The impact of job insecurity on mental health over time across gender and family responsibility

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Abstract

      While there is growing evidence that job insecurity leads to increased mental distress, prior studies have not investigated how gender and parental responsibilities may exacerbate this relationship. Since gender and parental responsibilities may interact with job insecurity to produce unique stressors, examining their contribution as potential effect modifiers may provide insights into gender inequalities in mental health and inform gender-sensitive labour policies to ameliorate the negative effects of job insecurity. Our study addresses this gap by examining the longitudinal association between job insecurity and mental health across different configurations of gender and parental responsibilities using a prospective cohort study design. Our sample includes 34,772 employed participants from the UK Household Longitudinal Study over the period of 2010-2018. A gender-stratified fixed-effect regression was used to model the within-person change over time in mental health functioning associated with loss of job security, and effect modification by parent-partner status (e.g. non-parents, lone mother, partnered father, etc). Loss of job security was associated with a moderate decrease in mental functioning for partnered fathers, partnered mothers, and non-parents ranging between a reduction in MCS-12 by 1.00 to 2.27 points (all significant at $p<0.05$). Lone fathers who lose their job security experienced a much higher decrease in mental functioning at -7.69 MCS-12 (95% CI: -12.69 to -2.70), while lone mothers did not experience any change. The effects of job insecurity on mental functioning varies across different configurations of gender, parental responsibilities, and partner status. Future studies should investigate the effects of policies that may reduce mental distress in the face of the threat of job loss such as reducing wait time for payment of unemployment benefits or increasing childcare cost coverage in the UK universal credit programme.

Keywords: Job insecurity, mental health, gender, parental responsibilities, lone fathers

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Introduction

      In the last four decades, the political economy of labour markets in wealthy countries of Europe and North America has shifted away from the "standard" employment condition of contracts of unlimited duration and a 40-hour work week with benefits[1]. Thus, new contractual forms alternatively referred to as "non- standard", "precarious", " flexible", "atypical", "contingent", "temporary" or "short term" contracts have become a more common feature[2,3]. Change has not been synchronous across wealthy countries including Europe, North America (Canada and USA) and the Asia-Pacific (e.g., Japan, Australia). This labour market transformation has been strongest in the EU where the standard employment relationship had been stronger since the end of WWII until the 1980s[2,4]. Denmark, for example, had adopted flexible employment in conjunction with strong social protections in the nineties, while Germany adopted a labour market reform that spurred the growth of "mini-jobs" around the turn of the 21st century[5], and Spain passed a labour market reform to facilitate new contractual forms after the beginning of the great recession in 2007[6]. The prevalence of non-standard work arrangements in Europe increased from 9 percent in 1985 to 15.2 percent in 2006[7]. In the post crisis years of the late 2010's, the pervasiveness of Non-Standard Work Arrangements has not improved substantially across wealthy countries. For example, between 2004 to 2013, temporary employment increased by 4% in France, and by 2% in Germany and Italy whereas the overall prevalence of permanent employment in Europe has decreased by 3%[7,8]. The increase in the rates of non-standard employment conditions (e.g. temporary jobs, short-term contracts) has resulted in such jobs being accepted as the "new normal"[9]. There is a growing body of research providing some evidence of the deleterious health effects of non-standard or temporary employment due to higher levels of job insecurity[2,10–14]. These findings highlight job insecurity (i.e., perceived risk and uncertainty associated with job loss) as an emerging social determinant of health[4,15].

Job insecurity and mental health

In spite of the growing evidence on the effects of job insecurity on a number of mental health problems (i.e., psychological distress[16–20] and mood disorders[21–24]), research in this area has several shortcomings. A limitation of early research has been its over reliance on cross-sectional designs[16,17,21–23,25–31]. Since exposure (job insecurity) and outcome (mental health outcomes) are simultaneously assessed, the lack of information on temporal relationship precludes the use of these models for causal inference. For example, a study based on a representative sample of England found that those who experienced job insecurity were 1.86 (95% CI: 1.47-2.35) times more likely to have depressive symptoms compared to those with job security[22]. Since the outcome and job insecurity were assessed at the same time, it is not possible to conclude if depression precedes job insecurity or vice versa. While most cross-sectional studies found a positive association between job insecurity and mental health problems (i.e., depression, anxiety, or higher psychological distress)[16,21–23,17,25–31], the effect sizes across studies were inconsistent. In a meta-analysis that identified 30 cross-sectional studies, the population effect size of job insecurity on mental health was considered medium[32], but the proportion of mental health variance explained by job insecurity was low and the ratio between residual standard deviations (across studies) to the population effect size (for the 30 studies) was greater than 0.25, which indicated heterogenous effect sizes (although all of them were positive) in a meta-analytic study. Given that cross-sectional studies are descriptive and exploratory, most recent studies have featured longitudinal designs to make stronger causal inferences about the impact of job insecurity on mental health. While there were questions about the temporal direction of effect with these cross-sectional studies, the issue of temporal precedence has been largely resolved through more recent longitudinal studies.

Another meta-analysis on the subject has deemed 10 longitudinal studies to be moderate or high quality (based on PRISMA-P guidelines for systematic review and meta-analysis[33]), and all 10 studies found that exposure to job insecurity led to an increase in depressive symptoms, psychological distress, and

anxiety[13]. Six of the ten longitudinal studies reported an increase in depressive symptoms (OR: 1.61, 95% CI: 1.29-2.00, pooled across 6 studies)[19,34–38], two studies reported an increase in psychological distress (OR: 1.65, 95% CI:1.25–2.18)[20,39], and the other two studies reported an increase in anxiety symptoms (OR:1.77, 95% CI: 1.18-2.65)[24,40].

Gender analysis in the current literature

While these studies provide stronger evidence for causality (i.e., by establishing temporal precedence of job insecurity), the way in which gender is considered across these studies is inadequate and does not account for the gendered nature of market and domestic labour. Gender (i.e. the social construction of being men and women) is often treated as a nuisance variable that is controlled out of these studies, i.e., the majority of these longitudinal studies (i.e., 6 out of 10) uses gender as a control variable[19,20,24,36,41], which ignores potential effect modification by gender. Additionally, gender roles and expectations are important dimensions of labour (e.g. parental responsibilities) but are not considered in these studies. Most of these longitudinal studies do not engage in an in-depth investigation of the gendered nature of job insecurity (e.g. gender differences in the impact of job insecurity in the face of differential engagement in domestic labour). The following sections outline common ways in which gender is treated in studies examining job insecurity, which includes 1) controlling for gender, 2) using gender interaction terms, and 3) gender-stratified analysis.

1) *Controlling for gender*: Many prior papers treat gender as an adjustment variable in longitudinal[19,20,24,36,41] and cross-sectional studies[16,17,23,32], which is controversial since the regression coefficient for the impact of job insecurity on mental health becomes an average effect across men and women. While controlling for the direct effect of gender addresses persistent gender differences in mental disorders and psychiatric distress[31,32], this method may lead to significant bias due to model misspecification. More specifically, if the effect of job insecurity was stronger for one gender than the other, this difference would be ignored without adequately addressing potential effect modification. Since

a growing number of studies provide evidence that there are gender differences in the effect of job insecurity[33–38], the failure to account for effect heterogeneity across gender could lead to bias and misinterpretation of results. In order to address this problem, one solution may be to use interactions or gender-stratified analyses.

2) *Gender interaction* is the use of a gender-specific product term to understand potential effect modification by gender in exposure-outcome associations using a mixed-gender dataset[42]. The use of gender interaction terms offer a flexible and efficient approach to investigate differential gender effects of an exposure in regression models. However, the use of gender-interactions in the current body of studies on job insecurity faces three key challenges: a) it fails to address potential *gender heterogeneity of covariate effects*, b) it fails to incorporate *gender-related variables into the analysis* (e.g. gender roles and expectations), and c) the use of gender interactions to provide insightful gender-based analysis might be stymied by the *limitations of 3-way interactions*. Each of these challenges are explained in detail below.

