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Mental and social wellbeing and the UK coronavirus job retention scheme: Evidence from nine longitudinal studies

Jacques Wels^{a,*,1}, Charlotte Booth^{b,1}, Bożena Wielgoszewska^{b,1}, Michael J. Green^{c,1}, Giorgio Di Gessa^{d,1}, Charlotte F. Huggins^e, Gareth J. Griffith^f, Alex S.F. Kwong^f, Ruth C.E. Bowyer^g, Jane Maddock^a, Praveetha Patalay^{a,b}, Richard J. Silverwood^b, Emla Fitzsimons^b, Richard Shaw^c, Ellen J. Thompson^g, Andrew Steptoe^d, Alun Hughes^a, Nishi Chaturvedi^a, Claire J. Steves^g, Srinivasa Vittal Katikireddi^c, George B. Ploubidis^b

^a MRC Unit for Lifelong Health and Ageing, University College London, UK

^b Centre for Longitudinal Studies, Social Research Institute, University College London, UK

^c MRC/CSO Social & Public Health Sciences Unit, University of Glasgow, UK

^d Institute of Epidemiology and Health Care, University College London, UK

^e Centre for Genomic and Experimental Medicine, University of Edinburgh, UK

^f MRC Integrative Epidemiology Unit, University of Bristol, UK

^g Department of Twin Research & Genetic Epidemiology, King's College London, UK

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ABSTRACT

Background: The COVID-19 pandemic has led to major economic disruptions. In March 2020, the UK implemented the Coronavirus Job Retention Scheme – known as furlough – to minimize the impact of job losses. We investigate associations between change in employment status and mental and social wellbeing during the early stages of the pandemic.

Methods: Data were from 25,670 respondents, aged 17–66, across nine UK longitudinal studies. Furlough and other employment changes were defined using employment status pre-pandemic and during the first lockdown (April–June 2020). Mental and social wellbeing outcomes included psychological distress, life satisfaction, self-rated health, social contact, and loneliness. Study-specific modified Poisson regression estimates, adjusting for socio-demographic characteristics and pre-pandemic mental and social wellbeing, were pooled using meta-analysis. Associations were also stratified by sex, age, education, and household composition.

Results: Compared to those who remained working, furloughed workers were at greater risk of psychological distress (adjusted risk ratio, ARR = 1.12; 95%CI: 0.97, 1.29), low life satisfaction (ARR = 1.14; 95%CI: 1.07, 1.22), loneliness (ARR = 1.12; 95%CI: 1.01, 1.23), and poor self-rated health (ARR = 1.26; 95%CI: 1.05, 1.50). Nevertheless, compared to furloughed workers, those who became unemployed had greater risk of psychological distress (ARR = 1.30; 95%CI: 1.12, 1.52), low life satisfaction (ARR = 1.16; 95%CI: 0.98, 1.38), and loneliness (ARR = 1.67; 95%CI: 1.08, 2.59). Effects were not uniform across all sub-groups.

Conclusions: During the early stages of the pandemic, those furloughed had increased risk of poor mental and social wellbeing, but furloughed workers fared better than those who became unemployed, suggesting that furlough may have partly mitigated poorer outcomes.

1. Introduction

COVID-19 and a series of associated ‘lockdown’ mitigation measures,

which included closure of non-essential retail, leisure facilities and schools, have had an adverse impact on the economy in the United Kingdom (UK) and worldwide (Koltai et al., 2020; Office for National Statistics, 2020). There is a well-established relationship between

* Corresponding author. University College London, MRC Unit for Lifelong Health and Ageing Floor 5, MRC LHA at UCL, 1 – 19 Torrington Place, London, WC1E 7HB, UK.

E-mail address: w.jacques@ucl.ac.uk (Jacques Wels).

¹ joint first authors.

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List of abbreviations

ARR	Adjusted Risk Ratio
ALSPAC-G1	Avon Longitudinal Study of Parents and Children
ALSPAC-G0	Parents of ALSPAC-G1
BCS70	1970 British Cohort Study
CI	Confidence interval
CJRS	Coronavirus Job Retention Scheme
ELSA	English Longitudinal Study of Ageing
GS	Generation Scotland: the Scottish Family Health Study
MCS	Millennium Cohort Study
NCDS	1958 National Child Development Study
NS	Next Steps (formerly the Longitudinal Study of Young People in England)
UK	United Kingdom
USOC	Understanding Society

individual employment status and mental health and wellbeing, with most studies suggesting that economic recessions and unemployment are generally associated with poorer mental health (Flint et al., 2013; Frاسquilho et al., 2016; Steele et al., 2013), although these associations are complex, might be context-specific, and vary across generations and demographic and socioeconomic groups (Catalano et al., 2011; Copeland et al., 2015; Valkonen et al., 2000).

Overall, it has been estimated that the prevalence of mental distress in the UK increased from 19.1% pre-pandemic to 30.6% in early lockdown (April 2020), with greater deteriorations observed in young adults and women (Banks and Xu, 2020; Niedzwiedz et al., 2021). More recent longitudinal research has found that raised levels of psychological distress were sustained across subsequent stages of the pandemic, particularly for women and younger adults (Patel et al., 2022). However, it is unclear how employment status change is related to mental and social wellbeing in this unique context.

2. Background

Employment is generally considered to be associated with good health (Benach et al., 2010; Graetz, 1993) and job loss or unemployment with deleterious physical and mental health (Puig-Barrachina et al., 2011), including lower psychological wellbeing (Murphy and Athanasou, 1999) and increased mortality (Roelfs et al., 2011). Most studies confirm the negative relationship between unemployment and mental health and wellbeing (McKee-Ryan et al., 2005) but with differences by sex. Men and those in their early and middle career stage can be especially affected by unemployment (Roelfs et al., 2011), although some studies have found greater effects of unemployment for women (Drydakis, 2015). Unemployment is also sometimes associated with social isolation (Lobo, 2018), which can lead to loneliness (Green et al., 2021). The relationship between unemployment and mental health is bi-directional: mental health is associated with unemployment, and reciprocally, poor mental health makes it difficult to move into employment (Harris et al., 1998; Kraut et al., 2000; Maier et al., 2006). There is also evidence that the relationship between unemployment and mental health varies by age and education level (van Zon et al., 2017), so studies of this relationship need to be sensitive to differences between sociodemographic groups and to respondents' prior mental health (before changes in employment status).

In March 2020 – in the early stages of the Covid-19 pandemic –, the UK government launched the Coronavirus Job Retention Scheme (CJRS, widely referred to as 'furlough'), providing employees who were unable to work due to the pandemic with 80% of pay (capped at £2,500 per month) (Adams-Prassl et al., 2020). Furlough occupies an intermediary status between employment and unemployment that is relatively new,

particularly in the UK (Bell and Blanchflower, 2020), because the cessation of work is intended to be, in principle, temporary and a substantial portion of income is maintained. Nevertheless, while furlough helps maintain some of the advantages of employment, benefits such as time structure, collective purpose, social contact, and physical activity are likely diminished for furloughed workers (Paul and Batinic, 2010), so it is unclear how this may impact on their mental and social wellbeing.

