# Stable vs. Variable Predictors of Mental Health in Individuals Residing in the UK, with a focus on those living in England during the COVID-19 Pandemic

**Joanne Cheung**

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# Chapter 1

## Lay Summary

### Background

The COVID-19 pandemic was a global health crisis caused by the spread of a new coronavirus (SARS-CoV-2). Many countries worldwide, including the United Kingdom (UK), implemented lockdowns or restrictions as public health measures to prevent the virus from spreading. As a result, the pandemic had a significant impact on the daily lives of most individuals. Restrictions on movements and closing businesses and schools, amongst other measures, adversely impacted individuals' financial, physical, and emotional well-being. Indeed, research has since indicated a rise in mental health disorders during the early phase of the pandemic. Cross-sectional and single timepoint studies have shown that well-known risk factors for mental ill health, such as younger age, female gender, and pre-existing medical or mental health conditions, increased the risk of developing a mental health disorder during the pandemic. However, follow-up studies during the pandemic reported mixed findings, with some indicating improvements in mental health after the restrictions were lifted, but others not. Furthermore, given the pandemic's unique and constantly evolving nature, much is still not known about the impact of restrictions on mental health and the impact of unique COVID-19-related stressors (for example, working from home, mask-wearing and worries regarding infection risks). Initial evidence examining a limited number of outbreak-related stressors found a link to poorer mental health. However, whether the impact of these unique stressors varies as a function of restrictions remains unknown.

### Aims

This research aims to 1) Investigate factors that may increase the risk of mental health disorders during the COVID-19 pandemic by reviewing the current published literature.

2) To determine a) whether COVID-19-related stressors relate to mental health and b) whether the impact of these stressors varies as a function of restrictions by examining data from the UK ATTACH study.

## Review of the Literature

We reviewed the available literature to identify which factors increased the risk of developing mental health issues during the COVID-19 pandemic. Using a thorough screening process, we identified 18 longitudinal studies that examined various risk factors in relation to mental health. Across studies, female gender, lower prior educational attainment, living conditions (living alone or with children), having a diagnosed mental health condition, and reporting loneliness increased the risk of anxiety and depression and, to a limited extent, post-traumatic stress disorder during the pandemic.

However, the findings were inconsistent regarding the effects on the mental health of being a younger adult, having a physical health condition, and belonging to an ethnic minority group. Whilst this review identified many stable predictors, that is, factors that are not easily changeable, such as living with children, it revealed how little research has been conducted examining factors that can be changed by public health measures (e.g., COVID-19-related stressors, including mask-wearing, home working). This indicates a clear need for more studies assessing the relationship between such stressors and mental health and the longitudinal impact of public health measures more broadly.

## Research Study

This research study examined the relationship between COVID-19-related stressors (e.g., worry about finances, travel restrictions, mask-wearing etc.) and mental health in adults living in England. It also assessed whether the relationship between self-reported mental

health and COVID-19-related stressors varied as a function of public health measures (e.g., restrictions during different stages of the pandemic). Adult participants enrolled in the UK ATTACH study and residing in England completed a series of daily poll questions via a mobile app. These data were used to examine the predictors of changes in mental health during different lockdown periods compared to a period with no restrictions.

Our findings indicated that participants were more likely to report a decrease from good to average mental health during the second national lockdown. However, this improved quickly following the easing of restrictions, and the improvements remained during a subsequent lockdown with stricter regulations. Several COVID-19-related stressors were consistently predicted by a combined data analyses approach. This included financial concerns, trusting the government to meet public needs and increased awareness of one's bodily signals. Various predictors, such as agreeing with travel restrictions, concerns about other's health risks, and relationship issues with one's significant other, showed changes in their relationship with mental health during different phases of the pandemic. Furthermore, several predictors were also revealed through different analytical approaches.

These results indicate that as the pandemic progressed, people experienced some fluctuation in their mental health, with COVID-19 related restrictions being associated with the changes in mental health.

**Conclusion**

This systematic review and empirical study sheds light on the influence of certain factors on mental health during the COVID-19 pandemic. Together, this review and empirical study highlighted some known risk factors and also revealed the impact of some unique stressors that vary in response to public health measures. Though more research is needed to understand the complex interplay between these factors and risk and resilience, by identifying

key potential risk factors, this research adds to a growing body of literature that may help to inform future public policy on the impact of lockdown restrictions, help to identify those most at risk and inform interventions to support mental health during future pandemics.

## Chapter 2

## The risk and resilience factors for psychopathology during the COVID-19 pandemic: A systematic review

### Abstract

COVID-19 was declared a pandemic in March 2020, resulting in many countries worldwide, including the UK, imposing strict lockdown measures to reduce the spread of the virus. Although such restrictions aimed to mitigate health risks, studies have since suggested they inadvertently adversely impacted mental health. Cross-sectional studies conducted in the early phase of the pandemic have demonstrated that certain well-established risk factors (e.g., gender) predict poorer mental health during the pandemic. However, more recent longitudinal studies have failed to replicate some of these findings. This study aimed to review the existing longitudinal literature on mental health risk and resilience factors during the COVID-19 pandemic, focusing on the UK population. Searches in Psychinfo, PubMed, and Web of Science identified 2172 records, of which 18 studies met inclusion criteria. This review observed that several known risk factors (e.g., female gender, lower educational attainment, living arrangement, pre-existing mental health conditions, and loneliness) related to increased risks of developing mental health issues during the COVID pandemic. Conflicting with previous reports, risk factors such as younger age, physical health conditions, financial adversity and ethnicity were less consistently associated with different forms of psychopathology. The review highlights a dearth of research exploring time-varying risk

factors, especially COVID-19-related stressors, and the clear need for more research to elucidate the relationship between COVID-19-related stressors and mental health across the later stages of the pandemic.