Gender heterogeneity of covariate effect: Among all the high quality studies identified in a previous review[13], gender interaction term is only tested with the main exposure[40,43]; however, it may be possible that the effect of regression covariates (e.g. job/occupational industry, income) also differ by gender, which would have been ignored in these models leading to model misspecification. This problem was highlighted in a methodological paper that pointed out how the heterogeneity of confounder association with an outcome has been systematically ignored in health science research[42]: while interaction terms are routinely used to test for effect modification of the main exposure, the relationship between confounders/covariates and outcomes may also differ by gender. Using simulated and applied examples, the study shows that when the implicit assumption of gender homogeneity of covariate relationships is erroneous, ignoring them can lead to significant bias due to model misspecification[42]. In the context of job insecurity research, for example, managerial status is often included as a potential confounder. But prior research has provided evidence that female managers often experience higher

stress than their male counterparts due to implicit gender bias in the workplace[44–46]. Among studies that used gender interactions to investigate effect modification in job insecurity, two studies have included managerial status as a confounder[40,43], but neither have accounted for the potential differential gender effect of managerial status. The problem of gender heterogeneity of covariate/confounder effect has not been adequately addressed in the literature, and the use of interactions between gender and main exposure alone does not address this problem.

Incorporating gender-related variables in the analysis: While the use of gender interactions is excellent for detecting effect modification of a study exposure by gender, more nuanced dimensions of gender, such as gender roles and expectations, can demarcate significant differences within each gender that are routinely ignored in most interaction-based analysis. For example, a study found that job insecurity was associated with increased odds of generalized anxiety disorder in men (OR=2.49, 95% CI:1.37-4.55) and not in women[40]. The study provided post-hoc explanations that the differential impact of job insecurity across gender may be related to unequal financial and career expectations between men and women. It may be possible that the threat of losing employment could incite more anxiety and negative emotions in men based on gendered expectations for men to be breadwinners[47,48]. On the other hand, there may be reasons to suspect that the impact of job insecurity on women's risk of generalized anxiety disorder may be unequally distributed. It is possible that women who are the sole wage earners (e.g. lone mothers) for their families may also be significantly impacted by the threat of unemployment - albeit through a different pathway. For example, lone mothers may be differentially vulnerable to the effects of job insecurity since they have the additional responsibility of providing for the livelihood of another person[47,48]. The threat of unemployment combined with domestic and childcare responsibilities could exacerbate the effects of job insecurity. This can be highlighted by examining single-sex studies (examining gendered differences across employed women) on the mental health differences across employed women with and without children[49–51]. Using longitudinal data, a study found that lone mothers

had 1.43 (95% CI: 1.02- 2.01) times higher odds of experiencing psychological distress compared to married/partnered mothers[51]. The authors noted that psychological distress among lone mothers was likely due to higher parenting responsibilities, and increased vulnerability to financial hardships. No such differences in psychological distress were observed between single and married women without children. Therefore, while a gender interaction term can be used to investigate potential effect modification of the main exposure, it alone may not be sufficient to address the gender roles and expectations (e.g. childcare responsibilities), which may require the use of additional gender-related variables. Single-sex studies (examining gendered differences across employed women) highlight important differences between women, which point to the potential problems of solely relying on a gender interaction term to reveal the gender story behind job insecurity.

The limitations of 3-way interactions: The potential for effect modification of gender and gender-related variables (e.g. parental responsibilities) on the association between job insecurity and mental health could be explored using higher order interaction terms (e.g. 3-way interactions). In short, the procedure can be used to test the effect of job insecurity (main exposure) on mental health problems (e.g. depressive symptoms, anxiety, or psychological distress) along with two additional moderator variables (e.g. gender and parental responsibilities). While a 3-way interaction is potentially useful, in reality, they are rarely if ever used in the literature due to difficulties associated with interpreting the interaction effects. There have been no studies using 3-way interactions to examine the impact of job insecurity. In a study of the methodological efficacy of 3-way interactions[52], it was pointed out that simply plotting the interactions and interpreting slope differences on the basis of face validity may lead to unjustified conclusions. For example, it is not clear if a significant 3-way interaction term is the result of significant differences among two, three or all four combinations of variables (i.e., independent, dependent and both moderator variables). The paper concludes that, despite a number of limitations (to be discussed at the

next section on stratified models), one of the best strategies for probing 3-way interactions is to carry out subgroup analysis using separate models where we can test the effect of the second moderator.

3) Gender stratified analysis can be used for detecting effect modification of a study exposure through separate analysis for men and women subgroups[53]. Moreover, gender stratified analysis also addresses the issues of gender heterogeneity for covariate effects by providing separate estimates for each gender. Compared to interaction analysis, stratified models are easier to interpret for more complex relationships (e.g. analysis that requires more than one moderator variable) since the effects of one moderator variable can be analysed within the strata subset by another moderator variable. In spite of these advantages, existing studies using stratified analysis face challenges such as the loss of statistical power due to data subsetting, and difficulties in comparing effect sizes across subgroups. Data subsetting can result in the loss of statistical power (due to decreased sample size within each strata), which can be prevented if researchers adequately powered the study to ensure exposure effects can be detected for gender-stratified analyses[52]. Secondly, while the indication and nature of effect modification (e.g. direction of effect) can be assessed for each subgroup via interaction plots and comparing regression coefficients across the two models, additional analyses are needed if researchers want to quantify the difference between genders[54]. Despite these limitations, subgroup analysis is an effective method to examine effect modification since it accounts for gender heterogeneity across covariates and provides an accessible method to include more than one effect modifier (e.g. gender-related variables) into the analysis[48].

There are a number of studies that examined the association of job insecurity and symptoms of mood disorders using gender-stratified models: three studies found that job insecurity predicted depressive symptoms in men only[37,38,40], and three studies found an association for depressive symptoms in both genders[18,55]. Most notably, these gender-stratified analyses do not take advantage of its analytical design to investigate potential effect modification via gender-related variables in the context of job

insecurity and mental health[18,37–39,55–58]. For example, in a longitudinal study using gender-stratified analysis to investigate the impact of job insecurity on mental health, researchers made the decision to control for the direct effect of having dependent children and marital status in stratified models; however, they did not explore the potential effect modification between these gender-related variables and job insecurity[37]. By controlling out these gender-related variables, the study may have missed an opportunity to investigate a more nuanced gender story that considers the moderating effects of gender roles. While some studies theorised that the differential gender effect is driven by the gendered expectation that a man's value is tied to his ability as a family provider[37,55], none of these studies tested whether parental responsibilities further modified the association between job insecurity and mental health. Moreover, among the studies that found inconsistent effects of job insecurity on mental health in women[37,38,55,56,58], differential levels of parental responsibilities and domestic labour across the study samples could be driving the inconsistent results. Further research should explore whether gender-related variables (e.g. parental responsibility and partner support) could clarify the impact of job insecurity across gender.

Second-level disaggregated analysis by gender: a potential method for moving forward

In the section above, we provided evidence that existing methods for addressing gender in studies of job insecurity may be inadequate. In order to understand if the impact of job insecurity on mental health differs by gender and gender-related variables simultaneously (e.g. parental responsibilities), the data can be analyzed using *second-level disaggregated analysis by gender*[59]. This method takes gender-stratified analysis one step further by investigating how gender-related variables may further modify the effect of an exposure across categories of individuals (e.g. those with and without children) within each gender[59,60]. Although this method is conceptually analogous to 3-way interactions, it is preferred over the use of higher order interaction terms due to the ease of interpretation. While not in the area of job insecurity research, one such study used second-level disaggregated analysis to examine the relationship between shift work and workplace injuries[61]. While men tend to have higher risk of injuries compared to

women in the general population, the study used gender-stratified models and they tested for effect modification with a gender-related variable (i.e. parental responsibility) within each stratified model to reveal that shift working women with dependent children were at the highest risk of workplace injuries. Similarly, in job insecurity research, we can use second-level disaggregated analysis to compare workers with and without parental responsibilities for each gender, which would reveal a more nuanced gender-story that may not have been uncovered simply by using an interaction term between gender and job insecurity. While prior studies have used gender interactions and stratified models to investigate gender differences in the impact of job insecurity[18,21,37,38,40,43,55–57], they have not incorporated gender-related variables (such as parental responsibilities and partner support) into a second-level disaggregated analysis by gender. Prior studies have only theorized the gendered nature of childcare and unequal distribution of unpaid domestic labour in a post-hoc manner rather than incorporating them into regression analysis[61]. Given that gender and parental responsibilities may interact with work stressors to produce health consequences[59], it may be possible that a similar set of gender-related factors may also modify the impact of job insecurity on mental health.

