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Working Paper

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ISER Working Paper Series, No. 2022-08

Provided in Cooperation with:
Institute for Social and Economic Research (ISER), University of Essex

Suggested Citation: Waddell, Lisa; Harkness, Susan (2022) : Sibling moderation of young adult psychological distress during a crisis: Evidence from the United Kingdom's first Covid-19 lockdown, ISER Working Paper Series, No. 2022-08, University of Essex, Institute for Social and Economic Research (ISER), Colchester

This Version is available at:
https://hdl.handle.net/10419/267161

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Sibling Moderation of Young Adult Psychological Distress During a Crisis:

Evidence from the United Kingdom's First Covid-19 Lockdown

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No. 2022-8
August 2022

INSTITUTE FOR SOCIAL
& ECONOMIC RESEARCH

UKRI Economic and Social Research Council
University of Essex
MiSoC ESRC Research Centre on Micro-Social Change
University of BRISTOL

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Non-technical Summary

Our paper focuses on the unique context of Covid-19 public health lockdowns to assess how much parent and sibling co-residence moderated adverse effects of a crisis on emerging adults' mental health, and whether these effects were differentiated by gender. Existing research suggests that young people suffered particularly large declines in their mental health during the pandemic, with young women being more adversely affected than young men. Previous studies have examined how young adults' mental health is affected by returning home to live with parents. Yet, because this support is often given in response to crisis (e.g., unemployment, relationship breakdown) it is difficult for researchers to identify the role that families play in mitigating any adverse effects. In contrast, Covid-19 was a shock that affected all young people and, as a result, provides a unique opportunity to improve our understanding of the role of living with parents and siblings in protecting young peoples' mental health during periods of adversity.

To study these effects, we link information from the nationally representative Millennium Cohort Study, which has followed individuals born in 2000 throughout their lives, to their responses in a special Covid-19 survey, conducted May 2020, at the height of severe national lockdown restrictions in the United Kingdom. Using the widely used and robust Kessler 6-question psychological distress scale to measure changes in mental health, we find that sibling effects appear to only benefit young men, whereas young women's mental health was buffered by parent co-residence regardless of siblings. Outside of men living with siblings and women living without parents, any previously observed gender differences in young adult mental health disappear. These associations are stable even after a range of individual and family factors (including socio-economic status, family structure, and economic activity) are included.

Young adults are the most vulnerable group to individual life-shocks (e.g., unemployment, relationship break down), and most likely to suffer severe decreases in their mental health due to such shocks. As such, prioritising particularly vulnerable young adults for social support, like young women without parental co-residence support, not only reduces well-being inequalities but also increases the potency of support provided. We draw some important recommendations from this study. Primarily, we call for a more nuanced investigations of gender differences in mental health; ones that account for how living arrangement differences and gendered family effects.

SIBLING MODERATION OF YOUNG ADULT PSYCHOLOGICAL DISTRESS DURING A CRISIS

EVIDENCE FROM THE UNITED KINGDOM'S FIRST COVID-19 LOCKDOWN

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Abstract

Young adults often rely on their parents following a crisis, and it is difficult to identify how families may mitigate any adverse emotional effects of moving home. The shock of UK Covid-19 lockdown policy, which negatively impacted all young adults, provides an opportunity to investigate how living with parents and siblings impact young men's and women's mental health during periods of adversity. By linking Millennium Cohort Study mainstage data to the Covid-19 survey, siblings appeared to moderate levels of psychological distress among young men during the lockdown, but not for young women.

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Keywords: Covid-19; young adults; siblings; psychological distress; crisis

Acknowledgements: We gratefully acknowledge funding from the United Kingdom's Economic and Social Resource Council through the Research Centre on Micro-Social Change, grant ES/S012486/1. We would also like to thank Esther Dermott, Julia Gumy, and Dinithi Widjedasa for helpful comments.

INTRODUCTION

On 23 March 2020 the United Kingdom (UK) government announced a nationwide lockdown with people instructed to stay at home, other than for very limited purposes, and to stop all public gatherings of more than two people. Although the lives of all adults were disrupted, young people's lives were particularly upended, as universities closed, job opportunities disappeared, and work environments virtualised. Over the course of the pandemic, many adults suffered deteriorated mental health; young adults, under the age of 30, saw particularly large declines (Pierce et. al., 2020; O'Connor et. al., 2021), with young women faring worse than young men (Stroud & Gutman, 2021).

Mandated social isolation disrupted young peoples' social networks and curtailed contact with their peers, leading to loneliness and worsening mental health (Loades et. al. 2020). Due to lockdown upheaval, many young adults, who had previously left their parents' homes, returned (Evandrou et al., 2021); whereas others, who may have planned to leave, stayed at home. Given the restrictions in place, living in the parental home may have provided a buffer against the loneliness, and adverse economic consequences, of lockdown restrictions. Moreover, living with siblings may have provided an additional, and unique, source of social and emotional support during lockdown. In this paper, we analyse how living with parents and siblings during the lockdown influenced levels of psychological distress among young people, aged 19, and whether gender differentiated these effects.

Families provide important instrumental and emotional support to young adults, particularly during times of need (Park et al., 2019). Despite 60% of UK families having more than one child, and despite 70% of young adults residing with their parents also live with their siblings (Her et al., 2022), sibling effects on young adult mental health remains largely understudied. Existing literature has indicated that sibling relationships play a significant role in the mental health of children and adults (McHale et al., 2012; Thomas et

al., 2017), directly influencing one another's development, through their relationship and interactions, and indirectly influencing family dynamics and the availability of household resources (McHale et al., 2012; Whiteman et al., 2011). Relationship qualities complicate sibling effects across a life course. Most notably, sisters were reported to have closer and more supportive relationships than other sibling gender compositions (e.g., Szymańska, 2020), and childhood bullying has been related to lessened later-life closeness (Plamondon et al., 2021).