# 1. Introduction

## 1.1 The COVID-19 Pandemic

In January 2020, The World Health Organisation (WHO) first identified a novel coronavirus (SARS-CoV-2: aka COVID-19), which they later declared a global pandemic in March 2020 (Cucinotta & Vanelli, 2020). This pandemic prompted many countries to adopt quarantine 'lockdown' measures to curtail disease spread and reduce fatalities. In response to COVID-19, the government of the UK implemented a national lockdown on the 23rd of March 2020 (Hadjidemetriou et al., 2020). All unnecessary social contact was restricted, and non-essential businesses were closed. UK citizens were told to remain at home and were only permitted to leave to purchase essentials and seek emergency medical attention. People with high-risk medical conditions such as respiratory diseases, obesity, hypertension, and cardiovascular diseases were further advised to 'shield'– not leave their homes for 12 weeks – and individuals aged 70 and over were advised to strictly adhere to the restrictions (Hadjidemetriou et al., 2020). These restrictions presented various psychological challenges, such as fear and uncertainty about the virus, financial adversities, social and movement restrictions, and reduced access to healthcare services (Fancourt et al., 2021).

Early COVID-19 studies have since reported increased mental health difficulties, such as anxiety and posttraumatic stress disorder (PTSD), during the pandemic (Pieh et al., 2021). Whilst it is well-established that the COVID-19 pandemic brought about unprecedented social, economic, and psychological challenges, the impact remains to be fully understood. Considering the reported increase in psychopathology during the COVID-19 pandemic, it is

important to identify the key predictors of these mental health problems and investigate the mechanisms that contributed to their development.

### 1.2 Key Predictors of Psychopathology

In terms of psychopathology, more broadly, a body of research suggests several factors that increase liability. These include genetic and environmental risk factors which operate separately, additively, and interactively (Hicks et al., 2009; Kendler et al., 2003). Factors such as genetic liability, gender, age, socioeconomic status, life events, early adversities, and developmental phases have been associated with an increased risk of developing psychopathology. Studies have consistently found that females are more likely to develop depression and anxiety than males, possibly because of genetic, hormonal, psychosocial, and developmental differences (Cahil, 2006; Kuehner, 2017; McLean & Anderson, 2009). Younger adults are also at an increased risk of developing mood and anxiety disorders, thought to be due to challenges associated with transitioning to adulthood, which include hormonal changes, changes in social roles and relationships, academic or career-related stress, and financial pressures (Kessler et al., 2005; Sowell et al., 2001). Similarly, lower socioeconomic status (SES) has been associated with an increased risk of depression, anxiety, substance use disorder, and schizophrenia (Evans et al., 2009; Lorant et al., 2003; Muntaner et al., 1998) due to the associated chronic stressors such as poverty and discrimination as well as reduced access to resources such as education, social support, and healthcare (Lorant et al., 2003). Common life events, including trauma and abuse, major life changes such as divorce, loss of a loved one, financial difficulties, as well as substance abuse, including alcohol and drug abuse, have also been found to be associated with PTSD, anxiety disorders, and depression (Sullivan et al., 2012). This suggests that the risk of developing psychopathology is complex and multifactorial.

### 1.3 Mental Health Research during the COVID-19 Pandemic

Pandemics have been a recurring threat throughout history and have been found to significantly impact physical and mental health (Sergeant et al., 2020). Studies of previous epidemics have found that the incidence of mental health difficulties increased during and after the Ebola and SARS epidemics, with female gender, pre-existing medical conditions, financial stress, and loneliness as particular risk factors for poor mental health (Leung et al., 2022). Whilst this research focused on the mental health consequences of pandemics in certain countries, such as the Ebola outbreak in West Africa (Baseler et al., 2017) and the SARS epidemic in Asia (Peiris et al., 2003) and can be used to inform public policy for future pandemics, it is notable that these findings may not directly apply to the COVID-19 outbreak in Western countries. This is due to variations in genetic profiles, societal and cultural norms across countries, as well as differences in disease transmission properties and government approaches to outbreak management (Baseler et al., 2017; Peiris et al., 2003). Indeed, before COVID-19, there had been no recent comparable pandemic in the UK that had impacted health and socioeconomic activity in such a profound way. Thus, whilst research from around the world can be informative, examining the impact of COVID-19 on psychopathology across the UK population is important for informing future public health policy in response to the pandemic.

Early cross-sectional studies examining the impact of the COVID-19 pandemic on psychopathology suggested that many of the well-established risk factors for psychopathology, such as gender, age, and financial adversity remained relevant during the pandemic (Germani et al., 2020; Horesh et al., 2020; Sherman et al., 2021). However, these studies only provide a snapshot of mental health outcomes at a particular time. Therefore, the causal role of the predictors is undetermined, and the risk mechanisms remain obscure. More

recent longitudinal studies have begun to shed light on the long-term impact of the pandemic, and surprisingly, some of these studies have failed to replicate the findings of earlier cross-sectional studies (Heinen et al., 2021; McPherson et al., 2021; Wood et al., 2021). In addition, these longitudinal studies examining the course of mental health across the pandemic have also suggested that symptoms of psychopathology may have improved as lockdowns continued (Fancourt et al., 2021). Together, these findings highlight the importance of longitudinal studies and raise questions about the stability of these well-established risk factors in the context of the pandemic, particularly in response to changing lockdown restrictions.

