Young people's subjective wellbeing in the wake of the COVID-19 pandemic: evidence from a representative cohort study in England

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The COVID-19 pandemic and the disruption it has caused had substantial short-term effects on young people. These effects have been found to be highly unequal, exacerbating existing inequalities in society, including those associated with socio-economic status, gender and ethnicity. But, just as importantly, it is believed that they continue to cast a long shadow over some young people's lives. In this paper we use data from the COVID Social Mobility & Opportunities study (COSMO) — a representative cohort study of over 13,000 young people in England aged 14-15 at pandemic onset whose education and post-16 transitions were acutely affected by the pandemic's disruption through their remaining education and subsequent transitions — to highlight ongoing inequalities in young people's subjective wellbeing and mental health in the wake of the pandemic. We document the substantial differences in subjective wellbeing — especially highlighting differences by gender — after adjusting for other demographic characteristics, self-reported levels of social support, and experience of adverse life events. We estimate how wellbeing differs by young people's own perceptions of the ongoing impact of the pandemic: those who indicate an ongoing negative impact in their lives have substantially lower subjective wellbeing scores. Finally, we find a link between adverse life experiences during the pandemic and lower post-pandemic wellbeing, but do not find evidence that this is mediated by demographic characteristics or social support.

Statements and Declarations

The authors have no competing interests to declare that are relevant to the content of this article. The datasets analysed in this study are available to download from the UK Data Service

(Wave 1: Anders et al., 2024a; Wave 2: Anders et al., 2024b). The study received full ethical approval from the UCL Institute of Education Research Ethics Committee (REC1660). It is registered with the UCL Data Protection Office (Z6364106/2022/06/30).

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1 Introduction

The COVID-19 pandemic and the disruption it caused had substantial short-term effects on young people's lives around the world, with evidence of significant impacts on young people's wellbeing and mental health (De France et al., 2022; Wolf & Schmitz, 2024). Young people in England, the focus of this paper, were no exception: extended periods in which in-person schooling was suspended (Anders, 2024) interrupted both pupils' learning (Jakubowski et al., 2024) and their social lives (Kalenkoski & Pabilonia, 2024), with consequent rises in loneliness a clear symptom of this (Kung et al., 2023). This widespread disruption had widely documented short-term effects on young people's wellbeing (e.g. Attwood & Jarrold, 2023; Banks & Xu, 2020; Neugebauer et al., 2023; Newlove-Delgado et al., 2021; Quintana-Domeque & Zeng, 2023), the magnitude of which was found to be linked with the intensity of lockdown restrictions (Owens et al., 2022), and the immediacy of which is reflected in the way that wellbeing increased and decreased as restrictions tightened and eased (Creswell et al., 2021). A review by Kauhanen et al. (2023) summarised the international picture as "a longitudinal deterioration in symptoms for different mental health outcomes especially for adolescents and young people".

Existing analyses suggest that effects of the disruption were unequal, often exacerbating existing demographic inequalities in society. Previous studies from across the world have highlighted inequalities associated with socioeconomic status (e.g., Ravens-Sieberer et al., 2022), gender (e.g., Anders et al., 2023; Davillas & Jones, 2021), ethnicity (e.g., Proto & Quintana-Domeque, 2021), and intersections of these characteristics. There is also evidence that older adolescents were particularly affected (Wolf & Schmitz, 2024), perhaps as these are such formative years in terms of social relationships and critical years in terms of disruption to education affecting subsequent educational and school-to-work transitions.

A range of studies have also drawn attention to the importance of variation in experiences and support during the pandemic for young people's wellbeing. Restrictions on social activities and the closure of schools reduced physical activity for some, which has been linked to worse mental health outcomes (Samji et al., 2022); other aspects of the pandemic and its restrictions are likely to have exacerbated the prevalence of adverse life events that previous studies have shown affect wellbeing (Cleland et al., 2016). On the other side of the ledger, the importance of social support has been identified has a potential buffer to negative impacts (Racine et al., 2021) of such negative stressors. These highlight the potential importance of experiences and social support during the pandemic for young people's wellbeing and, hence, the need to consider these in understanding differences in wellbeing.

While short-term impacts are, of course, important in their own right, we should be especially concerned if the impacts of the pandemic are continuing to affect young people's lives, including their subjective wellbeing, now that restrictions have subsided and life is back to 'normal'. Concern was expressed from early in the pandemic that negative effects of the pandemic on wellbeing would persist beyond the end of restrictions (Sonuga-Barke & Fearon, 2021), something that emerging evidence from the general population suggests may be being borne out (Quintana-Domeque & Proto, 2022).

Informed by the findings of these studies, we seek to provide new evidence regarding ongoing differences in young people's wellbeing post-pandemic, including those driven by their demographic characteristics, the role of adverse life experiences during the pandemic, and

the potential buffering role of social support. In doing so, we are guided by sociological theoretical models of stress processes in shaping wellbeing (Pearlin, 1989), distinguishing between long-term stressors such as those linked with socioeconomic and demographic characteristics, and more acute ones such as those presented by the disruption of the pandemic and specific events during its course. We also seek to provide new evidence to illuminate the relevance of young people's own perceptions of the ongoing impacts of the pandemic for their mental wellbeing through quantifying the extent to which young people's self-reports of such impacts are associated with their post-pandemic subjective wellbeing.

In particular, our research aims are to: 1. estimate differences in post-pandemic wellbeing among this cohort by demographic characteristics; 2. validate and quantify young people's own perceptions of the impact of the pandemic on their wellbeing and; 3. consider the role of adverse experiences during the pandemic — and how they may interact with existing predictors of wellbeing — in explaining differences in post-pandemic wellbeing.

To achieve these aims, we use data from the COVID Social Mobility & Opportunities study (COSMO) — a representative cohort study of over 13,000 young people in England aged 14-15 at pandemic onset whose education and post-16 transitions were acutely affected by the pandemic's disruption through their remaining education and subsequent transitions — to explore young people's subjective wellbeing since the end of most restrictions linked to the pandemic. COSMO has collected data on wellbeing at two annual, post-pandemic surveys (to date), along with rich data on demographics, social resources and experiences during the pandemic, allowing us to explore post-pandemic patterns in wellbeing and how they are shaped by these factors.

The paper proceeds as follows. In Section 2, we describe the data that we use in more detail, the steps we take to prepare it for analysis, and conduct descriptive analyses and visualisation to provide initial evidence on our research aims. In Section 3, we describe our use of regression modelling to support our analyses, before presenting results of this modelling in Section 4. Finally, in Section 5, we conclude with a discussion of our findings and their implications for policy and practice.

2 Data and descriptive analyses

This study uses data from the COVID Social Mobility & Opportunities study (COSMO). This longitudinal cohort study recruited a representative sample of young people (and their parents) who were in Year 10 (i.e., aged 14-15) at the onset of the pandemic in March 2020. We use data from those who participated at both waves 1 (Anders et al., 2024a), which was carried out between October 2021 and March 2022 (while participants were aged 16-17), and 2 (Anders et al., 2024b), which was carried out between October 2022 and March 2023 (while participants were aged 17-18). In both cases the majority of interviews are carried out within the first two months of fieldwork; we also control for month of interview in our regression models (further details below).

COSMO has a clustered and stratified design with oversampling of those from smaller (e.g., ethnic minorities), more disadvantaged and harder to reach demographic groups, aiming to allow for larger than proportional samples of those smaller groups to improve statistical power when exploring inequalities between such groups. Furthermore, there was initial non-response and attrition between the two waves. As such, it is important to take into account the deliberate and modelled disproportionalities in our sample, as well as the implications of the clustering and stratification for statistical inference; we seek to take these features into account in all our analyses using R's survey package (Lumley et al., 2024) with the study's provided clustering and stratification variables, and design and non-response weights (Adali et al., 2022, 2023).

To ensure a consistent sample across analyses, we restrict the sample to those who have valid data on the key variables we will be using in our analyses. This includes the primary outcome variable of self-reported wellbeing score, as well as the key predictors and demographic variables of which we make use. However, we are mindful of the potential implications of sample selection caused by complete case analysis, so we robustness check our results to ensure that our findings are not driven by the exclusion of those with missing data in Section 7, re-running our core analyses having only restricted the sample based on the primary

outcome (wellbeing score) and the main predictors (impact of pandemic on mental health and adverse life events reporting) and multiply imputed across 10 datasets all other predictors using a highly flexible classification and regression tree approach (Lumley, 2019; van Buuren & Groothuis-Oudshoorn, 2023).

2.1 Subjective wellbeing

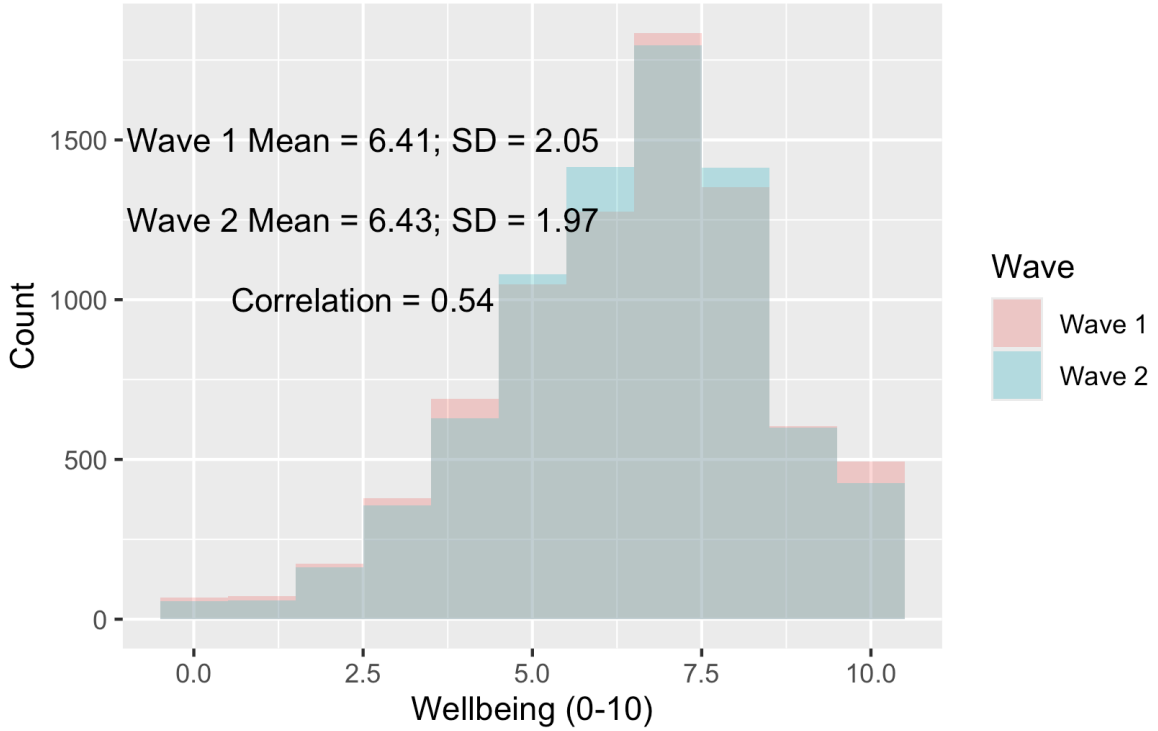
To measure self-reported wellbeing, we use the UK Office for National Statistics' official measure of life satisfaction (Office for National Statistics, 2018), which is widely recognised as an important dimension of subjective wellbeing (Petersen et al., 2022). This asks participants to respond to the prompt "Overall, how satisfied are you with your life nowadays?" on a scale ranging from 0 "Not at all satisfied" to 10 "Completely satisfied". This measure has been used in national UK surveys since 2011 and increasing numbers of academic studies, hence providing a useful benchmark for this concept in surveys based in the UK. There is also evidence that this measure is reliable measure of subjective wellbeing in young people (Levin & Currie, 2014), performing as well as the more in-depth Satisfaction with Life Scale (Jovanović, 2016), for example, although we do recognise that it will not capture all dimension of wellbeing (Ruggeri et al., 2020). It is also worth noting that, while they are distinct constructs, a clear correlation between lower wellbeing and increased risk of poor mental health (Lombardo et al., 2018).

As COSMO was established in response to the pandemic, there are no baseline pre-pandemic measures. As such, we emphasise that our estimates of differences in subjective wellbeing are between individuals all of whom have experienced the pandemic, but may have experienced it in different ways, rather than between their current situation and a counterfactual in which the pandemic did not happen. Others have used pre-existing longitudinal studies to explore change in mental health across the pandemic period (Henseke, mimeo), or attempted to get closer to such a counterfactual using a survey experiment approach explicitly asking participants to imagine the scenario where the pandemic had not happened (Andreoli et al.,

2024).

We have measures of wellbeing at two waves post-pandemic and use these to explore evidence of change in wellbeing between the two waves both overall, and between sub-groups of the data where this might be expected. We plot the overall distribution of reported wellbeing in both Waves 1 (age 16/17) and 2 (age 17/18) in Figure 1.

Figure 1: Histogram of distribution of subjective wellbeing in Wave 1 and 2



Notes: Histogram weighted for survey design and non-response.

Young people report a mean wellbeing score of 6.41 in Wave 1 and 6.43 at Wave 2, with the spread of the measure declining slightly from 2.05 to 1.97, but these are not a particularly substantial change. This provides little evidence of change between these two post-pandemic time points. However, in attempting to interpreting this (lack of) aggregate change, we must be mindful of wider context for this cohort.

One interpretation would be that, as we know there was a decline in mental health and wellbe-

ing among young people at the onset of the pandemic and its restrictions (Newlove-Delgado et al., 2021), we would hope to see an upward trajectory in wellbeing in subsequent years to be confident of a 'bounce back', with this lack of change suggesting a plateau at a lower level than was the case before the pandemic. That could be the case. A finding of minimal change is consistent with the findings of Henseke et al. (2022) (albeit for a wider age range of young people aged 16-29). Similarly, the UK Office For National Statistics' annual population survey also suggests that life satisfaction has not returned to pre-pandemic levels in the general population (Office for National Statistics, 2023).

Fundamentally, using our data alone we are unable to adjudicate between multiple potential plausible scenarios. Others, using a wider range of datasets are better placed to do so. For example, Henseke (mimeo) suggest that young people's wellbeing may have already returned to pre-pandemic levels, thus explaining a lack of trend for this reason. These findings would also be consistent with an upward post-pandemic trend being cancelled out by a countervailing age effect (for example) that would be expected based on the wider literature on wellbeing across the life course (Blanchflower, 2021).

However, this is not the focus of our paper. This aggregate stability at the cohort level does not mean that there are not individual-level differences or differential change in reported wellbeing. The correlation between the reported measures in Waves 1 and 2 is 0.54. While some of this likely reflects the natural fluctuation in young people's wellbeing due to idiosyncratic shocks that hit their lives every day, we now go on to explore evidence of systematic difference in change between the two waves, along with the differences in levels at each wave.

2.2 Demographic characteristics and social support

As discussed at the outset of this paper, previous work has found that the impact of the pandemic on young people's wellbeing differs depending upon their demographic characteristics (e.g., Anders et al., 2023). Both to estimate differences between young people based on these characteristics, and to control for these measures in other analyses, we make use of the rich

set of demographic measures collected in COSMO. Specifically, we construct the following measures of demographic characteristics.

- *Gender*: There are longstanding concerns about differences in wellbeing by gender, which have only been exacerbated by the pandemic (Davillas & Jones, 2021). We construct a variable for this characterised based on young people's reports at either wave (where a subsequent report is given precedence if they differ), young people are grouped into 'female', 'male' and 'non-binary+', where the final category is a combination of those who explicitly report being non-binary or choose to identify in any other way (since these other groups are too small for analysis).
- *Ethnicity*: There is evidence of a greater initial effect on young people's mental health if they are part of an ethnic minority (Proto & Quintana-Domeque, 2021). As with gender, our measure is based on self-reports at either wave (where a subsequent report is given precedence if they differ), young people are grouped into 'White', 'Mixed', 'Black', 'Asian' and 'Other'. While these categories are broad, they are chosen for consistency with the UK's major ethnic group classifications while avoiding groups that are too small for analysis purposes.
- *Parental education*: Generally viewed as a core component of socioeconomic status, which may affect wellbeing through long-term stress processes (Pearlin, 1989), we construct a measure of parental education based on the highest level of education reported by either parent at either wave (where a subsequent report is given precedence if they differ), grouping parents into 'Graduate', 'Below Graduate' and 'No Quals'.
- *Housing tenure*: Housing tenure is another component of a family's socioeconomic status, hence with potential implications for young people's wellbeing. We construct a measure of housing tenure based on young people's reports at either wave (where a subsequent report is given precedence if they differ), grouping families into those who own their home (either with a mortgage or outright; 'Own House') and all others (which predominantly include social and private renting; 'Other').
- *Area deprivation*: We also include an area-based measure of deprivation of participants'

home address, both as a correlate of socioeconomic stats due to residential sorting and given more direct implications this can have for potentially wellbeing-enhancing amenities. COSMO provides decile groups of the UK's Income Deprivation Affecting Children Index (IDACI), which is constructed at the 'lower-layer super-output area' (the smallest geographical areas in UK statistical geography, containing an average population of 1,500).