Research objective

Although the effects of job insecurity on mental health has been extensively studied, the ways in which job insecurity may interact with gender roles/expectations have rarely been considered. The objective of this study is to address the lack of a gendered perspective in research on job insecurity and mental health using second-level disaggregated analysis by gender[59]. The application of this method involves taking gender-stratified analysis one step further by considering whether gender-related variables (i.e. parental responsibilities and partner support), which may further entrench the effects of job insecurity and deepen gender inequalities in mental health. To this end, we propose the following **research question**: Does the longitudinal association between job insecurity and mental functioning

(measured by MCS-12) differ across configurations of gender, parental responsibilities, and partner support?

Methods

Sample: Understanding Society - the UK household longitudinal study (UKHLS)

The data for this study was taken from *Understanding Society,* a UK-based longitudinal nationally representative sample of households (UKHLS)[62]. UKHLS recruited a stratified, clustered, random sample of 40,000 households at baseline. Participants were surveyed between 2009-2018 across 9 waves of data collection[62]. This study used data from waves 2, 4, 6, and 8 when information on participants' employment activities were collected. This study focuses on adults aged 16 years or older who were in paid employment at least 2 of the 4 waves (*n*=34,772). Participants who only reported self-employment (with no other paid employment) were not included in the study (*n*=5,261; 7.3% of the original sample). The study also included employed individuals who were students and retirees since prior literature has provided evidence that these groups also rely on employment income to survive and may be adversely affected by job insecurity[63–65].

Outcome variable

Short Form Health Mental Health Component Summary (MCS-12)

The SF-12 Mental Component Summary score (MCS-12) is a widely used measure of everyday mental health functioning, and the measure is available at every wave in the UKHLS[66]. Mental health functioning is defined as the daily limitations associated with social, emotional, mental, and cognitive activities[67]. MCS-12 scores are based on assessments of vitality, social functioning, everyday functioning difficulties caused by emotional problems and mental health, with questions about how often participants' felt "calm and peaceful", "have a lot of energy", or "felt down-hearted and sad'' over the past 4 weeks. Responses are given on a scale of 1 (all of the time) to 5 (none of the time). The MCS-12 is calculated based on norm-based scoring, which linearly transforms the scales and summary measures

(including the mental component scores) to have a mean of 50 and standard deviation of 10 based on English general population data, with lower scores indicating a lower degree of mental health functioning[68–72]. Prior research has shown that the MCS-12 has high internal consistency (Cronbach's alpha and Mosier's alpha > 0.80)[69,73]. An analysis of the reliability and validity of MCS-12 among European adults reported a high Comparative Fit Index (0.939) and Goodness of Fit Index (0.945) using Confirmatory Factor Analysis[74]. Moreover, MCS-12 was deemed optimal to use for the assessment of clinical depression in a test of convergent validity with the Centre for Epidemiologic Studies Depression Scale (CEDS-10) (0.81-0.85)[75].

Key exposures

Job Security

Job security was measured at waves 2, 4, 6 and 8 using the single item question: "How likely do you think it is that you will lose your job over the next 12 months?", and participants could respond with the following options: 1) very likely; 2) likely; 3) unlikely; and 4) very unlikely. Since few participants reported "very likely" and "likely" to lose their jobs over the next 12 months (combined to be 11% of the sample), both groups were categorised as insecure. Those who reported "unlikely" and "very unlikely" to lose their jobs were categorized as secure. This question has been widely used to capture the perceived probability of losing employment[76,77]. Prior studies which have incorporated a single-item job security question have predicted future unemployment among those who report job insecurity, as respondents perceptions are informed by objective factors (e.g. industry employment growth, previous unemployment experiences, precarious job conditions)[32,78]. Additionally, according to a Labour Skills survey, 57% of respondents who initially reported feeling insecure (using a single-item question) on their survey were unemployed one year later on follow-up[78].

<u>Parental responsibilities and partner support</u>

Parental responsibility and partner support were key modifiers to be tested in this analysis. Parental responsibilities were determined by three criteria: 1) whether the participant reported being the natural, adoptive, or step parent of a child under 16; 2) whether they reported being the parent responsible for the child; and 3) whether they were living with the child. Meeting all three criteria would mean they have parental responsibility for the purpose of this study. Those who did not meet all 3 criteria were classified as not having parental responsibilities. Parents were defined as having partner support if they lived with a partner (living with their married, common law, or unmarried partner). Lone parents in the study include those that indicate they are the primary responsible parent. Based on the information on parental responsibilities and partner support, all participants were classified into 3 categories: partnered parents, lone parents (parents without partner support), and non-parents. This variable will be called parent-partner status in this study.

<u>Gender</u>

Gender identity was ascertained using the following question "are you male or female?". The question did not include other gender identities (e.g. non-binary) and is a limitation.

<u>Control variables</u>

An individual-level fixed-effect was used in this study, which explicitly models within-person change by removing the effects of observed and unobserved time-invariant factors. By modelling only within-person change over time as the outcome, the model effectively removes the effects of time-invariant factors (e.g. race, ethnicity, family history of mental illness, immigration status, etc.) since each person acts as their own control[79,80]. Since there are many macroeconomic factors that can simultaneously affect individuals across the UK (e.g. recessions, Brexit, etc.), a year fixed-effect was included that could help explain the impact of these temporal fluctuations on mental health functioning. A household level fixed-effect (using a household ID that is shared by other members of the household

participating in the survey) was used as a statistical control to account for unique unobserved household characteristics such as living in a dysfunctional family and poor living conditions. A region-level fixed-effect was used to account for persistent regional differences such as differential access to health care services. Specifically, individuals were categorized as a resident (measured at each wave) of one of the following 12 regions in the UK: North-East of England, North-West, Yorkshire and the Humber, East Midlands, West Midlands, East of England, London, South-East, South-West, Wales, Scotland, and Northern Ireland.

This study also included time variant control variables based on previous studies investigating the effects of job insecurity on mental health[18,44,56,58,81,82], which include the natural log of age, household income (total household income in the past month), full time versus part time employment, presence of chronic impairment for the past 12 months (yes versus no)[*], job levels (management/professional, intermediate, and routine), number of hours worked per week, autonomy over work hours (participants' ability to determine work hours reported as: a lot, some, little, or none), smoking status, drinking status and whether they changed jobs since the last wave. This study also included additional control variables that were important factors to consider in the context of our study related to childcare[18,81]. These include the number of people living in the household, family support other than the participant's partner (proxied by participants' parents or siblings living in the same household - yes versus no), and the amount of social benefits income as a proportion of their personal income (i.e. sum of public income support, child benefit, child tax credit, housing benefit, council tax credit, and maintenance/alimony in GBP divided by total personal income for the past month). All time-variant confounders were based on participant self-reported information.

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[*] This variable was ascertained using the following question: Do you have any long-standing physical or mental impairment, illness or disability? By 'long-standing' I mean anything that has troubled you over a period of at least 12 months or that is likely to trouble you over a period of at least 12 months.