Sibling support may be particularly important during stressful periods. Childhood studies have shown that siblings help moderate the relationship between stressful life events and behavioural and emotional problems (e.g., Gass et al., 2007). Recent childhood research showed that sibling relationships can reduce negative emotional consequences of parental divorce (van Dijk et al., 2022). In adulthood, when faced with adverse life events, such as the death of a parent, siblings were reported to provide important short-term emotional and instrumental supports (Kalmijn & Leopold, 2019). Additionally, most adults believed they could call on their siblings during a crisis (Van Volkom, 2006). The uniquely familiar and intimate nature of sibling relationships (Cicirelli, 1995; Dunn, 2007) suggests siblings are well positioned to provide emotional support during a period of stress and uncertainty independent from, and additional to, parents.

Because the family environment produces and replicates gender differences (McHale et al., 2003), and because gender influences the way family ties are formed and experienced across the life course, it may be that the influence of living with parents and siblings on psychological distress differs for young men and women. Women were reported to be more likely than men to initiate and maintain ties with their family members (White & Riedmann, 1992), and lack of family social support was more likely to negatively affect women (Johansen et al., 2021). Given this evidence, we expect women living away from family

during lockdown to have been most vulnerable to the adverse effects of social isolation. Moreover, although friendship protects men and women's mental health similarly, only men gain comparable support from siblings (Cable et al., 2013). Also, during lockdown, young women (aged 18-29) reported more consistent virtual connection with their peers than men (Prowse et al., 2021). So, young men, who were less virtually connected, may have benefitted more from co-resident sibling peer-like relationships. As a result, sibling co-residence is expected to be particularly beneficial for young men.

Although some young adults were already living with parents when the lockdown was instated in March 2020, social, educational, and economic disruption, meant many adult children who had previously left the family home returned, and these living arrangement changes were associated with increased stress (Evandrou et al., 2021). Yet this early Covid-19 study did not directly examine how parent co-residence affected young adults' well-being. Pre-pandemic evidence suggests that young adults who remained at home had similar mental health as those who had left, but those who had left home and then returned ('boomerangers') were more likely to experience depressive symptoms (Copp et al., 2017). These findings may be due to boomerangers returning in response to individual crises, such as employment or housing difficulties, relationship breakdown, or physical and mental health needs (Tosi & Grundy, 2018). These difficulties, rather than co-residence itself, may explain the observed adverse effects. In our analysis, to distinguish between the impacts of parent and sibling co-residence on young adult psychological distress during the UK spring lockdown we control for changes in living arrangements. Covid-19 lockdown provides a unique opportunity to study how siblings support young adult mental health during a crisis. Unlike other stressful life events, such as divorce or unemployment, the social isolation and upheaval of the lockdown affected all young adults. As lockdown curtailed opportunities for social

interactions, having siblings at home may have provided a particularly important source of protection against isolation and loneliness.

Parent and sibling co-residence is one of many factors to have affected young peoples' psychological distress during the pandemic. Due to the restrictions, many young people's employment opportunities disappeared; those in work saw their jobs virtualise or were put on furlough (where jobs were suspended but workers continued to be paid); education was disrupted; romantic partnerships were tested; and there was anxiety about catching and spreading the virus. Moreover, differences in resources meant some families had less capacity to cope with the shock of lockdown and the return of young people, for example those on low incomes or living in overcrowded accommodation.

Controlling for these factors, we assess whether living with siblings helped reduce young adult psychological distress during the UK spring 2020 lockdown. We compare the outcomes of young people who were living (i) with parents *and* siblings during the first lockdown; (ii) with parents and no siblings; and (iii) outside the parental home. Given the pandemic and sibling effects may both impact men and women differently (Johansen et al., 2021; Stroud & Gutman, 2021), we interact parent and sibling co-residence with young adult gender. Using Millennium Cohort Study young adult data during Covid-19 and linking to existing young adult data collected since 2001, we assessed how sibling co-residence impacted young adult mental health during the crisis of lockdown. We found that, as the lockdown increased young adult distress, living with parents and siblings helped ameliorate adverse mental health effects, with young men particularly protected by siblings.

METHODS

Data and Sample

Our participants were young adults, born in 2000, from the nationally representative Millennium Cohort Study (MCS) who responded to the special Covid-19 web survey

conducted 4th – 30th May 2020 (CLS, 2021). We linked the MCS subsample responses from the Covid-19 Wave 1 survey to their information in the MCS mainstage survey. The mainstage survey contained information about young adults and their parents, collected throughout their lives, when the participants were 9 months and 3, 5, 7, 11, 14, and 17 years. Although most of our variables were derived from the special Covid-19 survey and mainstage Wave 7 (participants aged 17), relevant factors that were unavailable in these periods were taken from the most recent available information in the mainstage survey Waves. From an initial sample of 2,645 young adults responding to the Covid-19 web survey, we excluded twins and triplets (N = -38), as is common in the literature. We further excluded those without full psychological distress answers during the Covid-19 survey (N= -326) and at Wave 7 (N= -20). Our final analytical sample was 2,261, which we weighted using survey weights to account for sample attrition and the complex survey design (Brown et al., 2021, p. 54).

Measures

Outcome Variable

We used the Kessler 6-question scale (K6) (Kessler et al., 2002) to capture psychological distress. The K6 is a well-validated measure of general, non-specific psychological distress (Mewton et al., 2015), which has been widely used in sociological and epidemiological studies of young adult mental health (e.g., Sharp & Theiler, 2018). Six questions were asked capturing how often, in the last 30 days, one has felt depressed, hopeless, restless or fidgety, everything was an effort, worthless, and nervous (on a Likert scale of 0 = 'None of the time' to 4 = 'All of the time'). The questions were added such that scores range from 0 (no psychological distress) to 24 (extremely high psychological distress). Our focus on non-specific psychological distress allowed us to capture adverse mental health effects in the

general British young adult population, with increasing K6 values indicating higher distress, thus worse mental health.

