The long-term impact of COVID-19 on student mental health

Jon CATLING[1*]

Affiliations:

[1]*School of Psychology, University of Birmingham, Birmingham. Email: J.C.Catling@bham.ac.uk.* **ORCID:** *0000-0002-2468-385X.*

*Corresponding Author:

Professor Jon Catling, School of Psychology, University of Birmingham, Birmingham. E-mail: J.C.Catling@bham.ac.uk

Abstract

Introduction: The COVID-19 pandemic and the resulting restrictions placed upon society have had a profound impact on both physical and mental health, particularly for young people. The current study assesses student mental health pre, within and post COVID.

Method: Eight hundred and fourteen first year undergraduate students completed a battery of self-report questionnaires to assess for depression, mobile phone use, self-esteem, resilience and social support with data being collected over a three-year period. The data from each year was compared (216, 218 and 380 students respectively).

Findings: Statistical analysis revealed that COVID-19 had a significant impact on self-reported levels of depression, smartphone use, self-esteem, resilience and social support. Multiple regression analysis revealed that smart phone use and resilience were significant predictors of levels of depression.

Discussion and Conclusion: Overall, we found far higher-than-expected mental health problems within the student cohort. These findings are discussed in relation to potential interventions. The findings suggest that COVID-19 has had a major impact upon student mental health, and that we have not yet seen a recovery within our new 'post-COVID' times.

Take home message: The COVID-19 pandemic has had a long-term impact not only on student mental health and self-esteem, but importantly on levels of student resilience, making them vulnerable to the impact of any further stress invoking events.

Key words: COVID-19; mental health; resilience; SARS-CoV-2; self-esteem; students.

INTRODUCTION

The Coronavirus 2019 (COVID-19) pandemic has had a dramatic impact on all aspects of society in general. Specifically, the impact of national government enforced lockdowns have had a significant effect on the populations' physical and mental health. We are starting now to get a better picture of how this impact has manifested itself, particularly in our young people. For example, Huckins et al. [1], in a 2-year longitudinal study of U.S. students, found that students studying within

the COVID-19 era were more sedentary and reported higher levels of anxiety and depression relative to previous academic terms. They also found that the amount of time spent on their mobile phone, the number of locations visited (socially), depression and anxiety were both strongly associated with increased amount of COVID-19–related news. Similarly, Kaparounaki et al. [2], in a survey of Greek University students' mental health, found that there was a dramatic increase in scores for anxiety, depression and suicidal thoughts, and a significant decrease in quality of sleep, and overall measures of quality of life.

Wattick et al. [3], in a cohort of college students in the USA showed there was a significant increase in prevalence of severe depression, severe anxiety, and high stress, and a significant decrease in prevalence of high-risk problem drinking before and since COVID-19 (although it was suggested that the decrease in drinking may have been due simply to fewer opportunities for social interaction). Similarly, Evans et al. [4], found that COVID restrictions had significantly increased levels of depression in a UK student population, but surprisingly had reduced alcohol consumption.

Furthermore, Robinson et al. [5], in a systematic review and meta-analysis of longitudinal cohort studies comparing mental health before versus during the COVID-19 pandemic in 2020, found, in Sixty-five studies, that compared to pre-pandemic outbreak that there was an overall increase in mental health symptoms observed during March-April 2020. Compared to measures of anxiety and general mental health, they found that increases in depression and mood disorder symptoms tended to be larger and remained significantly elevated in May-July 2020. Savage et al. [6], in a longitudinal study of mental health, in UK students, 9 months into the pandemic found mental wellbeing and physical activity decreased whereas perceived stress and time spent sedentary increased. They concluded that the COVID-19 pandemic is having a sustained negative impact on student mental health and movement behaviour.

Schindler et al. [7], in a longitudinal investigation of mental health, in a cohort of first-year German medical students' before and during the COVID-19, found an overall significant differences in depression and burnout (emotional exhaustion, depersonalisation, personal accomplishment). Prati and Mancini [8] in a review and meta-analysis of longitudinal studies assessing the psychological impact of COVID-19 pandemic lockdowns, found multivariate analysis of effect sizes revealed significant and relatively small effect sizes for increases in anxiety and depression, while those for social support, loneliness, general distress, negative affect, and suicide risk were not significant. Alternatively, Lu et al. [9], in an assessment of the mental health of new undergraduate students before and after COVID-19 in China, found that there was no deterioration in mental health status among Chinese new undergraduate students in 2020 after the COVID-19 mass quarantine compared with the baseline measures in 2019. In fact, there was an improvement in sleep quality and anxiety symptoms.

Furthermore, in a recent study Catling et al. [10], demonstrated that COVID-19 had had a significant impact on self-reported levels of depression, anxiety, and smartphone addiction – which all significantly increased from the 2019 to the 2020 cohort. The percentage of students who had a score which warranted a classification of clinical depression increased from 30% to 44%, and for anxiety increased from 22 to 27% – those students who showed a comorbidity across the two roses from 12% to 21%. Smartphone addiction levels rose from 39% to 50%. Correlational analysis also showed a significant relationship between Smartphone usage and depression and anxiety.

This link with smartphone uses and depression may be important as we know that over the past decade smartphone-use has become an essential part of young people's lives, and we also know that for many young people this use can become excessive and 'unhealthy,' and consequently may contribute to mental health problems. For example, Elhai et al. found that problematic smartphone-use amongst Chinese undergraduate students led to a significant increase in depression and anxiety symptoms [11]. These findings were supported by a meta-analysis of 41 studies by Sohn et al. [12], who found that problematic smartphone use resulted in an increased risk for both depression and anxiety in young people. Furthermore, Elhai et al. [11], in a systematic review found that depression, and anxiety were consistently related to problematic smartphone usage.