Statistical Analysis

A stratified fixed-effects ("within-person") approach to repeated measures analysis is undertaken, as it has the advantage of controlling for the impact of observed and unobserved time-invariant confounders[79,80]. In longitudinal analysis, variance in the outcome is composed of within-person variance (i.e change within individual over time) and between-person variance (i.e. variation between individuals over time)[80]. The fixed-effect analysis restricts the portion of variance in the outcome to model only within-person change over time. This is done by including an individual-level fixed-effect (i.e. k-1 dummy variables for every participant in the study), which absorbs the between-person variance in the outcome, so what remains is the within-person variance. In the context of this study, by including an individual-level fixed-effect, the variance in the outcome (i.e. MCS-12 score) that is modelled, represents the within-person change from 1 wave to the next (i.e. from wave 2 to 4, 4 to 6, and 6 to 8). Using fixed-effect models, this paper investigated whether parent-partner status modifies the job security-mental health functioning association over time across gender. In other words, change in job security from waves 2-4 was used to predict change in MCS-12 scores over the same period for each individual, change in waves 4 to 6 in job security to predict change in MCS-12 scores from waves 4 to 6 and so forth. Since fixed effects analysis only models within person change, it accounts for the effect of all observed (e.g. ethnicity, education) and unobserved (e.g. parents' education) time invariant individual characteristics. Additionally, as mentioned previously, the models include confounders such as age, household income, household size to account for the effects of time variant characteristics. The statistical models included individual fixed-effects to account for serial auto-correlation within individuals, household and region level fixed-effects to account for potential clustering effects at the household and regional level, and a year fixed-effect to account for temporal fluctuations that affect the whole sample. Sub-group analysis was used to test whether the effects of change in job security vary by gender. Model 1 (men-only) is a fixed-effect regression to model MCS-12 change across person-years predicted by: 1) job security, 2) year fixed-effect, 3) household fixed-

effect, 4) individual fixed-effect, 5) an interaction between job security and parent-partner status, and time-variant control variables. Model 2 is specified in the same way as model 1 but is a women-only analysis. An interaction term was used in both models to test whether the effects of job security vary by parent-partner status within each gender. Longitudinal weights are applied in all models to ensure the results are representative of the UK population. To deal with missing data, we analyzed the full, incomplete dataset using maximum likelihood estimation (MLE). This method does not impute any data, instead it uses each case's available data to compute MLE based on the distributional properties of the statistical model. The likelihood is computed separately for those cases with missing data and those with complete data on all variables. These two likelihoods are maximized together to find the estimates. Prior studies provided evidence that MLE performed similarly to multiple imputation in its ability to provide unbiased parameter estimates and standard errors in empirical and simulation studies with missing data[83,84]. Models were completed using the PGLM package in Rstudio 4.0.3.

To compare the effect of changes in job security for every parent-partner status across gender (e.g. comparison of the effect of job security on lone mothers vs lone fathers), the study used z-test for difference of regression coefficients for independent samples proposed by Paternoster, Mazerolle and Piquero[85], $z = (b_1 - b_2) / \sqrt{\left(SEb_1^2 - SEb_2^2\right)}$ is used to determine if the difference in coefficients across two separate models are statistically significant at p<0.05 (where |z| > |1.96|).

Sensitivity analysis

A concern for this analysis may arise since a dichotomous variable for the presence of chronic impairment may not fully account for potential residual confounding by physical health (i.e. it is possible that poor physical health can reduce work productivity increasing the likelihood of job insecurity and also have a negative impact on mental health functioning)[86,87]. While this study used a longitudinal design and within-person estimators to control for unmeasured characteristics that remained constant

throughout the study period along with a dichotomise (time-variant) measure for the development of chronic impairments, a sensitivity analysis was conducted (replacing the dichotomous variable with a validated measure of physical health, SF-12 physical health score[71,72]) to ensure that the observed longitudinal relationship between job security and mental health remained even after controlling for a different measure of physical health.

Results

The baseline descriptive statistics of the study participants (n=34,772) is stratified by gender and presented in Table 1 and 2 (men and women, respectively) . When cross tabulated with MCS-12 scores, it shows that baseline MCS-12 scores were lower (p-value <0.001) (poorer mental health functioning) for those who reported having insecure jobs, followed by those who reported having secure jobs. Similarly, baseline MCS-12 scores were lower (p-value <0.001) for lone parents (parents without a partner), followed by partnered parents, and non-parents. Baseline MCS-12 scores were cross tabulated with exposure variables, job security, parent-partner status, and other demographic variables such as gender, age, and household income.

Table 1: *Baseline characteristics of employed participants in the UK Longitudinal Household Survey (2009-2018) with mean mental health functioning across subgroups (men only)*

Sample characteristics	Proportions *(n)*	Mean MCS-12 score*(SD)*, higher is better
n= 16,741		
Job security status		
Insecure	11.7% *(1542)*	49.3 *(9.55)*
Secure	88.2% *(11607)*	51.4 *(8.07)*
P-value for difference in means		<0.0001
Age*		
34 and under	39.7% *(6648)*	*50.7 (8.46)*

35-54	45.6% *(7646)*	51.0 *(8.18)*
55+	14.6% *(2447)*	53.2 *(7.69)*
P-value for difference in means		<0.001
Parent-partner status		
Fathers with partner support	33.63% *(5627)*	51.0 *(8.02)*
Lone fathers	1.15% *(192)*	50.7 *(9.27)*
Non-fathers	65.22% *(10915)*	51.3 *(8.36)*
P-value for difference in means		0.002
Education		
Diploma, Degree and above	38.4% *(6430)*	50.9 *(8.03)*
High school (i.e., A-levels, GCSE)	53.0% *(8873)*	51.4 *(8.32)*
No qualifications	5.73% *(960)*	52.1 *(8.96)*
Other	2.85% *(478)*	*50.2 (10.2)*
P-value for difference in means		<0.001
Household Income (in the past month)**		
Quartile 1 (lowest) (< £2740.56)	25% *(4185)*	50.6 *(8.84)*
Quartile 2 (£2740.56 - £3887.04)	25% *(4184)*	51.1 *(8.37)*
Quartile 3 (£3887.04 - £5508.45)	25% *(4184)*	51.5 *(8.02)*
Quartile 4 (highest) (> £5508.45)	25% *(4185)*	51.7 *(7.76)*
P-value for difference in means		<0.001
Presence of chronic impairments in the past 12 months		
Yes	19.8% *(3322)*	49.7 *(9.43)*
No	80.1% *(13410)*	51.7 *(7.84)*

P-value for difference in means		<0.001
Presence of family support (other than the participants' partner)		
Has family support	12.8% *(2156)*	51.3 *(8.58)*
Does not have family support	87.1% *(14585)*	51.2 *(8.22)*
P-value for difference in means		0.658
Autonomy over work hours		
A lot	22.0% *(3307)*	51.9 *(7.83)*
Some	20.7% *(2893)*	51.1 *(7.86)*
Little	18.2% *(2433)*	50.7 *(8.42)*
None	39.1% *(4818)*	*51.1 (8.67)*
P-value for difference in means		<0.001
Changed employment since last wave		
Changed employment	4% *(657)*	51.1 *(8.38)*
Did not change employment	96% *(16084)*	51.3 *(8.12)*
P-value for difference in means		0.90
Job levels		
Professional/management	39.8% *(6383)*	51.0 *(7.94)*
Intermediate	10.87% *(1745)*	50.7 *(8.42)*
Routine	49.3% *(7913)*	51.5 *(8.50)*
P-value for difference in means		<0.001
Full- time versus Part-time employment		
Full-time	71.5% *(12118)*	51.2 *(8.21)*
Part-time	28.5% *(2140)*	51.6 *(8.56)*
P-value for difference in means		<0.001
Social benefits as a proportion of net personal income		
No benefits	69.3% *(13617)*	51.2 *(8.20)*

0 to 35% of net personal income	22% *(2505)*	51.1 *(8.43)*
More than 35% of net personal income	8.63% *(619)*	50.9 *(8.89)*
P-value for difference in means		0.97

*While the age information is presented as a categorical variable in Table 1 to facilitate the reader's understanding of the sample characteristics, it is used as a continuous variable (natural log of age) in the regression models following conventions in prior studies.

**While the Household income is presented as a categorical variable in Table 1, it is used as a continuous variable in the regression models following conventions in prior studies.