Existing studies on short-term unemployment schemes during the Covid-19 pandemic are sparse and more evidence is needed. One study has shown that remaining in part-time employment before and during the early stage of pandemic or being furloughed is associated with similar levels of mental health compared with continuous full-time employment (Burchell et al., 2020), indicating that a continuous connection to employment is associated with better mental health outcomes. However, these findings may need some qualification. It has been observed that people with pre-existing mental health problems were more likely to experience employment disruption during the pandemic (Breslau et al., 2021; Di Gessa et al., 2021). It remains unclear how policies introduced to mitigate economic disruption might have affected mental health and controlling for pre-pandemic mental health is critical to addressing this question. Furthermore, other individual background characteristics may partly explain the propensities to be unemployed or furlough during the pandemic. Younger workers and women were more likely to work in disrupted sectors, and therefore become unemployed or furloughed (Burchell et al., 2020). Similarly, people in lower skilled jobs, living in more deprived areas, or struggling financially were also more likely to be furloughed (Gray et al., 2021). Women with young children were also more likely to be furloughed (Green et al., 2021; Wielgoszewska et al., 2020) and previous studies found that, during the school closure period, women took on a bigger share of housework and childcare responsibilities (Zamarro and Prados, 2021; Zhou et al., 2020), and may therefore have been more affected by disruptions such as furlough.

Thus, our study contributes to a key knowledge gap in this area by leveraging data from nine UK population cohort studies and investigating how furlough and other employment changes were associated with a range of outcomes including psychological distress, life satisfaction, self-rated health, social contact, and loneliness. We draw on data from the early stages of the pandemic, when furlough was at its peak (between 25 and 30 percent of the UK population were furloughed between April and July 2020 and only 10 to 20 percent in the following months (ONS, 2021)). Employing 9 studies and statistically pooling results with meta-analysis, allows us to present more robust and nuanced evidence on associations within the UK working age population than would be possible with any single study alone. Given that employment disruption and furlough may have affected socio-demographic groups differently, inclusion of 9 studies provides enhanced statistical power to examine whether associations differed by sex, age, education, and household composition.

3. Method

3.1. Participants and design

Participants were 25,670 respondents from nine UK population-based longitudinal studies, who completed surveys both before and during the COVID-19 pandemic. Pandemic data were collected between April–June 2020 and pre-pandemic data constituted the most recent data available for each study prior to the pandemic (median was ~3 years earlier, with a range from 1 to 14 years). Further details of the design, sampling frame, age range, timing of the pre-pandemic and COVID-19 surveys, response rates, and sample size are in [Supplementary File 1](#).

Five studies were age homogenous birth cohorts: the Millennium Cohort Study (MCS); the children in the Avon Longitudinal Study of

Parents and Children (ALSPAC-G1); Next Steps (NS, formerly the Longitudinal Study of Young People in England); the 1970 British Cohort Study (BCS70); and the 1958 National Child Development Study (NCDS). Four age heterogeneous studies were included: Understanding Society (USOC); the English Longitudinal Study of Ageing (ELSA); the Scottish Family Health Study: Generation Scotland (GS); and the UK's largest adult twin registry (TwinsUK). Finally, the parents of the ALSPAC-G1 cohort were treated as a fifth age heterogeneous study population (ALSPAC-G0). All studies, except TwinsUK and Generation Scotland, are representative of the British population in their target age range (see Supplementary File 1 for further details).

Analytical samples were restricted to working age participants, defined as those aged 16 to 66 (the current state pension age in the UK), who had at least one wellbeing outcome in the COVID-19 survey and relevant pre-pandemic measures for confounder adjustment. Studies were weighted to be representative of their target population, accounting for sampling design and differential non-response (see, for instance, Brown et al., 2020). Weights were not available for GS.

3.2. Measures

Please, see [Supplementary File 2](#) for full details on the measures and variable coding in each study.

3.2.1. Exposure: employment status change

Employment change (or stability) was operationalised by comparing respondents' self-reported employment status during the initial stages of the pandemic and retrospectively in the months preceding the start of the pandemic. Participants in paid work or in self-employment were both classed as 'employed' for all the studies. Based on this information, we created six employment change (or stability) categories: stable employed (either as self-employed or an employee, which served as the reference group); furloughed (i.e., from employed to furlough); no longer employed (i.e., from employed to not working, such as job loss or retirement); stable unemployed (i.e., unemployed at both points); became employed (i.e., from not working to employed); and stable non-employed (i.e., not available for employment at either point, including in education, early retirement, caring responsibilities, sick or disabled).

3.2.2. Outcomes: mental health and social wellbeing

We investigated six different mental and social wellbeing outcomes. For each outcome, we created a binary variable using pre-validated cut-off scores where possible. **Psychological distress** was measured using the Kessler-6 (MCS) (Kessler et al., 2002), General Health Questionnaire-12 (NS, USOC) (Goldberg, 1978), Malaise Inventory (BCS, NCDS) (Rutter et al., 1970), Centre for Epidemiological Studies Depression Scale (ELSA) (Radloff, 1977), Short Mood and Feelings Questionnaire (ALSPAC G0/G1) (Angold et al., 1995), Patient Health Questionnaire (GS) (Kroenke and Spitzer, 2002), and Hospital Anxiety and Depression Scale (Twins UK) (Zigmond and Snaith, 1983). **Life satisfaction** was assessed using the Office for National Statistics (ONS) wellbeing scale that asks participants to rate how satisfied they are with their lives (most studies used a 0–10 scale; USOC used 1–7): those who answered less than 7 (or less than 5 in USOC) were classified as reporting low life satisfaction. **Self-rated health** was measured using responses to a generic question asking participants to rate their health on a five-point ordinal scale (excellent; very good; good; fair; poor): the five items were dichotomised into poor (fair or poor) versus good (excellent, very good or good). **Social contact** (either face-to-face, by telephone, or text message) with family and friends outside the household was coded to distinguish between those reporting daily versus less than daily social contact. **Loneliness** was assessed (MCS, NS, BCS, NCDS, ELSA, TwinsUK) using the short version of the Revised UCLA loneliness scale, with scores of 6 and higher indicating high loneliness (Russell et al., 1980). Additionally, we also considered the direct question "How often do you feel lonely?" rated on a three-point ordinal scale (hardly ever; some of

the time; often), as this was asked in two further studies (USOC, GS): we compared those reported often feeling lonely versus less frequent or no feelings of loneliness.

3.2.3. Confounders and moderators

Two levels of confounder adjustment were applied. The first level reflected a *basic* adjustment, accounting for sociodemographic characteristics: age (for age heterogeneous studies), sex, ethnicity (White vs. non-White ethnic minority - not available in NCDS and BCS), education (degree vs. no degree – parent education used for MCS), UK nation (England; Scotland; Wales; Northern Ireland), and household composition (living alone; with partner including possible children or others; with others e.g., housemates or other family members but no partner). The second level reflected *full* adjustment, additionally including all available pre-pandemic mental and social wellbeing measures, in order to determine whether differences in outcomes could be attributed to changes taking place during the pandemic.

Caption: Without control for pre-pandemic wellbeing, the risk ratios from the basic adjustment may represent both incident and established (pre-pandemic) outcomes. The risk ratios from the full adjustment block effects via pre-pandemic characteristics and are therefore interpreted as representing differential change in outcomes independent of pre-pandemic status.

Both stages of adjustment are relevant because our exposure, employment change, incorporates pre-pandemic employment status, which may have exerted effects via pre-pandemic mental and social wellbeing (see Fig. 1). By not controlling for pre-pandemic states, the basic adjusted risk ratios may represent differences in both incident and established (pre-pandemic) outcomes. In contrast, the full adjustment risk ratios block effects via pre-pandemic mental and social wellbeing and can therefore be interpreted as representing differential change in mental and social wellbeing between exposure groups, independent of pre-pandemic status.