Explanatory Variables

We distinguished between young people who were living with their parents and those who had were living away from parental homes in May 2020. Those residing with their parents were further categorised by sibling co-residence. Of those living away from the parental home, three were also living with siblings and were grouped together with those living independently without siblings. The resulting categories were: (i) left the parental home (living away from the parental home), (ii) living with parents, no siblings, and (iii) living with parents and siblings. To allow for gender variations in the effect of living arrangement on distress, we interacted these categories with sex.

We accounted for sibling relationship differences from before the pandemic, specifically, having a same-sex sibling (1 = at least one same sex sibling, 0 = no same sex siblings) and the quality of sibling relationship in childhood (either being bullied by a sibling or bullying a sibling: 1 = once a week or more; 0 = less than once a week). Sibling gender composition was derived from household information collected between Waves 1 through 7, and frequency of childhood sibling bullying was collected at Wave 6 (aged 14), with missing answers filled from Wave 5.

Covariates

Of particular importance to our study is the question of whether individuals experienced changes to their living arrangements. Following Evandrou *et al.* (2021), we include responses to the question "Have there been any changes to the people you are living with since the Coronavirus outbreak?" (1 = yes and 0 = no or missing). We also include a variable capturing whether the participant was at university prior to Covid-19. In the UK, whereas many university students live away from home during term time, their main address is often

recorded as the parental home. Given that many students were forced to return to their family home as universities closed, pre-Covid-19 university captures the potentially important impact of educational and living disruptions to on young peoples' mental health. Also important to young adult mental health was non-familial relationship, which we roughly capture with indicators for dating someone outside the household and for romantically cohabiting were also included. These factors were all captured during the Covid-19 Wave 1 survey.

The Covid-19 survey also allowed us to account for variations in socio-economic and demographic factors, we include a range of other controls. We accounted for young adult economic activity during the pandemic by including controls for being in education, in paid work, being on furlough, being economically inactive. Furlough includes those who were self-employed but not working and those who indicated they were employed but on furlough. The economically inactive group included all those who were not in paid work. Those in education indicated they were in training or education since the start of the pandemic.

To capture family socioeconomic status, we included dummy variables for low-income families (defined as a family being in the lowest equivalised income quintile for UK estimates at Wave 6 of the survey, when participants were aged 14), for at least one carer in the household having above high school education at Wave 6), and for living in overcrowded accommodation during lockdown (defined as reporting more than one person per room during the Covid-19 Wave 1 survey). Family income and parental education missing responses were filled with the most recent equivalent response in previous waves.

Family structure may have also affected young adult mental health outcomes. We included controls for whether there was a stepparent in the household or whether the young person lived in a single parent household at age 17. The most recent recorded response from previous waves were used to fill missing responses to family structure variables at Wave 7.

We also conditioned on the quality of household relationships, adding a dummy variable for whether intra-household conflict increased during the pandemic (as recorded during the Covid-19 survey).

Finally, a set of pandemic related stressors, which have been shown to be associated with poor mental health during the pandemic (Wright et al., 2020), were included. These were Covid-19 symptoms (captured during the Covid-19 Wave 1 survey; 1 = experience of any Covid-19 symptoms, 0 = not experienced any Covid-19 symptoms), country (Covid-19 Wave 1 survey: Northern Ireland, Wales, Scotland, and England), and ethnicity (Wave 6: 1 = non-white, 0 = white). Responses for country and ethnicity that were not present in their respective waves were captured from the most recent response in previous data collection waves.

Analytic Strategy

We used regression models to estimate the association between young peoples' mental health and their Covid-19 family living arrangements, controlling for a range of individual, family, and sibling relationship characteristics. To account for prior mental health status, we also control for psychological distress measured at age 17. Controlling for prior mental health levels allows us to examine how the *shock* of the coronavirus pandemic and the first lockdown affected mental health. By including a measure of pre-existing mental health as a predictor in the model, we account for the dynamic processes of positive mental health over a fixed period, as well as introduce a control for individual volatility and variation of mental health levels that contribute to omitted variable bias (Keele & Kelly, 2006).

A key criticism of autoregressive models, which include regressions with lagged dependent variables, is that they do not facilitate causal inference as easily as the similar, but distinct, fixed effects modelling. Nevertheless, unlike fixed effect models, autoregressive models allow the impact of the pandemic on mental health to differ across groups. As we

were interested in understanding whether siblings protected mental health during the lockdown, and as the number of siblings is unlikely to change over time for young adults, fixed effect models were not well suited to our analysis. Our approach similarly allows the influence of the pandemic on mental health to differ between those from low- and high-income backgrounds, or between young men and women, meanwhile accounting for pre-existing differences in mental health. A second criticism of autoregressive models is that they suppress the explanatory power of other independent variables and negatively bias estimates (Achen, 2001). That being said, when disturbance terms are uncorrelated and normally distributed, and the lag is observed, auto-regressive OLS is generally deemed appropriate for its consistency in large samples under weak dependence assumptions (Maeshiro, 1996).

RESULTS

Descriptive Analysis

Table 1 is provided to show descriptive statistics for all young adults and disaggregated by living arrangements during the first lockdown. Similar to the related literature on parent and young adult co-residence in the UK (Her et al., 2022), a majority of young adults in our sample were living with parents and siblings (68%), 20% were living with parents only, and 12% were living away from the parental home. Parallel with Evandrou et al. (2021), approximately 26% young adults reported changes in living arrangements during the first three months of lockdown.