Table 2: *Baseline characteristics of employed participants in the UK Longitudinal Household Survey (2009-2018) with mean mental health functioning across subgroups (women only)*

Sample characteristics	Proportions *(n)*	Mean MCS-12 score*(SD)*, higher is better
n= 18,029		
Job security status		
Insecure	11.7% *(1845)*	46.6 *(10.2)*
Secure	88.2% *(13849)*	49.7 *(8.94)*
P-value for difference in means		<0.001
Age*		
34 and under	40.1% *(7232)*	*48.4 (9.51)*
35-54	46.5% *(8390)*	49.4 *(9.01)*
55+	13.3% *(2407)*	51.5 *(8.34)*
P-value for difference in means		<0.001
Parent-partner status		
Mothers with partner support	27.32% *(4924)*	49.6 *(8.57)*
Lone mothers	6.2% *(1117)*	47.6 *(10.0)*
Non-mothers	66.48% *(11979)*	49.3 *(9.32)*
P-value for difference in means		<0.001
Education		
Diploma, Degree and above	42.2% *(7614)*	49.2 *(8.96)*

High school (i.e., A-levels, GCSE)	50.9% *(9179)*	49.2 *(9.37)*
No qualifications	4.80% *(861)*	50.7 *(8.96)*
Other	2.07% *(375)*	49.7 *(8.75)*
P-value for difference in means		<0.001
Household Income (in the past month)**		
Quartile 1 (lowest) (< £2740.56)	25% *(4506)*	48.7 *(9.83)*
Quartile 2 (£2740.56 - £3887.04)	25% *(4506)*	49.2 *(9.29)*
Quartile 3 (£3887.04 - £5508.45)	25% *(4506)*	49.3 *(9.06)*
Quartile 4 (highest) (> £5508.45)	25% *(4506)*	49.9 *(8.47)*
P-value for difference in means		<0.001
Presence of chronic impairments in the past 12 months		
Yes	21.9% *(3942)*	47.7 *(10.5)*
No	78.1% *(14078)*	49.8 *(8.69)*
P-value for difference in means		<0.001
Presence of family support (other than the participants' partner)		
Has family support	12.0% *(2156)*	48.5 *(9.76)*
Does not have family support	88.0% *(15873)*	49.4 *(9.10)*
P-value for difference in means		<0.001
Autonomy over work hours		
A lot	22.0% *(3178)*	50.1 *(8.79)*
Some	20.7% *(3227)*	49.4 *(8.74)*
Little	18.2% *(2941)*	48.9 *(8.99)*
None	39.1% *(6716)*	49.0 *(9.61)*
P-value for difference in means		<0.001

Changed employment since last wave		
Changed employment	4.3% *(777)*	49.2 *(9.12)*
Did not change employment	95.6% *(17252)*	*49.6 (8.92)*
P-value for difference in means		<0.001
Job levels		
Professional/management	39.5% *(7058)*	49.4 *(8.81)*
Intermediate	19.9% *(3547)*	*49.3 (9.13)*
Routine	40.5% *(7241)*	49.2 *(9.55)*
P-value for difference in means		0.80
Full- time versus Part-time employment		
Full-time	71.5% *(10166)*	49.2 *(9.11)*
Part-time	28.5% *(6729)*	49.4 *(9.29)*
P-value for difference in means		0.11
Social benefits as a proportion of net personal income		
No benefits	58.2% *(10495)*	49.1 *(9.29)*
0 to 35% of net personal income	28.6% *(5151)*	49.8 *(8.81)*
More than 35% of net personal income	13.2% *(2383)*	48.7 *(9.46)*
P-value for difference in means		<0.001

*While the age information is presented as a categorical variable in Table 1 to facilitate the reader's understanding of the sample characteristics, it is used as a continuous variable (natural log of age) in the regression models following conventions in prior studies.

**While the Household income is presented as a categorical variable in Table 1, it is used as a continuous variable in the regression models following conventions in prior studies.

Regression results

The regression results show that a change from secure to insecure job over the study period was

associated with worsening mental functioning for all groups to varying degrees, with the exception of

lone mothers. In the fully adjusted men-only model (model #1), partnered fathers (reference group)

who experienced a change in job security (from secure to insecure) saw a decrease in their mental

functioning by 1.00 (95% CI: -1.65 to -0.34). Similarly, a reduction in job security over time resulted in

decreases in mental functioning by 7.69 MCS-12 (95% CI: -12.69 to -2.70)[†] and 2.27 MCS-12 (95% CI: -3.72 to -0.83) for lone fathers and non-fathers respectively (see Table 3). Figure 1 shows marginal decreases in mental functioning as each group of men move from secure to insecure jobs over time. The association between loss of job security and decrease in MCS-12 scores was the greatest for lone fathers followed by non-fathers and partnered fathers.

Table 3: Fixed effects model predicting the effect of change in job security on MCS-12 score across parent-partner status, men-only model (13,511 participants, 30,706 person-years) using data from UK Longitudinal Household Survey

Predictors	Estimates (95% CI)	p-value
Secure job (reference)	reference group	--
Insecure job	-1.00 (-1.65 to -0.34)	0.003
Partnered fathers (reference)	reference group	--
Lone fathers	-0.76 (-2.51 to 1.03)	0.405
Non-fathers	0.13 (-0.30 to 0.57)	0.554
Insecure job*lone fathers	-6.69 (-11.03 to -2.36)	0.002
Insecure job*non-fathers	-1.27 (-2.06 to -0.48)	0.001
Household income (in £1000)	0.06 (-0.001 to 0.13)	0.054
Professional/management job (reference)	Reference group	--
Intermediate job	-0.25 (-0.78 to 0.28)	0.352
Routine job	-0.57 (-1.07 to -0.08)	0.022
North East region (reference)	Reference group	--
North West	-5.23 (-9.06 to -1.41)	0.007
Yorkshire and the Humber	-4.41 (-8.06 to -0.76)	0.018
East Midlands	-2.42 (-6.65 to 1.80)	0.261
West Midlands	-8.13 (-12.17 to -4.09)	<0.001
East of England	-6.42 (-10.43 to -2.41)	0.002
London	-6.82 (-10.75 to -2.90)	0.001
South East	-7.81 (-11.69 to -3.94)	<0.001
South West	-8.14 (-12.20 to -4.09)	<0.001
Wales	-11.8 (-16.43 to -7.16)	<0.001
Scotland	-13.39 (-18.23 to -8.55)	<0.001
Northern Ireland	-1.452 (-8.14 to 5.24)	0.671
Age (log)	-9.763 (-11.23 to -8.29)	<0.001
A lot of work autonomy (reference)	Reference	--
Some work autonomy	-0.26 (-0.56 to 0.04)	0.08

[†] These numbers are produced by adding the effect estimate of the change in job security from secure to insecure on MCS-12 scores to 1) the interaction term for the change in job security status and 2) lone father status. All the following reported results include the interaction and direct effects.

Little work autonomy	0.06 (-0.28 to 0.40)	0.737
No work autonomy	-0.375 (-0.72 to -0.03)	0.03
Full-time employment (reference)	Reference	--
Part-time employment	1.17 (0.55 to 1.79)	<0.001
Does not have family support (reference)	Reference	--
Has family support	-0.40 (-1.19 to 0.38)	0.315
Household size	0.23 (0.05 to 0.42)	0.01
Does not smoke (reference)	reference	--
Has a history of smoking	-0.352 (-0.82 to 0.11)	0.143
Does drink alcohol (reference)	reference	--
Has a history of drinking alcohol	-0.03 (-0.50 to 0.42)	0.90
Changed employment since last wave (reference)	reference	--
Did not change employment since last wave	-0.96 (-1.35 to -0.57)	<0.001
Presence of chronic impairments (reference)	reference	--
Does not have any chronic impairments	0.37 (0.07 to 0.67)	0.01
Social benefits (% of income comprised of benefits)	1.12 (-0.34 to 2.60)	0.130
Hours worked/week	-0.008 (-0.02 to 0.01)	0.44

Model 1 is predicted by: 1) individual fixed-effect, 2) year fixed-effect, 3) household fixed-effect, 4) region-fixed effect, 5) Job security 6) time-variant control variables (i.e. log of age, parents-partner status, household income, number of hours worked per week, social benefits, autonomy over work hours, smoking status, drinking status, part-time versus full-time work, family support, household size and, change in employment since last wave)

Table 4: Fixed effects model predicting the effect of change in job security on MCS-12 score across parent-partner status, women-only model (16,440 participants, 37,990 person-years) using data from UK Longitudinal Household Survey