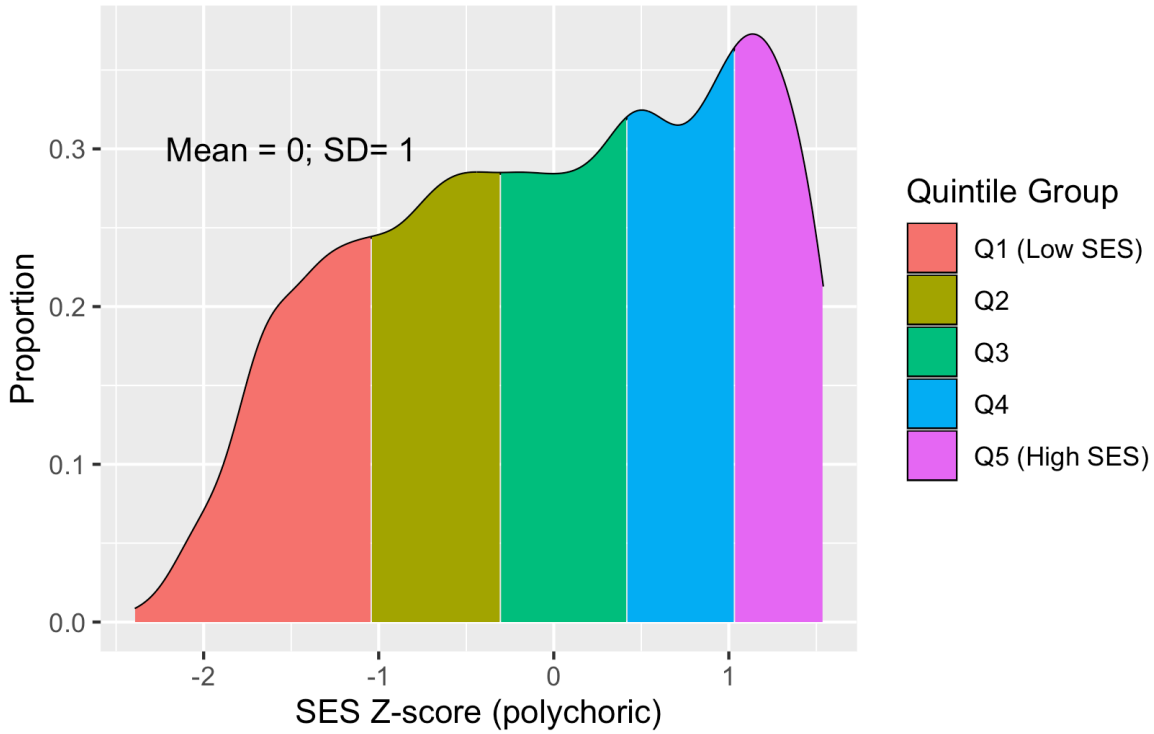
To allow exploration of differences in wellbeing by socioeconomic status (SES) in a simple way, we create a combined index of SES across our measures of parental education, housing tenure and home neighbourhood deprivation. Specifically, given the categorical nature of these variables, we estimate a polychoric correlation matrix of these measures and use principal component analysis (Revelle, 2024) to extract a single component that explains maximum shared variance. Our extracted principal component score explains 65% of the overall variance of our SES measures. We standardise the measure's distribution to have mean 0 and standard deviation 1 in our analysis sample, plot its distribution in Figure 2, and use it to split our sample into five quintile groups of equal size (accounting for sample weighting).

We demonstrate that this measure captures the underlying SES measures on which it is based in Table 1 by reporting the average levels of parental education, housing tenure and IDACI quintile group across the five quintile groups of the constructed SES measure.

Various reviews of the impact of the pandemic have highlighted that one's ability to draw on support around you appears important in helping to buffer shocks to wellbeing (Aksoy et al., 2024), using these as resources on which young people are able to draw in the face of adversity. To capture this factor, we use the social provisions scale (Cutrona & Russell, 2018), specifically a shortened three-item variant available in COSMO in which young people are asked to respond (using the categories "Not true", "Partly true" or "Very true") to the statements:

1. I have family and friends who help me feel safe, secure and happy
2. There is someone I trust whom I would turn to for advice if I were having problems

Figure 2: Distribution of SES summary measure, colour-coded by quintile group



Notes: SES measure based on polychoric principal component analysis of parental education, housing tenure and IDACI decile group. Density plot weighted for survey design and non-response.

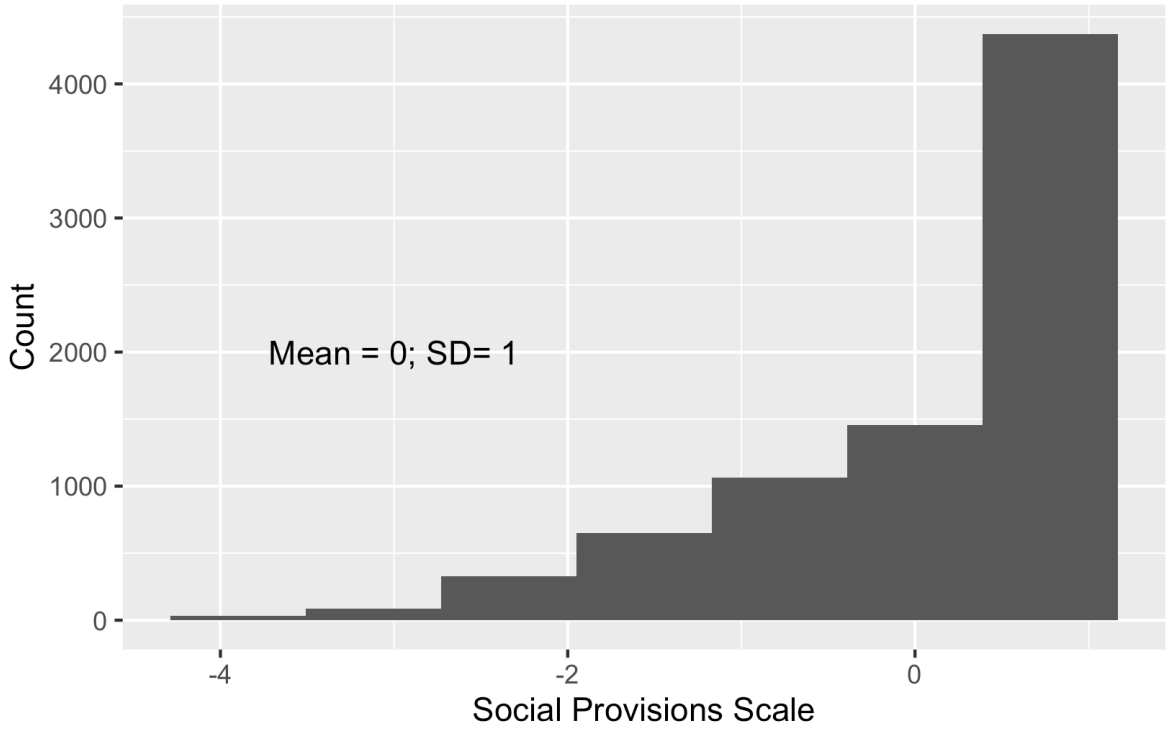
Table 1: Distribution of underlying socioeconomic characteristics by SES quintile group (SES quintile group based on polychoric principal component analysis of parental education, housing tenure and IDACI decile group)

Characteristic	**1 (Low SES)** N = 1,602	**2** N = 1,598	**3** N = 1,608	**4** N = 1,665	**5 (High**
Parental Education					
Graduate	16	41	63	69	
Below Graduate	54	52	33	30	
No Quals	27	6.3	3.3	1.4	
Unknown	3.1	0.8	0.2	0	
Housing Tenure					
Own House	10	49	75	90	
Other	90	51	25	9.5	
Unknown	0	0	0	0	
IDACI Quintile Group					
1 (High Deprivation)	76	31	1.8	0	
2	23	43	29	<0.1	
3	1.1	23	47	22	
4	<0.1	3.6	18	60	
5 (Low Deprivation)	0	0.2	3.3	19	

Notes: Reporting column percentages within each variable. All estimates are weighted for survey design and non-response.

3. There is no one I feel close to [Negatively coded]

Figure 3: Distribution of social provisions scale



Notes: Distribution of social provisions scale. The scale is standardised to have mean 0 and standard deviation 1 in the analysis sample. Weighted for survey design and non-response.

Following standard practice, we sum over the values of the three items and then standardise the resulting variable to have a mean of zero and a standard deviation of one for the purposes of interpretation. We plot the distribution of the social provisions scale in Figure 3. There is some evidence of a ceiling effect — the majority of respondents scoring the maximum value of 6 on the scale — but with a decent spread below this. We will use this measure as a continuous variable in our analyses.

Now that we have constructed this set of measures about young people, we report the prevalence of demographics in our cohort along with mean levels of self-reported wellbeing by these categories at Wave 1, Wave 2, and mean difference between the two in Table 2.

Table 2: Mean subjective wellbeing score by demographic characteristics

Characteristic	N	Prevalence (%)	Wave 1	Wave 2	Difference
Overall			6.41	6.43	0.017
1	7723				
Gender					
Male	3475	50	6.76	6.76	0.007
Female	4030	48	6.13	6.15	0.021
Non-Binary+	218	2.6	4.90	5.04	0.136
Ethnicity					
White	4877	77	6.43	6.44	0.014
Mixed	477	5.7	6.09	6.09	-0.008
Black	1503	10	6.51	6.48	-0.030
Asian	684	5.0	6.34	6.43	0.094
Other	182	2.2	6.44	6.64	0.201
Parental Education					
Graduate	3807	55	6.48	6.45	-0.024
Below Graduate	2962	36	6.35	6.37	0.024
No Quals	871	7.6	6.25	6.54	0.286
Unknown	83	0.8	6.42	6.37	-0.049
Housing Tenure					
Own House	4224	65	6.50	6.54	0.037
Other	3499	35	6.24	6.22	-0.020
Unknown	0	0			
IDACI Quintile Group					
1 (High Deprivation)	2306	22	6.24	6.23	-0.007
2	1678	19	6.39	6.42	0.032
3	1351	19	6.34	6.46	0.118
4	1231	20	6.54	6.56	0.023
5 (Low Deprivation)	1157	20	6.56	6.49	-0.072
SES Quintile Groups					
1 (Low SES)	2257	20	6.26	6.26	0.005
2	1770	20	6.28	6.37	0.088
3	1405	20	6.42	6.40	-0.019
4	1266	21	6.53	6.53	0.006
5 (High SES)	1025	19	6.58	6.58	0.002

Notes: Reporting means where otherwise specified. All estimates are weighted and account for the complex survey design. The difference is calculated as Wave 2 - Wave 1.

50% of the sample are male, 48% are female and 2.6% are non-binary or report in another way. Average reported wellbeing differs substantially between these groups with boys (6.76 in Wave 1) reporting higher levels of wellbeing than girls (6.13). This is consistent with existing work on inequalities in young people's wellbeing, both before the pandemic and as a result of its impact. Non-binary+ young people report lower levels of wellbeing still than girls, although there is evidence of an increase for this group between Waves 1 and 2; we should be mindful, however, of the smaller sample size for this group.

In terms of ethnicity, the highest levels of reported wellbeing are for Black young people (6.51 in Wave 1), followed by White young people (6.43), with the lowest being among young people who reported a Mixed ethnicity. These differences are small and, other than the small group of young people placed into the Other category, there is little evidence of change over time.

There is a broadly consistent gradient in wellbeing across our quintile groups of socioeconomic status, from 6.26 to 6.58 (both for Wave 1 but with a similar picture in Wave 2). Again, these appear to be rather small differences and there is no evidence of consistent change between the two waves.

Overall, this initial analysis highlights gender as the most important demographic difference in wellbeing for this sample of young people in England. However, we will return to explore these differences in more detail, including their potential interplay, in later sections.

2.3 Perceived ongoing impact

Next, we seek to quantify differences in young people's wellbeing by their own perceptions of the ongoing impact of the pandemic. This takes seriously young people's own perceptions of the ongoing impact of the pandemic on their wellbeing. To capture these perceptions, we use a question asked to young people at the second wave of COSMO. Specifically, young people are asked "Would you say the pandemic is still having an effect on [your mental wellbeing], whether positive or negative?" If they agree with this question then they are subsequently asked to distinguish whether this impact is positive, negative or they don't know.

Table 3: Mean subjective wellbeing score by whether and how the pandemic continues to affect mental wellbeing

Variable, N = 7723	**No** (64%)[1]	**Negative** (32%)[1]	**Don't know** (2%)[1]	**Positive** (2%)[1]	**Overall**
Wave 1	6.81	5.62	6.37	6.40	6.4
Wave 2	6.91	5.46	6.29	6.48	6.4
Difference	0.11	-0.16	-0.08	0.08	0.0

[1]Mean
[2]Design-based KruskalWallis test
Notes: All estimates are weighted and account for the complex survey design. The difference is calculated as Wave 2 - Wave 1.

Table 3 shows that 64% of young people report that the pandemic is continuing to have an impact on their mental wellbeing, with 32% of these reporting that this impact is negative. Perhaps unsurprisingly, much smaller proportion of young people report that the ongoing impact is positive (2%) or that they don't know if the impact is positive or negative (2%).

Those who report no impact of the pandemic on their mental wellbeing have the highest self-reported wellbeing (6.37 in Wave 1; 6.29 in Wave 2), while those who report that it had a negative impact on their mental wellbeing report the lowest (5.62 in Wave 1; 5.46 in Wave 2). Those who say it is still having an impact but that it is positive, or that they don't know if it is positive or negative, report somewhere between the other two groups but, as noted above, these are a very small proportion of the sample.

These groups are also distinguished by the change in their reported wellbeing between Waves 1 and 2. Those who report that the pandemic is continuing to have a negative impact on their mental wellbeing do, indeed, report a decline in wellbeing (-0.16) between the two waves, while those who report that it has had no impact (-0.08) or that it is having a positive impact report an increase (0.08). Those who report that it is still having an impact but that they don't know if it is positive or negative report a slight decline (0.11).

These last two groups are small, so these estimates should be treated with caution, and in subsequent analyses we decide to combine these two groups with the group who report no

impact. This allows for an overall comparison of those who report an ongoing negative impact with the rest of the sample in our later regression analyses seeking to understand the interplay of these perceptions further.

2.4 Adverse life events

Finally, we are interested in understanding whether subjective wellbeing is affected by adverse life events that happened during the COVID pandemic. In Wave 1, COSMO asked participants whether they had experienced each of the following life events since the onset of the pandemic in March 2020:

1. A parent/guardian or carer lost their job or business
2. My family could not afford to buy enough food, or had to use a food bank
3. My family could not afford to pay their bills/rent/mortgage
4. I was seriously ill in hospital
5. A close family member or friend is or was seriously ill in hospital
6. A close family member or friend died
7. Increase in number of arguments with parents/guardians
8. Increase in number of arguments between parents/guardians
9. Moving to a new home
10. Parents/guardians separated or divorced

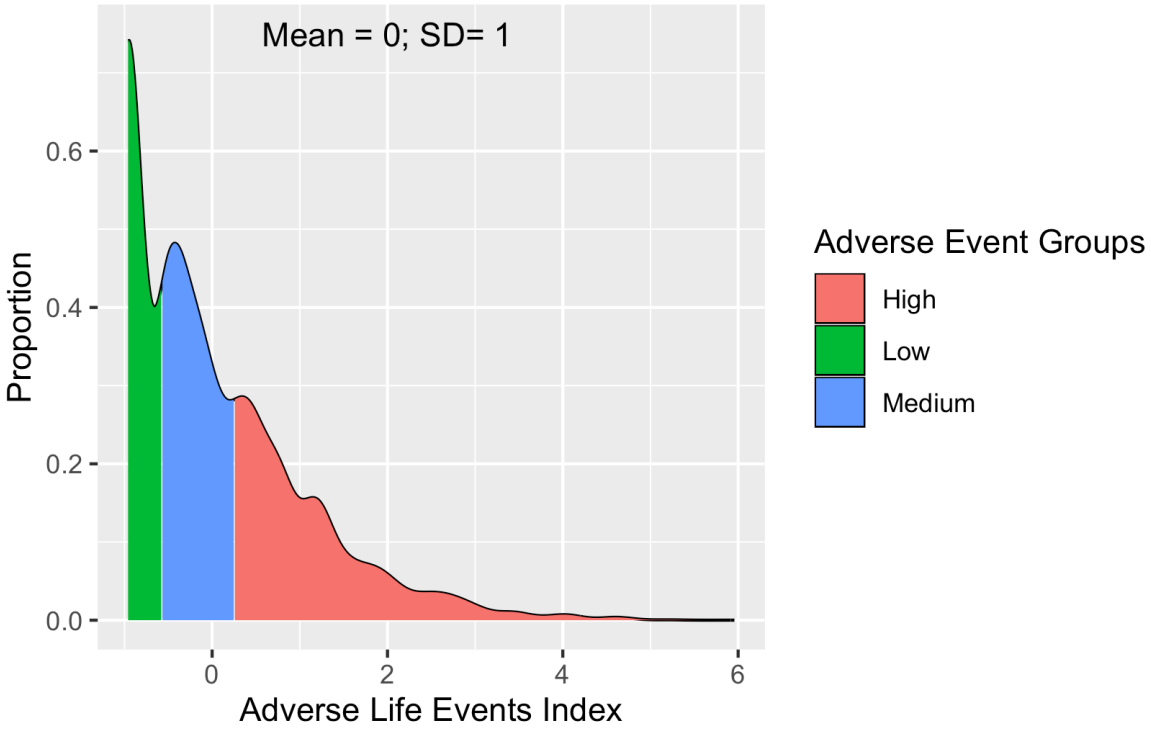
The question is worded to capture events whether or not they are directly attributable to the pandemic, its restrictions and disruptions, but it is reasonable to believe many were caused or exacerbated by the circumstances of the pandemic. Participants were then asked again whether they had experienced these events over the past twelve months (i.e., for most participants a year since they responded to the Wave 1 survey) in Wave 2.

29% of pupils experience no events at all, while 26% experience three or more events. We report the proportion of young people experiencing each of the ten specific adverse life events

in the first column of Table 4.