On average, Table 1 indicated that the level of psychological distress increased during Covid-19 across the three residence groups. Figure 1 illustrates how distress levels changed for young men and young women between age 17, before the pandemic, and age 19, when the country was in lockdown. Psychological distress levels were higher for young women than young men before the pandemic and increased across the three types of living arrangements but rose most rapidly for those who had left the parental home. Young men had

lower levels of distress prior to the pandemic and those who had left the parental home or were living with parents but without siblings reported increased levels of distress. At the same time, those who were living at home with parents reported a small reduction in their levels of distress. Overall, the descriptive changes in mean psychological distress before and during the pandemic suggest that although living with parents and siblings may have provided protection against psychological distress before Covid-19, these differences became more pronounced during the spring 2020 lockdown.

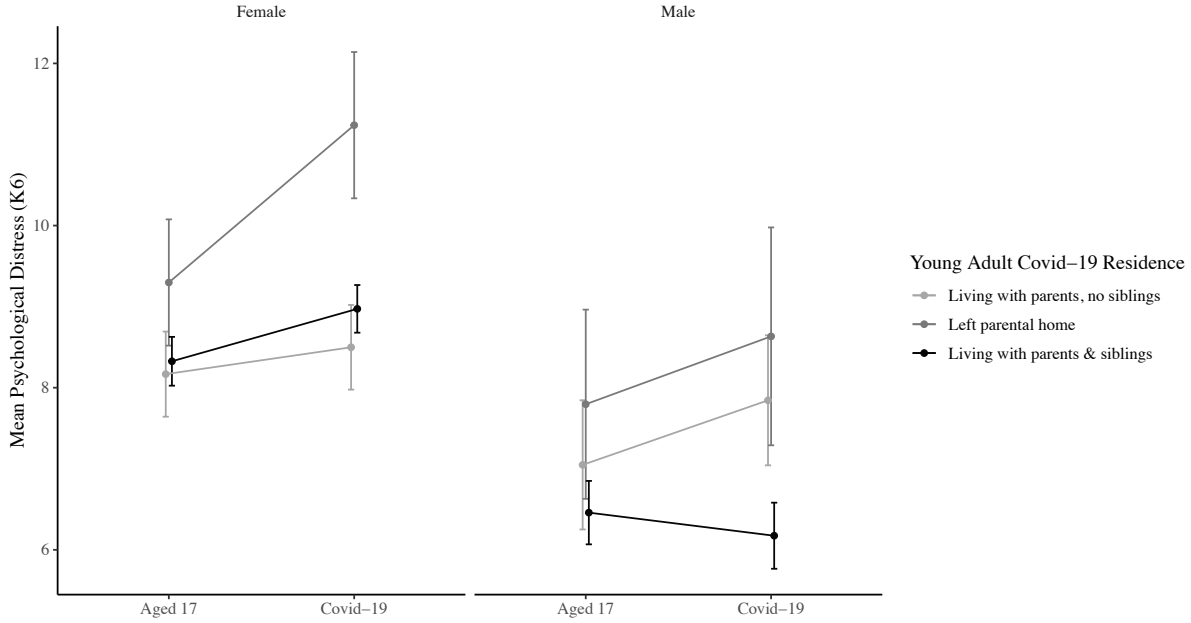
Table 1 *Descriptive statistics by Covid-19 young adult residence*

		Young Adult Covid-19 Residence		
Characteristic	Overall (N = 2261)[1]	Living With Parents, No Siblings (N = 459)[1]	Left Parental Home (N= 199)[1]	Living With Parents & Siblings (N= 1603)[1]
Covid-19 Psychological Distress	7.99	8.16	10.03	7.59
Psychological Distress (Age 17)	7.56	7.60	8.60	7.37
Male	49.62%	51.61%	46.41%	49.58%
Changed Living Arrangements	25.56%	24.85%	35.98%	23.96%
Young Adult Has No Sibling(s)	8.34%	33.82%	12.76%	0.00%
Young Adult Has Same Gender Sibling(s)	61.52%	42.13%	62.09%	67.19%
Childhood Sibling Bullying (Age 14)	27.32%	13.22%	30.71%	30.93%
Young Adult Economic Activity				
In Education	50.36%	44.63%	43.38%	53.27%
In Work	14.71%	13.17%	12.98%	15.47%
On Furlough	15.67%	21.18%	19.55%	13.37%
Other Inactive	9.99%	11.73%	11.17%	9.28%
Unemployed	9.26%	9.29%	12.92%	8.62%
Pre-Covid University	39.40%	36.14%	29.12%	42.15%
Young Adult Dating	35.04%	35.43%	29.34%	35.90%
Young Adult Romantically Cohabiting	6.66%	8.12%	22.44%	3.50%
Low Family Income (Age 14)	10.33%	9.44%	13.01%	10.13%
High Parental Education (Age 14)	55.35%	51.77%	40.73%	58.94%
Overcrowded Covid-19 HH	37.64%	21.03%	38.07%	42.50%
Young Adult Has Step Parent (Age 17)	9.93%	11.63%	17.28%	8.15%
Young Adult Has Single Parent (Age 17)	28.05%	35.00%	50.59%	22.09%
Increased Covid-19 Intra-HH Conflict	20.21%	18.88%	20.70%	20.51%
Ethnicity Non-White (Age 14)	20.27%	13.62%	30.45%	20.49%
Experienced Covid-19 Symptom(s)	61.48%	60.36%	58.55%	62.32%
Country				
England	85.62%	84.49%	89.53%	85.28%
Northern Ireland	2.82%	2.62%	0.73%	3.24%
Scotland	7.30%	7.45%	5.64%	7.54%
Wales	4.26%	5.44%	4.11%	3.94%

[1] Variables of interest are summarised according to variable type. Weighted mean summarises continuous variables (i.e., mental health measures). Weighted percent summarises categorical variables. Young adult Covid-19 residence further breaks down these summaries. Survey-provided sample and design weights were used. Sample size (N) remains unweighted for clarity and congrence with the main text.