Predictors	Estimates (95% CI)	p-value
Secure job (reference)	reference group	--
Insecure job	-1.83 (-2.49 to -1.18)	<0.001
Partnered mothers (reference)	reference group	--
Lone mothers	-0.158 (-0.85 to 0.53)	0.645
Non-mothers	-0.612 (-1.06 to -0.15)	0.008
Insecure job*lone mothers	2.79 (1.33 to 4.24)	<0.001
Insecure job*non-mothers	-0.19 (-0.97to 0.59)	0.633
Household income (in £1000)	0.015 (-0.01 to 0.05)	0.378
Professional/management job (reference)	Reference group	--
Intermediate job	0.67 (0.23 to 1.12)	<0.001
Routine job	0.46 (-0.02 to 0.94)	0.06
North East region (reference)	Reference group	--
North West	-4.55 (-8.82 to -0.27)	0.03
Yorkshire and the Humber	-2.87 (-6.87 to 1.12)	0.159
East Midlands	-3.99 (-8.34 to 0.35)	0.07
West Midlands	-1.48 (-5.62 to 2.64)	0.48
East of England	-4.71 (-9.07 to -0.36)	0.03
London	-2.80 (-7.07 to 1.47)	0.19
South East	-2.48 (-6.74 to 1.78)	0.25

South West	-5.20 (-9.60 to -0.79)	0.02
Wales	-3.51 (-8.94 to 1.91)	0.20
Scotland	-5.51 (-10.85 to -0.18)	0.04
Northern Ireland	0.78 (-10.54 to 12.11)	0.89
Age (log)	-7.71 (-9.18 to -6.24)	<0.001
A lot of work autonomy (reference)	Reference	--
Some work autonomy	-0.41 (-0.74 to 0.08)	0.01
Little work autonomy	-0.80 (-1.17 to -0.44)	<0.001
No work autonomy	-0.90 (-1.25 to -0.56)	<0.001
Full-time employment (reference)	Reference	--
Part-time employment	0.04 (-0.37 to 0.47)	0.82
Does not have family support (reference)	Reference	--
Has family support	-1.87 (-2.62 to -1.13)	<0.001
Household size	0.24 (0.06 to 0.42)	<0.001
Does not smoke (reference)	Reference	--
Has a history of smoking	0.22 (-0.27 to 0.72)	0.38
Does drink alcohol (reference)	reference	--
Has a history of drinking alcohol	-0.37 (-0.83 to 0.08)	0.10
Changed employment since last wave (reference)	reference	--
Did not change employment since last wave	-1.24 (-1.63 to -0.86)	<0.001
Presence of chronic impairments (reference)	Reference	--
Does not have any chronic impairments	0.55 (0.25 to 0.85)	<0.001
Social benefits (% of income comprised of benefits)	-1.07 (-2.06 to -0.07)	0.03
Hours worked/week	-0.02 (-0.04 to 0.001)	0.051

Model 1 is predicted by: 1) individual fixed-effect, 2) year fixed-effect, 3) household fixed-effect, 4) region-fixed effect, 5) Job security 6) time-variant control variables (i.e. log of age, parents-partner status, household income, number of hours worked per week, social benefits, autonomy over work hours, smoking status, drinking status, part-time versus full-time work, family support, household size and, change in employment since last wave)
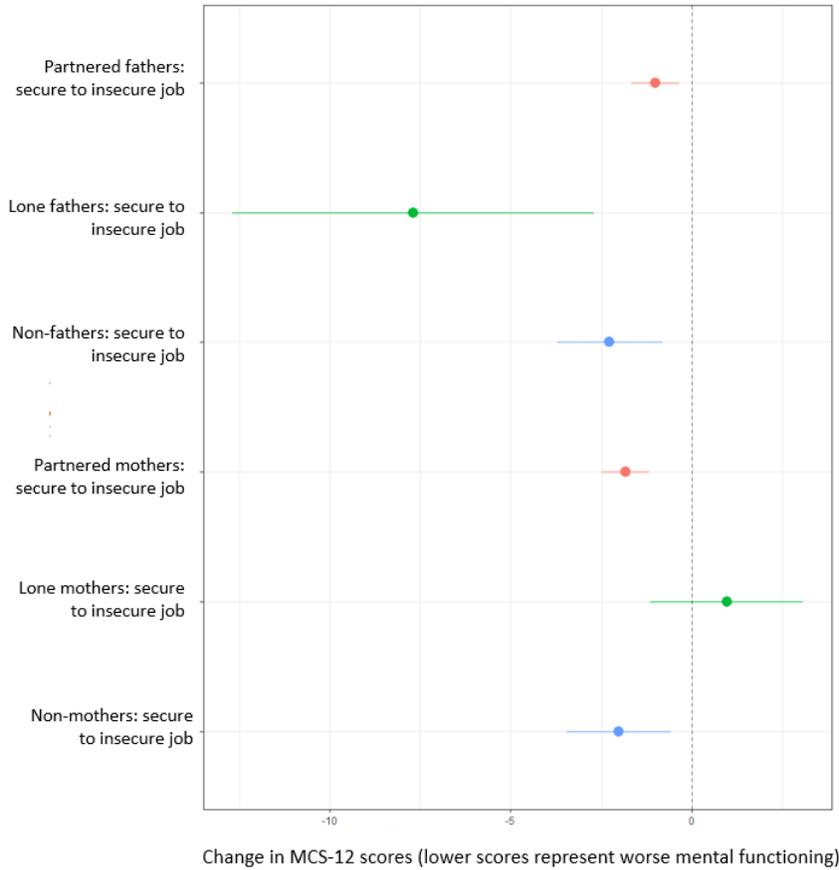
Figure 1: Marginal change in mental health functioning associated with a change from a secure to insecure job, by parent-partner status and gender

Change in MCS-12 scores (lower scores represent worse mental functioning)

In the fully adjusted women-only model (model#2), for partnered mothers (reference group), going from a secure to insecure job resulted in a decrease in their mental functioning by 1.83 (95% CI: -2.49 to -1.18) in their MCS- 12 scores (see Table 4). Non-mothers who experienced a reduction in job security saw a decrease of 2.02 (95% CI: 0.58 to 3.46) in their MCS-12 scores while lone mothers did not experience any changes when faced with a similar job security reduction (95% CI: -3.06 to 1.15). Figure 1 shows marginal decreases in mental functioning as each group of women move from secure to insecure jobs over time. The association between loss in job security and decreases in MCS-12 scores were similar across non-mothers and partnered mothers, while changes in job security had no effect on MCS-12 scores for lone mothers.

To determine whether the association between change in job security and change in mental functioning were significantly different across men and women within the same parent-partner status group (e.g. lone mothers vs. lone fathers), a z-test for difference of regression coefficients for independent samples was conducted with results in Table 5. Notably, it shows that a shift from secure to insecure job had a different impact upon lone mothers vs. lone fathers (p<0.001), while no such differences were observed for a) partnered fathers vs partnered mothers b) non-fathers vs non-mothers.

Table 5: Test of difference in men vs. women on the effect of job insecurity on mental functioning by parent-partner status using the z-test for difference of regression coefficients for independent samples

Men	β_1(Std.error)	Women	β_2(Std.error)	$\beta_1 - \beta_2$	Z-score	P-value for H_0: $\beta_1 = \beta_2$
Change from secure to insecure job						
Partnered fathers	-1.00 (0.33)	Partnered mothers	-1.83 (0.33)	0.83	1.76	0.07
Lone fathers	-7.69 (2.21)	Lone mothers	0.95 (0.74)	-8.65	-3.70	**<0.001**
Non-fathers	-2.27 (0.40)	Non-mothers	-2.02 (0.40)	-0.24	-0.44	0.65

Sensitivity Analysis

When the dichotomous measure of physical health was replaced with a continuous measure of physical health (SF-12 physical), the effect of change in job security on mental functioning continued to have a differential effect by parent-partner status for both men and women. For all groups of men, the effects of loss in job security over time remained similar to model 1 (see Table 6). The marginal decreases in mental functioning for sensitivity analysis was the greatest for lone fathers, followed by non-fathers and partnered fathers. Similarly, in the sensitivity analysis for women, all associations

between exposures and outcome (including interactions between job security and parent-partner status) were similar to the model 2 (women-only model) results (See Table 7).