We initially anticipated using the simple count of number of adverse events experienced in analyses. However, the substantial differences in prevalence of the events means this would be inappropriately imposing the same importance, or severity, of all the events. Instead, we want to allow these to differ, such that lower probability/higher impact events are given more weight in our analysis. We therefore create a composite index of adverse life events using a polychoric principal component analysis (PCA) of the ten measured adverse life events.

Figure 4: Distribution of Adverse Events Index, colour-coded by tertile group



Notes: Adverse events index based on polychoric principal component analysis of measured adverse life events. The index is standardised to have mean 0 and standard deviation 1 in the analysis sample. Weighted for survey design and non-response.

The first principal component explains 32% of the variance in the ten adverse life events. We standardise this index to have mean 0 and standard deviation 1 in our analysis sample, plot the distribution in Figure 4, and use it to split it into three groups based on the tertiles of the index

Table 4: Adverse life events experiences by Adverse Events Index group

Variable, N = 7723	**Low** (36%)[1]	**Medium** (30%)[1]	**High** (33%)[1]	**Overall** (100%
Parent lost job	0	13	23	12
Couldn't afford food	0	2.8	23	8.4
Couldn't afford bills	0	4.6	28	11
Seriously ill	0	2.6	7.0	3.1
Close family member seriously ill	0	45	54	32
Close family member died	19	28	51	33
More arguments with parents	0	28	72	32
More arguments between parents	0	7.8	60	22
Moved home	0	6.6	16	7.3
Parents separated	0	1.5	10	3.8
Number of events (grouped)				
0	81	0	0	29
1	19	60	0	25
2	0	40	23	20
3+	0	0	77	26
Number of events (mean)	0.19	1.40	3.44	1.64

[1]%; Mean

Notes: All estimates are weighted and account for the complex survey design.

(accounting for sample weighting). We label these groups as "Low", "Medium" and "High" to reflect the relative impact of adverse events experienced by each of these groups.

We report the prevalence of each of the ten adverse life events by the three groups of the index in Table 4. This demonstrates that these groups are capturing different levels of exposure to adverse life events, while reflecting the differential prevalence of the ten events. Students in the "Low" group are likely not to have experienced any of the events, with the exception of a close family member dying. In contrast, students in the "High" group have a good chance of having experienced multiple events.

We find that mean wellbeing score differs by experience of such events (Table 5). Wellbeing is lower for those who experience a higher prevalence of adverse life events, ranging from 5.67 for those with low experience of adverse life events to 6.46 for those with a high level

Table 5: Mean subjective wellbeing score by experience of adverse life events reported since onset of pandemic

Variable, N = 7723	**Low** (36%)[1]	**Medium** (30%)[1]	**High** (33%)[1]	**Overall** (100%)[1]	**p-value**[2]
Wave 1	7.04	6.46	5.67	6.41	<0.001
Wave 2	7.02	6.47	5.75	6.43	<0.001
Difference	-0.03	0.00	0.08	0.02	0.2

[1]Mean
[2]Design-based KruskalWallis test
Notes: All estimates are weighted and account for the complex survey design.

of experience of these. This pattern is consistent across Waves 1 and 2, but there is no significant evidence of difference in the patterns of change over time.

However, as with all our descriptive analyses, we are mindful that there is the potential for a lot of differences in socioeconomic and demographic characteristics between those who experience adverse life events and those who do not. For this reason, as well as for our other analyses, we use regression models to help us unpack these findings further.

3 Regression analysis

To extend our descriptive analyses and, hence, provide a more nuanced understanding of the factors associated with young people's wellbeing since the pandemic, we use regression models. All analyses are carried out using the statistical software R (R Core Team, 2024), with the survey package (Lumley et al., 2024) used to account for the complex survey design of the data, including design and non-response weights, along with adjustments to statistical inference due to stratification and clustering of the sample.

We break this section into three sub-sections, aligned with the research aims in this paper for which we will use regression modelling to support our analysis: demographic differences in

subjective wellbeing; the importance of perceived ongoing impact of the pandemic; and the importance of adverse life events during the pandemic.

3.1 Demographic differences in subjective wellbeing

First, we use linear regression models to explore differences in young people's wellbeing. These models all take the form

$$LifeSat_{it} = \beta_0 + \beta_1' SES_i + \beta_2' Gender_i + \beta_3' Ethnicity_i + X_i' + \varepsilon_{it}$$

where $LifeSat$ is the wellbeing score for person i at time t, SES is a vector of binary variables for the quintile groups of SES (leaving the highest SES quintile group as the omitted category), $Gender$ is a vector of binary variables for gender variables (Female and Non-binary+, leaving Male as the omitted category), $Ethnicity$ is a vector of binary variables for ethnicity (White, Asian, Black, Mixed, Other, leaving the omitted category as Mixed), X is a vector of other covariates, which varies between model specifications (discussed further below), and ε is the error term. We estimate these models separately for each time point of the survey, and then again for Wave 2 with an additional covariate of Wave 1 wellbeing score to provide estimates of difference adjusting for Wave 1 wellbeing as a baseline.

We begin with simple models including gender (L1), ethnicity (L2), and SES (L3) entered separately, replicating the descriptive analyses and unconditional estimates of differences in wellbeing reported in Table 2. Next, we include all three demographic characteristics at the same time in L4, along with the addition of a month of interview variable to allow for potential confounding due to the timing of the survey. This model, hence, provides estimates of demographic differences in wellbeing, conditional on the other demographic characteristics included.

We then explore evidence of intersectional differences in wellbeing between our core demographics in L5 (Codiroli Mcmaster & Cook, 2019) by including a full set of interaction terms between our SES, gender and ethnicity variables.

Next, motivated by understanding the potential importance of social resources in explaining these differences, we add social provisions score in L6. Differences between the coefficients on our demographic characteristics between L4 and L6 will, hence, provide information on the extent to which differences in these resources may explain the unadjusted differences.

L7 explores whether the importance of social resources varies by demographic characteristics. As with L5, we include interaction terms, this time between our demographic characteristics and the two social resources measures to allow for the moderation of the relationship between these measures and wellbeing.

Finally, L8 explores the importance of adverse life events in explaining demographic differences in wellbeing. We include the adverse life events index in this model, along with the demographic characteristics and social resources measures. Comparing coefficients on the demographic characteristics in L6 and L8 will, hence, provide information on the extent to which differences in adverse life events may explain demographic differences in wellbeing. We do not run a model exploring the interaction between adverse life events and demographic characteristics at this point as we will explore this in a subsequent section.

3.2 Importance of perceived impact of the pandemic on wellbeing

In this section, we again use linear regression models to estimate differences in subjective wellbeing. However, this time we focus on differences explained by young people's perceptions of the ongoing impact of the pandemic on their life, allowing us to validate and quantify these reports. The models used for this purpose all take the form:

$$LifeSat_{it} = \beta_0 + \beta_1' PandemicImpactPercep_i + X_i' + \varepsilon_{it}$$

where $LifeSat$ is the wellbeing score for person i at time t, $PandemicImpactPercep$ is a binary variable indicating that person i reports that the pandemic is continuing to have a negative impact on their life, X is a vector of other covariates, which varies between model specifications (discussed further below), and ε is the error term. We estimate these models

separately for each time point of the survey, and then again for Wave 2 with an additional covariate of Wave 1 wellbeing to provide estimates of difference adjusting for Wave 1 wellbeing as a baseline.

Our first model (P1) again replicates our descriptive findings by including no additional covariates, meaning the coefficient on $PandemicImpactPercep$ reports the difference between those who report that the pandemic had a negative impact on their mental wellbeing and the rest of the cohort (no longer disaggregating the 'don't know' and 'positive' groups).

Next, in P2, we include demographic (gender, ethnicity) and socioeconomic status (parental education, housing tenure, and area-level deprivation) covariates. We do this, rather than including combined SES quintile groups, now that we are not trying to interpret an overall SES association but rather adjust for these as flexibly as possible. We also include month of survey at this point. Our focal coefficient from this model thus estimates the difference in wellbeing associated with a continuing negative perception of the pandemic on wellbeing among those with similar socio-demographic characteristics.

We then explore the extent to which differences in wellbeing associated with a negative perceived impact of the pandemic are explained by the social resources available to young people. In P3, we add social provisions score and compare the estimate on our focal variable coefficient between models P2 and P3.

Finally, in P4, we explore evidence of variation in the difference in wellbeing associated with a negative perceived impact of the pandemic by demographic and social support measures. We do this by including a full set of interaction terms between our focal variable and the socio-demographic and social support variables in P3. Examining the coefficients on these interaction terms will provide evidence on this point.

3.3 Importance of adverse life events during the pandemic

For the paper's final research aim, we explore the importance of adverse life events during the pandemic in explaining young people's wellbeing post-pandemic.

To do so, we use linear regression models to explore the extent to which differences in self-reported wellbeing depends on the adverse life experiences they faced, including conditional on their perception of the impact of the pandemic on their wellbeing. The models used for this purpose all take the form:

$$LifeSat_{it} = \beta_0 + \beta_1' TAdverseEventIndex_i + X_i' + \varepsilon_{it}$$

where $LifeSat$ is the wellbeing score for person i at time t, $TAdverseEventIndex$ is a vector of binary variables indicating person i's location in the distribution of the adverse life event index (high and medium, leaving low as a baseline), X is a vector of other covariates, which varies between model specifications (discussed further below), and ε is the error term. We estimate these models separately for each time point of the survey, and then again for Wave 2 with an additional covariate of Wave 1 wellbeing to provide estimates of difference adjusting for Wave 1 wellbeing as a baseline. Where we are modelling wellbeing measured at Wave 1, a variant of our events index is used that is based on Wave 1 event reports only.

Our first model (E1) again replicates our descriptive findings by including only the tercile groups of the adverse life events index, meaning the coefficients on each level of $TAdverseEventIndex$ report the difference between those who experience medium and high levels of adverse events, as applicable, compared to the low adverse life events group. In preliminary work to inform our approach, we explored alternative ways of including information on adverse life events in our modelling, including using the index as a continuous variable and including a set of binary variables for the individual adverse life events, as listed in Section 2. We found that including tercile groups provided the most interpretable results without substantively affecting the model fit.

Next, in E2, we add in demographic characteristics (gender, ethnicity) and socioeconomic status indicators (parental education, housing tenure, and area-level deprivation). We also include month of survey at this point. Our coefficient estimates associated with adverse life events from this model thus provides an estimate of difference in wellbeing associated with greater experiences of adverse life events during the pandemic among those with similar socio-demographic characteristics, as well as the extent to which differential distribution of such life events across socio-demographic groups explains differences in reported wellbeing.

We then explore the extent to which differences in wellbeing associated with greater experience of adverse life events during the pandemic are explained by the social resources available to young people. In E3, we add covariates for our social provisions scale scores and compare the estimate on our focal variable between models E2 and E3. It may be noted that this is very similar to model L6 from the earlier section but here adverse life events are our focus and, hence, are entered using the tercile groups to aide interpretation.

Next, we include the covariate for perceived ongoing impact of the pandemic that was the focal variable of the previous section. As we hypothesise that at least some of the formation of ongoing perceptions of negative impact from the pandemic, this model (E4) is likely not a reliable guide to the association between adverse events and wellbeing since including the perception variable is over-controlling. However, the model is useful as a point of comparison with P3 in demonstrating the extent to which the difference in wellbeing associated with a negative perception of the ongoing impact of the pandemic on wellbeing is explained by having experienced adverse life events.

Finally, analogously to previous sections, we include interactions of our focal variables (experience of adverse life events) with our socio-demographic and social support measures in model E5. This allows us to see if there is evidence of variation in the importance of having experienced adverse life events for post-pandemic wellbeing between different groups of young people.

4 Results

In this section, we discuss the results of the regression models outlined in the previous section. We begin by exploring demographic differences in wellbeing Section 4.1, before moving on to the importance of perceived ongoing impact of the pandemic Section 4.2 and the importance of adverse life events during the pandemic Section 4.3. We primarily report our results graphically (Larmarange, 2024), focussing attention on the estimates pertinent to addressing our research aims and allowing for easy comparison across models, supplemented with illustration of interactions between characteristics (Arel-Bundock et al., Forthcoming), where relevant. We also provide full regression tables of the results for each model, which are included in Section 6 for reference.

4.1 Demographic differences in subjective wellbeing

First, we explore overall differences in wellbeing, through a series of models summarised (for ease of reference) in Table 6. The core results are plotted in Figure 5 for gender, Figure 7 for ethnicity, and Figure 9 for SES. In each case, results are presented for Wave 1, Wave 2, and Wave 2 adjusted for Wave 1, with the discussion starting out with Wave 1 in each case, before focussing on any notable differences in the pattern for Wave 2, or Wave 2 adjusted for Wave 1. Full tables of results for these models are reported in Section 6, specifically Table 9 for Wave 1, Table 10 for Wave 2, and Table 11 for Wave 2 adjusted for Wave 1.

Table 6: Model specifications for regression analysis of subjective wellbeing.

Variable	L1	L2	L3	L4	L5	L6	L7	L8
Gender	Included			Included	Interacted w/ Ethnicity and SES	Included	Interacted w/ Social Support	Included

Table 6: Model specifications for regression analysis of subjective wellbeing.

Variable	L1	L2	L3	L4	L5	L6	L7	L8
Ethnicity		Included		Included	Interacted w/ Gender and SES	Included	Interacted w/ Social Support	Included
SES			Included	Included	Interacted w/ Gender and Ethnicity	Included	Interacted w/ Social Support	Included
Social Support						Included	Interacted w/ Gender, Ethnicity and SES	Included
Adverse Events								Included

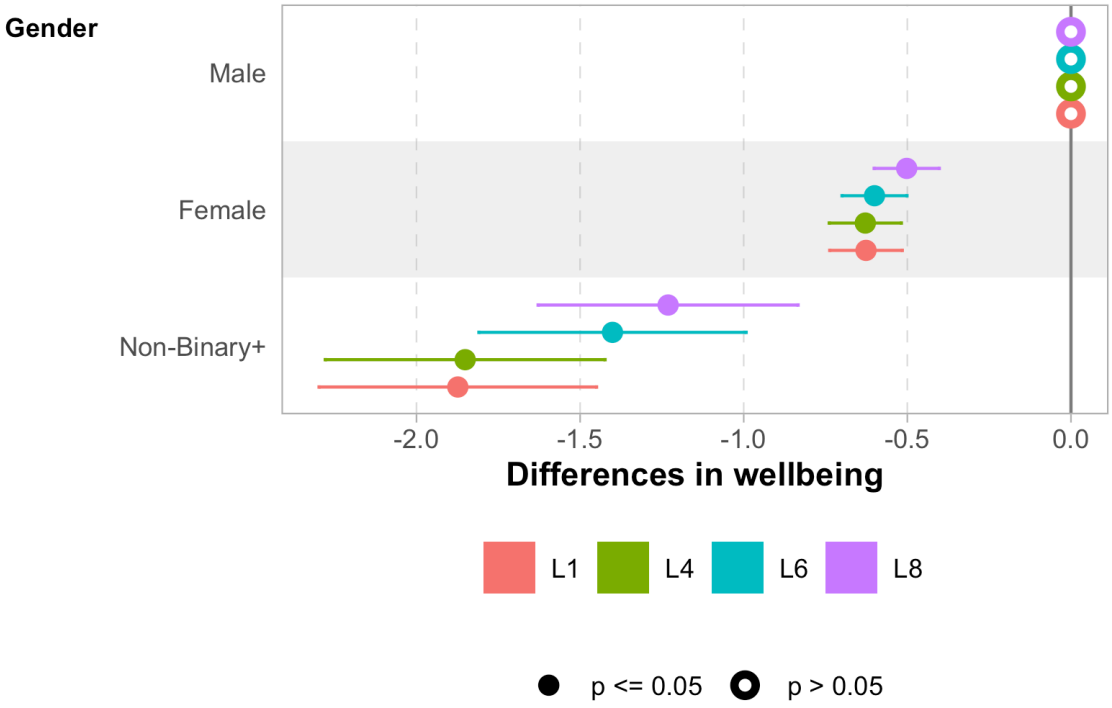
Notes: L1-L7 refer to the model number. SES = Socioeconomic status.

Beginning with gender (Figure 5), we replicate the descriptive findings (Table 2) in model L1 (except for the inclusion of controls for month of interview), finding that girls' wellbeing is 0.63 points lower than for boys, and a larger reduction for those grouped as non-binary+ where the reduction is 1.9 points compared to boys. There is essentially no change when we adjust for ethnicity and SES in model L4, with the differences remaining 0.63 points for girls and 1.9 points for non-binary+ young people.