One attempt at explaining this problematic smartphone-use is through the 'excessive reassurance pathway' [13] which states that smartphone-use becomes problematic when individuals feel the persistent need to seek reassurance from others. If an individual has a lack of emotional stability in 'real' life, this may cause them to seek assurance and support through online relationships. In time this can lead to a form of dependency on these online relationships who become 'dependent users,' and it is these individuals that are more susceptible to depression and anxiety depression and anxiety. Confirmatory evidence comes from Catling et al. in 2022 [10] who specifically showed a significant positive relationship between smartphone usage and depression within a UK student cohort. Finally, corroborating qualitative research has suggested that problematic smartphone-use can be linked to the excessive reassurance pathway, where students specifically experienced fear of missing out (FOMO) when they were not using their devices [14].

Another factor that we know has varied significantly from pre to post pandemic has been the availability of social support. Social support as a concept can be quite nebulous in nature, there have been a range of attempts to define it, one of the most prominent comes from Hirsh [15] who refers to it as support which is "provided by other people and arises within the context of interpersonal relationships" and as "support accessible to an individual through social ties to other individuals, groups, and the larger community" [16]. Furthermore, House [17] has outlined four broad classes or types of supportive behaviours as potential forms of social support: Emotional support; Instrumental support; Informational support; Appraisal support [16]. Cobb [18] provides another definition of social support by listing four different kinds of support potentially available from others that are represented by the key words, love, esteem, security, and appraisal. If we specifically focus on the role of social support in mental health, Cohen and Wills [19] have put forward the 'consistency of stress argument' to explain the mechanisms behind the positive impact of social support on mental health.

This argument suggests two models: the main effect model and the buffer model. The main effect model proposes that if an individual is able to maintain a large functioning social network, then an individual has significant opportunities to engages in regular positive experiences, which in turn leads to a positive affect and better general mental health. Whereas the buffer model highlights how different subtypes of social support can reduce the effect of stressful experiences through different pathways. Esteem support (Acceptance) can counterbalance the negative impact of stressful situations on self-esteem, whereas social companionship can counter feelings of loneliness. In this way, Vaux [20] suggest that rather than the models being considered as mutually exclusive, social support should be considered as a meta construct, such that different elements of social support can influence mental health in a range of ways, both directly and indirectly.

We know that another factor that can impact on mental health is self-esteem. Specifically, we know that poor self-esteem makes us more vulnerable to developing symptoms of depression [21 and anxiety [22,23]. Furthermore, a consistent predictive relationship between self-esteem and mental illness has been demonstrated in longitudinal and meta-analytic research [24]. Moreover, if we focus specifically on young adults, we have research such as that from Ogihara et al. [25], who have shown a significant association between self-esteem and mental health, and hence that, low self-esteem is an important risk factor for poor mental health. Doyle and Catling [26] in a recent study of UK undergraduate students found that self-esteem and resilience all significantly predicted depression and anxiety. Furthermore, they showed that maladaptive perfectionism and low self-esteem predispose an individual to depression and anxiety, though resilience may act as a protective factor against development of mental illness. As seen in the study above, resilience has been shown to impact mental health, specifically, students with higher resilience and higher self-esteem tend to display fewer depressive symptoms [27] resilience has also been shown to act as a mediator for the impact of stress for depression [28].

Robbins et al. [29], in a study of UK undergraduate students revealed that self-esteem, exposure to stressful events, levels of avoidance in maternal relationships, and levels of anxiety in paternal relationships were significant predictors of levels of resilience. And in a recent study (again with UK

undergraduate students) Catling et al. [28] identified two significant individual predictors of depression: perceived stress and resilience. A mediation analysis showed that resilience acted as a mediator for the impact of stress on depression. It has also been demonstrated that resilience can mediate the relationship between perfectionism and mental illness [30,31]. Finally, Edwards et al. [32], assessed for predictors of resilience levels in UK students UK and found that lack of adversity within the relationship with parents/guardians and an internal locus of control predicted higher levels of resilience.

Following from this plethora of evidence, the current study assesses the impact of the COVID-19 pandemic and the subsequent move away from national lockdown, on student mental health, mobile phone use, self-esteem, resilience, and social support. It is important, for this study, to know the time frame for the lockdowns in the UK as a response to COVID-19: The first national lockdown was from March to June 2020, there were minimal lockdown restrictions from July to September 2020, and then a return to a national lockdown from November 2020 to March 2021. Lockdown was completely released in August of 2021. Our data collection timepoints were matched to Pre, within and post lockdown - Data from the 2020 group were collected from October 2019 to end of January 2020 (Pre-COVID), data from the 2021 group were collected from October 2020 to end of January 2021 (Within-COVID), data from the 2022 group were collected from October 2021 to the end of January 2022 (Post-COVID). Also of significance, the educational experience of the 2020 group was as per normal, the 2021 group (within-COVID) was entirely online, with strict restrictions on socialisation, and the 2022 group was in the main back to normal as per the pre-COVID group.

Research Question 1: Has there been significant changes in levels of depression, and mobile phone use, self-esteem, resilience, and social support due to the impact of COVID-19, and importantly has this impact been reversed in the 'post-COVID' higher education environment?

Research Question 2: Which factors predict depression levels in 1st year students in higher education?

METHODS

Participants and procedure

The study was of cross-sectional design. The target population was undergraduate students within a UK University. 814 first-year psychology undergraduate students aged 17-51 were recruited via a research participation scheme for which they received credits for completing the questionnaire. The 2019/20 group comprised 216 students (M = 18.5 years, SD = .894, 83.3% female), the 2020/21 group comprised 218 students (M = 18.8 years, SD = 1.49, 86.2% female), and the 2021/22 group comprised of 380 students (M= 19 years, SD = 2.22, 84.2 female). Importantly, each group was from a different cohort. Participants volunteered to partake in the study via the University's website. Participants completed all sections of the questionnaire and submitted responses via Google Forms; completion took ~30 minutes. Data from the 2020 group were collected from October 2019 to end of January 2020 (Pre-COVID), data from the 2021 group were collected from October 2020 to end of January 2021 (Within-COVID), data from the 2022 group were collected from October 2021 to the end of January 2022 (Post-COVID).