Note: The no sibling variable was derived from all sibling-related responses across all waves (ages 9months to 19 years). The same gender sibling variable was derived across all waves of the mainstage survey (ages 9 months to 17 years). All other variables, unless indicated in the variable name, were collected during the Covid-19 Wave 1 survey.

Figure 1: *Psychological distress (K6) before and during the first lockdown (at ages 17 and 19) by living arrangements during lockdown and gender*



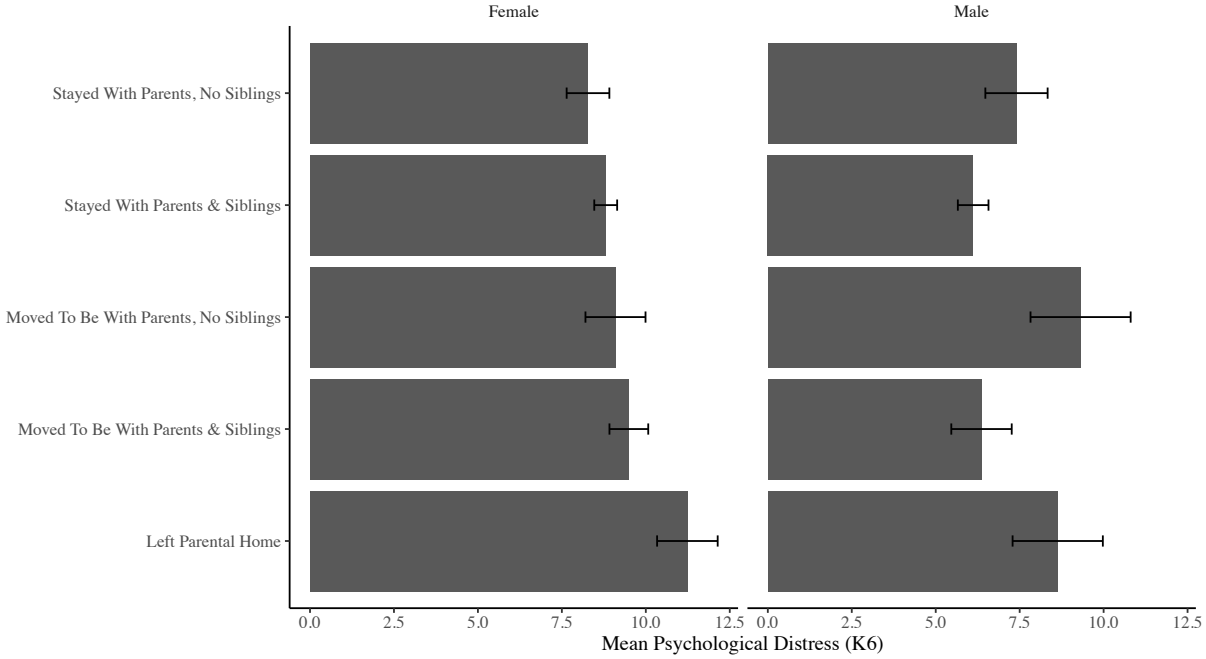
Note: Participants aged 19 during Covid-19. Mean Kessler K6 distress score collected during Wave 7 and the special Covid-19 Wave 1 web survey, when lockdown restrictions were in full force (May 2020). Error bars represented by 95% confidence intervals.

Given the potentially important influence of changes in living arrangements on young adults' mental health, in Figure 2, we interacted current living arrangements with whether living arrangements had changed to see whether there was a differential effect on Covid-19 psychological distress. The results indicated that there were few differences between young adults whose living arrangements changed and those whose did not. Instead, men's psychological distress appeared lowest when living with parents and siblings (regardless of changes in living arrangements), and women's psychological distress appeared highest when living away from parents (regardless of whether siblings were present or whether living arrangements changed).

Table 1 shows variations in sibling characteristics. Those living with just parents appear more likely to have no siblings, thus less likely to have a same sex siblings and experience sibling bullying. Table 1 clearly shows that collinearity between no siblings and residence (0.0% of those living with siblings and parents had no siblings). Therefore, the no sibling variable was excluded from subsequent regression analyses. Along other covariates, those

living with parents and siblings appear more likely to live in overcrowded accommodation, have at least one parent with education above high school, and to have been in university before Covid-19. Leaving the family home also appears more common among non-white young adults, those romantically cohabiting, and those with step- and single- parent families.

Figure 2: *Young adult psychological Kessler (K6) distress scores by changes in living arrangements and parent/sibling co-residence during the first UK lockdown.*



Note: All averages are weighted. Participants aged 19. Mean Kessler K6 distress score collected May 2020, when lockdown restrictions were in full force (May 2020). Error bars represented by 95% confidence intervals. Distinctions between 'stayed' and 'moved' were determined with the Covid-19 Wave 1 survey question: '*Post-C19: Whether living arrangement change involving Respondent's parent(s)*'. Participants who indicated they moved in with their parents since Covid-19 were indicated as 'Moved to be with parents', those who lived with parents but did not move during Covid-19 were indicated as 'Stayed with parents', and those who indicated they had either moved away or were not living with parents were considered 'left parental home'. Further sibling co-residence distinctions were made with those who indicated they were currently living with siblings.