3.3. Analysis

We conducted analysis in each dataset using a co-ordinated approach. This allowed us to operationalise measures as closely as possible across datasets using a common framework, while ensuring the

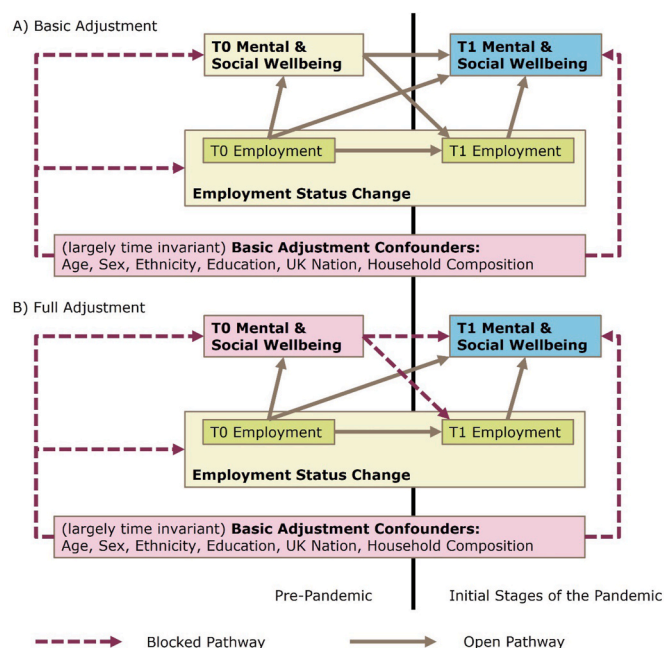


Fig. 1. Causal pathways blocked under differing levels of adjustment.

best approach for characterising variables and measures within each dataset. As a second step, meta-analysis of dataset-specific estimates was performed which maximises statistical power and generalisability, while – crucially – allowing us to quantify heterogeneity across studies and take this into account.

Within each study, each of the mental and social wellbeing outcomes were regressed on employment status change, using a modified Poisson model with robust standard errors that returns risk ratios for ease of interpretation and to avoid issues related to non-collapsibility of odds ratios (Zou, 2004; Zou and Donner, 2013). A sensitivity analysis was conducted with the continuous version of psychological distress (standardised within studies), using linear regression. We focus on reporting risk ratios comparing stable employment to furlough, no longer employed, and stable unemployment, as the main exposure categories of interest. Results from each study were statistically pooled using a random effects meta-analysis with restricted maximum likelihood (maximum likelihood was used for models that failed to converge). Study-specific estimates were excluded if the number of individuals reporting the outcome of interest was very low (≤ 2). See [Supplementary File 3](#) for further information and full model estimates. Stratification by sex, age, education, and household composition was assessed with sub-group analyses using the *full* level of confounder adjustment (i.e., controlling for sociodemographic and pre-pandemic mental and social wellbeing). Sub-group differences that were significant at the $p < .05$ threshold are reported in the text. See [Supplementary File 4](#) for figures of the sub-group analyses. A final sensitivity analysis was conducted using furlough as the reference group (fully adjusted models only) in order to directly compare furlough to the other employment categories, with a particular focus on those no longer employed. See [Supplementary File 3](#) for full model estimates.

4. Results

4.1. Descriptive statistics

Descriptive statistics for mental and social wellbeing outcomes across nine studies are presented in [Table 1](#). During the pandemic, the proportion of participants displaying psychological distress ranged from 7.2% (ALSPAC G0) to 35.7% (NS). The proportion reporting low life satisfaction ranged from 18.2% (ALSPAC G0) to 48.8% (MCS). The

proportion reporting poor self-rated health ranged from 6.8% (GS) to 22.0% (ELSA). The proportion reporting less than daily social contact ranged from 5.8% (ALSPAC G0) to 81.2% (USOC). The proportion displaying high loneliness (UCLA scale) ranged from 20.8% (NCDS) to 53.5% (TwinsUK). The proportion reporting feeling often lonely ranged from 4.9% (GS) to 22.6% (MCS).

4.2. Employment change

Descriptive statistics for employment status change (and stability) across nine studies are displayed in [Table 2](#). The proportion of participants in stable employment ranged from 10.9% (MCS) to 71.5% (ALSPAC G1). The proportion of participants who were furloughed ranged from 5.8% (TwinsUK) to 23.2% (BCS). The proportion of participants no longer employed ranged from 1.7% (BCS) to 7.1% (ALSPAC G0). The proportion of participants who were stable unemployed ranged from 0.5% (BCS, GS) to 8.6% (ALSPAC G0).

4.3. Main results

The pooled results suggest a largely common pattern in the way employment change was associated with mental and social wellbeing outcomes (see [Fig. 2](#)). Compared to those in stable employment, those furloughed, no longer employed, and stable unemployed tended to show excess risk for poor mental and social wellbeing, with magnitude of excess risk being largest for the stable unemployed, followed by those no longer employed, and then those furloughed.

Caption: Error bars show 95% confidence intervals; Stable employment is the reference category; Basic adjustment includes: age, sex, ethnicity, education, household composition; Full adjustment includes: pre-pandemic psychological distress, life satisfaction, self-rated health, social contact, and loneliness.

4.3.1. Psychological distress

In unadjusted models, compared to participants in stable employment, those furloughed had higher psychological distress (RR = 1.21; 95% CI: 1.02, 1.44; $I^2 = 60\%$), as did those no longer employed (RR = 1.58; 95% CI: 1.35, 1.85; $I^2 = 0\%$), and those in stable unemployment (RR = 2.03; 95% CI: 1.51, 2.73; $I^2 = 50\%$). In the fully adjusted model, controlling for sociodemographic and pre-pandemic mental and social

Table 1

Descriptive statistics of mental health and social wellbeing outcomes pre- and during initial stages of the pandemic by study.

	MCS	NS	BCS	NCDS	ELSA	USOC	ALSPAC-G0	ALSPAC-G1	GS	TWINS-UK
Age/Age range	18–20	30–31	50	62	52–66	17–66	50–65	27–29	27–66	22–65
	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)
Psychological distress										
pre-pandemic	17.8 (338)	25.4 (432)	19.1 (493)	14.4 (508)	12.9 (272)	22.2 (1268)	19.6 (336)	18.8 (205)	11.1 (294)	7.8 (64)
during	19.0 (386)	35.7 (595)	17.2 (481)	12.2 (436)	22.8 (505)	33.3 (1991)	7.2 (108)	17.3 (182)	9.8 (243)	12.6 (105)
Low life satisfaction										
pre-pandemic	-	9.0 (144)	22.1 (594)	22.6 (836)	29.5 (620)	29.2 (1619)	20.4 (346)	16.4 (166)	14.1 (374)	-
during	48.8 (863)	32.1 (525)	27.8 (813)	25.6 (993)	36.0 (807)	37.6 (2181)	18.2 (305)	28.0 (276)	47.2 (1253)	40.6 (382)
Poor self-rated health										
pre-pandemic	7.0 (111)	9.7 (138)	19.1 (442)	16.8 (519)	22.0 (443)	20.3 (1055)	-	-	-	9.9 (85)
during	9.5 (163)	9.4 (139)	13.0 (324)	17.1 (548)	22.0 (457)	-	-	-	6.8 (180)	8.4 (79)
Less than daily social contact										
pre-pandemic	-	-	-	-	51.6 (1214)	78.0 (5160)	-	-	56.8 (1505)	-
during	60.8 (1135)	64.2 (1024)	63.3 (2007)	55.6 (2523)	65.3 (1524)	81.2 (5279)	5.8 (100)	8.1 (90)	56.1 (1486)	11.7 (110)
High loneliness (UCLA)										
pre-pandemic	-	-	-	-	21.6 (455)	-	-	-	-	-
during	44.0 (782)	29.9 (480)	21.2 (623)	20.8 (809)	24.4 (528)	-	-	-	-	53.5 (494)
Often lonely										
pre-pandemic	13.7 (224)	8.2 (172)	7.9 (215)	8.3 (283)	6.8 (143)	9.9 (477)	-	-	1.0 (26)	-
during	22.6 (403)	11.0 (187)	6.9 (180)	6.8 (231)	6.8 (136)	10.4 (465)	-	-	4.9 (129)	5.0 (46)
Total N	1,839	1,595	3,143	4,416	2,344	6,849	1,469	1,051	2,652	978