Table 6: Fixed effects model predicting the effect of change in job security on MCS-12 score across parent-partner status using a continuous measure of physical health for sensitivity analysis, men-only model (n= 13,511 participants, 30,706 person-years) using data from UK Longitudinal Household Survey

Predictors	Estimates (95% CI)	p-value
Secure job (reference)	reference group	--
Insecure job	-1.18 (-1.80 to -0.57)	<0.001
Partnered fathers (reference)	reference group	--
Lone fathers	-0.43 (-2.11 to 1.23)	0.607
Non-fathers	0.416 (0.01 to 0.82)	0.04
Insecure job*lone fathers	-6.78 (-10.82 to -2.73)	0.001
Insecure job*non-fathers	-1.00 (-1.74 to -0.27)	0.001
Household income (in £1000)	0.04 (-0.02 to 0.10)	0.198
Social benefits (% of income comprised of benefits)	0.65 (-0.72 to 2.02)	0.353
Hours worked/week	-0.0001 (-0.02 to 0.02)	0.99

Model 3 is predicted by: 1) individual fixed-effect, 2) year fixed-effect, 3) household fixed-effect, 4) region-fixed effect, 5) Job security 6) time-variant control variables (i.e. log of age, parents-partner status, household income, number of hours worked per week, social benefits, autonomy over work hours, smoking status, drinking status, part-time versus full-time work, family support, SF-12 physical, household size and, change in employment since last wave)

Table 7: Fixed effects model predicting the effect of change in job security on MCS-12 score across parent-partner status using a continuous measure of physical health for sensitivity analysis, women-only model (16,440 participants, 37,990 person-years) using data from UK Longitudinal Household Survey

Predictors	Estimates (95% CI)	p-value
Secure job (reference)	reference group	--
Insecure job	-1.91 (-2.52 to -1.29)	<0.001
Partnered mothers (reference)	reference group	--
Lone mothers	0.05 (-0.59 to 0.70)	0.865
Non-mothers	-0.90 (-1.33 to -0.47)	0.307
Insecure job*lone mothers	2.29 (0.93 to 3.66)	<0.001
Insecure job*non-mothers	-0.23 (-0.96 to 0.51)	0.540
Household income (in £1000)	0.017 (-0.01 to 0.05)	0.006
Social benefits (% of income comprised of benefits)	-1.75 (-2.68 to -0.81)	<0.001
Hours worked/week	-0.01 (-0.03 to 0.005)	0.149

Model 4 is predicted by: 1) individual fixed-effect, 2) year fixed-effect, 3) household fixed-effect, 4) region-fixed effect, 5) Job security 6) time-variant control variables (i.e. log of age, parents-partner status, household income, number of hours worked per week, social benefits, autonomy over work hours, smoking status, drinking status, part-time versus full-time work, family support, SF-12 physical, household size and, change in employment since last wave)

Discussion

This study provides evidence that job insecurity has a negative impact on mental health, similar to many prior studies[18,19,22,24,37,38,40,43,57,58,88]. This study also advances the literature by providing evidence that the relationship between job security and mental functioning differs across different configurations of gender, parental responsibilities, and the presumed level of support for these responsibilities through a spouse or partner. The effect of change in job security on mental functioning is similar between men and women in the non-parent and partnered-parent groups but differed for lone mothers and fathers. While a change from secure to insecure job was detrimental to the mental health of almost every group, the mental health of lone fathers was the most negatively impacted by job insecurity among all groups examined. In the following sections, we will offer an explanation of these results by outlining some practical challenges faced by lone fathers. While these practical challenges are also faced by lone mothers, we further explain that job security, which represents a unique threat to the normative construction of fatherhood, may erode the self-worth of lone fathers more so than lone mothers[89]. The practical challenges faced by lone fathers, combined with the threat of job loss that damages their self-worth, may have contributed to the unique vulnerability experienced in this subgroup.

Practical challenges faced by lone parents

Among men, while partnered fathers and non-fathers in this study were negatively affected by a reduction in job security, the effects were much higher for lone fathers. One explanation for the differential effect is that lone parents (including lone fathers) may have less resources to cope with threats of job loss compared to others, which in turn leads to greater stress. When faced with job insecurity, prior studies have indicated that employees cope with the rising threat of job loss through career development strategies to improve their career prospects outside the organization[90] and engage in job searches[91]. However, lone fathers (and lone parents in general) may have less time and resources

to engage in career development (e.g. attending and paying for further training) and job search activities compared to the partnered parent and non-parent groups[92]. Moreover, many lone parents rely on workplace accommodations (e.g. flexitime) in order to balance work and domestic responsibilities[93], and the availability of accommodations may limit the range and variety of jobs they can include in their job searches, since they may be excluded from jobs that will not accommodate their sole parenthood responsibilities (e.g. being able to work from home if their child is sick).

Another explanation for the increased effect of job insecurity on lone fathers (compared to other men) may be due to the lack of a partner to rely on who can help buffer the negative effects of job insecurity or financial uncertainty. While the lack of a partner (to buffer the potential threat of job loss) and reduced flexibility to change jobs can also affect lone mothers, in the next section, we will explain why job insecurity may be more damaging for lone fathers due to the normative construction of fatherhood.

Linking job insecurity to the mental health of fathers through a normative construction of fatherhood

While both lone mothers and lone fathers are responsible for the double duty to provide emotional and financial support for their children, due to the normative construction of fatherhood as a financial provider, the threat of job loss in lone fathers may have the additional effect of threatening their self-worth. In the following, we will first explain how the normative construction of fatherhood (i.e. value of a father judged by his ability to be a financial provider) is linked to mental health, then explain why job insecurity may engender differential effects in lone fathers versus lone mothers.

The roles of fathers have evolved in recent years with greater emphasis on emotional support and meeting the psychosocial developmental needs of children[94], but providing financial security to one's family continues to be intrinsic to the normative construction of fatherhood[95–98]. In a 2018 study examining the role of paid labour in the social construction of parenthood across 22 couples (examining

changes in attitudes before and after childbirth) based in Western Europe, parents in the study

highlighted the provision of financial security as the father's main responsibility[99]. More specifically, the

participants believed that fathers have to be financially prepared for childbirth (e.g. finishing post-

secondary studies prior to becoming a parent), seek out jobs that appropriately support a family (prior

to pregnancy), and continue to seek out increased sources of income after childbirth in order to be a

responsible father. In a 2015 study involving interviews with 35 new fathers, the majority of participants

ranked financial responsibilities over emotional support as their top priority[100]. Based on these studies, it

can be summarized that for many fathers, their sense of self-worth is based upon a normative

construction of a father as a financial provider of his family[94,101], and failure to do so can have damaging

consequences to their mental wellbeing[99,102]. This is highlighted in interviews with underemployed and

unemployed fathers[94], where they connect their provider role to their worthiness as fathers (i.e. "I feel

like if I can't support my child, then I don't deserve contact with my son")[94(p13)], and subsequently, their

inability to provide, in turn, leads to a deteriorating emotional state (i.e. while the birth of a newborn is

usually associated with felicity, a father laments that "I just couldn't smile since I can't provide")[94(p8)].

   While the normative construction of fatherhood has been linked to labour force attachment, the

normative construction of motherhood does not have the same requirement, and often emphasizes

withdrawal from labour if it is in conflict with her domestic and caring responsibilities[96,103]. Prior studies

on women's notion of ideal motherhood have traced a dominant cultural narrative of good mothers

nurturing her children at the expense of her career[96]. In the UK, as of 2019, 28.5% of mothers with

children age 14 and under said they had reduced their working hours (or shifted to part-time) due to

childcare reasons, compared to only 4.8% in fathers[104]. While mothers are expected to withdraw from

their careers to be a good parent, this is not the case for fathers: in a study that interviewed 16 lone

fathers (also in full-time employment with full or shared custody of their children), many in the group

reported that social expectations of caregiving responsibilities were significantly lower than financial

expectations, and others were generally willing to be understanding when they were unable to meet

certain caregiving expectations (e.g., being late or forgetting child-related appointments)[103]. A potential

explanation for the greater impact of job insecurity on lone fathers (over lone mothers) is that, unlike

lone fathers, the threat of job loss does not represent a mother's failure to conform to normative

constructions of motherhood. Given the differences in normative beliefs and expectations for mothers

vs fathers, the threat of job loss presents a unique stressor for lone fathers that engenders greater

psychological distress and diminished self-worth.