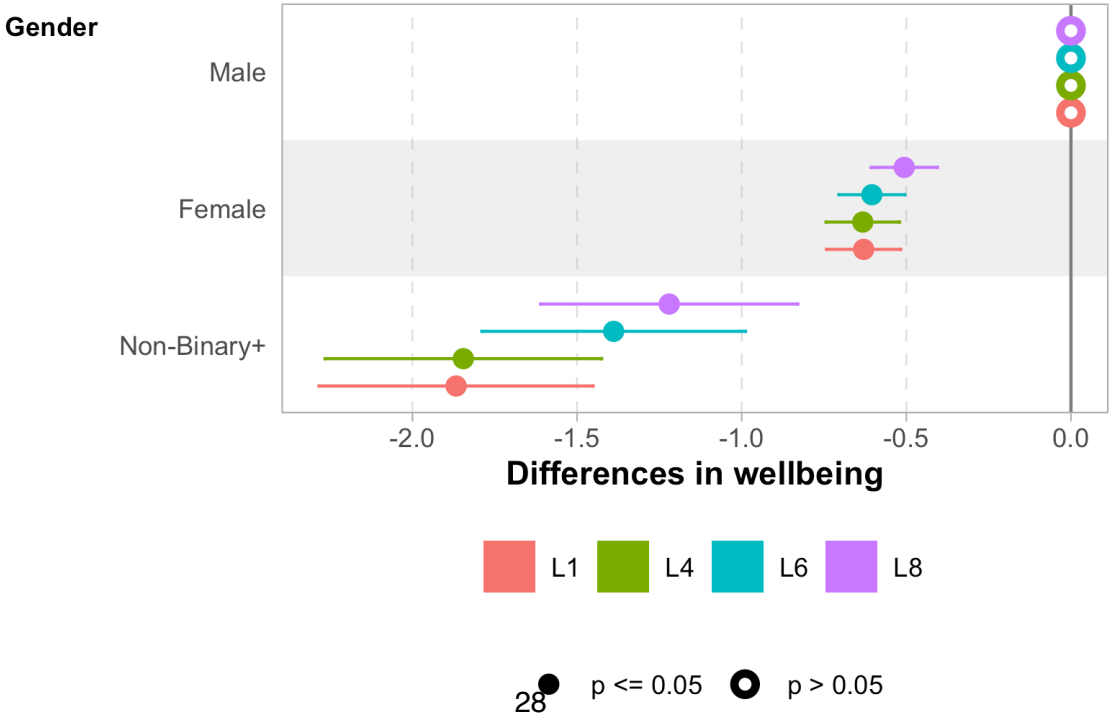
However, some of the difference in levels of wellbeing for non-binary+ young people appears to be explained by variation in social support. When we include the social provisions scale in model L6, the difference in wellbeing reduces to 1.4 points for those identifying as non-binary+ compared to boys. This makes a similar difference for non-binary+ young people's wellbeing at Wave 2, but no difference for girls at any wave, nor for non-binary+ youth when considering Wave 2 wellbeing after adjusting for their wellbeing at Wave 1.

Figure 5: Differences in wellbeing by gender

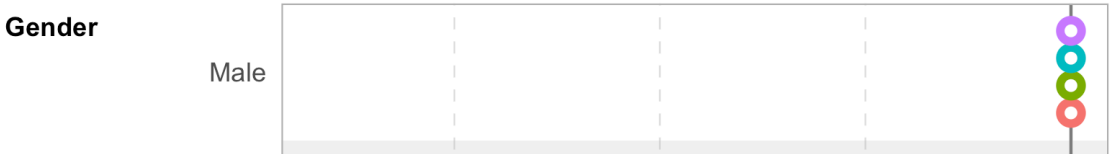
(a) Wave 1



(b) Wave 2



(c) Wave 2 adjusted for Wave 1



A small part of the remaining difference in wellbeing appears to be explained by experiences of adverse life events, reducing to 1.2 for non-binary+ young people and to 0.5 for girls, although the difference between models L6 and L8 is not statistically significant for the non-binary+ group, nor quite statistically significant at the 5% level for girls.

Across Waves 1 and 2 (panels 1 and 2 of Figure 7), the only significant unconditional differences in young people's wellbeing are between those classified as White and those classified as of Mixed ethnicity. No difference emerges when other demographic characteristics are included in model L4. However, these lower levels among those with Mixed ethnicity are explained by differences in social support, while, conversely, including this covariate reveals a significant difference in wellbeing between those classified as White and those classified as Black and Asian in model L6. This latter finding implies that if Black and Asian young people reported the same scores on the social provisions scale as White young people, their wellbeing scores would be higher. This difference is only present at Wave 2 for those with an Asian ethnicity, and is not present for any group when we are looking at Wave 2 wellbeing having adjusting for wellbeing at Wave 1.

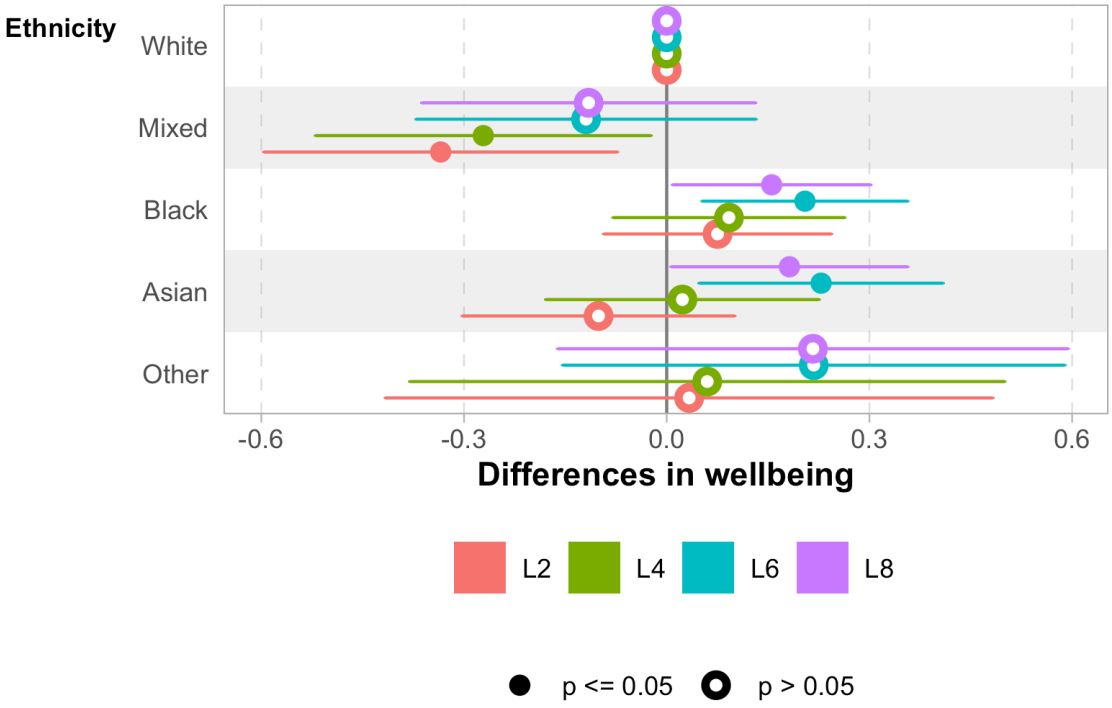
The differences that emerged for Black and Asian young people in model L6 appear slightly attenuated by differences in adverse life events (0.16 for Black young people and 0.18 for Asian young people), but not by much and the estimates in L6 and L8 are not statistically significant from one another.

There is evidence of a gradient in wellbeing by SES, with a roughly linear pattern across SES quintile groups at both Waves 1 and 2. However, the differences are only significant in the unconditional model (L3) once we reach the top two quintile groups, compared to the bottom. The overall difference between the top and bottom quintile groups is 0.3 points at Wave 1 and a bit larger (0.33 points) at Wave 2.

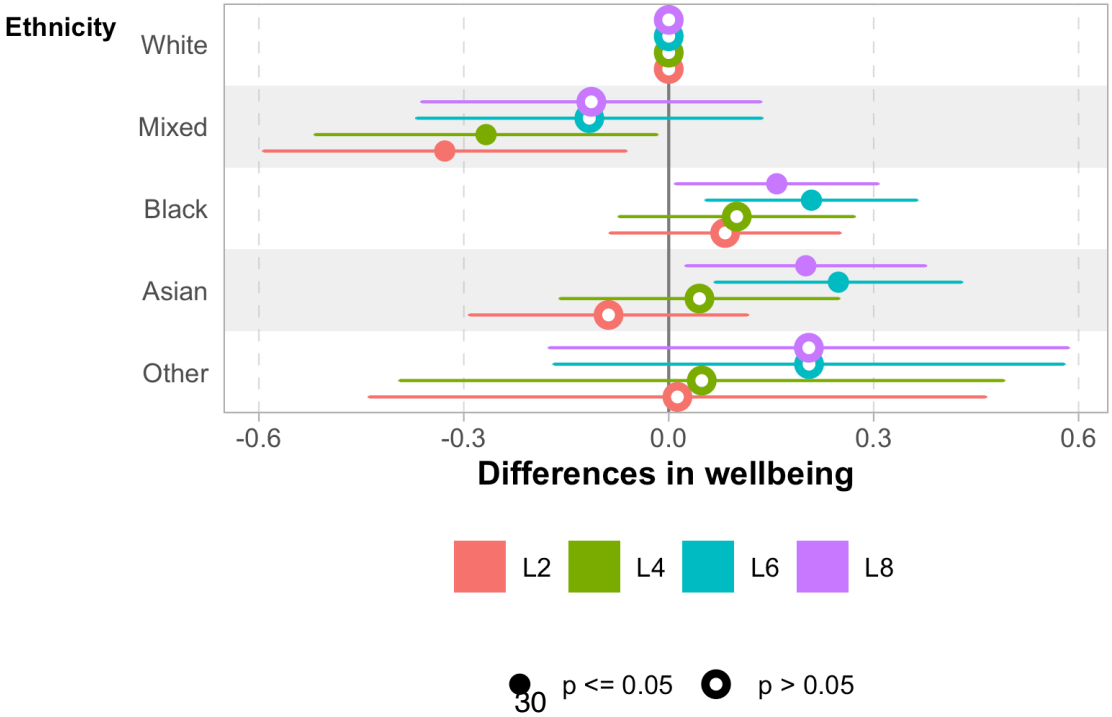
There is essentially no difference when gender and ethnicity are included in model L4, but some of the SES gradient is attenuated by differences in social support when these are included in model L6. For Wave 1, the difference between the bottom and the second-highest

Figure 7: Differences in wellbeing by ethnicity

(a) Wave 1



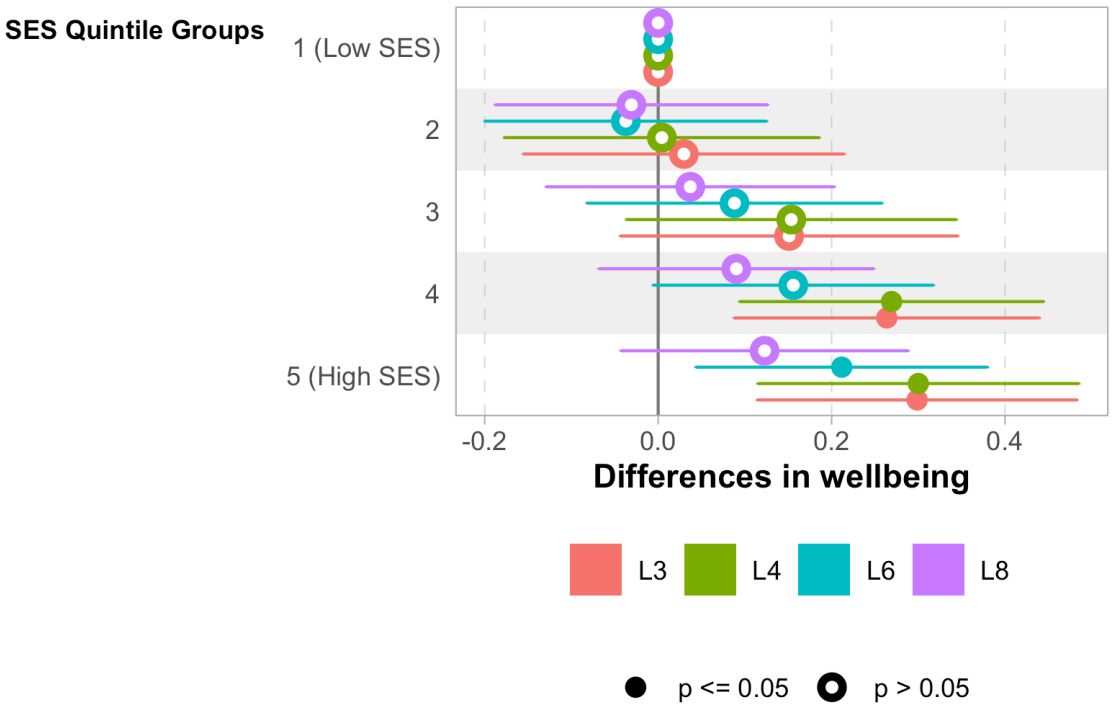
(b) Wave 2



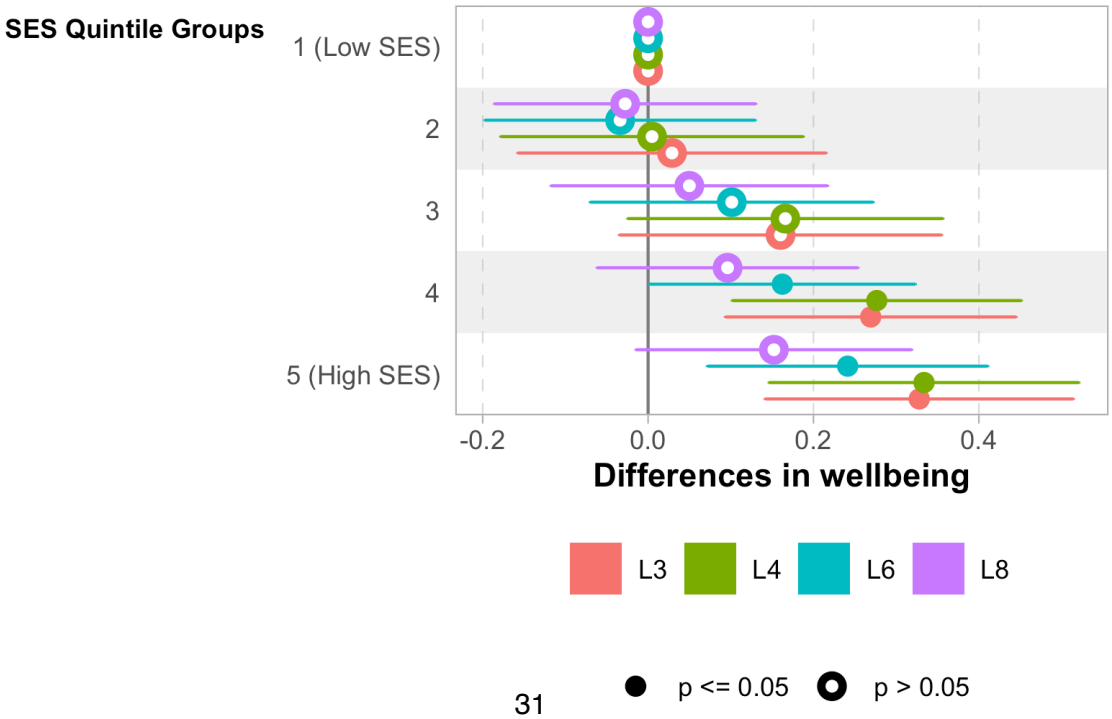
(c) Wave 2 adjusted for Wave 1

Figure 9: Differences in wellbeing by SES

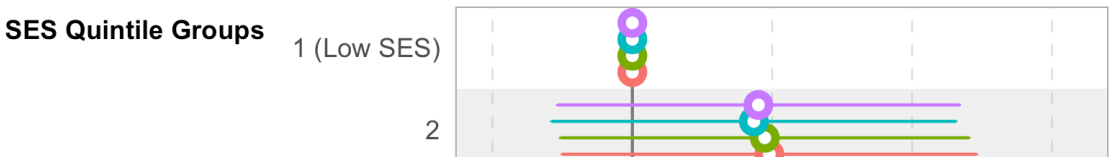
(a) Wave 1



(b) Wave 2



(c) Wave 2 adjusted for Wave 1



quintile groups becomes statistically insignificant, although this is not the case for differences at Wave 2, given their slightly larger overall magnitude. The conditional difference between the top and bottom quintile groups is 0.21 points at Wave 1 and, again, a bit larger (0.24 points) at Wave 2.

Ultimately, even these differences between the top and bottom SES quintile groups are attenuated to statistical insignificance when we adjust for experiences of adverse life events in model L8 (although we should note that the differences in coefficients between models L6 and L8 are not themselves statistically significant). This is the case for both Waves 1 and 2, and for Wave 2 after adjusting for Wave 1 wellbeing. It would seem that, between them, we can account for much of the socioeconomic variation in wellbeing with social support and experiences of adverse life events — although it is important to note that this is not the same as saying that socioeconomic inequalities in wellbeing are unimportant, especially as socioeconomic status is likely to affect levels of social support and adverse life events.

We explore the potential for intersectional differences between the demographic characteristics using model L5, but find little evidence of any clear or consistent patterns of this type. Similarly, we allow for moderation of the importance of social support by demographic characteristics in model L7, but find little evidence of this either. Full tables of results for these models are reported the final two columns of Table 9 (Wave 1), Table 10 (Wave 2) and Table 11 (Wave 2 adjusting for Wave 1) in Section 6.