Note: Data were collected during the early stages of the COVID-19 pandemic (April–June 2020); Pre-pandemic data were collected at different times ranging from 2006 to 2019 (see [Supplementary File 1](#) for more information); Missing items reflect that no consistent measure was available for that particular study.

Table 2
Percent distribution of change in employment status during the pandemic across nine studies.

	MCS	NS	BCS	NCDS	ELSA	USOC	ALSPAC G0	ALSPAC G1	GS	TwinsUK
Age/Age range	18–20	30–31	50	62	52–66	17–66	50–65	27–29	27–66	22–65
Stable employed	10.9	62.2	65.4	33.9	50.3	58.7	53.8	71.5	62.5	30.6
Furloughed	14.8	22.3	23.2	19.1	13.8	14.3	13.1	15.8	8.2	5.8
No longer employed	3.5	3.1	1.7	2.8	2.0	3.6	7.1	4.6	3.4	1.8
Became employed	1.5	1.1	0.5	0.8	0.4	1.3	3.4	2.2	0.6	0
Stable unemployed	3.1	1.7	0.5	1.5	2.9	1.8	8.6	2.7	0.5	0.8
Stable non-employed	66.2	9.6	8.7	41.9	30.6	20.3	14	3.2	24.9	60.9
N	1,839	1,595	3,143	4,416	2,344	6,849	1,469	1,051	2,652	978

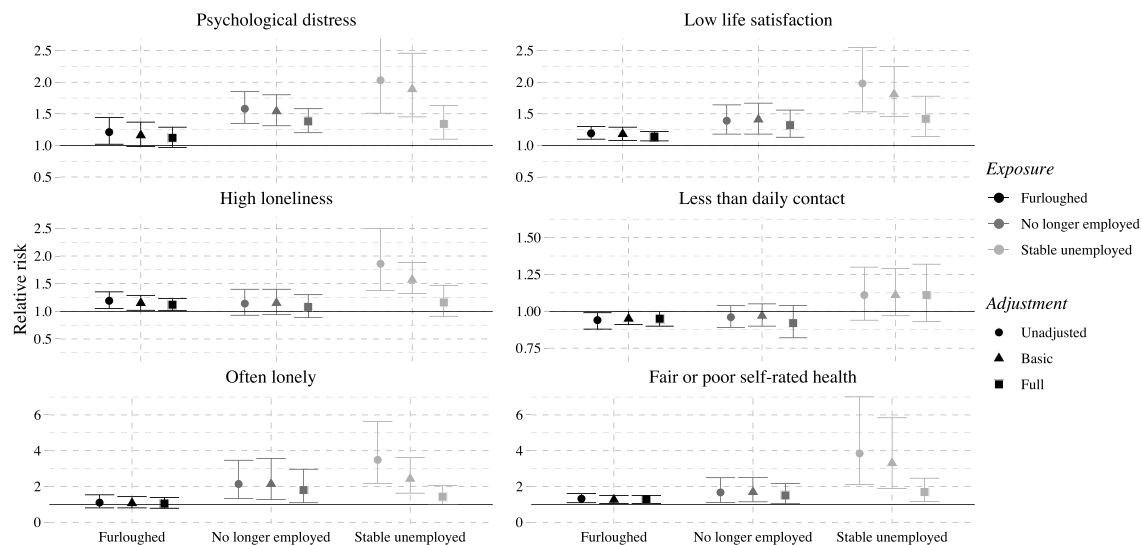


Fig. 2. Relative risk of employment status change in mental and social wellbeing.

wellbeing, estimates were attenuated for furlough (ARR = 1.12; 95% CI: 0.97, 1.29; $I^2 = 49\%$), those no longer employed (ARR = 1.38; 95% CI: 1.20, 1.58; $I^2 = 0\%$), and those in stable unemployment (ARR = 1.34; 95% CI: 1.10, 1.63; $I^2 = 50\%$). The sensitivity analysis conducted with the continuous version of psychological distress confirmed these results. Sub-group analyses revealed no differences by sex, education, age, or household composition (see [Supplementary File 3](#) for full model estimates).

4.3.2. Low life satisfaction

In unadjusted models, compared to participants in stable employment, those furloughed had lower life satisfaction (RR = 1.19; 95% CI: 1.10, 1.30; $I^2 = 24\%$), as did those no longer employed (RR = 1.39; 95% CI: 1.18, 1.64; $I^2 = 45\%$), and those in stable unemployment (RR = 1.98; 95% CI: 1.53, 2.55; $I^2 = 76\%$). Estimates were attenuated in the fully adjusted model, but less so for furlough (ARR = 1.14; 95% CI: 1.07, 1.22; $I^2 = 7\%$) and those no longer employed (ARR = 1.32; 95% CI: 1.13, 1.56; $I^2 = 52\%$), than the stable unemployed (ARR = 1.42; 95% CI: 1.14, 1.78; $I^2 = 65\%$). Sub-group analyses revealed no differences by sex, education, age, or household composition.

4.3.3. Poor self-rated health

Compared to stable employment, risk of poor self-rated health was higher in the unadjusted model for furlough (RR = 1.32; 95% CI: 1.09, 1.60; $I^2 = 43\%$), no longer being employed (RR = 1.67; 95% CI: 1.11, 2.49; $I^2 = 61\%$), and stable unemployment (RR = 3.85; 95% CI: 2.12, 7.01; $I^2 = 85\%$). Estimates were attenuated in the fully adjusted model, with a similar pattern of milder attenuation for furlough (ARR = 1.26; 95% CI: 1.05, 1.50; $I^2 = 44\%$) and those no longer employed (ARR = 1.50; 95% CI: 1.04, 2.17; $I^2 = 59\%$), compared to those in stable unemployment (ARR = 1.69; 95% CI: 1.16, 2.47; $I^2 = 65\%$).

Sub-group analyses revealed differences by sex ($p = .009$), where furlough was associated with poorer self-rated health for females (ARR = 1.41; 95% CI: 1.11, 1.79; $I^2 = 49\%$), compared to males (ARR = 1.01; 95% CI: 0.97, 1.07; $I^2 = 0\%$). Differences were also observed by age ($p = .019$), with no longer being employed being more strongly associated with poorer self-rated health among those aged 30–49 years (ARR = 2.86; 95% CI: 1.28, 6.36; $I^2 = 0\%$), compared to those aged 50+ (ARR = 1.28; 95% CI: 0.95, 1.71; $I^2 = 42\%$); estimates for ages 16–29 years were not available due to data sparsity.

4.3.4. Less than daily social contact

We observed no differences in the risk of less than daily social contact across employment groups in all models. Sub-group analyses revealed no differences by sex, education, age, or household composition.