Study instruments

Patient Health Questionnaire (PHQ-9) [33] was used as a self report measure of depression severity. The questionnaire focuses on diagnostic criteria for depression (DSM-IV), assessing severity via nine questions on a scale from experiencing a problem 'not at all' (0) to 'nearly every day' (3) over the last two weeks (e.g., 'Feeling down, depressed, or hopeless'). Higher scores represent higher depression severity, the highest possible score is 27. Internal consistency was reviewed with a Cronbach's α coefficient of 0.86, with good test-retest reliability. Beard et al., [34] identified good convergent and discriminant validity in a psychiatric sample. Manea et al., [35] identified an optimal cut-off score of 10 when diagnosing (moderate to severe) depression with the PHQ-9 with 88% sensitivity and 88% specificity.

Smartphone Addiction Scale Short-Version (SAS-SV) [36] was used as a self-report measure of SA. The questionnaire contains 10 statements which are measured on a scale from 1 to 6 (strongly

disagree to strongly agree, e.g. 'Using my smartphone longer than I had intended'), with a highly reliable Cronbach's α coefficient of .911. Higher scores represent higher SA, the highest possible score is 60. The cut-off value for considering an individual 'addicted' to their smartphone was 31 in males, and 33 in females. Andrade et al. [37], showed that the questionnaire had good predictive and convergent validity in adolescents. Kwon et al. [36], suggested a cut-off value of 33 to signify clinical addiction.

Connor-Davidson Resilience Scale (CD-RISC-25) [38] approaches resilience as a dynamic process that can be impacted by life events over time, and hence the questionnaire assesses the participants' resilience over the last month. The questionnaire consists of twenty-five statements, for example, 'Past successes give me confidence in dealing with new challenges and difficulties', which requires participants to respond on a five-point Likert scale, ranging from 0 (not true at all) to 4 (true nearly all the time) to report how much each statement applied to them over the last month. The final score of the scale ranges from 0 to 100; the higher the score, the greater the level of resilience. The CD-RISC-25 is deemed appropriate as it has high internal consistency [38] with a Cronbach's alpha reliability from .78 to .91, and strong test-retest reliability (r=.78 to .88) [39].

Rosenberg Self-Esteem Scale (RSES) [40] is a unidimensional measure of global self-esteem, including positively and negatively worded items: "On the whole I am satisfied with myself", "I certainly feel useless at times". 10 items are rated on a 4-point even scale (0 = "strongly disagree", 3 = "strongly agree"), inversely scored for negative items. Total scores range from 0-30; higher scores indicate higher self-esteem. Reliability of the RSES is demonstrated in high internal consistency estimates (r =-.72 .88) [41] and test re-test coefficients (r = .50 -.63) [42-44], high criterion (r = .77-.88) [45] has also been shown.

The Interpersonal Support Evaluation List (ISEL) [46] was used to measure social support. The scale consists of 40 questions with subscales for appraisal, belonging, tangible and self-esteem. The participants indicated how true they believed statements to be on a 4-point Likert scale ranging from "definitely false" to "definitely true". An example item is "Most people I know think highly of me". The scale has high internal reliability (*a* = 0.91) and can be considered a sufficient measure of social support for students [47]**.**

Data analysis

For the statistical analysis of the data, first to check for significant effects of COVID-19 on depression, anxiety, and smartphone addiction a MANOVA was conducted, with groups/time as the between-subjects factor. Second, a multiple linear regression analysis with 'enter' method was undertaken to check for predictors of depression. Depression was entered as the dependent variable, and Smart phone use, self-esteem, resilience, and social support were entered as independent or 'predictor' variables.

Ethical aspects

Ethical permission was obtained from the University of Birmingham's Ethics committee. Participants consented to participate and were informed of their right to withdraw data from analysis prior to a given date. Student ID numbers were used, maintaining confidentiality. A variety of Mental health service resources were highlighted should participants have any concerns relating to the content of the questionnaires. All experimental protocols were approved by the University of Birmingham's ethics committee. All methods were carried out in accordance with relevant guidelines and regulations. Informed written consent was obtained from all participants.

RESULTS

Results for Research Question 1

Descriptive statistics including means, standard deviations and ranges were calculated for both groups. Depression, anxiety, and SA increased compared to the previous year (See Table 1). To check for significant effects of COVID-19, a MANOVA was conducted, with groups as the between-subjects factor.

Table 1. Descriptive Statistics of Both groups of Data with the Means, Standard Deviations and Ranges.

Variable	2020 Group		2021 Group		2022 Group	
	(N=216)		*(N=218)*		*(N=380)*	
	Mean *(SD)*	Range	Mean *(SD)*	Range	Mean *(SD)*	Range
Depression*	8.1*(4.1)*	19 (0-19)	9.6 *(5.8)*	27 (0- 27)	11.0 *(6.1)*	25 (0-25)
Smartphone Addiction*	30.3 *(8.5)*	43 (10-53)	32.6 *(9.1)*	45 (10-55)	33.0 *(8.7)*	48 (10-58)
Self-Esteem*	30.8 *(4.1)*	22 (18-40)	26.9 *(5.8)*	17 (13-40)	23.4 *(5.5)*	29 (10-39)
Resilience*	62.4 *(13.2)*	83 (13-96)	61.6 *(12.7)*	65 (28-93)	54.8 *(12.1)*	79 (19-88)
Social Support*	83.7 *(15.4)*	78 (38-116)	63.2 *(5.1)*	36 (41-77)	87.4 *(11)*	50 (66-116)

Note: * Significant change at p < 0.01

The MANOVA revealed a significant main effect of Group for depression (F (2,697) = 20.71, p < 0.001), smartphone use (F (2,697) = 6.93, p = 0.001), self-esteem (F(2, 697) = 96, p < 0.001), resilience (F(2, 697) = 40.4, p < 0.001) and social support (F(2, 697) = 304.7, p < 0.001). Post-hoc Tukey comparisons were then undertaken (See Figures 1-5).

