology Hub*, 40(1), 49–62. <https://doi.org/10.13133/2724-2943/17773>
- Chen, S., Cárdenas, D., Zhou, H., & Reynolds, K. J. (2024). Positive school climate and strong school identification as protective factors of adolescent mental health and learning engagement: A longitudinal investigation before and during COVID-19. *Social Science & Medicine*, 348, 116795. <https://doi.org/10.1016/j.socscimed.2024.116795>
- Canadian Health Libraries Association; CHLA (2018). Concepts de stratégie de recherche: Adolescents et jeunes adultes. <https://extranet.santecom.qc.ca/wiki/biblio3s/doku.php?id=concepts:adolescents-et-jeunes-adultes> [Last accessed 24 April 2024]
- Cohen, Z. P., Cosgrove, K. T., DeVille, D. C., Akeman, E., Singh, M. K., White, E., Stewart, J. L., Aupperle, R. L., Paulus, M. P., & Kirlic, N. (2021). The impact of COVID-19 on adolescent mental health: Preliminary findings from a longitudinal sample of healthy and at-risk adolescents. *Frontiers in Pediatrics*, 9, 622608. <https://doi.org/10.3389/fped.2021.622608>
- Colby, A., Fereday, B., Le, N. Q., & Malin, H. (2023). A longitudinal study of US college students before and during the covid-19 pandemic. *Journal of American College Health*. <https://doi.org/10.1080/07448481.2023.2220391>
- Daniunaite, I., Truskauskaitė-Kunevičienė, I., Thoresen, S., Zeliene, P., & Kazlauskas, E. (2021). Adolescents amid the COVID-19 pandemic: A prospective study of psychological functioning. *Child and Adolescent Psychiatry and Mental Health*, 15(1), 45. <https://doi.org/10.1186/s13034-021-00397-z>
- HM Government, Department of Health and Social Care & Cabinet Office (2021). COVID-19 mental health and wellbeing recovery action plan. <https://www.gov.uk/government/publications/covid-19-mental-health-and-wellbeing-recovery-action-plan#full-publication-update-history> [Last accessed 24 April 2024]
- Deppe, M., & Zapko-Willmes, A. (2023). Youth depression symptoms during COVID-19. *Zeitschrift Für Psychologie*, 231(2), 126–136. <https://doi.org/10.1027/2151-2604/a000521>
- Fergus, S., & Zimmerman, M. A. (2005). Adolescent resilience: A framework for understanding healthy development in the face of risk. *Annual Review of Public Health*, 26(1), 399–419. <https://doi.org/10.1146/annurev.publhealth.26.021304.144357>
- Fritz, J., Graaff, A. M.de, Caisley, H., Harmelen, A.-L.van, & Wilkinson, P. O. (2018). A systematic review of amenable resilience factors that moderate and/or mediate the relationship between childhood adversity and mental health in young people. *Frontiers in Psychiatry*, 9, 230. <https://doi.org/10.3389/fpsyg.2018.00230>
- Gupta, R. S., Dickey, L., & Kujawa, A. (2022). Neural markers of emotion regulation difficulties moderate effects of COVID-19 stressors on adolescent depression. *Depression and Anxiety*, 39(6), 515–523. <https://doi.org/10.1002/da.23268>
- Holt-Gosselin, B., Cohodes, E. M., McCauley, S., Foster, J. C., Odriozola, P., Zacharek, S. J., Kribakaran, S., Haberman, J. T., Hodges, H. R., & Gee, D. G. (2022). Lack of robust associations between prepandemic coping strategies and frontolimbic circuitry with depression and anxiety symptoms during the COVID-19 pandemic: A preregistered longitudinal study. *Behavioral Neuroscience*, 136(6), 528–540. <https://doi.org/10.1037/bne0000534>
- Houghton, S., Kyron, M., Hunter, S. C., Lawrence, D., Hattie, J., Carroll, A., & Zadow, C. (2022). Adolescents' longitudinal trajectories of mental health and loneliness: The impact of COVID-19 school closures. *Journal of Adolescence*, 94(2), 191–205. <https://doi.org/10.1002/jad.12017>
- Huremović, D. (2019). *Psychiatry of pandemics, a mental health response to infection outbreak*. Springer Cham. <https://doi.org/10.1007/978-3-030-15346-5>
- Jung, R. G., Di Santo, P., Clifford, C., Prospero-Porta, G., Skanes, S., Hung, A., Parlow, S., Visintini, S., Ramirez, F. D., Simard, T., & Hibbert, B. (2021). Methodological quality of COVID-19 clinical research. *Nature Communications*, 12(1), 943. <https://doi.org/10.1038/s41467-021-21220-5>
- Juvonen, J., Lessard, L. M., Kline, N. G., & Graham, S. (2022). Young adult adaptability to the social challenges of the COVID-19 pandemic: The protective role of friendships. *Journal of Youth and Adolescence*, 51(3), 585–597. <https://doi.org/10.1007/s10964-022-01573-w>