It is also important to note that hitherto, the role of some putative environmental risk factors on mental health more broadly has been difficult to establish because of gene-environment correlations, that is, the propensity for genetic factors to create and shape environmental experiences and correlations between environmental exposures, for example, age, gender, socioeconomic status, and social isolation correlating with exposure to life events or adversities (Jaffee & Price, 2008). Thus, the COVID-19 pandemic and the population-wide restrictions on social activity and work provided a unique 'natural experiment' to investigate how environmental changes can impact mental health and interact with risk factors such as age, gender, and prior history of physical and mental health problems (Mutch, 2020). Furthermore, the COVID-19 pandemic has also resulted in some unique outbreak-related stressors such as economic loss, isolation, worrying about friends and family being infected, and long-term effects and neurological complications of COVID-19 infection (Efstathiou et al., 2022; Kwong et al., 2020). Together, these stressors add additional dimensions that may have contributed to the inconsistent relationships observed between these known risk factors and psychopathology when comparing research across the

pandemic that utilised different methods (cross-sectional vs longitudinal) as well as research during and prior to the pandemic (Taquet et al., 2021).

### 1.4 Objectives of the Systematic Review

To date, no systematic review has examined risk factors for psychopathology during the COVID-19 pandemic, specifically in the United Kingdom. As such, this review aims to 1) identify the risk and resilience factors linked to psychopathology during the pandemic and the associated lockdowns and 2) whether well-established risk factors remain significant predictors during the course of the COVID-19 pandemic, or whether new risk factors have emerged.

## 2. Methods

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria (Page & Moher, 2017).

### 2.1 Search strategy

The electronic databases Pubmed, PsycINFO, and Web of Science were systematically searched for English studies published in peer-reviewed journals between January 2020 and January 2022. The following search terms were used: (Britain OR "United Kingdom" OR UK OR England OR British) AND (("mental health" OR psychia* OR psycholog*) AND (predictor* OR risk factor* OR resilience) AND (COVID*)). "Longitudinal" was not included as a search term and was manually filtered for later. Moreover, reference lists of eligible articles were manually reviewed to identify additional studies. No additional studies were found.

## 2.2 Eligibility and Study Selection

The titles and abstracts of each publication were screened for relevance. Full-text articles were assessed for eligibility after the initial screening. Inclusion was restricted to studies using a longitudinal, quantitative study design, examining at least two time points and investigating the risk and resilience factors of mental health difficulties during the COVID-19 pandemic. These factors included mental health deterioration, depression, anxiety, and PTSD. Studies were only included if they focused on an adult sample (older than 18 years of age) who were residing in the United Kingdom during the pandemic. Finally, studies needed to utilise standardised or commonly used measures of psychopathology, such as clinical diagnoses, structured clinical interviews, or self-report screening tools. Studies that did not meet these criteria were excluded. A second reviewer assessed the full text of 20% of the eligible studies identified during the abstract screening phase to ensure adherence to these criteria. Disagreement on the inclusion or exclusion of articles was resolved by discussion. There was 95% agreement between the researcher and the second reviewer, indicating good inter-rater reliability.

## 2.3 Data Extraction

The data extracted included author, year of publication, sample size, sample characteristics, study period, assessment tools, and the risk or resilience factors tested. The sample characteristics and study details are reported in Table 1.

## 2.4 Appraisal of Study Quality

For study quality appraisal, this review used the Newcastle-Ottawa Scale (NOS), adapted for longitudinal studies (Luchini et al., 2017). This scale comprises seven items assessing quality in several domains: sample representativeness and size, comparability,

ascertainment of exposure and outcome, and statistical quality. Studies could receive a maximum score of nine, where 7-9 is considered high quality, 5-6 moderate quality, and 0-4 low quality.

### 2.5 Data Synthesis

Due to the heterogeneity of measures and the aspects of psychopathology assessed, a narrative synthesis was conducted, consistent with best practice (Johnson & Hennessy, 2019). Relevant findings were determined according to statistical significance ($p < .05$) and effect sizes. Key findings and effect sizes (if reported) across studies are summarised in Tables 2-5. To facilitate the narrative synthesis, studies were grouped by study design and the emergent risk factors were clustered into four distinctive groups: sociodemographic characteristics, psychological factors, lifestyle factors, and COVID-19-related stressors.

To enable strong inferences to be made, this systematic review focused on factors that were examined in at least five studies to allow consistency and robustness of the findings to be explored. The results are presented in the following sections according to the study design. Within each category, studies that found a relationship in primary analyses are reported, followed by studies that found a relationship that was not significant when controlling for other factors, followed by those that did not find an association. Furthermore, in order to distinguish between primary effects and secondary effects (e.g., those associations identified in covariate analyses), Table 2 denotes variables that were associated as covariates with the label "C" to make it clear that they were secondary effects. Regardless of the study design, the findings relating to each risk factor from all the identified studies are also summarised.