For depression a significant difference was shown between all 3 comparisons (p < 0.05). For Smartphone use a significant difference was shown between the 2020 vs 2021 group and the 2020 vs 2022 group (P<0.05), but not between the 2021 and 2022 groups.

For self-esteem a significant difference was shown between all 3 comparisons (p < 0.01). For resilience a significant difference was shown between groups 2020 and 2022 and 2021 and 2022 (p < 0.05), but not between groups 2020 and 2021. For social support a significant difference was shown between all 3 comparisons (p < 0.01).
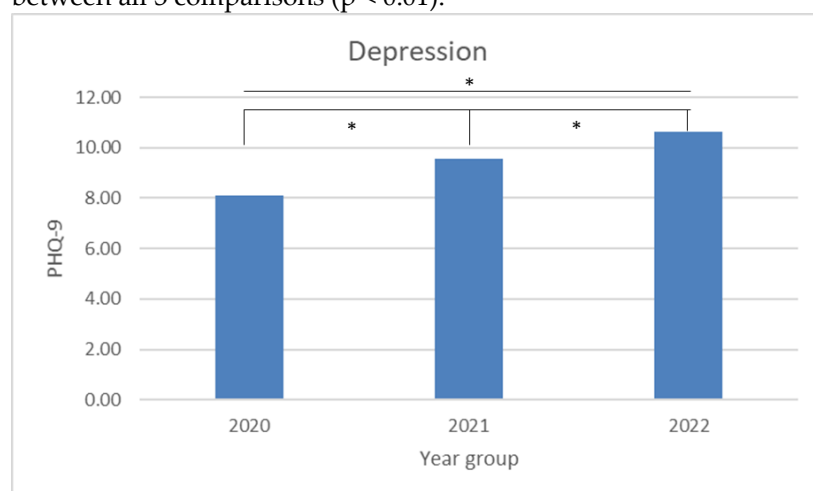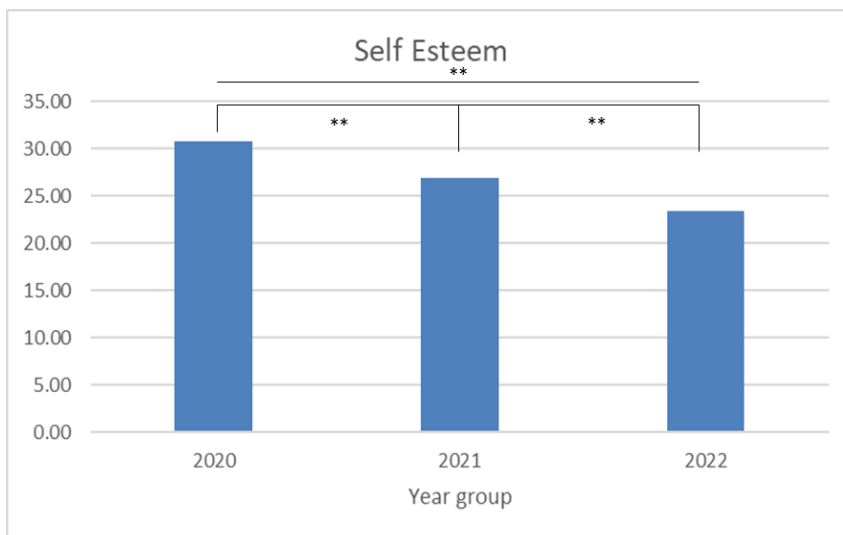