Regression Results

Table 2 presents the results of our regressions on young adult Covid-19 psychological distress. To examine how sibling, young adult, and family characteristics moderate the relationship between psychological distress and living arrangements we ran five models. All models conditioned on our measure of psychological distress prior to Covid-19, ethnicity, whether the respondent had experienced Covid-19 symptoms, and region. In the first model, we also included controls for Covid-19 living arrangement interacted with gender and changes in living arrangements. The second model also controlled for sibling relationship

quality, conditioning on having a same sex sibling and whether there was bullying during childhood. Our third model added controls for economic status during the lockdown (education, employment, furlough, unemployment, and other inactivity), whether they were at university prior to Covid-19, and whether they were a romantic relationship during the lockdown. Model four included controls for family characteristics (whether the child lived in a low-income family or with a single or stepparent at age 17, parents' education, Covid-19 household overcrowding, and an interaction term between low-income and overcrowding). The final model conditioned on worsening family relationships during the first three months of the spring lockdown. In line with existing work (Pierce et al., 2020), we found significant evidence that Covid-19 increased young adult psychological distress. The positive coefficient on our measure of psychological distress at age 17 suggests that those who were already suffering from higher levels of psychological distress saw their mental health deteriorate most sharply. Looking at how living arrangements affected distress levels, we found that living at home with parents and siblings was associated with large reductions in psychological distress for young men. At the same time, we found few differences between young men who lived only with parents and those who had left the family home. For young women, living with siblings and parents had little influence on mental health compared relative to living with parents alone. Nonetheless, those who left the parental home had significantly higher levels of distress. These differences were stable across all five models as controls were added.

Comparing the outcomes of young men and young women, our results suggest that accounting for prior differences explains part of the previously observed gender gap in the effect of Covid-19 on psychological distress (Stroud & Gutman, 2021). Living arrangements provided a more nuanced explanation to gender differences in mental health. Once we accounted for living arrangements, we found that young women's and young men's

psychological distress is similar outside of young men living with parents and siblings and young women living outside the parental home. Young women, who left home, stood out as having reported particularly high levels of psychological distress during the lockdown, while young men who lived with parents and siblings had considerably lower levels of distress.

Regarding sibling characteristics, in contrast to some prior studies, we found no association between the gender mix of siblings and psychological distress. Nevertheless, we found that regular incidence of childhood sibling bullying (as reported age 14) was associated with a significant increase in psychological distress during lockdown. This supports existing evidence that the impact of childhood sibling relationship could reach into adulthood (Plamondon et al., 2021) and suggests that those with adversarial sibling relationships may benefit less from their presence during adulthood.

The results for the other covariates were largely as expected; we found that young people who were cohabiting had lower levels of distress. In line with prior studies (Pierce et al., 2020) we found that those who lived in low-income households at age 14 had higher levels of distress during the pandemic than better off families, with similarly impactful effects from overcrowded lockdown accommodation. The significant interaction between family income and overcrowding indicated that, with sufficient financial resources, overcrowded households may not be inherently negative in the lockdown context. We observed small, but significant, psychological distress decreases in non-low income overcrowded households. Perhaps surprisingly, other socio-economic characteristics and family structure factors appeared to have no significant effect on levels of distress.

Finally, Evandrou et al. (2021) found that intra-household conflict played an important role in moderating the relationship between changes in living arrangements and stress for young people. In our models, we also found that higher levels of conflict were strongly associated with increased psychological distress. Nonetheless, the coefficients on living

arrangements were largely unchanged. Indeed, for young men, the estimated benefit of living with parents and siblings is marginally greater. Additionally, once accounting for intra-household conflict, as Evandrou and her colleagues found, the estimated relationship between changes in living arrangements and psychological distress lost strength.

Table 2: *OLS regression estimates using Kessler (K6) Psychological Distress scores during Covid-19 as the outcome measure*

	Covid-19 Psychological Distress Regression Models				
	Residence[1]	Add Sibling Characteristics[1]	Add Young Adult Characteristics[1]	Add Family Characteristics[1]	Add Intra- Household Conflict[1]
(Ref: Female - Living With Parents, No Siblings)					
Female - Left Parental Home[2]	1.88** (0.43)	1.73** (0.44)	1.86** (0.44)	1.81** (0.44)	1.72** (0.44)
Female - Living With Parents & Siblings[2]	0.33 (0.30)	0.18 (0.31)	0.18 (0.31)	0.17 (0.31)	0.05 (0.31)
Male - Left Parental Home[2]	0.44 (0.45)	0.35 (0.45)	0.30 (0.45)	0.31 (0.45)	0.30 (0.45)
Male - Living With Parents, No Siblings[2]	0.06 (0.37)	0.06 (0.37)	-0.02 (0.38)	-0.05 (0.38)	-0.14 (0.37)
Male - Living With Parents & Siblings[2]	-1.26** (0.31)	-1.37** (0.31)	-1.37** (0.32)	-1.38** (0.32)	-1.46** (0.32)
Changed Living Arrangements[2]	0.40* (0.19)	0.45* (0.19)	0.51** (0.20)	0.49* (0.20)	0.41* (0.19)
Young Adult Has Same Gender Sibling[3]		0.08 (0.18)	-0.01 (0.18)	-0.10 (0.18)	-0.05 (0.18)
Childhood Sibling Bullying[4]		0.61** (0.19)	0.59** (0.19)	0.57** (0.19)	0.59** (0.19)
(Ref: Young Adult in Education)					
Young Adult on Furlough[2]			0.24 (0.30)	0.29 (0.30)	0.45 (0.30)
Young Adult Employed[2]			-0.21 (0.30)	-0.14 (0.30)	-0.13 (0.30)
Young Adult Unemployed[2]			0.38 (0.34)	0.33 (0.34)	0.51 (0.34)
Young Adult Economically Inactive[2]			-0.14 (0.31)	-0.08 (0.32)	-0.12 (0.31)
Young Adult Romantically Dating[2]			0.27 (0.18)	0.25 (0.18)	0.16 (0.18)
Young Adult Romantically Cohabiting[2]			-0.62 (0.36)	-0.76* (0.37)	-0.91* (0.37)
Pre-Covid University[2]			-0.42 (0.24)	-0.28 (0.25)	-0.25 (0.24)
High Parental Education[4]				0.30 (0.24)	0.33 (0.23)
Low Family Income[4]				0.74* (0.31)	0.61* (0.31)
Overcrowded Covid-19 HH[2]				0.67** (0.25)	0.62* (0.25)
Not Low Income and Overcrowded				-1.00** (0.36)	-0.97** (0.35)
Young Adult Has Step-Parent[5]				0.36 (0.30)	0.17 (0.30)
Young Adult Has Single Parent[5]				-0.14 (0.21)	-0.20 (0.21)
Covid-19 Intra-HH Conflict[2]					1.71** (0.21)
Psychological Distress (Age 17)[6]	0.57** (0.02)	0.56** (0.02)	0.56** (0.02)	0.55** (0.02)	0.54** (0.02)
Ethnicity Non-White[4]	0.57** (0.21)	0.55** (0.21)	0.51* (0.21)	0.42 (0.22)	0.56** (0.22)
Experienced Covid-19 Symptom(s)[2]	0.85** (0.17)	0.84** (0.17)	0.86** (0.18)	0.88** (0.18)	0.76** (0.17)
(Ref: England)					
Wales[7]	0.32 (0.42)	0.32 (0.42)	0.32 (0.42)	0.33 (0.41)	0.47 (0.41)
Scotland[7]	0.65* (0.32)	0.61 (0.32)	0.59 (0.32)	0.58 (0.32)	0.50 (0.32)
Northern Ireland[7]	-0.49 (0.51)	-0.56 (0.51)	-0.62 (0.51)	-0.60 (0.51)	-0.59 (0.51)
Constant	3.05** (0.33)	3.00** (0.33)	3.17** (0.40)	2.96** (0.42)	2.88** (0.42)
Num.Obs.	2261	2261	2261	2261	2261
R2 Adj.	0.389	0.391	0.394	0.396	0.413