4.3.5. High loneliness

Compared to stable employment, furlough was associated with higher loneliness in the unadjusted model (RR = 1.19; 95% CI: 1.05, 1.35; $I^2 = 27\%$), no longer being employed showed a similar magnitude association but confidence intervals crossed the null (RR = 1.14; 95% CI: 0.93, 1.40; $I^2 = 0\%$), and there was a stronger association for stable unemployment (RR = 1.86; 95% CI: 1.38, 2.50; $I^2 = 50\%$). Yet, in the fully adjusted model, only those furloughed had increased risk for high loneliness (ARR = 1.12; 95% CI: 1.01, 1.23; $I^2 = 0\%$). Sub-group analyses revealed no differences by sex, education, age, or household composition.

4.3.6. Often lonely

In the unadjusted model with the single-item loneliness measure, compared to those in stable employment, there was no clear association with furlough (RR = 1.10; 95% CI: 0.80, 1.53; $I^2 = 66\%$), but those no

longer employed were more likely to report feeling lonely (RR = 2.14; 95% CI: 1.32, 3.47; $I^2 = 68\%$), as were those in stable unemployment (RR = 3.49; 95% CI: 2.17, 5.63; $I^2 = 61\%$). Results were attenuated in the fully adjusted model for those no longer employed (ARR = 1.80; 95% CI: 1.09, 2.97; $I^2 = 72\%$) and stable unemployed (ARR = 1.43; 95% CI: 0.99, 2.06; $I^2 = 42\%$).

Sub-group analyses revealed differences by sex ($p = .051$), whereby no longer being employed was strongly associated with feeling lonely for females (ARR = 2.39; 95% CI: 1.41, 4.08; $I^2 = 72\%$), but not males (ARR = 1.05; 95% CI: 0.55, 2.00; $I^2 = 60\%$). There were also differences by household composition ($p < .001$), whereby stable unemployment was more strongly associated with feeling lonely for those living with a partner (and possibly other family members) (ARR = 4.04; 95% CI: 2.28, 7.18; $I^2 = 4\%$), than for those living alone (ARR = 2.07; 95% CI: 1.32, 3.25; $I^2 = 60\%$), or those living with others but no partner (ARR = 1.00; 95% CI: 0.69, 1.44; $I^2 = 0\%$).

4.4. Sensitivity analysis: furlough vs. no longer employed

A sensitivity analysis was conducted using furlough as the reference group (at the end of Supplementary File 3). Compared to furlough, those no longer employed showed increased risk for psychological distress (ARR = 1.30; 95% CI: 1.12, 1.52; $I^2 = 0\%$) and reporting feeling often lonely (ARR = 1.67; 95% CI: 1.08, 2.59; $I^2 = 56\%$), and marginally increased risk for low life satisfaction (ARR = 1.16; 95% CI: 0.98, 1.38; $I^2 = 49\%$). No differences were observed for self-rated health, less than daily social contact, or high loneliness.

5. Discussion

Across nine UK longitudinal studies drawn from the UK working age population, we found that furlough was associated with a slight decline in mental and social wellbeing compared to stable employment during the early stages of the COVID-19 pandemic. While raised risks of psychological distress, low life satisfaction, poor self-rated health, and loneliness were seen among furloughed people, the excess risk was generally smaller than that associated with no longer being employed or being in stable unemployment. There was little association between employment status and having daily social contact. Moreover, we observed when adjusting for pre-pandemic characteristics, that the excess risk associated with stable unemployment was more strongly attenuated than that for furlough or no longer being employed. This indicates that the large magnitude risks associated with stable unemployment may have had more to do with characteristics that were already established before the pandemic.

As with most observational studies, unobserved confounding could have affected our estimates. Despite being embedded within long standing cohorts, survey responses during the pandemic were lower than typically achieved, and while weighting was employed to correct for this, bias due to selective non-response could not be ruled out (Fernández-Sanlés et al., 2021; Mostafa et al., 2021). There are other limitations that should also be considered. First, we were not able to achieve full harmonisation of measures across studies, for example, a range of different psychological distress scales were used and questions on social contact differed considerably (which may explain some of the between study differences in prevalence). Second, all cohorts and studies could not contribute to every analysis as the number of cases and available data varied between studies. Third, participation in the furlough scheme was more common during the initial stages of the pandemic than being no longer employed or in stable unemployment, which meant that estimates for the latter groups were based on small numbers with considerable heterogeneity, especially in sub-group analyses. Additionally, due to lack of consistently detailed data, we were unable to examine the specific effect of similar schemes for self-employed participants. Finally, it is important to recognise that the experience of stable employment itself may have changed during the

pandemic with childcare conflicts during school closures and changes in working practices such as home-working potentially affecting mental health and wellbeing, which is an important area for future research (Wielgoszewska et al., 2022).

Nevertheless, our findings concur with those of Burchell et al. (2020) that continued connection to employment is better for mental health. We demonstrate further that furlough occupies an intermediary position between employment and unemployment and that the mental health of furloughed workers was somewhat worse than those who remained in employment. This finding was consistent after comparing formally job loss and furlough as the reference group. Our study emphasises that these findings generalize across several measures of mental health and wellbeing (except social contacts), are relatively consistent across nine datasets, and are robust to adjustment for pre-pandemic mental health and wellbeing. Sub-group analyses show that furlough was associated with poorer self-rated health for females and among those aged 30–49 years, pointing out the role of gender and age in assessing the effect of furlough. This is in line with several studies that have recently shown that mental health, furlough, as well as the pandemic experiences were generally gendered (Collins et al., 2021; Wang et al., 2022). Interestingly, other studies have shown that furlough was not associated with substantial changes in health behaviours (Green et al., 2021; Wielgoszewska et al., 2022) indicating an effect of furlough that is not mediated by health behaviours.

Understanding the impacts of furlough is important because it was a key policy measure implemented to mitigate the economic disruption of the pandemic. Due to the UK CJRS furlough scheme, unemployment only rose moderately (Küçük et al., 2021), which is confirmed in our studies, as the number of furloughed workers was more than three times higher than the number of employees who lost their job. Furlough schemes and temporary lay-off policies were implemented to mitigate employment losses in many European countries, Asia, and the United States (ILO, 2022) but with variations across countries. (Müller et al., 2022). Some countries, such as Portugal or Austria, have implemented short-time work schemes through financial support to companies to compensate the hours not worked by their employees. Some other countries have implemented wage subsidy schemes to subsidise companies independently of working time reduction such as in the Netherlands or Ireland. Furlough schemes are about paying employees for hours not worked through temporary or partial layoff and have been implemented in Belgium, Denmark, and Finland as well as the UK but the content, financial modalities and length of these policies have varied from one country to another (Danielli et al., 2021). Unlike traditional forms of unemployment, the relationship between specific labour market policy interventions, such as furlough, and health is less well-understood (Escudero-Castillo et al., 2021; Ikeda et al., 2021; Wels and Hamarat, 2022). This is partly because job retention schemes, which focus on buffering the impact of economic downturns, were uncommon in Western countries, and particularly in the UK, prior to the COVID-19 outbreak (Puig-Barrachina et al., 2020).