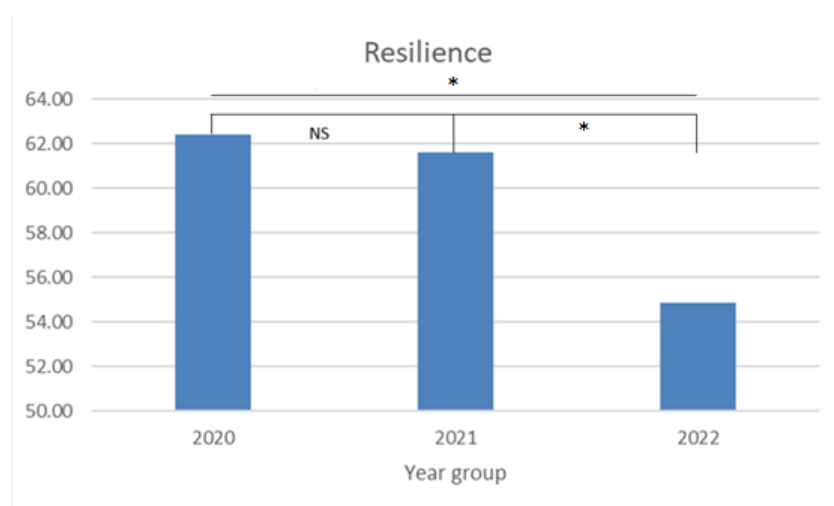**Figure 1.** Comparison of depression scores by year group.
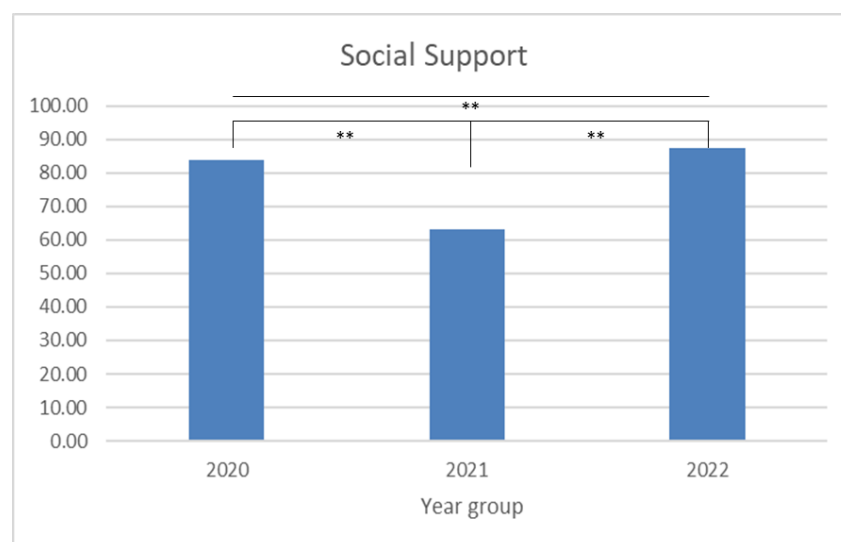*Note:* * Significant at p < 0.05
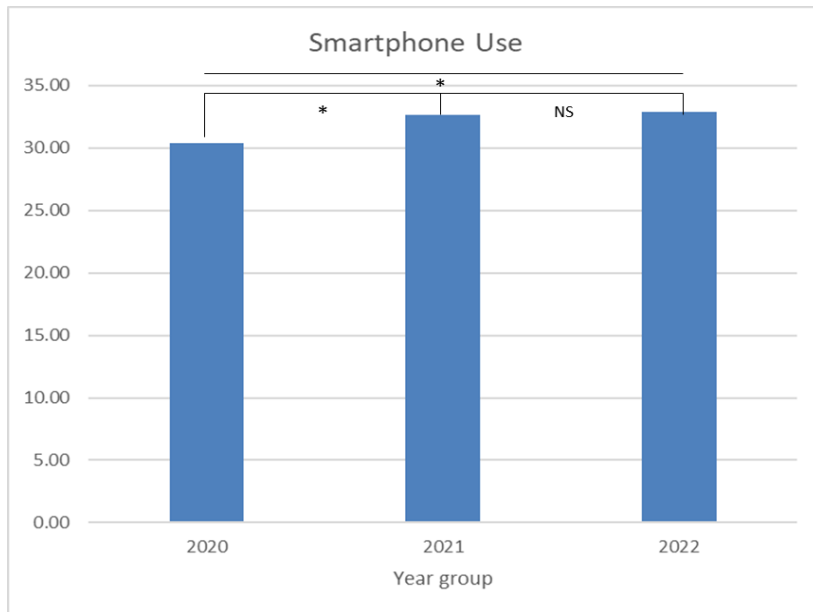
Figure 2. Comparison of smartphone use scores by year group.
Note: * Significant at p < 0.05

Figure 3. Comparison of self-esteem scores by year group.
Note: * Significant at p < 0.05   ** Significant at p < 0.01

Figure 4. Comparison of resilience scores by year group.
Note: * Significant at p < 0.05   ** Significant at p < 0.01

Figure 5. Comparison of social support scores by year group.
Note: * Significant at p < 0.05   ** Significant at p < 0.01

Results for Research Question 2

In a second phase of analysis, a multiple linear regression analysis with 'enter' method was undertaken. Depression was entered as the dependent variable, and smart phone use, self-esteem, resilience, and social support were entered as independent or 'predictor' variables. The multiple linear regression model was significant (F (4,695) = 45.8, p < 0.001) and accounted for 20% of the variance. Only smartphone use (β = 0.161, p < 0.001), and resilience (β = -0.394, p < 0.001) were significant predictors of depression.

DISCUSSION

In summary, within the current study we observed, as expected, a significant increase in mobile phone use between pre-COVID and COVID student cohorts, but no significant difference between COVID and post-COVID groups, where levels of use levelled out. Our social support results were also not surprising, levels of social support decreased significantly when entering the COVID lockdown era, but then bounced back to near pre-pandemic levels once students moved into post-

lockdown conditions. Within the current study we also observed a significant increase in depression levels between pre-COVID and COVID student cohorts, however, unexpectedly, we also saw an additional increase when moving to the post-COVID era. This pattern was repeated with levels of self-esteem, where we observed a significant decrease between pre-COVID and COVID cohorts, and an additional significant decrease when moving to post-COVID status. Finally, the most surprising finding was linked to levels of resilience – which stayed relatively level between pre-COVID and COVID groups but took a significant drop when entering the post-COVID stages.

Within the current study smartphone use has increased between the pre-COVID and COVID cohorts, but unexpectedly it has remained high into the post-COVID cohort. It appears that once set at a higher level it is difficult for students to return to pre-pandemic levels, this may also indicate an increase in problematic smartphone use. Furthermore, the current study also found that smartphone use was a significant predictor of depression. This is in line with studies such as [48] who found that mobile addiction is significantly related to student academic work engagement. Their research identified a negative influence of mobile phone addiction on student academic engagement, and interestingly, significant gender differences in smartphone addiction and academic work engagement. PA et al. [49], found that social media addiction had a significant impact on academic performance, accounting for over 57 percent of the observed variance, and suggested that excessive social media use, can lead to smartphone addiction, and have a significant negative effect on academic performance. Conversely whilst – Yang et al. [50] found an increase in depression during COVID in Chinese students, they did not observe a significant increase in problematic smartphone use and found no association between the two.