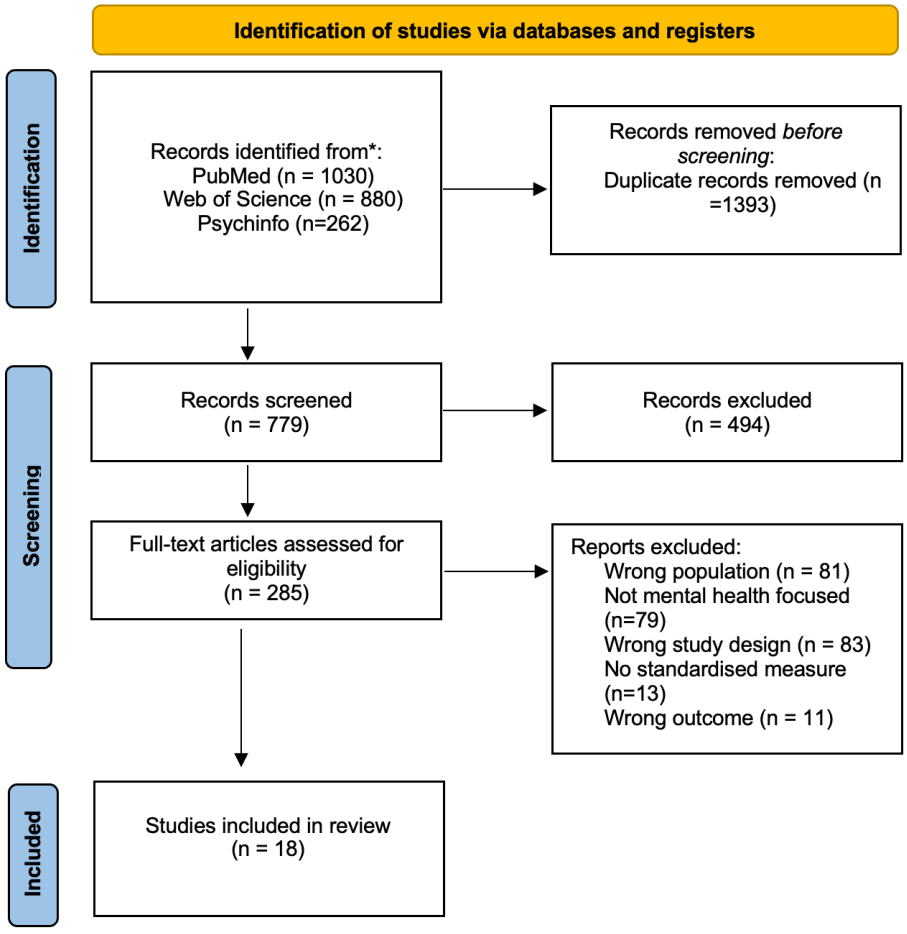
# 3. Results

## 3.1 Study Selection

A total of 2172 articles were yielded from the database search, 1393 duplicates of which were subsequently removed using Rayyan (Ouzzani et al., 2016). This software aids the screening and selection of studies in systematic reviews. Seven hundred seventy-nine studies were screened based on their title and abstract, 494 of which were excluded for not meeting the aforementioned inclusion criteria. Of the remaining 285 studies that qualified for full-text screening, 18 met the full inclusion criteria and were included in this systematic review (Figure 1).

**Figure 1**

*Diagram showing the PRISMA study selection used in this systematic review.*



## 3.2 Characteristics of the Included Studies

The key characteristics of these studies are summarised below, and the instruments that were used to assess psychopathology are shown in Table 1.

### *3.2.1 Study Design*

Three types of study designs were identified: 1*) Pre-and-post-onset COVID-19 studies*, where psychopathology was measured before and after the onset of the pandemic; 2) *Pre-onset and during COVID-19 studies* that examined mental health at several time points during the pandemic, and 3) *Trajectory-based studies*, which identified the different patterns of trajectories in symptoms during the pandemic.

#### *a. Pre-and-post-onset COVID-19 Studies*

Eight studies compared mental health before and after the pandemic began (Creese et al., 2020; Gallagher et al., 2020; Kwong et al., 2020; Proto & Zhang, 2021; Rimfeld et al., 2021; Rutland-Lawes et al., 2021; Sharp et al., 2021; Warne et al., 2021). They followed a longitudinal study design between 4-20 years follow-forward. Two of these studies were age-homogenous birth cohorts, that is, all the participants were a similar age: the Avon Longitudinal Study of Parents and Children (ALSPAC) Generation 1 offspring cohorts (Warne et al., 2021) and the Twins Early Development Study (TEDS) (Rimfeld et al., 2021). In addition, three studies covered a range of ages. These age-heterogenous studies were the Platform for Research Online to Investigate Genetics and Cognition in Aging (PROTECT) study (Creese et al., 2020), the English Longitudinal Study of Ageing (ELSA) (Rutland-Lawes et al., 2021) and the UK Household Longitudinal Study (UKHLS) (Proto & Zhang, 2021). One study examined three cohorts: one age-homogenous birth cohort – the ALSPAC-

young cohort – and two age-heterogenous cohorts – the ALSPAC-parent cohort and Generation Scotland – (Kwong et al., 2020). In addition, two other studies looked at highly selective populations: cancer patients (Gallagher et al., 2021) and veterans (Sharp et al., 2021). The study sample sizes ranged from 518-8947 participants.

*b. Pre-onset and During COVID-19 Studies*

Seven identified studies were conducted during the pandemic and measured psychopathology at specific time points (Fancourt et al., 2021; Groarke et al., 2021; Heinen et al., 2021; Kannangara et al., 2021; Stevenson & Wakefield, 2021; Stroud & Gutman, 2021; Wood et al., 2021). All the studies began between March and May 2020 and had three to eight months of follow-up. The study sample sizes ranged from 324-36520 participants. Three age-heterogenous studies were included, namely the University College London (UCL) COVID-19 Social Study (Fancourt et al., 2021), the COVID-19 Psychological Wellbeing Study (Groarke et al., 2021), and the Prolific Academic study (Stevenson & Wakefield., 2021). Four studies looked at selected populations such as university staff (Wood et al., 2021), university students (Kannangara et al., 2021), younger adults (Stroud & Gutman, 2021), and residents in Oxfordshire or Buckinghamshire (Heinen et al., 2021).

*c. Trajectory-based Studies*

Three studies examined the differential trajectories in symptomatology throughout the pandemic. Using data from various time points, they statistically identified clusters of groups with similar trajectories in mental health symptoms (McPherson et al., 2021; Saunders et al., 2021; Shevlin et al., 2021). These studies used data from the COVID-19 Psychological Wellbeing Study (McPherson et al., 2021), the COVID-19 Social Study (Saunders et al., 2021), and the COVID-19 Psychological Research Consortium (C19PRC) Study (Shevlin et al., 2021). All the studies had three to four months of follow-up. The number of individual

trajectories identified by the reviewed studies ranged from four to six, and the sample sizes of these studies ranged from 1958-21938.