The UK CJRS furlough scheme officially ended on the September 30, 2021. It might be expected that the economic downturn caused by the COVID-19 pandemic will last beyond the end of the furlough scheme, and potentially beyond the end of the pandemic (Whitehead et al., 2021). With potentially damaging effects on mental health and wellbeing for those who stopped working (via furlough or otherwise), one pertinent question is whether the mental health and wellbeing of those who were furloughed will recover when they move back to their previous employment status. In line with this, another important question is whether those who benefited from the CJRS scheme will be more likely to experience further economic disruptions such as job or income loss in the post-furlough period, as this could exacerbate detrimental effects on health and wellbeing. A final point to consider is whether furlough schemes could help mitigate negative impacts of other economic disruptions (besides COVID-19) on mental and social wellbeing. Whilst temporary forms of unemployment existed prior to the start of the

pandemic in countries such as Belgium (Hendrickx et al., 2020) or Germany (Chung and Thewissen, 2011), schemes allowing employers to furlough employees in cases of acute economic difficulty could be investigated further.

6. Conclusion

During the initial stages of the COVID-19 pandemic, many people experienced employment disruption, which we found to be associated with change in mental and social wellbeing. Compared to those who remained working, furloughed workers showed a decline with respect to their mental and social wellbeing. However, those who had left employment or remained unemployed fared worse than furloughed workers. This suggests that furlough may have helped to mitigate some of the detrimental impacts of employment disruption on mental health, but nevertheless, furloughed workers still experienced a modest deterioration in their mental and social wellbeing and may need additional support to recover from pandemic-related disruptions.

Author contribution statement

Conceptualised the study and design: Wels; Booth; Wielgoszewska; Green; Di Gessa Ploubidis, Katikireddi.

Designed the methodology: Wels; Booth; Wielgoszewska; Green; Di Gessa Ploubidis, Katikireddi, Silverwood; Maddock

Conducted the formal analysis: Wels; Booth; Wielgoszewska; Green; Di Gessa; Huggins; Griffith; S. F. Kwong; Bowyer.

Data curation: Wels; Booth; Wielgoszewska; Green; Di Gessa; Huggins; Griffith; S. F. Kwong; Bowyer.

Wrote the original draft of the manuscript: Wels; Booth; Wielgoszewska.

Data visualisation: Wels and Di Gessa.

All authors contributed to critical revision of the manuscript.

Supervision: Ploubidis and Katikireddi.

Funding acquired: Patalay, Katikireddi, Ploubidis, Steves, Silverwood, and Chaturvedi.

Declarations

Ethics approval and consent to participate

We have detailed the ethical approval for each study in Supplementary File 1.

Availability of data and materials

All datasets included in this analysis have established data sharing processes, and for most included studies the anonymized datasets with corresponding documentation can be downloaded for use by researchers from the UK Data Service. We have detailed the processes for each dataset in Supplementary File 1.

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Declaration of competing interest

No conflicts of interest were declared by the authors, except SVK who is a member of the Scientific Advisory Group on Emergencies.

Data availability

Each dataset is available upon request to the different institutions in charge of the surveys

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Appendix A. Supplementary data