4.2 Perceived continuing impact of the pandemic on wellbeing

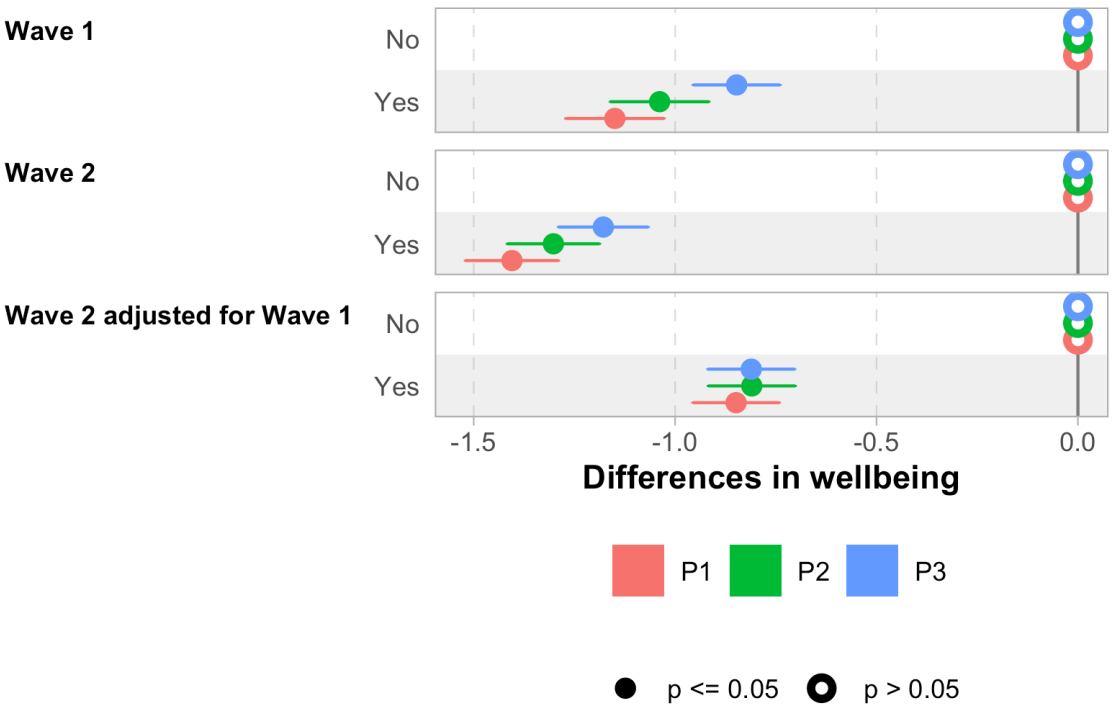
Next, we discuss differences in wellbeing by perceived continuing impact of the pandemic. Again, we summarise the models used to explore this issue in Table 7. The core results are plotted in Figure 11. Full tables of results for these models are reported in Section 6, Table 12 (Wave 1), Table 13 (Wave 2) and Table 14 (Wave 2 adjusting for Wave 1).

Table 7: Model specifications for regression analysis of subjective wellbeing.

Variable	P1	P2	P3	P4
Perceived Impact	Included	Included	Included	Interacted with Demographics, SES and Social Support
Demographics		Included	Included	Interacted with Perceived Impact
SES		Included	Included	Interacted with Perceived Impact
Social Support			Included	Interacted with Perceived Impact

Notes: P1-P4 refer to the model number. SES = Socioeconomic status.

Figure 11: Differences in wellbeing by perceived continuing impact of pandemic on wellbeing



Notes: Reporting coefficients from underlying regression models reported in Table 12, Table 13, and Table 14.

Results from unconditional model P1 indicate that young people who perceive a negative continuing impact of the pandemic on their wellbeing report 1.1 points lower wellbeing score than those who do not perceive such an impact. Perhaps surprisingly, given the greater time that has elapsed since the pandemic, this difference is larger at Wave 2, with a 1.4 point difference between these two groups. However, we should recall that the report of a negative continuing impact of the pandemic is collected at Wave 2, so may reflect this being more contemporary with the report.

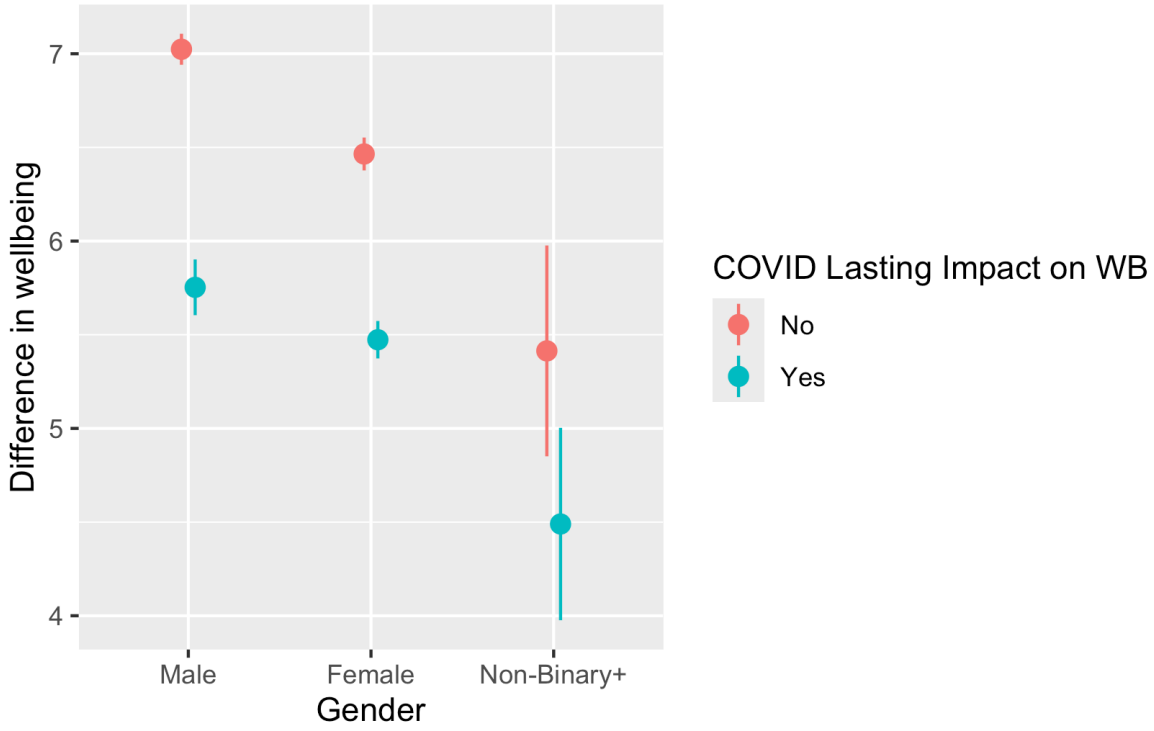
A fairly small part of the difference in wellbeing score is explained by inclusion of demographic characteristics (in P2) and social support (in P3). The differences are reduced to 0.85 points and 1.2 points at Wave 1 and Wave 2, respectively, once all of these covariates have been included. This highlights a significant unexplained component of wellbeing unexplained by young people's observable characteristics and social support — although we will return to whether more of this difference can be explained by adverse life events during the pandemic in the next section.

The unconditional difference in wellbeing by perceived continuing impact of the pandemic on wellbeing at Wave 2 is lower in models where we have adjusted for Wave 1 wellbeing (0.85 points). However, demographic and social support controls make essentially no difference for this outcome, with the difference remaining 0.81 points once these have been included, with a very similar magnitude to that seen in the fully adjusted model for Wave 1.

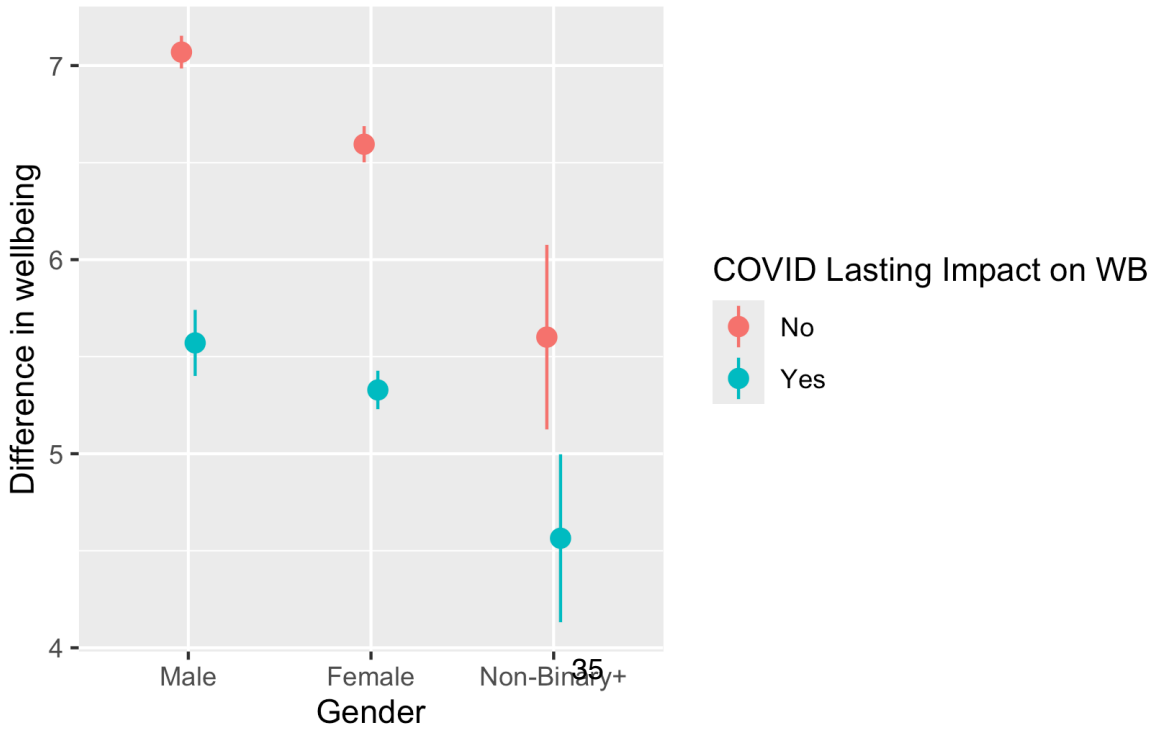
We also explore whether the difference associated with this perception is moderated by key demographic characteristics, particularly focussing on gender and social provisions. The results for gender are plotted in Figure 12 and suggest that the differences in wellbeing by perceived ongoing impact of the pandemic on wellbeing are larger for boys, although this is only statistically significant at the 10% level and for Wave 1 so this is rather a tentative finding. The results for social provisions are plotted in Figure 14 and suggest little variation in the difference in wellbeing by perceived ongoing impact of the pandemic on wellbeing depending on the level of social provisions.

Figure 12: Predicted wellbeing by perceived ongoing impact of pandemic on wellbeing and gender

(a) Wave 1



(b) Wave 2



(c) Wave 2 adjusted for Wave 1

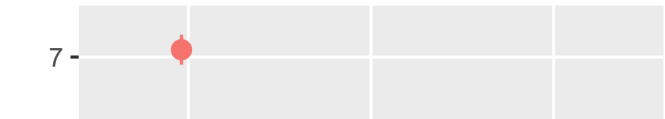
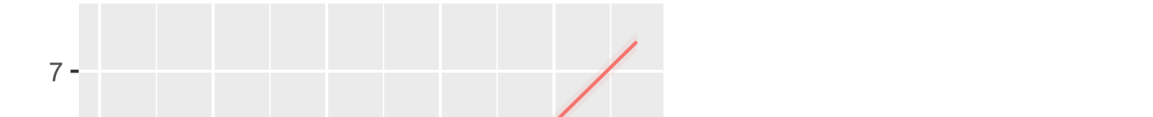


Figure 14: Predicted wellbeing by perceived ongoing impact of pandemic on wellbeing and Social Provisions Scale Total Score

(a) Wave 1

(b) Wave 2

(c) Wave 2 adjusted for Wave 1



4.3 Adverse life events

Next, we turn to the importance of adverse life events for young people's wellbeing. This is explored through a series of models that, for ease of reference, are summarised in Table 8; full results are reported in Table 15, Table 16 and Table 17 in Section 6. The core results are plotted in Figure 16, demonstrating the association unconditionally (E1), adjusting for demographic measures (E2), and adjusting also for social support (E3).

Table 8: Model specifications for regression analysis of subjective wellbeing by life events.

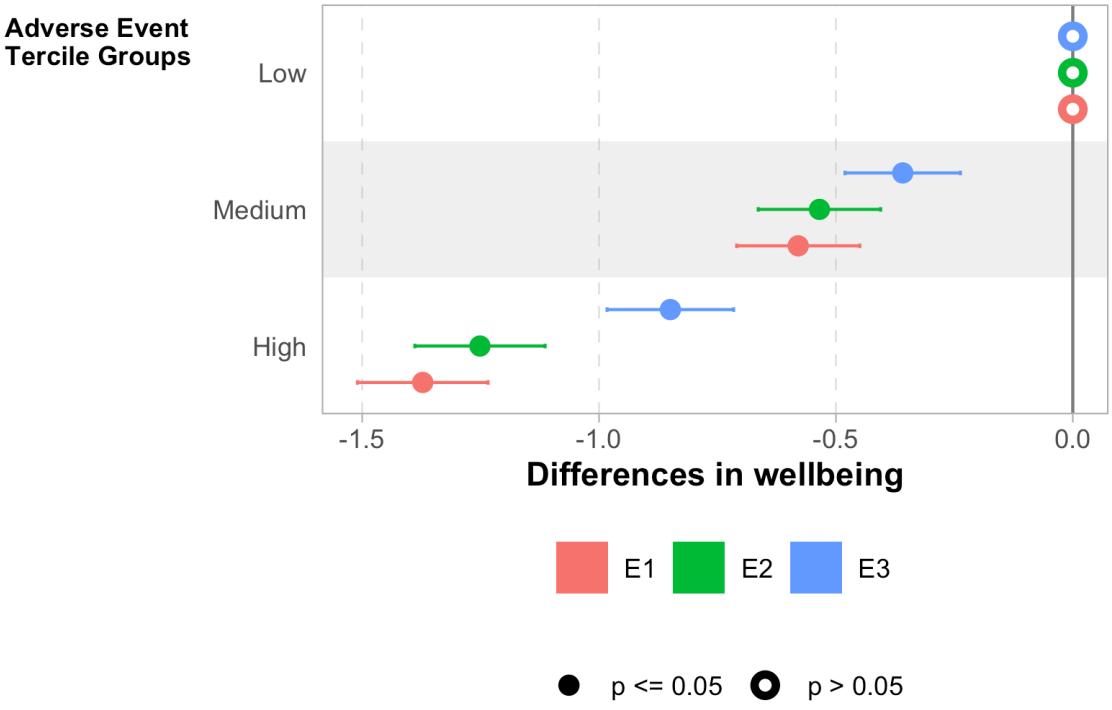
Variable	E1	E2	E3	E4	E5
Adverse Events	Included	Included	Included	Included	Interacted with Demographics, SES, Social Support and Perceived Impact
Demographics		Included	Included	Included	Interacted with Adverse Events
SES		Included	Included	Included	Interacted with Adverse Events
Social Support			Included	Included	Interacted with Adverse Events
Perceived Impact				Included	Interacted with Adverse Events

Notes: E1-E5 refer to the model number. SES = Socioeconomic status.

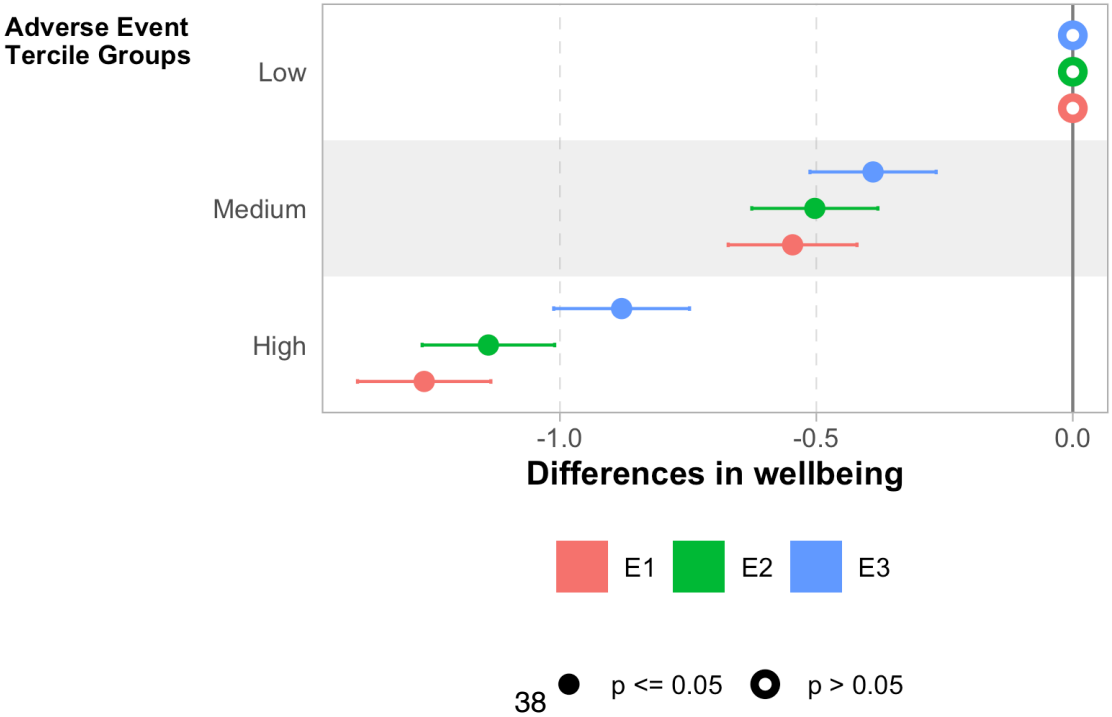
Those who have experienced more adverse life events during the pandemic do report substantially lower wellbeing scores, with the unconditional difference between the low and high prevalence groups being 1.4 points at Wave 1 and 1.3 points at Wave 2. A small part of this difference is explained by demographic characteristics (in E2). However, more is explained by social support (in E3), especially in terms of the those who experienced the most adverse life events (i.e., the High tercile group), bringing the gap between low and high prevalence groups to 0.85 points at Wave 1 and 0.88 points at Wave 2.