### *3.2.2 Quality Appraisal*

Of the 18 studies, four were rated as 'low' quality, ten as 'moderate' quality, and four as 'high' quality. Studies deemed 'low' quality were retained in the systematic review to provide a comprehensive and unbiased view of the evidence base. The results of the quality appraisal are displayed in Table 6.

**Table 1**

*Table showing study characteristics (n=18).*

| Study | Sample size (n=) | Sample characteristics | | Study period | Outcome measures | Risk factors |
|---|---|---|---|---|---|---|
| | | Age (range) | Mean (standard deviation) | | | |
| **PRE-AND-POST-ONSET COVID-19 STUDIES** | | | | | | |
| **Creese et al. (2020)** | 3281 | 55-96 | 67±6.5 | 2015-June 2020 | PHQ-9<br>GAD-7<br>(D, A) | Demographic, COVID-19 stressors |
| **Gallagher et al. (2020)** | 518 | - | 63.98±11.54 | 2017-April 2020 | GHQ12<br>(D) | Demographic, COVID-19 stressors |
| **Kwong et al. (2020) ALSPAC-parent** | 3720 | >40 | 59±4.82 | 1991-May 2020 | sMFQ<br>GAD-7<br>(D, A) | Demographic, COVID-19 stressors |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Kwong et al. (2020) ALSPAC- young** | 2973 | 18-29 | 28±0.54 | 1991-May 2020 | sMFQ GAD-7 (D, A) | Demographic, COVID-19 stressors |
| **Kwong et al. (2020) Generation Scotland** | 4233 | >18 | 59±12.03 | 2006-May 2020 | PHQ-9 GAD-7 (D, A) | Demographic, COVID-19 stressors |
| **Proto & Zhang (2021)** | 8947 | 24-93 | - | 2017-January 2021 | GHQ-12 (Mental Health Deterioration) | Psychological |
| **Rimfeld et al. (2021)** | 10346 | 21-25 | 22.27±0.9 | 2018-March 2021 | SDQ GAD-7 SMFQ CASE – Self-harm (Conduct, Emotional, Hyperactivity, Peer Problems, Pro-Social Behaviour, A, D, Behavioural Problems, Self-harm) | - Demographic, COVID-19 stressors |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Rutland-Lawes et al. (2021)** | 5331 | | 70.25±9.30 | 2018-July 2020 | CES-D-SF (D) | Demographic, Lifestyle factors |
| **Sharp et al. (2021)** | 3547 | >25 | - | 2014-Sept 2020 | GHQ12 Common Mental Health Disorders) | COVID-19 stressors |
| **Warne et al. (2021)** | 2657 | 27-29 | 28.2±0.5 | 2016-July 2020 | WEMWBS GAD-7 sMFQ (Wellbeing, A, D) | Psychological |
| **PRE-ONSET AND DURING COVID-19 STUDIES** | | | | | | |
| **Fancourt et al. (2021)** | 36520 | >18 | - | March-August 2020 | PHQ-9, GAD-7 (D, A) | Demographic |
| **Groarke et al. (2021)** | 1958 | 18-87 | 37.01±12.81 | March-June 2020 | PHQ-9 (D) | Psychological |
| **Heinen et al. (2021)** | 324 | 18-82 | 43.2±16.50 | July 2020-May 2021 | PHQ-9, GAD-7 (D, A) | Demographics, Lifestyle factors |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Kannangara et al. (2021)** | 1281 | >18 | - | May 2020-July 2020 | CORE-10<br>GAD-7<br>(Psychological Distress, A) | COVID-19 stressors |
| **Stevenson & Wakefield (2021)** | 457 | 18-87 | 37.60 | May-September 2020 | HADS<br>(A-D) | Demographic, Psychological, COVID-19 stressors |
| **Stroud & Gutman (2021)** | 880 | 18-25 | - | April-November 2020 | GHQ-12<br>(Mental Health Distress) | Demographics, Lifestyle factors |
| **Wood et al. (2021)** | 3900 | >18 | - | May-Sept 2020 | WEMWBS A-contentment D-enthusiasm Warr's scale<br>(Wellbeing, A, D) | Demographic, COVID-19 stressors, lifestyle factors |
| **TRAJECTORY-BASED STUDIES** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **McPherson et al. (2021)** | 1958 | >18 | - | March-June 2020 | GAD-7<br>PHQ-9<br>Life Events Checklist for DSM-5<br>PCL-5<br>(A, D, PTSD) | Demographic, Psychological, COVID-19 stressors |
| **Saunders et al. (2021)** | 21938 | >18 | - | March-July 2020 | PHQ-9 GAD-7<br>(D, A) | Demographic, Psychological |
| **Shevlin et al. (2021)** | 2025 | >18 | - | March-July 2020 | Patient Health Questionnaire A and D Scale ITQ<br>(D, A, PTSD) | Demographic, Psychological, COVID-19 stressors |