Unsurprisingly, we saw a drop-in social support during the pandemic and this rebounded after lockdowns were removed. Many previous studies have found positive relationship between social support (in students) and resilience [51,52], and academic performance [53], or social support and school adaptation [54] specifically Zhang [54] found that social support and resilience played multiple mediating roles in the relationship between interpersonal relationships and school adaptation. Additionally, in a multicultural study Pantelli et al. found that social support was a significant predictor of student wellness. Also, Wang et al. [55], in a longitudinal study of depression and anxiety among adolescents during COVID-19 lockdown in China, found that less social support was a risk factor for poor mental health outcomes. Furthermore, Çağış Z.G. et al. [56] demonstrated that loneliness (through lack of social interaction) was a significant mediator for the impact of COVID induced anxiety on overall outlook on life.

Within the present study we found that levels of depression significantly increased between pre-COVID and COVID student cohorts, and, unexpectedly, also increased when moving to the post-COVID era. These results mirror those of Fruehwirth et al. [57], who found the prevalence of moderate-severe depression increased from 21.5% before pandemic to 31.7% within four months after the pandemic began. Black, female, and sexual/gender minority students were at highest risk of increases in depression symptoms. Wang et al. [55], in a cohort study based in China, found the proportion of students with scores equal to or above 15 in the PHQ-9 ranged between 22.6% and 25.5% in 2019 and 37.0% in June 2020, PHQ-9 scores were 3.11 (CI=2.40-3.83) higher than expected. However, importantly the current study is one of very few that follows student cohorts beyond the COVID pandemic restrictions, and shows that depression levels in students, have not returned to pre-pandemic levels and in fact have continued to worsen.

The current study found a significant decrease in self-esteem levels between pre-COVID and COVID cohorts, and an additional significant decrease when moving to post-COVID status. Very few studies have assessed the impact of the pandemic restrictions on student self-esteem – one that has, in younger secondary school students in Spain comes from Villodres et al. [58], who found that social lockdowns impacted their student's self-esteem, but that this could be moderated by physical exercise and diet. In a study of adolescent and young women Vall-Roqué, et al. [59], found that levels of self-esteem were reduced during COVID lockdowns, but importantly they suggested that the mechanism for this was a significant increase in the use of social networking sites (e.g., TikTok &

Instagram), and the subsequent comparisons being made. Specifically, they found a significant relationship between the frequency of Instagram use and body dissatisfaction, drive for thinness and low self-esteem.

Finally, the most surprising finding was linked to levels of resilience – which stayed relatively level between pre-COVID and COVID groups but took a significant drop when entering the post-COVID stages. Broadly, within the COVID era, research has shown a mediating impact of resilience on stress and mental health, for example Drach-Zahavy [60] found in a cohort of 492 nursing students that higher levels of resilience decreased the students' level of strain symptoms above and beyond their stress levels. Specifically, the nursing students' trait resilience was negatively associated with their strain symptoms. They concluded that nursing students' resilience should be seen as a flexible resource that can be developed and influenced by their academic and clinical training [60]. Furthermore, as per the findings of the current study, Serrano Sarmiento et al. [61], found in a sample of 253 graduate and postgraduate Spanish students, that during the pandemic they generally observed high levels of resilience among the university students analysed, irrespective of socio-demographic variables.

The limitations of the current study are primarily linked to the sample that was utilised. First, the sample group from all years was predominantly female, and hence any extrapolations to the entire student cohort should be made with caution. Second, all of the sample groups came from a single subject background, namely Psychology, again this could restrict the range of extrapolations that can be made from the results. Finally, the different samples from the different year cohorts were made up of different students, this was not a paired/longitudinal study, and hence we do need to take into account the impact of individual differences between the groups, that said, the sample sizes were large and hence any impact of individual differences between the groups should have been lessened.

To our knowledge the current study is the first to take snap shots of resilience levels before, during and after the pandemic, and to find that despite the fact that student's lives have to all extensive purposes become better (with levels of social contact back up and education experience almost back to normal), unexpectedly the levels of resilience have significantly dropped and hence depression levels have gone up. Resilience levels most closely matched to depression levels. It would appear that resilience levels can maintain functioning and garner a certain amount of protection during critical stressor events, but there is a mid-term toll, and post the acute stressor event these protective factors can dwindle, with a subsequent impact on mental health and self-esteem. It is the view of the authors that these findings should be a clarion call for university welfare support systems within higher education institutions throughout the world, the pandemic may well be over, but the impact on our young people's mental health is most definitely not.

Conflicts of Interest: None.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Publisher's Note: Edizioni FS stays neutral with regard to jurisdictional claims in published maps and institutional affiliation.