Figure 16: Differences in wellbeing by experience of adverse life events

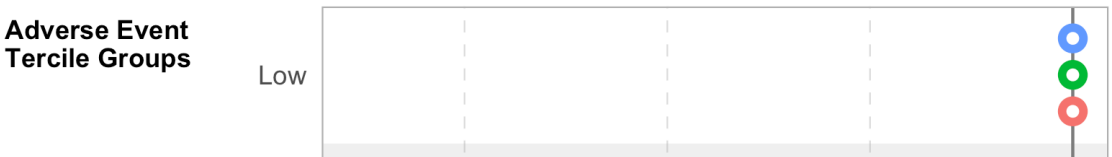
(a) Wave 1



(b) Wave 2

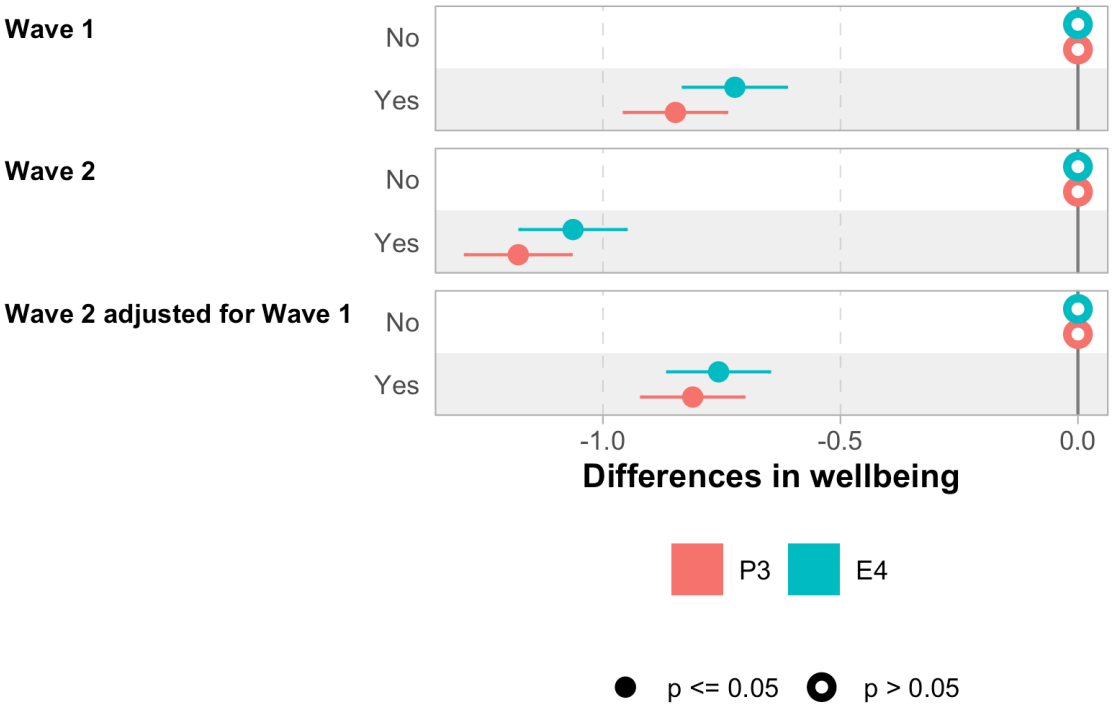


(c) Wave 2 adjusted for Wave 1



As has become familiar, the patterns are similar but substantially attenuated when considering differences at Wave 2 that control for differences at Wave 1. Nevertheless, there remains a substantial difference (0.36 points) in wellbeing at Wave 2 by adverse events experienced even after controlling for wellbeing at Wave 1, demographic characteristics and social support.

Figure 18: Differences in wellbeing by perceived ongoing negative impact of the pandemic, with and without controlling for adverse life events



Notes: Reporting coefficients from underlying regression models reported in Table 12, Table 13, and Table 14, and Table 15, Table 16, and Table 17.

Building on the models reported in Figure 16, we also explore whether the association between adverse life events and wellbeing is mediated by the perceived ongoing impact of the pandemic on wellbeing. The core results are plotted in Figure 18, which compares our model including the perceived ongoing impact of the pandemic on wellbeing (E4) with the analogous model excluding our events measure from earlier analyses (P3). The results suggest that, de-

spite the differences in perceptions explained by adverse events experienced as discussed at the start of this section, only a fairly small part of the perceived ongoing impact of the pandemic on wellbeing is explained by the experience of adverse life events during the pandemic.

We did also explore whether there was evidence that adverse events matter more for some groups than others using interactions between adverse life events and key demographic characteristics. These results are reported in column E5 of Table 15, Table 16 and Table 17 in Section 6. There is little evidence of any systematic moderation of the main effects that we have discussed.

5 Conclusions

This paper contributes to existing literature on young people's wellbeing in England in the aftermath of the COVID-19 pandemic by exploring levels of wellbeing at two time points since the pandemic and the factors associated with these levels. In particular, we build on existing work showing that the pandemic has had a negative impact on young people's wellbeing (e.g., Mansfield et al., 2022), along with evidence of some initial recovery in wellbeing in the latter phases of the pandemic (Henseke et al., 2022).

We contribute to evidence on ongoing issues of gender differences in wellbeing, which other evidence demonstrates to have been exacerbated by the pandemic (e.g., Davillas & Jones, 2021), with girls and those who identify as non-binary or in another way reporting lower wellbeing scores (on a scale from 1-10 around 0.5 for girls; around 1.5 for non-binary+ young people) than boys, even after adjusting for other demographic characteristics, self-reported levels of social support and experience of adverse life events. These are substantial differences that are relevant to the higher rates of mental health challenges for those in these groups. In particular, the large differences associated with identifying as non-binary or in another way suggest the need for targeted support for those in this group.

Our analysis makes innovative use of young people's own perceptions of the ongoing impact of the pandemic on their mental wellbeing in order to validate and quantify these reports. The findings of these analyses illustrate the importance of taking such reports seriously: those who indicate an ongoing negative impact in their lives have substantially lower subjective wellbeing scores — more than 1 point on a 1-10 scale — with similar differences across demographic groups.

Adverse life events experienced during the pandemic are shown to predict lower subjective wellbeing, although they can explain only a fairly small part of the lower scores we see among those who perceive an ongoing impact of the pandemic on their mental wellbeing. Contrary to our expectations, and in contrast to others' findings (Racine et al., 2021), while social support predicts higher wellbeing scores, we did not find evidence that it mediates or buffers the impact of adverse life events in our population.

This study benefits from a large, representative, longitudinal dataset, with direct reports from both young people and parents to improve the quality of data collected. Nevertheless, in drawing these conclusions, we are mindful of the limitations of this study, most particularly that our data lacks any pre-pandemic baseline measures of wellbeing, which would substantially increase our ability to understand the longer-term dynamics of the changes (or lack thereof) in wellbeing that we have observed. We should also be aware that our data is drawn from a single cohort of young people in England, whose final years in compulsory education were especially disrupted by the impacts of the pandemic, which is important context in any attempt to generalise our findings to other populations.

Our findings indicate continuing challenges of inequalities in young people's wellbeing and, hence, the importance of ongoing targeted support to overcome these. The practicalities of providing this at scale are now much harder for our specific cohort, since many of whom have now left education entirely, but many of the issues discussed will apply similarly to those still working their way through the education system who could be reached through schools and colleges. Ignoring this issue has potential implications for national economic performance (Deaton, 2008), including via the increased risk of mental health challenges implied (Lombardo

et al., 2018), if more instrumental motivation is needed than simply the negative implications for the life experiences of these young people.

References

Adali, T., Anders, J., Calderwood, L., Cullinane, C., Hamlyn, B., Kennett, J., Shao, X., Taylor, L., & Xu, D. (2022). *COVID Social Mobility & Opportunities study (COSMO): Wave 1 User Guide (Version 1)* [User {{Guide}}]. COVID Social Mobility & Opportunities Study.

Adali, T., Anders, J., Calderwood, L., Cullinane, C., Hamlyn, B., Kennett, J., Shao, X., Taylor, L., & Xu, D. (2023). *COVID Social Mobility & Opportunities study (COSMO): Wave 2 User Guide (Version 1)* [User {{Guide}}]. COVID Social Mobility & Opportunities Study.

Aksoy, O., Wu, A. F.-W., Aksoy, S., & Rivas, C. (2024). Social support and mental well-being among people with and without chronic illness during the Covid-19 pandemic: Evidence from the longitudinal UCL covid survey. *BMC Psychology*, *12*(1), 1–14. https://doi.org/10.1186/s40359-024-01596-x

Anders, J. (2024). The pandemic, socioeconomic disadvantage, and learning outcomes in England. In S. V. Schnepf, D. A. Klinger, O. Giancola, & L. Salmieri (Eds.), *The pandemic, socioeconomic disadvantage, and learning outcomes: Cross national impact analyses of education policy reforms*. Publications Office of the European Union.

Anders, J., Calderwood, L., Crawford, C., Cullinane, C., Goodman, A., Macmillan, L., Patalay, P., Wyness, G., & University College London, I. O. E. (2024a). *COVID Social Mobility and Opportunities Study: Wave 1, 2021-2022*. UK Data Service. https://doi.org/10.5255/UKDA-SN-9000-4

Anders, J., Calderwood, L., Crawford, C., Cullinane, C., Goodman, A., Macmillan, L., Patalay, P., Wyness, G., & University College London, I. O. E. (2024b). *COVID Social Mobility and Opportunities Study: Wave 2, 2022-2023*. UK Data Service. https://doi.org/10.5255/UKDA-SN-9158-2

Anders, J., Macmillan, L., Sturgis, P., & Wyness, G. (2023). Inequalities in late adolescents'

educational experiences and wellbeing during the Covid-19 pandemic. *Oxford Review of Education*, *49*(5), 620–642. https://doi.org/10.1080/03054985.2022.2124964

Andreoli, F., Kirsch, C., Peluso, E., & Prete, V. (2024). The subjective treatment effects of COVID-19 on child well-being: Evidence from Luxembourg. *International Review of Economics*. https://doi.org/10.1007/s12232-024-00453-y

Arel-Bundock, V., Greifer, N., & Heiss, A. (Forthcoming). How to interpret statistical models using `marginaleffects` in R and `Python`. *Journal of Statistical Software*. https://marginaleffects.com

Attwood, M., & Jarrold, C. (2023). Investigating the impact of the COVID-19 pandemic on older adolescents' psychological wellbeing and self-identified cognitive difficulties. *JCPP Advances*, *3*(4), e12164. https://doi.org/10.1002/jcv2.12164

Banks, J., & Xu, X. (2020). The Mental Health Effects of the First Two Months of Lockdown during the COVID-19 Pandemic in the UK*. *Fiscal Studies*, *41*(3), 685–708. https://doi.org/10.1111/1475-5890.12239

Blanchflower, D. G. (2021). Is happiness U-shaped everywhere? Age and subjective well-being in 145 countries. *Journal of Population Economics*, *34*(2), 575–624. https://doi.org/10.1007/s00148-020-00797-z

Cleland, C., Kearns, A., Tannahill, C., & Ellaway, A. (2016). The impact of life events on adult physical and mental health and well-being: Longitudinal analysis using the GoWell health and well-being survey. *BMC Research Notes*, *9*(1), 470. https://doi.org/10.1186/s13104-016-2278-x

Codiroli Mcmaster, N., & Cook, R. (2019). The contribution of intersectionality to quantitative research into educational inequalities. *Review of Education*, *7*(2), 271–292. https://doi.org/10.1002/rev3.3116

Creswell, C., Shum, A., Pearcey, S., Skripkauskaite, S., Patalay, P., & Waite, P. (2021). Young people's mental health during the COVID-19 pandemic. *The Lancet Child & Adolescent Health*, *0*(0). https://doi.org/10.1016/S2352-4642(21)00177-2

Cutrona, C. E., & Russell, D. W. (2018). *Social Provisions Scale*. American Psychological Association. https://doi.org/10.1037/t06213-000

Davillas, A., & Jones, A. M. (2021). *The First Wave of the COVID-19 Pandemic and Its Impact on Socioeconomic Inequality in Psychological Distress in the UK* ({{IZA Discussion Paper}} 14057; p. 34). IZA Institute of Labor Economics.

De France, K., Hancock, G. R., Stack, D. M., Serbin, L. A., & Hollenstein, T. (2022). The mental health implications of COVID-19 for adolescents: Follow-up of a four-wave longitudinal study during the pandemic. *American Psychologist*, *77*(1), 85–99. https://doi.org/10.1037/amp0000838

Deaton, A. (2008). Income, Health, and Well-Being around the World: Evidence from the Gallup World Poll. *Journal of Economic Perspectives*, *22*(2), 53–72. https://doi.org/10.1257/jep.22.2.53

Henseke, G. (mimeo). *Revisiting the Mental Health Impact of COVID-19 on Young Adults: Long-Term Trends, Temporary Setbacks, and Recovery* [Unpublished Work].

Henseke, G., Green, F., & Schoon, I. (2022). Living with COVID-19: Subjective Well-Being in the Second Phase of the Pandemic. *Journal of Youth and Adolescence*, *51*(9), 1679–1692. https://doi.org/10.1007/s10964-022-01648-8

Jakubowski, M., Gajderowicz, T., & Patrinos, H. (2024). *COVID-19, School Closures, and Student Learning Outcomes: New Global Evidence from Pisa*.

Jovanović, V. (2016). The validity of the Satisfaction with Life Scale in adolescents and a comparison with single-item life satisfaction measures: A preliminary study. *Quality of Life Research*, *25*(12), 3173–3180. https://doi.org/10.1007/s11136-016-1331-5

Kalenkoski, C. M., & Pabilonia, S. W. (2024). Teen social interactions and well-being during the COVID-19 pandemic. *Review of Economics of the Household*. https://doi.org/10.1007/s11150-024-09712-x

Kauhanen, L., Wan Mohd Yunus, W. M. A., Lempinen, L., Peltonen, K., Gyllenberg, D., Mishina, K., Gilbert, S., Bastola, K., Brown, J. S. L., & Sourander, A. (2023). A systematic review of the mental health changes of children and young people before and during the COVID-19 pandemic. *European Child & Adolescent Psychiatry*, *32*(6), 995–1013. https://doi.org/10.1007/s00787-022-02060-0

Kung, C. S. J., Kunz, J. S., & Shields, M. A. (2023). COVID-19 lockdowns and changes

in loneliness among young people in the U.K. *Social Science & Medicine*, *320*, 115692. https://doi.org/10.1016/j.socscimed.2023.115692

Larmarange, J. (2024). *Ggstats: Extension to ggplot2 for plotting stats*. https://larmarange.github.io/ggstats/

Levin, K. A., & Currie, C. (2014). Reliability and Validity of an Adapted Version of the Cantril Ladder for Use with Adolescent Samples. *Social Indicators Research*, *119*(2), 1047–1063. https://doi.org/10.1007/s11205-013-0507-4

Lombardo, P., Jones, W., Wang, L., Shen, X., & Goldner, E. M. (2018). The fundamental association between mental health and life satisfaction: Results from successive waves of a Canadian national survey. *BMC Public Health*, *18*(1), 342. https://doi.org/10.1186/s12889-018-5235-x

Lumley, T. (2019). *Mitools: Tools for multiple imputation of missing data*. https://CRAN.R-project.org/package=mitools

Lumley, T., Gao, P., & Schneider, B. (2024). *Survey: Analysis of complex survey samples*. http://r-survey.r-forge.r-project.org/survey/

Mansfield, R., Santos, J., Deighton, J., Hayes, D., Velikonja, T., Boehnke, J. R., & Patalay, P. (2022). The impact of the COVID-19 pandemic on adolescent mental health: A natural experiment. *Royal Society Open Science*, *9*(4), 211114. https://doi.org/10.1098/rsos.211114

Neugebauer, M., Patzina, A., Dietrich, H., & Sandner, M. (2023). *Two Pandemic Years Greatly Reduced Young People's Life Satisfaction: Evidence from a Comparison with Pre-COVID-19 Panel Data*.

Newlove-Delgado, T., McManus, S., Sadler, K., Thandi, S., Vizard, T., Cartwright, C., & Ford, T. (2021). Child mental health in England before and during the COVID-19 lockdown. *The Lancet Psychiatry*, *8*(5), 353–354. https://doi.org/10.1016/S2215-0366(20)30570-8

Office for National Statistics. (2018). Personal well-being user guidance. In *Office for National Statistics*. https://www.ons.gov.uk/peoplepopulationandcommunity/wellbeing/methodologies/personalwellbe

Office for National Statistics. (2023). *Personal well-being in the UK* [Statistical {{Bulletin}}]. Office for National Statistics.

Owens, M., Townsend, E., Hall, E., Bhatia, T., Fitzgibbon, R., & Miller-Lakin, F. (2022). Mental Health and Wellbeing in Young People in the UK during Lockdown (COVID-19). *International Journal of Environmental Research and Public Health*, *19*(3), 1132. https://doi.org/10.3390/ijerph19031132

Pearlin, L. I. (1989). The Sociological Study of Stress. *Journal of Health and Social Behavior*, *30*(3), 241–256. https://doi.org/10.2307/2136956

Petersen, K. J., Humphrey, N., & Qualter, P. (2022). Dual-Factor Mental Health from Childhood to Early Adolescence and Associated Factors: A Latent Transition Analysis. *Journal of Youth and Adolescence*, *51*(6), 1118–1133. https://doi.org/10.1007/s10964-021-01550-9

Proto, E., & Quintana-Domeque, C. (2021). COVID-19 and mental health deterioration by ethnicity and gender in the UK. *PLOS ONE*, *16*(1), e0244419. https://doi.org/10.1371/journal.pone.0244419

Quintana-Domeque, C., & Proto, E. (2022). On the Persistence of Mental Health Deterioration during the COVID-19 Pandemic by Sex and Ethnicity in the UK: Evidence from Understanding Society. *The B.E. Journal of Economic Analysis & Policy*, *22*(2), 361–372. https://doi.org/10.1515/bejeap-2021-0394

Quintana-Domeque, C., & Zeng, J. (2023). *COVID-19 and mental health: Natural experiments of the costs of lockdowns* ({{IZA Discussion Paper}} 16532). IZA Institute of Labor Economics.