<u>Comparison to prior literature</u>

Although prior studies provided strong evidence linking job security and mental

health[18,24,36,37,39,43,55,58,88,90,105], the evidence concerning whether the effect of job insecurity differed by

gender have been mixed, with some studies finding that job security had different impact on mental

health across genders[37,58] while others found no evidence of effect modification[18,39,57]. Only one prior

longitudinal study based in the UK has been published on job security and mental health that included

gender stratified analysis[57], and they found no significant effect modification by gender among white-

collar civil servants. Compared to our study, which used a sample of the UK general working population,

the prior study sampled employees from 20 civil service departments and had a limited age range

(limited to 30-55 year olds). Given that UK civil service careers tend to require higher education,

specialized training, and provides access to continuous career development[106], the unique circumstances

surrounding these jobs might limit the study's generalizability to the national working population.

Furthermore, this study (and other studies that included hypothesis testing of effect modification by

gender[18,37–39,58]) have neglected to consider how parenthood responsibility may play a role in the

production of gender inequalities vis-à-vis job insecurity. While several studies have treated single-

parenthood status as a control variable in the study of the effects of job insecurity on mental

health[18,37,58], this can be considered a limitation since it precludes further understanding of potential

differences between lone mothers vs lone fathers. For example, a Denmark-based study of job insecurity

on depression (that included gender-stratified analysis) found a significant effect modification by

gender[37], but their approach of using single-parent status as a control variable may have unwittingly

omitted an important dimension of parenthood responsibility in the production of gender inequality in

the effects of job insecurity. Through the use of second-level disaggregated analysis, the results of this

study tell a more complex story than is represented in prior literature. While the impact of job security

did not differ between non-parent and partnered-parent groups in our study (i.e. job security had a

similarly negative effect across both genders), there were significant differences between men and

women in the lone parent groups, which required further disaggregated analysis to be discovered.

<u>Limitations and strengths</u>

There are several aspects of this study that could limit the generalizability of the findings: 1)

UKHLS measurement of job security is based on a single question of one's likelihood of job loss over the

next 12 months, and it does not include questions about individual and workplace characteristics that

could predispose certain employees to a greater threat of unemployment (e.g. deteriorating work

conditions, job performance, probability of re-employment)[18,57]. A more complete characterization of

job insecurity may include an employees' beliefs around their job prospects, since employees who

believe they can be quickly rehired after job loss may be less affected by threats of unemployment[26,32].

2) UKHLS survey questions did not include questions on transgender and non-binary gender identities,

which limited the analysis only to men and women. 3) Job characteristics (such as job demands and

control over manner of work) are occupational determinants of mental health[107], and may confound the

relationship between job insecurity and mental health. While a complete set of these job characteristics

are not available in the survey, we included autonomy over work hours as an adjustment variable which

can capture some of the effect of control over manner of work. 4) While lone parents in the study are all

considered the primary responsible parent, we are unable to assess how these parents gained custody

of their children (i.e. widowed, unexpected pregnancies, or divorced and granted full custody) or how long their children have lived in a single-parent household, which may influence association between job insecurity and mental health. 5) While the study cannot capture every unobserved time-variant confounder (e.g. sudden death in the family), individual qualities such as their resilience to adversity are accounted for by the individual fixed-effect. Also, major events such as Brexit and economic recession would have been accounted for through the models' time fixed-effect.

Despite these limitations, this study also had a number of methodological improvements compared to prior studies. While prior studies examined the effect of job security by sex, they frequently neglected to take gender-related roles such as parental and partner status into consideration. Moreover, this study used a second-level disaggregated analysis to reveal a more nuanced gender-story that may not have been uncovered simply by using an interaction term between gender and job security. By using a within-person estimator (i.e. individual fixed-effect), along with household, year, and region-level fixed-effects, the study ensures that unobserved time-invariant confounders at the individual level (e.g. genetics, family history of mental illness, neuroticism), household factors (e.g. household composition, the impact of living in a dysfunctional household, etc.), time-variant large-scale socioeconomic shocks (e.g. Brexit and economic recessions), and region-specific factors (e.g. geographically differential access to healthcare) are accounted for in this study. The use of a sensitivity analysis also ensured that the effects of job security on mental health (across gender and parent-partner status) are not an artifact of residual confounding effect by physical health.

Policy relevance of study: Job insecurity is an important determinant of mental health for the working population, and we discuss changes to policies that will help to ameliorate the negative impact of job insecurity. In the UK, people who lose their employment can claim Universal Credit, which is a support payment for the working population depending on household and childcare costs[108]. Despite the existence of the Universal Credit programme, the wait times between application and first payment

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is typically five weeks but can be as long as six months[109,110], which can be a source of stress since a delay in receiving payments might lead to the inability to afford rent, food, and other basic necessities. Since job insecurity can produce mental distress via the inability to pay bills on a timely basis, a solution might be to provide a default payment equivalent to five weeks of the Standard Allowance of Universal Credit to ensure that basic needs are met during the waiting period. A study examining the effects of social benefits on mental health concluded that reducing waiting periods for support payments not only improved the mental health for the unemployed but also the psychological well-being of employed persons experiencing job insecurity[111]. Additionally, childcare cost coverage in the UK should be increased to 100% for lone parent families as they rely on a single source of income and high upfront childcare payments can amplify mental distress for lone parents experiencing job insecurity (all working families are eligible to claim up to 85% of their childcare costs)[110,112,113]. If the childcare costs coverage for lone parent families is increased to 100%, they will not be trapped between going into debt to afford childcare and turning down new employment thus, alleviating some mental distress associated with job insecurity.

There also needs to be a cultural shift regarding the normative construction of fatherhood since the valuation of fathers are often restricted to their role as financial providers, while simultaneously ignoring their contribution to emotional development and caregiving for their children[94,99,103,107]. Due to these normative notions of fatherhood, the threat of job loss has the effect of directly threatening a father's self-worth (over and above the damaging effects of financial instability). Policies that promote gender equality in childcare can help to normalize fathers' role as caregivers and may alleviate the stress associated with deviations from the cultural narrative of father qua breadwinner. Currently, the existing programs in the UK do not encourage fathers to actively participate in childcare activities. Parental leaves for fathers are inflexible (mandated to take leave between 20 to 52 weeks following birth) and not well publicised or encouraged[114,115]. For example, a qualitative survey documenting paternity leave

experiences of NHS doctors concluded that roughly 40% of the respondents were unaware about the additional parental leave option[115]. Another study indicates that British fathers feel marginalized from possibilities of flexible work since their identity is often narrowed down to economic providers[116]. These findings indicate that fathers (including lone fathers) face numerous cultural and structural barriers when trying to actively participate in childcare responsibilities and as a result, are forced to value their worth as fathers solely through labour force participation. Policies and reforms at the structural level may help facilitate a cultural shift in gender norms that promote a more well-rounded view of fatherhood, which may in turn help to decouple job insecurity from notions of failure as a father. In Sweden and Iceland, fathers are encouraged to actively participate in childcare via a non-transferable parental leave (i.e. cannot be transferred to mothers)[114,117]. A report examining the effects of non-transferable parental leave documented that fathers taking time from work for childcare increased to 90% in Sweden and Iceland as opposed to only 14% in Denmark (where there are no dedicated non-transferable quotas for fathers)[117]. Non-transferable paternal leave can promote gender equality and would normalise the role of fathers as primary caretakers for their children. This can in turn decrease the negative effects of job insecurity on mental health for lone fathers since their worth as fathers would not be solely centred around employment and financial support. Future studies in the UK should evaluate whether the implementation of these policies changes gender norms around childcare, and in turn, the effect of job insecurity on mental health.

Conclusion

Job security is an important social determinant of mental health for lone fathers and the general population. This study points to the importance of considering parent-partner status as a key modifier in studies of job security effects on mental health. Additional research to investigate what specific interventions may improve mental health for lone fathers who are faced with job insecurity are necessary.

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