- Kalisch, R., Baker, D. G., Basten, U., Boks, M. P., Bonanno, G. A., Brummelman, E., Chmitorz, A., Fernández, Gén, Fiebach, C. J., Galatzer-Levy, I., Geuze, E., Groppa, S., Helmreich, I., Hendler, T., Hermans, E. J., Jovanovic, T., Kubiak, T., Lieb, K., Lutz, B. . . . B., Kleim (2017). The resilience framework as a strategy to combat stress-related disorders. *Nature Human Behaviour*, 1(11), 784–790. <https://doi.org/10.1038/s41562-017-0200-8>
- Ke, T., Li, W., Sanci, L., Reavley, N., Williams, I., & Russell, M. A. (2023). The mental health of international university students from China during the COVID-19 pandemic and the protective effect of social support: A longitudinal study. *Journal of Affective Disorders*, 328, 13–21. <https://doi.org/10.1016/j.jad.2023.02.014>
- Liu, S., Xu, J., Cao, H., An, Y., Li, Y., Li, Z., Gao, M., & Han, Z. R. (2024). Changes in emotion regulation strategies during the pandemic: Prospective pathways to adolescent depressive symptoms. *Journal of Child Psychology and Psychiatry*, 65(12), 1638–1647. <https://doi.org/10.1111/jcpp.14027>
- Masten, A. S. (2014). Global perspectives on resilience in children and youth. *Child Development*, 85(1), 6–20. <https://doi.org/10.1111/cdev.12205>

- McGuinn, L. A., Rivera, N. R., Osorio-Valencia, E., Schnaas, L., Hernandez-Chavez, C., DeFelice, N. B., Harari, H., Klein, D. N., Wright, R. J., Téllez-Rojo, M. M., Wright, R. O., Rosa, M. J. & Tamayo-Ortiz, M. (2023). Changes in depressive and anxiety symptoms during COVID-19 in children from the PROGRESS cohort. *Pediatric Research*, 94(1), 349–355. <https://doi.org/10.1038/s41390-022-02379-z>
- National Institutes of Health; NIH. (2021). Quality assessment tool for observational cohort and cross-sectional studies. <https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools> [Last accessed 15 March 2024].
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, Aørn, Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S. . . . D., Moher (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., John, A., Kontopantelis, E., Webb, R., Wessely, S., McManus, S., & Abel, K. M. (2020). Mental health before and during the COVID-19 pandemic: A longitudinal probability sample survey of the UK population. *The Lancet Psychiatry*, 7(10), 883–892. [https://doi.org/10.1016/s2215-0366\(20\)30308-4](https://doi.org/10.1016/s2215-0366(20)30308-4)
- Pierce, M., McManus, S., Jessop, C., John, A., Hotopf, M., Ford, T., Hatch, S., Wessely, S. & Abel, K. M. (2020). Says who? The significance of sampling in mental health surveys during COVID-19. *The Lancet Psychiatry*, 7(7), 567–568. [https://doi.org/10.1016/s2215-0366\(20\)30237-6](https://doi.org/10.1016/s2215-0366(20)30237-6)
- Prattley, J., Evans-Whipp, T., O'Donnell, K., Wong, C., Quinn, B., & Rowland, B. (2023). Returning to the nest: Emerging adults living with parents during the COVID-19 pandemic. *Australian Journal of Social Issues*, 58(1), 150–172. <https://doi.org/10.1002/ajis.4.235>
- Preetz, R., Greifenberg, J., Hülsemann, J., & Filser, A. (2022). Moving back to the parental home in times of COVID-19: Consequences for students' life satisfaction. *International Journal of Environmental Research and Public Health*, 19(17), 10659. <https://doi.org/10.3390/ijerph191710659>
- Reim, J., Alt, P., Gniewosz, G., & Walper, S. (2024). The role of family climate in adolescents' well-being during the COVID-19 pandemic. *Journal of Child and Family Studies*, 33(8), 2455–2470. <https://doi.org/10.1007/s10826-024-02868-1>
- Robinson, E., Sutin, A. R., Daly, M., & Jones, A. (2022). A systematic review and meta-analysis of longitudinal cohort studies comparing mental health before versus during the COVID-19 pandemic in 2020. *Journal of Affective Disorders*, 296, 567–576. <https://doi.org/10.1016/j.jad.2021.09.098>
- Romm, K. F., Park, Y. W., Hughes, J. L., & Gentzler, A. L. (2021). Risk and protective factors for changes in adolescent psychosocial adjustment during COVID-19. *Journal of Research On Adolescence*, 31(3), 546–559. <https://doi.org/10.1111/jora.12667>
- Royuela-Colomer, E., Fernández-González, L., Orue, I., & Calvete, E. (2023). The association between exposure to COVID-19, internalizing symptoms, and dispositional mindfulness in adolescents: A longitudinal pre- and during-pandemic study. *Child Psychiatry & Human Development*, 54(6), 1521–1533. <https://doi.org/10.1007/s10578-022-01349-0>
- Seaborn, K., Henderson, K., Gwizdka, J., & Chignell, M. (2022). A meta-review of psychological resilience during COVID-19. *Npj Mental Health Research*, 1(1), 5. <https://doi.org/10.1038/s44184-022-00005-8>