*Note.* **Demographic:** age, gender, ethnicity, education, income or employment status, pre-existing mental health conditions, pre-existing physical health condition, marital status, key worker status, employment rank, difficulty accessing mental health service pre-pandemic, received mental health treatment, pregnancy, and family identification. **Psychological:** extraversion, neuroticism, conscientiousness, openness, agreeableness, social, loneliness before or during pandemic, meaning in life, genetics, intolerance of uncertainty, resilience, internal/external locus of control, positivity, self-harm or suicidal behaviours, cognition, emotional dysregulation, and disordered eating. **Lifestyle factors:** living arrangements, living region, alcohol consumption, smoking, leisure/ physical activity, groceries, changes in diet, changes in routine, visiting green spaces.**COVID-19 related stressors:** fears about COVID, friends/ family contracting COVID-19, losing close ones due to COVID-19, caring responsibilities, change in child care arrangement, difficulty accessing food, difficulty accessing medication or treatment, lockdown, COVID-19 symptoms, financial changes/struggles, living alone during the pandemic, self-isolation, worried about government.
**Outcome Measures:** Patient Health Questionnaire-9 (PHQ-9), Mood and Feeling Questionnaire - short form (sMFQ), The World and Center for Epidemiologic Studies Depression Scale (CES-D), Strengths and Difficulties Questionnaire (SDQ), Generalized Anxiety Disorder-7 item (GAD-7), Hospital Anxiety and Depression Scale (HADS), The 12 item General Health Questionnaire (GHQ-12), Clinical Outcomes in Routine Evaluation 10 (Core-10), Warwick-Edinburgh Mental Well-Being Scale (WEMWBS), PTSD Checklist for DSM-5 (PCL-5), International Trauma Questionnaire (ITQ). Depression (D) Anxiety(A) Anxiety-Depression (A-D) Post Traumatic Stress Disorder (PTSD)

**Table 2**

*Results of studies examining the effect of demographic risk factors on psychopathology.*

| Study | Measures | Age | Gender | Ethnicity | Low education | Financial struggles/ Low income | Diagnosed mental illness | Physical health | Marital status | Key worker | Job status/ rank | Mental health treatment | Family identification |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PRE-AND-POST-ONSET COVID-19 STUDIES** | | | | | | | | | | | | | |
| Creese et al (2020) | PHQ-9 GAD-7 (D, A) | (N) | (Y, U) | - | - | (N) | A (Y, U) D (N) | (N) | (N) | - | D (Y, U) A (N) | - | - |
| Gallagher et al (2020) | GHQ12 (D) | (Y-) | (Y+) | - | - | - | (Y+) | (N) | D (Y+) | - | - | - | - |
| Kwong et al (2020) ALSPAC-parents | sMFQ GAD-7 (D, A) | D (Y-) A (Y-) | D (Y++) A (Y+) | - | D (Y-) A (Y-) | D (+) A (N) | D (Y, C++) A (Y, C+) | (Y+) | D (Y++) A (Y+) | (N) | - | - | - |
| Kwong et al (2020) ALSPAC-young | sMFQ GAD-7 (D, A) | D (N) A (N) | D (Y++) A (Y++) | - | D (N) A (Y-) | D (N) A (Y+) | D (Y, C++) A (Y, C +) | D (Y+) A (Y+) | - | D (Y-) A (N) | - | D (Y+) A (Y+) | - |
| Kwong et al (2020) Gen Scot | PHQ-9, GAD7 (D, A) | D (Y-) A (Y-) | D (Y++) A (Y+) | - | D (Y-) A (N) | D (Y+) A (Y+) | - | D (Y++) A (Y+) | - | D (N) A (N) | - | - | - |
| Proto & Zhang (2021) | GHQ-12 (Mental Health Deterioration) | (C, U) | - | - | - | (C, U) | - | (C, U) | (C, U) | - | (C, U) | - | - |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rimfield et al (2021) | CRISIS<br>SDQ<br>GAD-7<br>SMFQ<br>CASE – Self -harm) | - | (Y+) | - | - | (Y+) | (Y+) | - | - | - | - | - | - |
| Rutland-Lawes et al (2021) | CES-D-SF (D) | (Y, U) | (Y, U) | (Y, U) | (N) | (N) | (Y, U) | (Y, U) | - | - | (Y, U) | - | - |
| Sharp et al (2021) | GHQ12 (Common mental health disorders) | (C, U) | (C, U) | - | (C, U) | (Y++) | (Y, U) | (Y, U) | (C, U) | (Y+) | (C, U) | - | (Y++) |
| Warne et al (2021) | WEMWBS<br>GAD-7<br>sMFQ<br>(Wellbeing, D, A) | - | (C, U) | - | (C, U) | (C, U) | (Y) | - | - | - | - | - | - |