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References

- Adams-Prassl, A., Boneva, T., Golin, M., Rauh, C., 2020. Furloughing. *Fisc. Stud.* 41 (3), 591–622. <https://doi.org/10.1111/1475-5890.12242>.
- Angold, A., Costello, E.J., Messer, S.C., 1995. The development of a questionnaire for use in epidemiological studies of depression in children and adolescents. *International Journal of Methods in Psychiatric Research* 5, 237–249. <https://www.researchgate.net/publication/236313650>.
- Banks, J., Xu, X., 2020. The mental health effects of the first two months of lockdown and social distancing during the Covid-19 pandemic in the UK. IFS Working Paper W20 (16).
- Bell, D.N., Blanchflower, D.G., 2020. US and UK labour markets before and during the covid-19 crash. *Nat. Inst. Econ. Rev.* 252 (252), 1–18.
- Benach, J., Solar, O., Vergara, M., Vanroelen, C., Santana, V., Castedo, A., Ramos, J., Muntaner, C., 2010. Six employment conditions and health inequalities: a descriptive overview. *Int. J. Health Serv.* 40 (2), 269–280. <https://doi.org/10.2190/HS.40.2.g>.
- Breslau, J., Roth, E.A., Baird, M.D., Carman, K.G., Collins, R.L., 2021. A longitudinal study of predictors of serious psychological distress during COVID-19 pandemic. *Psychol. Med.* 1–9. <https://doi.org/10.1017/S0033291721004293>.
- Brown, M., Goodman, A., Peters, A., Ploubidis, G.B., Sanchez, A., Silverwood, R., Smith, K., 2020. COVID-19 Survey in Five National Longitudinal Studies Waves 1 and 2 User Guide (Version 2). UCL Centre for Longitudinal Studies and, London, pp. 1–69. <https://discovery.ucl.ac.uk/id/eprint/10119088/1/UCL-Cohorts-COVID-19-Survey-user-guide.pdf>.
- Burchell, B., Wang, S., Kameräde, D., Bessa, I., Rubery, J., 2020. Cut hours, not people: no work, furlough, short hours and mental health during the covid-19 pandemic in the UK. W 521, 22pp. https://www.cbr.cam.ac.uk/fileadmin/user_upload/centre-for-business-research/downloads/working-papers/wp521.pdf%0Ahttps://www.cam.ac.uk/research/news/furlough-stemmed-the-tide-of-poor-mental-health-during-uk-lockdown-study-suggests.
- Catalano, R., Goldman-Mellor, S., Saxton, K., Margerison-Zilko, C., Subbaraman, M., Lewinn, K., Anderson, E., 2011. The health effects of economic decline. *Annu. Rev. Publ. Health* 32, 431–450. <https://doi.org/10.1146/annurev-publhealth-031210-101146>.
- Chung, H., Thewissen, S., 2011. Falling back on old habits? A comparison of the social and unemployment crisis reactive policy strategies in Germany, the UK and Sweden. *Soc. Pol. Adm.* 45 (4), 354–370. <https://doi.org/10.1111/j.1467-9515.2011.00779.x>.
- Collins, C., Landivar, L.C., Ruppner, L., Scarborough, W.J., 2021. COVID-19 and the gender gap in work hours. *Gen. Work. Organ.* 28 (S1), 101–112. <https://doi.org/10.1111/gwao.12506>.
- Copeland, A., Kasim, A., Bamba, C., 2015. Grim up North or Northern grit? Recessions and the English spatial health divide (1991–2010). *J. Publ. Health* 37 (1), 34–39. <https://doi.org/10.1093/pubmed/fdu019>.
- Danielli, S., Patria, R., Donnelly, P., Ashrafian, H., Darzi, A., 2021. Economic interventions to ameliorate the impact of COVID-19 on the economy and health: an international comparison. *J. Publ. Health* 43 (1), 42–46. <https://doi.org/10.1093/pubmed/fdaa104>.
- Di Gessa, G., Maddock, J., Green, M.J., Thompson, E.J., McElroy, E., Davies, H.L., Mundy, J., Stevenson, A.J., Kwong, A.S.F., Griffith, G.J., Katikireddi Srinivasa Vitta, Niedzwiedz, C.L., Ploubidis, G.B., Fitzsimons, E., Henderson, M., Silverwood, R.J., Chaturvedi, N., Breen, G., Steves, C.J., Steptoe, A., Porteous, D., Patalay, P., 2021. Pre-pandemic mental health and disruptions to healthcare, economic and housing outcomes during the COVID-19 pandemic: evidence from 12 UK longitudinal studies. *The British Journal of Psychiatry* 220 (1), 21–30. <https://doi.org/10.1192/bjp.2021.132>.
- Drydakis, N., 2015. The effect of unemployment on self-reported health and mental health in Greece from 2008 to 2013: a longitudinal study before and during the financial crisis. *Soc. Sci. Med.* 128, 43–51. <https://doi.org/10.1016/j.socscimed.2014.12.025>.
- Escudero-Castillo, I., Mato-Díaz, F.J., Rodríguez-Alvarez, A., 2021. Furloughs, teleworking and other work situations during the covid-19 lockdown: impact on mental well-being. *Int. J. Environ. Res. Publ. Health* 18 (6), 1–16. <https://doi.org/10.3390/ijerph18062898>.
- Fernández-Sanlés, A., Smith, D., Clayton, G.L., Northstone, K., Carter, A.R., Millard, L.A., Borges, M.C., Timpson, N.J., Tilling, K., Griffith, G.J., Lawlor, D.A., 2021. Bias from questionnaire invitation and response in COVID-19 research: an example using ALSPAC. *Wellcome Open Research* 6, 184. <https://doi.org/10.12688/wellcomeopenres.17041.1>.
- Flint, E., Bartley, M., Shelton, N., Sacker, A., 2013. Do labour market status transitions predict changes in psychological well-being? *J. Epidemiol. Community* 67 (9), 796–802. <https://doi.org/10.1136/jech-2013-202425>.
- Frasquilho, D., Matos, M.G., Salonna, F., Guerreiro, D., Storti, C.C., Gaspar, T., Caldas-De-Almeida, J.M., 2016. Mental health outcomes in times of economic recession: a systematic literature review Health behavior, health promotion and society. In *BMC Public Health*. BioMed Central Ltd 16 (Issue 1). <https://doi.org/10.1186/s12889-016-2720-y>.
- Goldberg, D., 1978. *Manual of the general health questionnaire*. Nfer Nelson 1–32.
- Graetz, B., 1993. Health consequences of employment and unemployment: longitudinal evidence for young men and women. *Soc. Sci. Med.* 36 (6), 715–724. [https://doi.org/10.1016/0277-9536\(93\)90032-Y](https://doi.org/10.1016/0277-9536(93)90032-Y).
- Gray, B.J., Kyle, R.G., Song, J., Davies, A.R., 2021. Characteristics of those most vulnerable to employment changes during the COVID-19 pandemic: a nationally representative cross-sectional study in Wales. *J. Epidemiol. Community* 76 (1). <https://doi.org/10.1136/jech-2020-216030>.
- Green, M.J., Maddock, J., di Gessa, G., Wielgoszewska, B., Parsons, S., Griffith, G.J., Croft, J., Stevenson, A.J., Huggins, C.F., Booth, C., Wels, J., Silverwood, R.J., Patalay, P., Hughes, A.D., Chaturvedi, N., Howe, L.D., Fitzsimons, E., Katikireddi, S.V., Ploubidis, G.B., 2021. The UK COVID-19 furlough scheme and associations with smoking, alcohol consumption and vaping: evidence from 8 UK longitudinal population surveys. *MedRxiv*. <https://doi.org/10.1101/2021.10.28.21265593>.
- Green, M.J., Whitley, E., Niedzwiedz, C.L., Shaw, R.J., Katikireddi, S.V., 2021. Social contact and inequalities in depressive symptoms and loneliness among older adults: A mediation analysis of the English Longitudinal Study of Ageing. *SSM - Population Health* 13. <https://doi.org/10.1016/j.ssmph.2021.100726>.
- Harris, E., Webster, I.W., Harris, M.F., Lee, P.J., 1998. Unemployment and health: the healthcare system's role. *Med. J. Aust.* 168 (6), 291–296. <https://doi.org/10.5694/j.1326-5377.1998.tb140164.x>.
- Hendrickx, F., Taes, S., Wouters, M., 2020. Covid-19 and labour law in Belgium. *European Labour Law Journal* 11 (3), 276–285. <https://doi.org/10.1177/2031952520934554>.
- Ikeda, T., Igarashi, A., Odani, S., Murakami, M., Tabuchi, T., 2021. Health-related quality of life during COVID-19 pandemic: assessing impacts of job loss and financial support programs in Japan. *Applied Research in Quality of Life* 17, 541–557. <https://doi.org/10.1007/s11482-021-09918-6>.
- ILO, 2022. World Employment and Social Outlook Trends 2022. https://www.ilo.org/wcmsp5/groups/public/-dgreports/-dcomm/-publ/documents/publication/wcms_834081.pdf.
- Kessler, R.C., Andrews, G., Colpe, L.J., Hiripi, E., Mroczek, D.K., Normand, S.L.T., Walters, E.E., Zaslavsky, A.M., 2002. Short screening scales to monitor population prevalence and trends in non-specific psychological distress. *Psychol. Med.* 32 (6), 959–976. <https://doi.org/10.1017/S0033291702006074>.
- Koltai, J., Toffolutti, V., McKee, M., Stuckler, D., 2020. Changing probability of experiencing food insecurity by socioeconomic and demographic groups during the COVID-19 pandemic in the UK. *medRxiv* 2020.11.10.20229278, 1–18. <https://doi.org/10.1101/2020.11.10.20229278>.
- Kraut, A., Mustard, C., Walld, R., Tate, R., 2000. Unemployment and health care utilization. *Scand. J. Work. Environ. Health* 26 (2), 169–177. <https://doi.org/10.5271/sjweh.527>.
- Kroenke, K., Spitzer, R.L., 2002. The PHQ-9: a new depression diagnostic and severity measure. *Psychiatr. Ann.* 32 (9) <https://doi.org/10.3928/0048-5713-20020901-06>.
- Küçük, H., Lenoël, C., Macqueen, R., 2021. UK Economic Outlook: Brexit Britain in Covid Recovery Ward. *Ational Institute UK Economic Outlook*, pp. 1–16. February 2021.
- Lobo, F., 2018. Unemployment and leisure: the Marienthal legacy. *World Leisure Journal* 60 (2), 75–93. <https://doi.org/10.1080/16078055.2018.1458424>.
- Maier, R., Egger, A., Barth, A., Winker, R., Osterode, W., Kundi, M., Wolf, C., Ruediger, H., 2006. Effects of short- and long-term unemployment on physical work capacity and on serum cortisol. *Int. Arch. Occup. Environ. Health* 79 (3), 193–198. <https://doi.org/10.1007/s00420-005-0052-9>.
- McKee-Ryan, F.M., Song, Z., Wanberg, C.R., Kinicki, A.J., 2005. Psychological and physical well-being during unemployment: a meta-analytic study. *J. Appl. Psychol.* 90 (1), 53–76. <https://doi.org/10.1037/0021-9010.90.1.53>.
- Mostafa, T., Narayanan, M., Pongiglione, B., Dodgeon, B., Goodman, A., Silverwood, R.J., Ploubidis, G.B., 2021. Missing at random assumption made more plausible: evidence from the 1958 British birth cohort. *J. Clin. Epidemiol.* 136, 44–54. <https://doi.org/10.1016/j.jclinepi.2021.02.019>.
- Müller, T., Schulten, T., Drahoukoupil, J., 2022. Job retention schemes in Europe during the COVID-19 pandemic – different shapes and sizes and the role of collective bargaining. *Transfer: European Review of Labour and Research* online first, 1–19. <https://doi.org/10.1177/10242589221089808>, 10242589221089808.
- Murphy, G.C., Athanasou, J.A., 1999. The effect of unemployment on mental health. *J. Occup. Organ. Psychol.* 72 (1), 83–99. <https://doi.org/10.1348/096317999166518>.
- Niedzwiedz, C.L., Green, M.J., Benzeval, M., Campbell, D., Craig, P., Demou, E., Leyland, A., Pearce, A., Thomson, R., Whitley, E., Katikireddi, S.V., 2021. Mental health and health behaviours before and during the initial phase of the COVID-19 lockdown: Longitudinal analyses of the UK Household Longitudinal Study. *Journal of Epidemiology and Community Health* 75 (3), 224–231. <https://doi.org/10.1136/jech-2020-215060>.