References

1. Huckins JF, DaSilva AW, Wang W, Hedlund E, Rogers C, Nepal SK, et al. Mental health and behavior of college students during the early phases of the COVID-19 pandemic: Longitudinal smartphone and ecological momentary assessment study. J Med Internet Res. 2020 Jun 17;22(6):e20185.
2. Kaparounaki CK, Patsali ME, Mousa DP, Papadopoulou EV, Papadopoulou KK, Fountoulakis KN. University students' mental health amidst the COVID-19 quarantine in Greece. Psychiatry Res. 2020 Aug 1;290:113111.
3. Wattick RA, Hagedorn RL, Olfert MD. Impact of resilience on college student mental health during COVID-19. J Am Coll Health. 2021 Aug 6:1-8.
4. Evans S, Alkan E, Bhangoo JK, Tenenbaum H, Ng-Knight T. Effects of the COVID-19 lockdown on mental health, wellbeing, sleep, and alcohol use in a UK student sample. Psychiatry Res. 2021 Apr 1;298:113819.
5. Robinson E, Sutin AR, Daly M, Jones A. A systematic review and meta-analysis of longitudinal cohort studies comparing mental health before versus during the COVID-19 pandemic in 2020. J Affect Disord. 2022 Jan 1;296:567-576.
6. Savage MJ, Hennis PJ, Magistro D, Donaldson J, Healy LC, James RM. Nine months into the COVID-19 pandemic: a longitudinal study showing mental health and movement behaviours are impaired in UK students. Int J Environ Res Public Health. 2021 Mar 12;18(6):2930.
7. Schindler AK, Polujanski S, Rotthoff T. A longitudinal investigation of mental health, perceived learning environment and burdens in a cohort of first-year German medical students' before and during the COVID-19 'new normal'. BMC Med Educ. 2021 Dec;21:1-1.
8. Prati G, Mancini AD. The psychological impact of COVID-19 pandemic lockdowns: a review and meta-analysis of longitudinal studies and natural experiments. Psychol Med. 2021 Jan;51(2):201-211.
9. Lu P, Yang L, Wang C, Xia G, Xiang H, Chen G, et al. Mental health of new undergraduate students before and after COVID-19 in China. Sci Rep. 2021;11(1):1-9.
10. Catling JC, Bayley A, Begum Z, Wardzinski C, Wood A. Effects of the COVID-19 lockdown on mental health in a UK student sample. BMC Psychol. 2022 Dec;10(1):1-7.
11. Elhai JD, Yang H, McKay D, Asmundson GJ. COVID-19 anxiety symptoms associated with problematic smartphone use severity in Chinese adults. J Affect Disord. 2020 Sep 1;274:576-582.
12. Sohn SY, Rees P, Wildridge B, Kalk NJ, Carter B. Prevalence of problematic smartphone usage and associated mental health outcomes amongst children and young people: a systematic review, meta-analysis and GRADE of the evidence. BMC Psychiatry. 2019 Dec;19(1):1-0.
13. Billieux J, Maurage P, Lopez-Fernandez O, Kuss DJ, Griffiths MD. Can disordered mobile phone use be considered a behavioral addiction? An update on current evidence and a comprehensive model for future research. Curr Addict Rep. 2015 Jun;2(2):156-162.
14. Yang X, Hu H, Zhao C, Xu H, Tu X, Zhang G. A longitudinal study of changes in smart phone addiction and depressive symptoms and potential risk factors among Chinese college students. BMC Psychiatry. 2021 May 14;21(1):252.
15. Hirsch BJ. Social networks and the coping process: Creating personal communities. In Social networks and social support. Sage Publications; 1981.
16. Cooke BD, Rossmann MM, McCubbin HI, Patterson JM. Examining the definition and assessment of social support: A resource for individuals and families. Fam Relat. 1988;211-216.
17. House JS. Work stress and social support. Addison-Wesley series on occupational stress; 1983.
18. Cobb S. An approach to the relationship between social networks, the sense of social and health. In The Sunbelt Social Networks Conference; 1982.
19. Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. Psychol Bull. 1985;98(2):310.
20. Vaux A. Social support: Theory, research, and intervention. Praeger publishers; 1988.
21. Masselink M, Van Roekel E, Oldehinkel AJ. Self-esteem in early adolescence as predictor of depressive symptoms in late adolescence and early adulthood: The mediating role of motivational and social factors. J Youth Adolesc. 2018 May;47(5):932-946.
22. Nguyen DT, Wright EP, Dedding C, Pham TT, Bunders J. Low self-esteem and its association with anxiety, depression, and suicidal ideation in Vietnamese secondary school students: a cross-sectional study. Front Psychiatry. 2019:698.
23. Ntemsia S, Triadafyllidou S, Papageorgiou E, Roussou K. Self-esteem and anxiety level of students at the technological educational institute of Athens–Planning of interventions. Health Sci J. 2017:11(3):1.

24. Steiger AE, Allemand M, Robins RW, Fend HA. Low and decreasing self-esteem during adolescence predict adult depression two decades later. J Pers Soc Psychol. 2014 Feb;106(2):325.

25. Ogihara Y, Uchida Y, Kusumi T. Losing confidence over time: temporal changes in self-esteem among older children and early adolescents in Japan, 1999-2006. Sage Open. 2016 Aug;6(3):2158244016666606.

26. Doyle I, Catling JC. The influence of perfectionism, self-esteem and resilience on young people's mental health. J Psychol. 2022 Jan 11;156(3):224-240.

27. Chung JO, Lam KK, Ho KY, Cheung AT, Ho LL, Gibson F, et al. Relationships among resilience, self-esteem, and depressive symptoms in Chinese adolescents. J Health Psychol. 2020 Nov;25(13-14):2396-405.

28. Catling J, Michail M, Lakhani N, Devine R. Psychological and lifestyle predictors of mental health in higher education: how healthy are our students? J Ment Health Train Educ Pract. 2022 Sep 20;17(6):562-571.

29. Robbins A, Kaye E, Catling JC. Predictors of Student Resilience in Higher Education. Psychol Teach Rev. 2018;24(1):44-52.

30. Klibert J, Lamis DA, Collins W, Smalley KB, Warren JC, Yancey CT, et al. Resilience mediates the relations between perfectionism and college student distress. J Couns Dev. 2014 Jan;92(1):75-82.

31. Sheppard L, Hicks RE. Maladaptive perfectionism and psychological distress: The mediating role of resilience and trait emotional intelligence. Int J Psychol Stud. 2017;9(4):65-75.

32. Edwards T, Catling JC, Parry E. Identifying predictors of resilience in students. Psychol Teach Rev. 2016;22:26–31.

33. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001 Sep;16(9):606-613.

34. Beard C, Hsu KJ, Rifkin LS, Busch AB, Björgvinsson T. Validation of the PHQ-9 in a psychiatric sample. J Affect Disord. 2016 Mar 15;193:267-273.

35. Manea L, Gilbody S, McMillan D. Optimal cut-off score for diagnosing depression with the Patient Health Questionnaire (PHQ-9): a meta-analysis. CMAJ. 2012 Feb 21;184(3):E191-196.