| Fancourt et al (2021) | GAD-7, PHQ-9. (D, A) | D (C, Y, U)<br>A (C, Y, U) | D (C, Y, U)<br>A (C, Y, U) | (N) | D (C, Y, U)<br>A (C, Y, U) | D (C, Y, U)<br>A (C, Y, U) | D (C, Y, U)<br>A (C, Y, U) | - | - | - | - | - | - |
| Groarke et al (2021) | PHQ-9 (D) | (C, N) | (Y+) | - | - | - | - | - | - | - | - | - | - |
| Heinen et al (2021) | SHAI (Health A) | (N) | (Y+) | (N) | - | (N) | (Y++) | (Y+) | - | (N) | - | - | - |
| Kannangara et al (2021) | CORE-10<br>GAD-7<br>(Psychological distress, A) | - | - | - | - | - | - | - | - | - | - | - | - |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stevenson & Wakefield (2021) | HADS, SBQR (D, A, Self-harm) | (C, U) | (C, U) | - | - | (Y, U) | - | - | (C, U) | - | - | - | D (Y-)<br>A (Y--) |
| Stroud & Gutman (2021) | GHQ-12 (Mental Health Distress) | (N) | (Y, C, U) | (N) | - | (N, C) | (Y, C, U) | (N, C) | - | - | - | - | - |
| Wood et al (2021) | WEMWBS<br>A-contentment<br>D-enthusiasm<br>Warr's scale | (Y, U) | (Y, U) | - | (Y, U) | - | - | - | - | - | - | - | - |
| **TRAJECTORY-BASED STUDIES** | | | | | | | | | | | | | |
| McPherson et al (2021) Class 1 (severe but stable) | GAD-7<br>PHQ-9<br>Life Events Checklist for DSM-5<br>PCL-5<br>(A, D, PTSD) | D<br>(N, C)<br>A<br>(N, C)<br>PTSD<br>(N, C) | D (N, C)<br>A (N, C)<br>PTSD<br>(N, C) | - | - | (Y, U) | D (Y, U)<br>A (N)<br>PTSD<br>(Y, U) | (N) | (N) | (N, C) | (N) | - | - |
| McPherson et al (2021) Class 2 (increasing symptoms) | GAD-7<br>PHQ-9<br>Life Events Checklist for DSM-5<br>PCL-5<br>(A, D, PTSD) | D<br>(N, C)<br>A<br>(Y, C)<br>PTSD<br>(N, C) | D (N, C)<br>A (N, C)<br>PTSD<br>(N, C) | - | - | (N) | (N) | (N) | D (N)<br>A (Y, U)<br>PTSD<br>(N) | (N, C) | (N) | - | - |
| McPherson et al (2021) Class 3 (improving symptoms) | GAD-7<br>PHQ-9<br>Life Events Checklist for DSM-5<br>PCL-5<br>(A, D, PTSD) | D<br>(N, C)<br>A<br>(N, C)<br>PTSD<br>(N, C) | D (N)<br>A (Y, C, U)<br>PTSD<br>(Y, C, U) | - | - | (N) | (N) | (N) | D (Y, U)<br>A (N)<br>PTSD<br>(N) | (N, C) | (N) | - | - |
| Saunders et al (2021) Class 2 (increasing symptoms) | PHQ-9<br>GAD-7<br>(D, A) | D (--)<br>A (--) | (N) | (N) | D (-)<br>A (-) | D (+)<br>A (+) | D (+++)<br>A (+++) | D (+)<br>A (+) | - | (N) | - | - | - |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Saunders et al (2021) Class 3 (moderate but stable) | PHQ-9 GAD-7 (D, A) | (Y--) | (Y+) | (Y, C+) | (N) | (Y+) | (Y++) | (Y+) | - | (N) | - | - | - |
| Saunders et al (2021) Class 4 (symptoms worsening but improving after lockdown measures were lifted) | PHQ-9 GAD-7 (D, A) | (Y--) | (Y+) | (N) | (Y-) | (Y+) | (Y++) | (Y+) | - | D (N) A (Y+) | - | - | - |
| Saunders et al (2021) Class 5 (severe initial A that decreases to normal range- during lockdown) | GAD-7 (A) | A (---) | A (Y+) | (N) | (N) | (N) | A (Y+) | A (Y+) | - | A (Y+) | - | - | - |
| Shevlin et al (2021) Class 1 (increasing symptoms) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | (N) | (N) | (N) | - | (N) | - | (N) | - | - | - | (Y++) D (Y++) PTSD (N) | - |
| Shevlin et al (2021) Class 2 (severe but stable) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | (N) | A-D (Y+) PTSD (N) | (N) | - | A-D (Y+) PTSD (N) | - | A-D (Y+) PTSD (N) | - | - | - | A-D (Y+++) PTSD (N) | - |
| Shevlin et al (2021) Class 3 (improving symptoms) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | (N) | (N) | (N) | - | A-D (Y+) PTSD (N) | - | A-D (Y+) PTSD (N) | - | - | - | A-D (Y+) PTSD (N) | - |
| Shevlin et al (2021) Class 4 (worsening symptoms) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | (N) | (N) | (N) | - | (N) | - | (N) | - | - | - | A-D (Y++) PTSD (N) | - |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shevlin et al (2021) (moderate but stable) | ITQ (PTSD) | PTSD (Y+) | PTSD (Y++) | (N) | - | (N) | - | (N) | - | - | - | PTSD (Y+) | - |