[1] Standard error in parentheses. Significance represented as '*' p < 0.05, '**' p < 0.01.
[2] Collected during the Covid-19 Wave 1 survey, when participants were aged 19.
[3] Responses derived from household composition variables across all mainstage survey waves (from ages 9 months to 17 years).
[4] Responses mostly collected during the mainstage Wave 6 survey, when participants were aged 14. Missing responses were filled with the most recent response from previous waves.
[5] Responses mostly collected during the mainstage Wave 7 survey, when participants were aged 17. Missing responses were filled with the most recent equivalent response in previous waves.
[6] Collected during the mainstage Wave 7 survey, when participants were aged 17.
[7] Responses mostly collected during the Covid-19 Wave 1 survey, when participants were aged 19. Missing responses were filled with the most recent response from the mainstage survey.
Note : All models are weighted with survey weights provided in the Covid-19 survey. The outcome variable its corresponding lag (collected when participants were age 17) are captured with the Kessler (K6) Psychological Distress Scale.

Table 3. *OLS regression estimates using the shortened Warwick Edinburgh Mental Wellbeing Scale scores during Covid-19 as the outcome measure*

	Covid-19 Mental Wellbeing Regression Models				
	Residence[1]	Add Sibling Characteristics[1]	Add Young Adult Characteristics[1]	Add Family Characteristics[1]	Add Intra- Household Conflict[1]
(Ref: Female - Living With Parents, No Siblings)					
Female - Left Parental Home[2]	-0.52 (0.37)	-0.41 (0.38)	-0.40 (0.38)	-0.30 (0.38)	-0.24 (0.37)
Female - Living With Parents & Siblings[2]	-0.39 (0.26)	-0.29 (0.26)	-0.34 (0.26)	-0.34 (0.27)	-0.24 (0.26)
Male - Left Parental Home[2]	-1.35** (0.39)	-1.29** (0.39)	-1.18** (0.39)	-1.23** (0.39)	-1.22** (0.38)
Male - Living With Parents, No Siblings[2]	-0.62 (0.32)	-0.62 (0.32)	-0.53 (0.32)	-0.46 (0.32)	-0.39 (0.31)
Male - Living With Parents & Siblings[2]	0.91** (0.26)	0.99** (0.27)	0.93** (0.27)	0.92** (0.27)	0.99** (0.27)
Changed Living Arrangements[2]	-0.70** (0.17)	-0.74** (0.17)	-0.77** (0.17)	-0.77** (0.17)	-0.69** (0.17)
Young Adult Has Same Gender Sibling[3]		-0.07 (0.15)	0.04 (0.15)	0.17 (0.15)	0.11 (0.15)
Childhood Sibling Bullying[4]		-0.41* (0.17)	-0.35* (0.17)	-0.35* (0.17)	-0.36* (0.16)
(Ref: Young Adult in Education)					
Young Adult on Furlough[2]			-0.29 (0.26)	-0.34 (0.26)	-0.47 (0.25)
Young Adult Employed[2]			0.54* (0.26)	0.47 (0.26)	0.47 (0.26)
Young Adult Unemployed[2]			-0.79** (0.29)	-0.84** (0.29)	-0.98** (0.29)
Young Adult Economically Inactive[2]			0.41 (0.27)	0.31 (0.27)	0.36 (0.26)
Young Adult Romantically Dating[2]			-0.43** (0.16)	-0.44** (0.16)	-0.35* (0.15)
Young Adult Romantically Cohabiting[2]			-0.03 (0.31)	0.09 (0.32)	0.21 (0.31)
Pre-Covid University[2]			0.48* (0.21)	0.25 (0.21)	0.25 (0.21)
High Parental Education[4]				-0.66** (0.20)	-0.69** (0.20)
Low Family Income[4]				-0.90** (0.26)	-0.78** (0.26)
Overcrowded Covid-19 HH[2]				-0.34 (0.21)	-0.28 (0.21)
Not Low Income and Overcrowded				0.53 (0.31)	0.50 (0.30)
Young Adult Has Step-Parent[5]				-0.22 (0.25)	-0.04 (0.25)
Young Adult Has Single Parent[5]				0.23 (0.18)	0.28 (0.18)
Covid-19 Intra-HH Conflict[2]					-1.50** (0.18)
Mental Wellbeing (Age 17)[6]	0.40** (0.02)	0.40** (0.02)	0.39** (0.02)	0.39** (0.02)	0.38** (0.02)
Ethnicity Non-White[4]	0.23 (0.18)	0.24 (0.18)	0.23 (0.18)	0.41* (0.19)	0.28 (0.19)
Experienced Covid-19 Symptom(s)[2]	-0.56** (0.15)	-0.55** (0.15)	-0.54** (0.15)	-0.54** (0.15)	-0.43** (0.15)
(Ref: England)					
Wales[7]	0.18 (0.36)	0.19 (0.36)	0.20 (0.35)	0.15 (0.35)	0.03 (0.35)
Scotland[7]	-0.14 (0.28)	-0.12 (0.28)	-0.08 (0.28)	-0.07 (0.28)	0.00 (0.27)
Northern Ireland[7]	-0.03 (0.44)	0.03 (0.44)	0.07 (0.44)	0.07 (0.44)	0.10 (0.43)
Constant	12.79** (0.46)	12.97** (0.47)	13.01** (0.50)	13.35** (0.52)	13.81** (0.51)
Num.Obs.	2265	2265	2265	2265	2265
R2 Adj.	0.256	0.258	0.270	0.278	0.299