- Shoshani, A. (2024). Longitudinal changes in children's and adolescents' mental health and well-being and associated protective factors during the COVID-19 pandemic. *Psychological Trauma: Theory, Research, Practice, and Policy*, 16(7), 1158–1168. <https://doi.org/10.1037/tra0001556>
- Shoshani, A., & Kor, A. (2024). The longitudinal impact of the COVID-19 pandemic on adolescents' internalizing symptoms, substance use, and digital media use. *European Child & Adolescent Psychiatry*, 33(5), 1583–1595. <https://doi.org/10.1007/s00787-023-02269-7>
- Smith, M. R., Parrish, K. H., Shimomaeda, L., Zalewski, M., Rosen, M. L., Rodman, A., Kasperek, S., Mayes, M., Meltzoff, A. N., McLaughlin, K. A., & Lengua, L. J. (2022). Early-childhood temperament moderates the prospective associations of coping with adolescent internalizing and externalizing symptoms. *Frontiers in Psychology*, 13, 1011095. <https://doi.org/10.3389/fpsyg.2022.1011095>
- Song, Q., Vicman, J. M., & Doan, S. N. (2022). Changes in attachment to parents and peers and relations with mental health during the COVID-19 pandemic. *Emerging Adulthood*, 10(4), 1048–1060. <https://doi.org/10.1177/21676968221097167>
- Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Annual Review of Psychology*, 52(1), 83–110.
- Taylor, M. M., Wicks, J. J., Fassett-Carman, A. N., & Snyder, H. R. (2022). Differences in depression, anxiety, and coping in emerging adults prior to versus during the COVID-19 pandemic. *Translational Issues in Psychological Science*, 8(3), 431–439. <https://doi.org/10.1037/tps0000310>
- Tsai, K. M., & Jung, D. (2024). Changes in family dynamics and adolescent adjustment during the COVID-19 pandemic. In *Translational Issues in Psychological Science*. <https://doi.org/10.1037/tps0000393>
- Van Doren, N. V., Mahlobo, C. T., Galla, B. M., Colaianne, B. A., Hirshberg, M. J., Inkelas, K. K., & Roeser, R. W. (2023). The role of mindfulness and compassion in early adults' subsequent mental health, coping and compliance with health guidelines during the COVID-19 pandemic: A prospective longitudinal study. *Social and Personality Psychology Compass*, 17(11). <https://doi.org/10.1111/spc3.12870>
- Wang, C., Havewala, M., Fan, Q., Wang, Q., & Bali, D. (2023). The relations between COVID-19 stress, social connectedness, and mental health: A longitudinal investigation comparing chinese and American college students. *Current Psychology*. <https://doi.org/10.1007/s12144-023-04290-0>
- Wang, X., Tan, Y., Jia, L., Mao, Y., Feng, T., Lei, X., He, Q., Chen, H., Nie, Q., Teng, Z., Blain, S., & Qiu, J. (2024). Contributions of coping flexibility and Associated functional brain connectivity to resilient trajectories of mental health During the COVID-19 pandemic. *Clinical Psychological Science*. <https://doi.org/10.1177/21677026241242455>
- Widnall, E., Winstone, L., Plackett, R., Adams, E. A., Haworth, C. M. A., Mars, B., & Kidger, J. (2022). Impact of school and peer connectedness on adolescent mental health and well-being outcomes during the COVID-19 pandemic: A longitudinal panel survey. *International Journal of Environmental Research and Public Health*, 19(11), 6768. <https://doi.org/10.3390/ijerph19116768>
- Wiedemann, A., Gupta, R., Okey, C., Galante, J., & Jones, P. B. (2023). A systematic review of resilience-enhancing factors and mental health outcomes in adolescents and young adults during the COVID-19 pandemic. PROSPERO 2023 CRD42023428631. https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42023428631
- Wiedemann, A., Stochl, J., Neufeld, S. A. S., Fritz, J., Bhatti, J., Hook, R. W., Dolan, R., Goodyer, I., Fonagy, P., Jones, P., Moutoussis, M., Hauser, T., Neufeld, S., Romero-Garcia, R., Clair, M. S., Vértes, P., Whitaker, K., Inkster, B., Prabhu, G. . . . P. B., Jones (2022). The impact of the initial COVID-19 outbreak on young adults' mental health: A longitudinal study of risk and resilience factors. *Scientific Reports*, 12(1), 16659. <https://doi.org/10.1038/s41598-022-21053-2>
- Wong, R. S., Tung, K. T. S., Li, X., Chui, C. S., Tso, W. W. Y., Lee, T. M. C., Chan, K. L., Wing, Y. K., Fu, K. W., Wong, I. C. K., & Ip, P. (2022). Examining family pre-pandemic influences on adolescent psychosocial wellbeing during the COVID-19 pandemic. *Current Psychology*, 43(13), 12034–12044. <https://doi.org/10.1007/s12144-022-02736-5>