- Office for National Statistics, 2020. Coronavirus and the latest indicators for the UK economy and society: 10 September 2020. Coronavirus (COVID-19) 1–26. February. <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/coronavirustheconomyandsocietyfasterindicators/3september2020>.
- ONS, 2021. *Comparison of Furloughed Jobs Data, UK March 2020 to January 2021*. 1–20.
- Patel, K., Robertson, E., Kwong, A.S.F., Griffith, G.J., Willan, K., Green, M.J., di Gessa, G., Huggins, C.F., McElroy, E., Thompson, E.J., Maddock, J., Niedzwiedz, C.L., Henderson, M., Richards, M., Steptoe, A., Ploubidis, G.B., Moltrecht, B., Booth, C., Fitzsimons, E., Silverwood, R., Patalay, P., Porteous, P., Katikireddi, S.V., 2022. Psychological Distress Before and During the COVID-19 Pandemic Among Adults in the United Kingdom Based on Coordinated Analyses of 11 Longitudinal Studies. *JAMA Network Open* 5 (4), e227629. <https://doi.org/10.1001/jamanetworkopen.2022.7629>.
- Paul, K.I., Batinic, B., 2010. The need for work: jahoda's latent functions of employment in a representative sample of the German population. *J. Organ. Behav.* 31 (1), 45–64. <https://doi.org/10.1002/job.622>.
- Puig-Barrachina, V., Giró, P., Artazcoz, L., Bartoll, X., Cortés-Franch, I., Fernández, A., González-Marín, P., Borrell, C., 2020. The impact of active labour market policies on health outcomes: a scoping review. *Eur. J. Publ. Health* 30 (1), 36–42. <https://doi.org/10.1093/eurpub/ckz026>.
- Puig-Barrachina, V., Malmusi, D., Martínez, J., Benach, J., 2011. Monitoring social determinants of health inequalities: the impact of unemployment among vulnerable groups. *Int. J. Health Serv.* 41 (3), 459–482. <https://doi.org/10.2190/HS.41.3.d>.
- Radloff, L.S., 1977. The CES-D scale: a self-report depression scale for research in the general population. *Appl. Psychol. Meas.* 1 (3), 385–401. <https://doi.org/10.1177/014662167700100306>.
- Roelfs, D.J., Shor, E., Davidson, K.W., Schwartz, J.E., 2011. Losing life and livelihood: a systematic review and meta-analysis of unemployment and all-cause mortality. *Soc. Sci. Med.* 72 (6), 840–854. <https://doi.org/10.1016/j.socscimed.2011.01.005>.
- Russell, D., Peplau, L.A., Cutrona, C.E., 1980. The revised UCLA loneliness scale: concurrent and discriminant validity evidence. *J. Pers. Soc. Psychol.* 39 (Issue 3).
- Rutter, M.; T. J.; W. K. E., 1970. *Education, Health and Behaviour*. Longman Publishing Group.
- Steele, F., French, R., Bartley, M., 2013. Adjusting for selection bias in longitudinal analyses using simultaneous equations modeling: the relationship between employment transitions and mental health. *Epidemiology* 24 (5), 703–711. <https://doi.org/10.1097/EDE.0b013e31829d2479>.
- Valkonen, T., Martikainen, P., Jalovaara, M., Seppo, Koskinen, Martelin, T., Makela, P., 2000. Changes in socioeconomic inequalities in mortality during an economic boom and recession among middle-aged men and women in Finland. *Eur. J. Publ. Health* 10 (4), 274–280. <https://doi.org/10.1093/eurpub/10.4.274>.
- van Zon, S.K.R., Reijneveld, S.A., Mendes de Leon, C.F., Bültmann, U., 2017. The impact of low education and poor health on unemployment varies by work life stage. *Int. J. Publ. Health* 62 (9), 997–1006. <https://doi.org/10.1007/s00038-017-0972-7>.
- Wang, S., Kamerade, D., Bessa, I., Burchell, B., Gifford, J., Green, M., Rubery, J., 2022. The impact of reduced working hours and furlough policies on workers' mental health at the onset of COVID-19 pandemic: a longitudinal study. *J. Soc. Pol.* 1–25. <https://doi.org/10.1017/S0047279422000599>.
- Wels, J., Hamarat, N., 2022. A shift in women's health? Older workers' self-reported health and employment settings during the COVID-19 pandemic. *European Journal of Public Health* 32 (1), 80–86. <https://doi.org/10.1093/eurpub/ckab204>.
- Whitehead, M., Taylor-Robinson, D., Barr, B., 2021. Poverty, health, and covid-19. In: *The BMJ*, vol. 372. BMJ Publishing Group. <https://doi.org/10.1136/bmj.n376>.
- Wielgoszewska, B., Booth, C., Green, M.J., Hamilton, O.K., Wels, J., 2022. Association between home working and mental health by key worker status during the Covid-19 pandemic. Evidence from four British longitudinal studies. *Industrial Health* 60, 1–12. <https://doi.org/10.2486/indhealth.2022-0081>.
- Wielgoszewska, B.B., Green, F., Goodman, A., 2020. *Finances and employment during lockdown*, 24. UCL Centre for Longitudinal Studies.
- Wielgoszewska, B., Maddock, J., Green, M.J., di Gessa, G., Parsons, S., Griffith, G.J., Croft, J., Stevenson, A.J., Booth, C., Silverwood, R.J., Bann, D., Patalay, P., Hughes, A.D., Chaturvedi, N., Howe, L.D., Fitzsimons, E., Katikireddi, S.V., Ploubidis, G.B., 2022. The UK Coronavirus Job Retention Scheme and diet, physical activity, and sleep during the COVID-19 pandemic: evidence from eight longitudinal population surveys. *BMC Medicine* 20 (1), 147. <https://doi.org/10.1186/s12916-022-02343-y>.
- Zamarro, G., Prados, M.J., 2021. Gender differences in couples' division of childcare, work and mental health during COVID-19. *Rev. Econ. Househ.* 19 (1), 11–40. <https://doi.org/10.1007/s11150-020-09534-7>.
- Zhou, M., Hertog, E., Kolpashnikova, K., Kan, M.-Y., 2020. Gender Inequalities: Changes in Income, Time Use and Well-Being before and during the UK COVID-19 Lockdown. <https://doi.org/10.31235/osf.io/u8ytc>. *SocArXiv*, 6th September, 1–16.
- Zigmond, A.S., Snaith, R.P., 1983. The hospital anxiety and depression scale. *Acta Psychiatr. Scand.* 67 (6) <https://doi.org/10.1111/j.1600-0447.1983.tb09716.x>.
- Zou, G., 2004. A modified Poisson regression approach to prospective studies with binary data. *Am. J. Epidemiol.* 159 (7), 702–706. <https://doi.org/10.1093/aje/kwh090>.
- Zou, G., Donner, A., 2013. Extension of the modified Poisson regression model to prospective studies with correlated binary data. *Stat. Methods Med. Res.* 22 (6), 661–670. <https://doi.org/10.1177/0962280211427759>.