[1] Standard error in parentheses. Significance represented as '*' p < 0.05, '**' p < 0.01.
[2] Collected during the Covid-19 Wave 1 survey, when participants were aged 19.
[3] Responses derived from household composition variables across all mainstage survey waves (from ages 9 months to 17 years).
[4] Responses mostly collected during the mainstage Wave 6 survey, when participants were aged 14. Missing responses were filled with the most recent response from previous waves.
[5] Responses mostly collected during the mainstage Wave 7 survey, when participants were aged 17. Missing responses were filled with the most recent equivalent response in previous waves.
[6] Collected during the mainstage Wave 7 survey, when participants were aged 17.
[7] Responses mostly collected during the Covid-19 Wave 1 survey, when participants were aged 19. Missing responses were filled with the most recent response from the mainstage survey.
Note : All models are weighted with survey weights provided in the Covid-19 survey. The outcome variable its corresponding lag (collected when participants were age 17) are captured with the Shortened Warwick Edinburgh Mental Wellbeing Scale.

Robustness Checks

To check our models' robustness to alternative measures we replicated the analysis using negatively correlated mental health measure, the shortened Warwick Mental Wellbeing Scale (SWEMWBS) (Tennant et al., 2007), as summarised in Table 3. The supplementary analysis

showed that young men's SWEMWBS scores improved during lockdown if they were living with parents and siblings; but we found no residence effects for women. The difference between patterns of psychological distress and mental wellbeing reflects the fact that, although psychological distress and mental wellbeing are related, these are separate concepts with different underlying mechanisms (Kazdin, 1993).

CONCLUSION

We examined how living with parents and siblings affected the mental health of young adults during the first Covid-19 lockdown in the UK, by using data collected before and during the spring 2020 Covid-19 lockdown. In line with previous studies, we found that levels of psychological distress increased during lockdown and that this change was, on average, greater for young women than for young men. We added to these findings by showing that living with parents and siblings helped protect young adults from worsening levels of distress, and that gender differentiated these effects. Specifically, we found that young women who had left the parental home were at greater risk of increased distress but having siblings at home was beneficial for young men.

Although young women have, on average, seen larger deteriorations in their mental health during the pandemic than young men (Stroud & Gutman, 2021), our results suggest that gender differences in mental health are influenced by living arrangements and indicate a need for a more detailed investigations into how the pandemic has affected young adults. We showed that young women, who were living with their parents (with or without siblings), had similar levels of, and changes in, psychological distress as young men who were living with their parents (but without siblings) or who had left home. Young women coped worse in the absence of (co-residential) parental support, but for young men the presence of siblings in the family home was associated with reduced distress. Our findings were in line with past studies which have shown that gender structures family relationships (McHale et al., 2003), with

women's mental health most affected by having (or not having) familial social support (Johansen et al., 2021) and siblings mattering more to men (Cable et al., 2013). The pandemic also saw many young people unexpectedly moving back home (Evandrou et al., 2021). These changes in living arrangements, rather than the living arrangements themselves, also affected mental health. Although we found that changed living arrangements were associated with higher levels of distress, they did not explain differences in the mental health of young men and women living with parents and/or siblings, or who had left home.

Compared to prior studies, we had the advantage of being able to control for mental health measured before the pandemic. Although this study used high quality longitudinal data to track the impact of the pandemic on young people's mental health, limitations remain. Most notable is the concern that a range of other factors, which may themselves have affected mental health, may contribute to young adults' living arrangements. For example, those with the poorest family relationships or from less favourable socioeconomic backgrounds (for example, overcrowded homes), may have been most likely to leave home. On the other hand, those with best economic opportunities may have been most likely to leave the parental home, whereas those in greatest need of support may have been most likely to remain in the parental home (Tosi & Grundy, 2018). Although our sample was relatively young (age 19), and most participants were still living at home during the pandemic, these selection effects may have nonetheless impacted our estimates.

This study has shown how living with parents and siblings helped protect young adults from psychological distress during the spring 2020 Covid-19 lockdown. We highlighted gender differences in how young adults benefitted from family support, showing that young women not living with parents were particularly vulnerable to psychological distress, but siblings played an important role in reducing distress levels among young men. Our findings may help policy makers identify young people most at risk of psychological distress. Our

study also suggests avenues for future research. First, we used data from the first lockdown in the UK in May 2020 and future research may want to consider the implications of high levels of psychological distress during Covid-19 for future mental health. Second, we focused on young adults, aged 19. Sibling relationships are likely to have been even more important to children and young adolescents' mental health during lockdown; future research should explore whether this was indeed the case. In conclusion, mental health gender differences may be contingent on the living arrangements of young people, indicating a need for a more nuanced understanding of how crises affected young people and what can be done to support them.

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