36. Kwon M, Kim DJ, Cho H, Yang S. The smartphone addiction scale: development and validation of a short version for adolescents. PloS One. 2013 Dec 31;8(12):e83558.

37. Andrade AL, Scatena A, Martins GD, de Oliveira Pinheiro B, da Silva AB, Enes CC, et al. Validation of smartphone addiction scale–Short version (SAS-SV) in Brazilian adolescents. Addict Behav. 2020 Nov 1;110:106540.

38. Connor KM, Davidson JR. Development of a new resilience scale: The Connor-Davidson resilience scale (CD-RISC). Depress Anxiety. 2003 Sep;18(2):76-82.

39. Khoshouei MS. Psychometric evaluation of the Connor-Davidson resilience scale (CD-RISC) using Iranian students. Int J Test. 2009 Mar 20;9(1):60-66.

40. Rosenberg M. Society and the adolescent self-image. Princeton university press; 2015 Dec 8.

41. Fleming JS, Courtney BE. The dimensionality of self-esteem: II. Hierarchical facet model for revised measurement scales. J Pers Soc Psychol. 1984 Feb;46(2):404.

42. Byrne BM. Investigating measures of self-concept. Measurement and Evaluation in Guidance. 1983 Oct 1;16(3):115-126.

43. Silber E, Tippett JS. Self-esteem: Clinical assessment and measurement validation. Psychol Rep. 1965 Jun;16(3_suppl):1017-1071.

44. McCarthy JD, Hoge DR. The dynamics of self-esteem and delinquency. Am J Sociol. 1984;90(2):396–410.

45. Myers K, Winters NC. Ten-year review of rating scales. II: Scales for internalizing disorders. J Am Acad Child Adolesc Psychiatry. 2002 Jun 1;41(6):634-659.

46. Cohen S, Hoberman HM. Positive events and social supports as buffers of life change stress. J Appl Soc Psychol. 1983 Apr;13(2):99-125.

47. Zarzycka D, Śpila B, Wrońska I, Makara-Studzińska M. Analiza walidacyjna wybranych aspektów Skali Oceny Wsparcia Społecznego-Interpersonal Support Evaluation List-40 v. General Population (ISEL-40 v. GP). Psychiatria. 2010;7(3):83-94.

48. Sharma S. Mobile phone and its impact on academic work engagement. Online J Distance Educ e-Learn. 2021 Jul;9(3):402.

49. Pa WA, Mahmud MS, Zainal MS. Implications of social media addiction on academic performance among generation Z student-athletes during COVID-19 Lockdown. Int J Learn Teach Educ Res. 2021 Aug 31;20(8):194-209.

50. Yang Z, Asbury K, Griffiths MD. Do Chinese and British university students use smartphones differently? A cross-cultural mixed methods study. Int J Ment Health Addict. 2019 Jun 15;17:644-657.

51. Yildirim M, Turan Me, Albeladi Ns, Crescenzo P, Rizzo A, Nucera G, et al. Resilience and perceived social support as predictors of emotional well-being. J Health Soc Sci. 2023;8(1):59-75.

52. Yıldırım M, Çağış ZG, Batra K, Ferrari G, Kızılgeçit M, Chirico F, et al. Role of resilience in psychological adjustment and satisfaction with life among undergraduate students in Turkey: A cross-sectional study. J Health Soc Sci. 2022;7(2):224–235. doi: 10.19204/2022/RLFR8.

53. Warshawski S. Academic self-efficacy, resilience and social support among first-year Israeli nursing students learning in online environments during COVID-19 pandemic. Nurse Educ Today. 2022 Mar 1;110:105267.

54. Zhang X, Huang PF, Li BQ, Xu WJ, Li W, Zhou B. The influence of interpersonal relationships on school adaptation among Chinese university students during COVID-19 control period: Multiple mediating roles of social support and resilience. J Affect Disord. 2021 Apr 15;285:97-104.

55. Wang D, Zhao J, Ross B, Ma Z, Zhang J, Fan F, et al. Longitudinal trajectories of depression and anxiety among adolescents during COVID-19 lockdown in China. J Affect Disord. 2022 Feb 15;299:628-635.

56. Çağış ZG, Öztekin GG, Aziz IA, Chirico F, Rizzo A, Yıldırım M. Meaning in Life and Loneliness as Mediators between COVID-19 Anxiety and Life Satisfaction in the Post-Pandemic among the General Population in Turkey: A Serial Mediation Model. Eur J Investig Health Psychol Educ. 2023 Oct 9;13(10):2214-2225.

57. Fruehwirth JC, Biswas S, Perreira KM. The Covid-19 pandemic and mental health of first-year college students: Examining the effect of Covid-19 stressors using longitudinal data. PloS one. 2021 Mar 5;16(3):e0247999.

58. Villodres GC, García-Pérez L, Corpas JM, Muros JJ. Influence of Confinement Due to COVID-19 on Physical Activity and Mediterranean Diet Adherence and Its Relationship with Self-Esteem in Pre-Adolescent Students. Children. 2021 Sep 25;8(10):848.

59. Vall-Roqué H, Andrés A, Saldaña C. The impact of COVID-19 lockdown on social network sites use, body image disturbances and self-esteem among adolescent and young women. Progr Neuro-Psychopharmacol Biol Psychiatry. 2021 Aug 30;110:110293.

60. Drach-Zahavy A, Goldblatt H, Admi H, Blau A, Ohana I, Itzhaki M. A multi-level examination of nursing students' resilience in the face of the COVID-19 outbreak: A cross-sectional design. J Adv Nurs. 2022 Jan;78(1):109-120.

61. Serrano Sarmiento Á, Sanz Ponce R, González Bertolín A. Resilience and COVID-19. An analysis in university students during confinement. Educ Sci. 2021 Sep 12;11(9):533.