R Core Team. (2024). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. https://www.R-project.org/

Racine, N., McArthur, B. A., Cooke, J. E., Eirich, R., Zhu, J., & Madigan, S. (2021). Global Prevalence of Depressive and Anxiety Symptoms in Children and Adolescents During COVID-19: A Meta-analysis. *JAMA Pediatrics*, *175*(11), 1142–1150. https://doi.org/10.1001/jamapediatrics.2021.2482

Ravens-Sieberer, U., Kaman, A., Erhart, M., Devine, J., Schlack, R., & Otto, C. (2022). Impact of the COVID-19 pandemic on quality of life and mental health in children and adolescents in Germany. *European Child & Adolescent Psychiatry*, *31*(6), 879–889. https://doi.org/10

.1007/s00787-021-01726-5

Revelle, W. (2024). *Psych: Procedures for psychological, psychometric, and personality research*. https://personality-project.org/r/psych/

Ruggeri, K., Garcia-Garzon, E., Maguire, Á., Matz, S., & Huppert, F. A. (2020). Well-being is more than happiness and life satisfaction: A multidimensional analysis of 21 countries. *Health and Quality of Life Outcomes*, *18*(1), 192. https://doi.org/10.1186/s12955-020-01423-y

Samji, H., Wu, J., Ladak, A., Vossen, C., Stewart, E., Dove, N., Long, D., & Snell, G. (2022). Review: Mental health impacts of the COVID-19 pandemic on children and youth – a systematic review. *Child and Adolescent Mental Health*, *27*(2), 173–189. https://doi.org/10.1111/camh.12501

Sonuga-Barke, E., & Fearon, P. (2021). Editorial: Do lockdowns scar? Three putative mechanisms through which COVID-19 mitigation policies could cause long-term harm to young people's mental health. *Journal of Child Psychology and Psychiatry*, *62*(12), 1375–1378. https://doi.org/10.1111/jcpp.13537

van Buuren, S., & Groothuis-Oudshoorn, K. (2023). *Mice: Multivariate imputation by chained equations*. https://github.com/amices/mice

Wolf, K., & Schmitz, J. (2024). Scoping review: Longitudinal effects of the COVID-19 pandemic on child and adolescent mental health. *European Child & Adolescent Psychiatry*, *33*(5), 1257–1312. https://doi.org/10.1007/s00787-023-02206-8

6 Appendix: Full regression tables

Table 9: Differences in wellbeing at Wave 1

	L1		L2		L3		L4	
Characteristic	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]
(Intercept)	6.7***	0.062	6.4***	0.057	6.2***	0.076	6.6***	0.087
Gender								
Male	—	—					—	—
Female	-0.63***	0.057					-0.63***	0.056
Non-Binary+	-1.9***	0.216					-1.9***	0.218
Ethnicity								
White			—	—			—	—
Mixed			-0.33*	0.133			-0.27*	0.127
Black			0.08	0.086			0.09	0.087
Asian			-0.10	0.103			0.02	0.103
Other			0.03	0.229			0.06	0.224
SES Quintile Groups								
1 (Low SES)					—	—	—	—
2					0.03	0.094	0.00	0.093
3					0.15	0.099	0.15	0.097
4					0.26**	0.090	0.27**	0.089
5 (High SES)					0.30**	0.094	0.30**	0.094
SES Quintile Groups * Gender								
2 * Female								
3 * Female								
4 * Female								
5 (High SES) * Female								
2 * Non-Binary+								
3 * Non-Binary+								
4 * Non-Binary+								
5 (High SES) * Non-Binary+								
SES Quintile Groups * Ethnicity								
2 * Mixed								
3 * Mixed								
4 * Mixed								
5 (High SES) * Mixed								
2 * Black								
3 * Black								
4 * Black								
5 (High SES) * Black								
2 * Asian								
3 * Asian								
4 * Asian								
5 (High SES) * Asian								
2 * Other								
3 * Other								
4 * Other								
5 (High SES) * Other								
Gender * Ethnicity								
Female * Mixed								
Non-Binary+ * Mixed								
Female * Black								
Non-Binary+ * Black								
Female * Asian								
Non-Binary+ * Asian								
Female * Other								
Non-Binary+ * Other								
Social Provisions Scale								
Gender * Social Provisions Scale								
Female * Social Provisions Scale								
Non-Binary+ * Social Provisions Scale								

Table 10: Differences in wellbeing at Wave 2

	L1		L2		L3		L4	
Characteristic	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]
(Intercept)	6.8***	0.050	6.4***	0.043	6.3***	0.069	6.6***	0.081
Gender								
Male	—	—					—	—
Female	-0.63***	0.057					-0.63***	0.057
Non-Binary+	-1.9***	0.212					-1.8***	0.214
Ethnicity								
White			—	—			—	—
Mixed			-0.33*	0.135			-0.27*	0.127
Black			0.08	0.086			0.10	0.088
Asian			-0.09	0.104			0.04	0.104
Other			0.01	0.230			0.05	0.225
SES Quintile Groups								
1 (Low SES)					—	—	—	—
2					0.03	0.095	0.00	0.093
3					0.16	0.099	0.17	0.097
4					0.27**	0.089	0.28**	0.089
5 (High SES)					0.33***	0.095	0.33***	0.095
SES Quintile Groups * Gender								
2 * Female								
3 * Female								
4 * Female								
5 (High SES) * Female								
2 * Non-Binary+								
3 * Non-Binary+								
4 * Non-Binary+								
5 (High SES) * Non-Binary+								
SES Quintile Groups * Ethnicity								
2 * Mixed								
3 * Mixed								
4 * Mixed								
5 (High SES) * Mixed								
2 * Black								
3 * Black								
4 * Black								
5 (High SES) * Black								
2 * Asian								
3 * Asian								
4 * Asian								
5 (High SES) * Asian								
2 * Other								
3 * Other								
4 * Other								
5 (High SES) * Other								
Gender * Ethnicity								
Female * Mixed								
Non-Binary+ * Mixed								
Female * Black								
Non-Binary+ * Black								
Female * Asian								
Non-Binary+ * Asian								
Female * Other								
Non-Binary+ * Other								
Social Provisions Scale								
Gender * Social Provisions Scale								
Female * Social Provisions Scale								
Non-Binary+ * Social Provisions Scale								

Table 11: Differences in wellbeing at Wave 2 (conditional on Wave 1 wellbeing)

	L1		L2		L3		L4	
Characteristic	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]
(Intercept)	3.3***	0.118	3.0***	0.106	2.9***	0.112	3.2***	0.126
Gender								
Male	—	—					—	—
Female	-0.28***	0.046					-0.29***	0.046
Non-Binary+	-0.77***	0.169					-0.75***	0.169
Wave 1 Wellbeing	0.51***	0.015	0.53***	0.014	0.53***	0.014	0.51***	0.015
Ethnicity								
White			—	—			—	—
Mixed			-0.17	0.098			-0.15	0.098
Black			-0.01	0.058			0.00	0.060
Asian			0.04	0.083			0.10	0.086
Other			0.18	0.177			0.19	0.176
SES Quintile Groups								
1 (Low SES)					—	—	—	—
2					0.10	0.075	0.09	0.074
3					0.06	0.071	0.07	0.071
4					0.13	0.076	0.15	0.077
5 (High SES)					0.15*	0.075	0.17*	0.078
SES Quintile Groups * Gender								
2 * Female								
3 * Female								
4 * Female								
5 (High SES) * Female								
2 * Non-Binary+								
3 * Non-Binary+								
4 * Non-Binary+								
5 (High SES) * Non-Binary+								
SES Quintile Groups * Ethnicity								
2 * Mixed								
3 * Mixed								
4 * Mixed								
5 (High SES) * Mixed								
2 * Black								
3 * Black								
4 * Black								
5 (High SES) * Black								
2 * Asian								
3 * Asian								
4 * Asian								
5 (High SES) * Asian								
2 * Other								
3 * Other								
4 * Other								
5 (High SES) * Other								
Gender * Ethnicity								
Female * Mixed								
Non-Binary+ * Mixed								
Female * Black								
Non-Binary+ * Black								
Female * Asian								
Non-Binary+ * Asian								
Female * Other								
Non-Binary+ * Other								
Social Provisions Scale								
Gender * Social Provisions Scale								
Female * Social Provisions Scale								
Non-Binary+ * Social Provisions Scale								

Table 12: Differences in wellbeing at Wave 1 by perceived continuing impact of pandemic on wellbein

	P1		P2	
Characteristic	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]
(Intercept)	6.7***	0.057	6.9***	0.103
Negative continuing impact of pandemic on mental wellbeing				
No	—	—	—	—
Yes	-1.1***	0.062	-1.0***	0.062
Gender				
Male			—	—
Female			-0.46***	0.057
Non-Binary+			-1.5***	0.213
Ethnicity				
White			—	—
Mixed			-0.28*	0.123
Black			0.04	0.082
Asian			0.00	0.102
Other			0.09	0.219
Parental Education				
Graduate			—	—
Below Graduate			-0.07	0.066
No Quals			-0.22	0.124
Unknown			-0.09	0.303
Housing Tenure				
Own House			—	—
Other			-0.10	0.066
IDACI Quintile Group				
1 (High Deprivation)			—	—
2			0.14	0.093
3			0.07	0.098
4			0.22*	0.097
5 (Low Deprivation)			0.27**	0.103
Social Provisions Scale				
Negative continuing impact of pandemic on mental wellbeing * Gender				
Yes * Female				
Yes * Non-Binary+				
Negative continuing impact of pandemic on mental wellbeing * Ethnicity				
Yes * Mixed				
Yes * Black				
Yes * Asian				
Yes * Other				
Negative continuing impact of pandemic on mental wellbeing * Parental Education				
Yes * Below Graduate				
Yes * No Quals				
Yes * Unknown				
Negative continuing impact of pandemic on mental wellbeing * Housing Tenure				
Yes * Other				
Negative continuing impact of pandemic on mental wellbeing * IDACI Quintile Group				
Yes * 2				
Yes * 3				
Yes * 4				
Yes * 5 (Low Deprivation)				
Negative continuing impact of pandemic on mental wellbeing * Social Provisions Scale				
Yes * Social Provisions Scale				
W1 Month of Interview				
Sep 2021	—	—	—	—
Oct 2021	0.12	0.067	0.07	0.067
Nov 2021	0.37*	0.185	0.29	0.184
Dec 2021	0.25	0.132	0.23	0.132
Jan 2022	0.48	0.254	0.45	0.234

Table 13: Differences in wellbeing at Wave 2 by perceived continuing impact of pandemic on wellbein

	P1		P2	
Characteristic	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]
(Intercept)	6.9***	0.041	7.0***	0.093
Negative continuing impact of pandemic on mental wellbeing				
No	—	—	—	—
Yes	-1.4***	0.059	-1.3***	0.058
Gender				
Male			—	—
Female			-0.40***	0.056
Non-Binary+			-1.2***	0.184
Ethnicity				
White			—	—
Mixed			-0.29*	0.118
Black			-0.06	0.073
Asian			0.10	0.104
Other			0.25	0.194
Parental Education				
Graduate			—	—
Below Graduate			-0.03	0.064
No Quals			0.14	0.109
Unknown			-0.10	0.318
Housing Tenure				
Own House			—	—
Other			-0.23***	0.060
IDACI Quintile Group				
1 (High Deprivation)			—	—
2			0.19*	0.088
3			0.22*	0.092
4			0.26**	0.091
5 (Low Deprivation)			0.23*	0.094
Social Provisions Scale				
Negative continuing impact of pandemic on mental wellbeing * Gender				
Yes * Female				
Yes * Non-Binary+				
Negative continuing impact of pandemic on mental wellbeing * Ethnicity				
Yes * Mixed				
Yes * Black				
Yes * Asian				
Yes * Other				
Negative continuing impact of pandemic on mental wellbeing * Parental Education				
Yes * Below Graduate				
Yes * No Quals				
Yes * Unknown				
Negative continuing impact of pandemic on mental wellbeing * Housing Tenure				
Yes * Other				
Negative continuing impact of pandemic on mental wellbeing * IDACI Quintile Group				
Yes * 2				
Yes * 3				
Yes * 4				
Yes * 5 (Low Deprivation)				
Negative continuing impact of pandemic on mental wellbeing * Social Provisions Scale				
Yes * Social Provisions Scale				
W2 Month of Survey				
October 2022	—	—	—	—
November 2022	-0.04	0.056	-0.09	0.055
December 2022	0.13	0.126	0.09	0.122
January 2023	0.21	0.271	0.13	0.270
February 2023	0.47	0.243	0.41	0.256

Table 14: Differences in wellbeing at Wave 2 (conditional on Wave 1 wellbeing) by perceived continuing impact of on wellbeing

	P1		P2	
Characteristic	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**
(Intercept)	3.6***	0.121	3.7***	0.15
Negative continuing impact of pandemic on mental wellbeing				
No	—	—	—	—
Yes	-0.85***	0.055	-0.81***	0.05
Wave 1 Wellbeing	0.48***	0.015	0.46***	0.01
Gender				
Male			—	—
Female			-0.19***	0.04
Non-Binary+			-0.54**	0.16
Ethnicity				
White			—	—
Mixed			-0.15	0.09
Black			-0.09	0.06
Asian			0.09	0.08
Other			0.22	0.17
Parental Education				
Graduate			—	—
Below Graduate			0.03	0.05
No Quals			0.24**	0.08
Unknown			-0.07	0.26
Housing Tenure				
Own House			—	—
Other			-0.18***	0.05
IDACI Quintile Group				
1 (High Deprivation)			—	—
2			0.12	0.07
3			0.19*	0.08
4			0.15*	0.07
5 (Low Deprivation)			0.08	0.07
Social Provisions Scale				
Negative continuing impact of pandemic on mental wellbeing * Gender				
Yes * Female				
Yes * Non-Binary+				
Negative continuing impact of pandemic on mental wellbeing * Ethnicity				
Yes * Mixed				
Yes * Black				
Yes * Asian				
Yes * Other				
Negative continuing impact of pandemic on mental wellbeing * Parental Education				
Yes * Below Graduate				
Yes * No Quals				
Yes * Unknown				
Negative continuing impact of pandemic on mental wellbeing * Housing Tenure				
Yes * Other				
Negative continuing impact of pandemic on mental wellbeing * IDACI Quintile Group				
Yes * 2				
Yes * 3				
Yes * 4				
Yes * 5 (Low Deprivation)				
Negative continuing impact of pandemic on mental wellbeing * Social Provisions Scale				
Yes * Social Provisions Scale				
W1 Month of Interview				
Sep 2021	—	—	—	—
Oct 2021	0.07	0.057	0.05	0.05
Nov 2021	0.29*	0.113	0.27*	0.11

Table 15: Differences in wellbeing at Wave 1 by number of life events experienced during pandemic

	E1		E2		E3
Characteristic	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]	**Beta**[1]
(Intercept)	7.0***	0.064	7.2***	0.107	7.0***
Adverse Event Tercile Groups					
Low	—	—	—	—	—
Medium	-0.58***	0.066	-0.53***	0.066	-0.36***
High	-1.4***	0.070	-1.3***	0.070	-0.85***
Gender					
Male			—	—	—
Female			-0.48***	0.056	-0.50***
Non-Binary+			-1.6***	0.204	-1.3***
Ethnicity					
White			—	—	—
Mixed			-0.23	0.126	-0.11
Black			0.03	0.086	0.14
Asian			-0.03	0.100	0.17
Other			0.08	0.220	0.20
Parental Education					
Graduate			—	—	—
Below Graduate			-0.02	0.064	-0.01
No Quals			-0.16	0.126	-0.04
Unknown			-0.01	0.314	0.21
Housing Tenure					
Own House			—	—	—
Other			-0.09	0.067	-0.06
IDACI Quintile Group					
1 (High Deprivation)			—	—	—
2			0.05	0.091	0.03
3			-0.02	0.098	-0.03
4			0.17	0.096	0.15
5 (Low Deprivation)			0.14	0.100	0.12
Social Provisions Scale					0.83***
Negative continuing impact of pandemic on mental wellbeing					
No					
Yes					
Adverse Event Tercile Groups * Gender					
Medium * Female					
High * Female					
Medium * Non-Binary+					
High * Non-Binary+					
Ethnicity * Negative continuing impact of pandemic on mental wellbeing					
Mixed * Yes					
Black * Yes					
Asian * Yes					
Other * Yes					
Adverse Event Tercile Groups * Parental Education					
Medium * Below Graduate					
High * Below Graduate					
Medium * No Quals					
High * No Quals					
Medium * Unknown					
High * Unknown					
Adverse Event Tercile Groups * Housing Tenure					
Medium * Other					
High * Other					
Adverse Event Tercile Groups * IDACI Quintile Group					
Medium * 2					
High * 2					
Medium * 3					

Table 16: Differences in wellbeing at Wave 2 by number of life events experienced during pandemic

	E1		E2		E3
Characteristic	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]	**Beta**[1]
(Intercept)	7.0***	0.049	7.2***	0.098	7.0***
Adverse Event Tercile Groups					
Low	—	—	—	—	—
Medium	-0.55***	0.064	-0.50***	0.063	-0.39***
High	-1.3***	0.066	-1.1***	0.066	-0.88***
Gender					
Male			—	—	—
Female			-0.48***	0.054	-0.49***
Non-Binary+			-1.4***	0.174	-1.2***
Ethnicity					
White			—	—	—
Mixed			-0.24	0.124	-0.16
Black			-0.06	0.078	0.01
Asian			0.09	0.101	0.22*
Other			0.23	0.202	0.31
Parental Education					
Graduate			—	—	—
Below Graduate			0.03	0.064	0.04
No Quals			0.22*	0.112	0.30**
Unknown			0.02	0.325	0.15
Housing Tenure					
Own House			—	—	—
Other			-0.24***	0.062	-0.22***
IDACI Quintile Group					
1 (High Deprivation)			—	—	—
2			0.10	0.086	0.09
3			0.13	0.093	0.11
4			0.22*	0.093	0.20*
5 (Low Deprivation)			0.09	0.095	0.07
Social Provisions Scale					0.53***
Negative continuing impact of pandemic on mental wellbeing					
No					
Yes					
Adverse Event Tercile Groups * Gender					
Medium * Female					
High * Female					
Medium * Non-Binary+					
High * Non-Binary+					
Ethnicity * Negative continuing impact of pandemic on mental wellbeing					
Mixed * Yes					
Black * Yes					
Asian * Yes					
Other * Yes					
Adverse Event Tercile Groups * Parental Education					
Medium * Below Graduate					
High * Below Graduate					
Medium * No Quals					
High * No Quals					
Medium * Unknown					
High * Unknown					
Adverse Event Tercile Groups * Housing Tenure					
Medium * Other					
High * Other					
Adverse Event Tercile Groups * IDACI Quintile Group					
Medium * 2					
High * 2					
Medium * 3					

Table 17: Differences in wellbeing at Wave 2 (conditional on Wave 1 wellbeing) by number of life events ex
during pandemic

	E1		E2		E3
Characteristic	**Beta**[1]	**SE**[2]	**Beta**[1]	**SE**[2]	**Beta**[1]
(Intercept)	3.5***	0.126	3.7***	0.154	4.2***
Adverse Event Tercile Groups					
Low	—	—	—	—	—
Medium	-0.26***	0.056	-0.25***	0.056	-0.19***
High	-0.59***	0.060	-0.54***	0.060	-0.36***
Wave 1 Wellbeing	0.49***	0.015	0.48***	0.015	0.41***
Gender					
Male			—	—	—
Female			-0.24***	0.045	-0.18***
Non-Binary+			-0.69***	0.162	-0.50**
Ethnicity					
White			—	—	—
Mixed			-0.12	0.098	-0.13
Black			-0.08	0.061	-0.07
Asian			0.09	0.088	0.11
Other			0.21	0.177	0.25
Parental Education					
Graduate			—	—	—
Below Graduate			0.06	0.053	0.03
No Quals			0.30***	0.088	0.25**
Unknown			0.01	0.263	-0.04
Housing Tenure					
Own House			—	—	—
Other			-0.20***	0.054	-0.17**
IDACI Quintile Group					
1 (High Deprivation)			—	—	—
2			0.07	0.074	0.10
3			0.13	0.081	0.17*
4			0.12	0.079	0.15
5 (Low Deprivation)			0.00	0.079	0.05
Social Provisions Scale					0.17***
Negative continuing impact of pandemic on mental wellbeing					
No					—
Yes					-0.76***
Adverse Event Tercile Groups * Gender					
Medium * Female					
High * Female					
Medium * Non-Binary+					
High * Non-Binary+					
Ethnicity * Negative continuing impact of pandemic on mental wellbeing					
Mixed * Yes					
Black * Yes					
Asian * Yes					
Other * Yes					
Adverse Event Tercile Groups * Parental Education					
Medium * Below Graduate					
High * Below Graduate					
Medium * No Quals					
High * No Quals					
Medium * Unknown					
High * Unknown					
Adverse Event Tercile Groups * Housing Tenure					
Medium * Other					
High * Other					
Adverse Event Tercile Groups * IDACI Quintile Group					

7 Appendix: Multiple Imputation

Table 18: Regression of wellbeing at Wave 1 on perceived negative impact of COVID-19 on mental wellbeing

Characteristic	**Beta**[1]	**SE**[2]
(Intercept)	3.3***	0.130
Gender		
Male	—	—
Female	-0.47***	0.051
Non-Binary+	-1.2***	0.178
Ethnicity		
White	—	—
Mixed	-0.09	0.115
Black	0.15*	0.071
Asian	0.18*	0.079
Other	0.18	0.174
SES Quintile Group		
Q1 (Low)	—	—
Q2	-0.10	0.080
Q3	0.04	0.081
Q4	-0.01	0.076
Q5 (High)	0.07	0.081
Social Provisions Scale	0.64***	0.021
Adverse Event Index	-0.50***	0.037
Wave 1 Survey Month		
Sep 2021	—	—
Oct 2021	0.03	0.057
Nov 2021	0.37*	0.154
Dec 2021	0.09	0.108
Jan 2022	0.33	0.244
Feb 2022	-0.43*	0.212
Mar 2022	-0.12	0.081
Apr 2022	-0.09	0.088
N	9,307	

[1]*p<0.05; **p<0.01; ***p<0.001

[2]SE = Standard Error

Notes: All estimates are weighted and inference accounts for the complex survey design. Minimum residual degrees of freedom in any of the 10 imputations = 748

Table 19: Regression of wellbeing at Wave 2 on perceived negative impact of COVID-19 on mental wellbeing

Characteristic	**Beta**[1]	**SE**[2]
(Intercept)	4.8***	0.130
Negative continuing impact of pandemic on mental wellbeing		
No	—	—
Yes	-1.0***	0.055
Gender		
Male	—	—
Female	-0.32***	0.049
Non-Binary+	-0.97***	0.166
Ethnicity		
White	—	—
Mixed	-0.16	0.109
Black	0.09	0.066
Asian	0.06	0.091
Other	0.30	0.162
SES Quintile Group		
Q1 (Low)	—	—
Q2	0.09	0.078
Q3	0.08	0.075
Q4	0.15	0.077
Q5 (High)	0.26**	0.087
Social Provisions Scale	0.39***	0.021
Adverse Event Index	-0.39***	0.035
Wave 2 Survey Month		
October 2022	—	—
November 2022	-0.11*	0.052
December 2022	0.09	0.104
January 2023	0.25	0.289
February 2023	0.34	0.208
March 2023	0.41*	0.182
April 2023	0.01	0.178
N	9,307	

[1]*p<0.05; **p<0.01; ***p<0.001

[2]SE = Standard Error

Notes: All estimates are weighted and inference accounts for the complex survey design. Minimum residual degrees of freedom in any of the 10 imputations = 748

Table 20: Regression of wellbeing at Wave 2 (adjusted for wellbeing at Wave 1) on perceived negative impact of COVID-19 on mental wellbeing

Characteristic	**Beta**[1]	**SE**[2]
(Intercept)	3.3***	0.134
Wave 1 Wellbeing	0.41***	0.016
Negative continuing impact of pandemic on mental wellbeing		
No	—	—
Yes	-0.75***	0.051
Gender		
Male	—	—
Female	-0.16***	0.043
Non-Binary+	-0.56***	0.162
Ethnicity		
White	—	—
Mixed	-0.11	0.089
Black	0.03	0.057
Asian	-0.03	0.083
Other	0.24	0.149
SES Quintile Group		
Q1 (Low)	—	—
Q2	0.13	0.071
Q3	0.05	0.067
Q4	0.13	0.070
Q5 (High)	0.17*	0.073
Social Provisions Scale	0.13***	0.021
Adverse Event Index	-0.22***	0.031
Wave 1 Survey Month		
Sep 2021	—	—
Oct 2021	0.01	0.052
Nov 2021	0.24*	0.122
Dec 2021	0.36**	0.113
Jan 2022	0.19	0.175
Feb 2022	0.23	0.285
Mar 2022	-0.03	0.069
Apr 2022	-0.03	0.075
Wave 2 Survey Month		
October 2022	—	—
November 2022	-0.08	0.047
December 2022	0.13	0.095
January 2023	0.40	0.264
February 2023	0.20	0.201
March 2023	0.44**	0.151
April 2023	0.00	0.176
N	9,307	

[1]*p<0.05; **p<0.01; ***p<0.001

[2]SE = Standard Error

Notes: All estimates are weighted and inference accounts for the complex survey design. Minimum residual degrees of freedom in any of the 10 imputations = 740

Table 21: Regression of wellbeing at Wave 1 on perceived negative impact of COVID-19 on mental wellbeing

Characteristic	**Beta**[1]	**SE**[2]
(Intercept)	3.5***	0.167
Negative continuing impact of pandemic on mental wellbeing		
No	—	—
Yes	-0.84***	0.051
Gender		
Male	—	—
Female	-0.45***	0.050
Non-Binary+	-1.1***	0.184
Ethnicity		
White	—	—
Mixed	-0.11	0.114
Black	0.15*	0.072
Asian	0.19*	0.080
Other	0.19	0.170
Parental Education	-0.02	0.045
Housing Tenure	-0.05	0.057
IDACI Quintile Group		
1 (High Deprivation)	—	—
2	0.07	0.077
3	0.03	0.084
4	0.17*	0.082
5 (Low Deprivation)	0.19*	0.087
Social Provisions Scale	0.67***	0.020
Wave 1 Survey Month		
Sep 2021	—	—
Oct 2021	0.02	0.056
Nov 2021	0.33*	0.158
Dec 2021	0.08	0.110
Jan 2022	0.36	0.246
Feb 2022	-0.53**	0.202
Mar 2022	-0.12	0.080
Apr 2022	-0.07	0.088
N	9,307	

[1]*p<0.05; **p<0.01; ***p<0.001

[2]SE = Standard Error

Notes: All estimates are weighted and inference accounts for the complex survey design. Minimum residual degrees of freedom in any of the 10 imputations = 746

Table 22: Regression of wellbeing at Wave 2 on perceived negative impact of COVID-19 on mental wellbeing

Characteristic	**Beta**[1]	**SE**[2]
(Intercept)	4.9***	0.170
Negative continuing impact of pandemic on mental wellbeing		
No	—	—
Yes	-1.2***	0.054
Gender		
Male	—	—
Female	-0.38***	0.050
Non-Binary+	-1.1***	0.168
Ethnicity		
White	—	—
Mixed	-0.16	0.110
Black	0.08	0.067
Asian	0.11	0.095
Other	0.32	0.165
Parental Education	0.03	0.044
Housing Tenure	-0.17**	0.056
IDACI Quintile Group		
1 (High Deprivation)	—	—
2	0.15*	0.077
3	0.13	0.081
4	0.19*	0.081
5 (Low Deprivation)	0.20*	0.086
Social Provisions Scale	0.43***	0.021
Wave 2 Survey Month		
October 2022	—	—
November 2022	-0.10*	0.052
December 2022	0.08	0.108
January 2023	0.23	0.280
February 2023	0.34	0.205
March 2023	0.40*	0.181
April 2023	0.00	0.174
N	9,307	

[1]*p<0.05; **p<0.01; ***p<0.001

[2]SE = Standard Error

Notes: All estimates are weighted and inference accounts for the complex survey design. Minimum residual degrees of freedom in any of the 10 imputations = 747

Table 23: Regression of wellbeing at Wave 2 (adjusted for wellbeing at Wave 1) on perceived negative impact of COVID-19 on mental wellbeing

Characteristic	**Beta**[1]	**SE**[2]
(Intercept)	3.3***	0.171
Wave 1 Wellbeing	0.43***	0.016
Negative continuing impact of pandemic on mental wellbeing		
No	—	—
Yes	-0.81***	0.051
Gender		
Male	—	—
Female	-0.19***	0.043
Non-Binary+	-0.61***	0.162
Ethnicity		
White	—	—
Mixed	-0.10	0.089
Black	0.01	0.057
Asian	0.01	0.086
Other	0.25	0.151
Parental Education	0.05	0.037
Housing Tenure	-0.15**	0.050
IDACI Quintile Group		
1 (High Deprivation)	—	—
2	0.12	0.067
3	0.12	0.075
4	0.10	0.072
5 (Low Deprivation)	0.10	0.074
Social Provisions Scale	0.14***	0.021
Wave 1 Survey Month		
Sep 2021	—	—
Oct 2021	0.01	0.052
Nov 2021	0.24*	0.120
Dec 2021	0.36**	0.114
Jan 2022	0.21	0.172
Feb 2022	0.23	0.285
Mar 2022	-0.04	0.070
Apr 2022	-0.02	0.076
Wave 2 Survey Month		
October 2022	—	—
November 2022	-0.08	0.047
December 2022	0.12	0.096
January 2023	0.40	0.256
February 2023	0.18	0.197
March 2023	0.44**	0.150
April 2023	-0.01	0.172
N	9,307	

[1]*p<0.05; **p<0.01; ***p<0.001

[2]SE = Standard Error

Notes: All estimates are weighted and inference accounts for the complex survey design. Minimum residual degrees of freedom in any of the 10 imputations = 739

Table 24: Regression of wellbeing at Wave 1 on adverse life events during the pandemic

Characteristic	**Beta**[1]	**SE**[2]
(Intercept)	4.0***	0.181
Adverse Event Tercile Groups		
Low	—	—
Medium	-0.34***	0.062
High	-0.76***	0.071
Negative continuing impact of pandemic on mental wellbeing		
No	—	—
Yes	-0.70***	0.052
Gender		
Male	—	—
Female	-0.39***	0.050
Non-Binary+	-1.0***	0.178
Ethnicity		
White	—	—
Mixed	-0.10	0.115
Black	0.12	0.071
Asian	0.15	0.078
Other	0.18	0.171
Parental Education	-0.03	0.044
Housing Tenure	-0.02	0.056
IDACI Quintile Group		
1 (High Deprivation)	—	—
2	0.04	0.076
3	0.01	0.084
4	0.17*	0.081
5 (Low Deprivation)	0.15	0.086
Social Provisions Scale	0.63***	0.021
Wave 1 Survey Month		
Sep 2021	—	—
Oct 2021	0.02	0.056
Nov 2021	0.36*	0.160
Dec 2021	0.07	0.108
Jan 2022	0.33	0.246
Feb 2022	-0.51*	0.207
Mar 2022	-0.13	0.081
Apr 2022	-0.09	0.086
N	9,307	

[1]*p<0.05; **p<0.01; ***p<0.001

[2]SE = Standard Error

Notes: All estimates are weighted and inference accounts for the complex survey design. Minimum residual degrees of freedom in any of the 10 imputations = 744

Table 25: Regression of wellbeing at Wave 2 on adverse life events during the pandemic

Characteristic	**Beta**[1]	**SE**[2]
(Intercept)	5.3***	0.176
Adverse Event Tercile Groups		
Low	—	—
Medium	-0.34***	0.059
High	-0.67***	0.067
Negative continuing impact of pandemic on mental wellbeing		
No	—	—
Yes	-1.1***	0.055
Gender		
Male	—	—
Female	-0.33***	0.050
Non-Binary+	-0.99***	0.165
Ethnicity		
White	—	—
Mixed	-0.15	0.111
Black	0.06	0.066
Asian	0.08	0.093
Other	0.31	0.165
Parental Education	0.03	0.043
Housing Tenure	-0.15**	0.055
IDACI Quintile Group		
1 (High Deprivation)	—	—
2	0.13	0.075
3	0.12	0.080
4	0.18*	0.081
5 (Low Deprivation)	0.17	0.086
Social Provisions Scale	0.39***	0.022
Wave 2 Survey Month		
October 2022	—	—
November 2022	-0.10*	0.052
December 2022	0.08	0.106
January 2023	0.26	0.294
February 2023	0.34	0.205
March 2023	0.41*	0.184
April 2023	0.01	0.177
N	9,307	

[1]*p<0.05; **p<0.01; ***p<0.001

[2]SE = Standard Error

Notes: All estimates are weighted and inference accounts for the complex survey design. Minimum residual degrees of freedom in any of the 10 imputations = 745

Table 26: Regression of wellbeing at Wave 2 (adjusted for wellbeing at Wave 1) on adverse life events during the pandemic

Characteristic	**Beta**[1]	**SE**[2]
(Intercept)	3.6***	0.178
Wave 1 Wellbeing	0.41***	0.016
Adverse Event Tercile Groups		
Low	—	—
Medium	-0.20***	0.053
High	-0.36***	0.060
Negative continuing impact of pandemic on mental wellbeing		
No	—	—
Yes	-0.75***	0.051
Gender		
Male	—	—
Female	-0.17***	0.043
Non-Binary+	-0.58***	0.161
Ethnicity		
White	—	—
Mixed	-0.10	0.089
Black	0.00	0.057
Asian	-0.01	0.085
Other	0.24	0.150
Parental Education	0.05	0.037
Housing Tenure	-0.14**	0.050
IDACI Quintile Group		
1 (High Deprivation)	—	—
2	0.10	0.066
3	0.11	0.075
4	0.10	0.072
5 (Low Deprivation)	0.08	0.074
Social Provisions Scale	0.13***	0.021
Wave 1 Survey Month		
Sep 2021	—	—
Oct 2021	0.01	0.052
Nov 2021	0.26*	0.124
Dec 2021	0.35**	0.113
Jan 2022	0.21	0.173
Feb 2022	0.23	0.288
Mar 2022	-0.04	0.069
Apr 2022	-0.04	0.075
Wave 2 Survey Month		
October 2022	—	—
November 2022	-0.08	0.047
December 2022	0.12	0.095
January 2023	0.41	0.266
February 2023	0.18	0.198
March 2023	0.44**	0.152
April 2023	0.00	0.174
N	9,307	

[1]*p<0.05; **p<0.01; ***p<0.001

[2]SE = Standard Error

Notes: All estimates are weighted and inference accounts for the complex survey design. Minimum residual degrees of freedom in any of the 10 imputations = 737