*Note.* For coefficient $\beta$ effect sizes, small effect sizes are between 0.10–0.29 medium effect sizes are between 0.30–0.49 and large effect sizes are 0.50 or greater (Cohen, 1988). For odds ratios and relative risk ratios 1.32, 2.38, and 4.70 are small, moderate, and large respectively (Olivier et al., 2017). (N) Not significant risk predictor (Y) Significant predictor (-) Not applicable (+) Positive relationship (-) Negative relationship. (+/++/+++): small/moderate/ large effect sizes (-/--/---): small/moderate/ large effect sizes (C) Covariate (U) Unspecified (D) Depression (A) Anxiety. (A-D) Anxiety-Depression (PTSD) Post Traumatic Stress Disorder

**Table 3**

*Table showing the results of studies examining the relationship between lifestyle factors and psychopathology.*

| Study | Measures | Living arrangement/ Household size | Rural/ Urban area/region | Alcohol consumption | Smoking | Leisure/ Physical activity | Groceries | Changes in diet | Changes in routine | Visiting green spaces |
|---|---|---|---|---|---|---|---|---|---|---|
| **PRE-AND-POST-ONSET COVID-19 STUDIES** | | | | | | | | | | |
| Creese et al (2020) | PHQ-9, GAD-7 (D, A) | - | - | - | - | (Y, C+) | - | - | - | - |
| Gallagher et al (2020) | GHQ12 (D) | - | - | - | - | - | - | - | - | - |
| Kwong et al (2020) ALSPAC-parents | sMFQ, GAD-7 (D, A) | D (Y++) A (N) | (Y+) | D (N) A (Y+) | (Y+) | - | - | - | - | D (Y++) A (N) |
| Kwong et al (2020) ALSPAC-young | sMFQ, GAD-7 (D, A) | D (Y+) A (N) | D (N) A (Y+) | (Y+) | (N) | - | - | - | - | D (Y+) A (N) |
| Kwong et al (2020) Gen Scot | PHQ9, GAD7 (D, A) | D (Y++) A (N) | (Y+) | (N) | D (Y++) A (Y+) | - | - | - | - | (Y+) |
| Proto & Zhang (2021) | GHQ-12 (Mental Health Deterioration) | (C, U) | (C, U) | - | - | - | - | - | - | - |
| Rimfield et al (2021) | CRISIS, SDQ, GAD-7, SMFQ CASE – Self-harm. | - | - | - | - | - | - | - | - | - |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Rutland-Lawes et al (2021) | CES-D-SF (D) | (Y, U) | (Y, U) | (Y, U) | (Y, U) | - | - | - | - | - |
| Sharp et al (2021) | GHQ12 AUDIT-C (common mental health disorders, HazardoU alcohol Ue) | (Y+++) | - | - | - | - | - | - | - | - |
| Warne et al (2021) | WEMWBS GAD-7 sMFQ (Wellbeing, D, A) | - | - | - | - | (Y++) | - | - | - | (Y++, U) |
| | | | | **PRE-ONSET AND DURING COVID-19 STUDIES** | | | | | | |
| Fancourt et al (2021) | GAD-7, PHQ-9 (D, A) | (Y, C, U) | - | - | - | - | - | - | - | - |
| Groarke et al (2021) | PHQ-9 (D) | - | - | - | - | - | - | - | - | - |
| Heinen et al (2021) | SHAI (Health A) | - | - | (N) | (N) | (N) | (N) | (N) | (N) | - |
| Kannangara et al (2021) | CORE-10, GAD-7 (Psychological distress, A) | - | - | - | - | - | - | - | - | - |
| Stevenson & Wakefield (2021) | HADS, SBQR (D, A, Self - harm) | - | - | - | - | - | - | - | - | - |
| Stroud & Gutman (2021) | GHQ-12 (Mental Health Distress) | - | - | (Y+) | (C, U) | (N) | - | - | - | - |
| Wood et al (2021) | WEMWBS A-contentment D-enthusiasm Warr's scale | - | - | - | - | - | - | - | - | - |

**TRAJECTORY-BASED STUDIES**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| McPherson et al (2021) Class 1 (severe but stable) | GAD-7, PHQ-9, Life Events Checklist for DSM-5 PCL-5 (D, A, PTSD) | (N) | (N) | - | - | - | - | - | - | - |
| McPherson et al(2021) Class 2 (increasing symptoms) | GAD-7, PHQ-9, Life Events Checklist for DSM-5 PCL-5 (D, A, PTSD) | (N) | (N) | - | - | - | - | - | - | - |
| McPherson et al (2021) Class 3 (improving symptoms) | GAD-7, PHQ-9, Life Events Checklist for DSM-5 PCL-5 (D, A, PTSD) | (N) | (N) | - | - | - | - | - | - | - |
| Saunders et al (2021) Class 2 (increasing symptoms) | PHQ-9 GAD-7 (D, A) | D (Y+) A (N) | (N) | - | - | - | - | - | - | - |
| Saunders et al (2021) Class 3 (moderate but stable) | PHQ-9 GAD-7 (D, A) | (Y+) | D (Y+) A (N) | - | - | - | - | - | - | - |
| Saunders et al (2021) Class 4 (symptoms worsening but improving after lockdown measures were lifted) | PHQ-9 GAD-7 (D, A) | (Y+) | (N) | - | - | - | - | - | - | - |
| Saunders et al (2021) Class 5 (severe initial A that decreases to normal range- during lockdown) | GAD-7 (A) | (N) | (N) | - | - | - | - | - | - | - |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Shevlin et al (2021) Class 1 (increasing symptoms) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | (N) | (N) | - | - | - | - | - | - | - |
| Shevlin et al (2021) Class 2 (severe but stable) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | A-D (Y-) PTSD (N) | (N) | - | - | - | - | - | - | - |
| Shevlin et al (2021) Class 3 (improving symptoms) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | (N) | (N) | - | - | - | - | - | - | - |
| Shevlin et al (2021) Class 4 (worsening symptoms) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | (N) | (N) | - | - | - | - | - | - | - |
| Shevlin et al (2021) (moderate but stable) | ITQ (PTSD) | PTSD (Y+) | PTSD (Y+) | - | - | - | - | - | - | - |

*Note.* For coefficient $\beta$ effect sizes, small effect sizes are between 0.10–0.29 medium effect sizes are between 0.30–0.49 and large effect sizes are 0.50 or greater (Cohen, 1988). For odds ratios and relative risk ratios 1.32, 2.38, and 4.70 are small, moderate, and large respectively (Olivier et al., 2017). (N) Not significant risk predictor (Y) Significant predictor (-) Not applicable (+) Positive relationship (-) Negative relationship. (+/++/+++): positive small/moderate/ large effect sizes (-/--/---): negative small/moderate/ large effect sizes (C) Covariate (U) Unspecified (D) Depression (A) Anxiety. (A-D) Anxiety-Depression (PTSD) Post Traumatic Stress Disorder

**Table 4**

*Table showing the results of studies examining the relationship between psychological factors and psychopathology.*

| Study | Measures | Extraversion | Neuroticism | Conscientiousness | Openness | Agreeable-ness | Social | Loneliness | Meaning in life | Genetics | IOU | Resilience | Internal/ external locus of control | Positivity | Self-harm/ suicidal behaviours | Cognition | Emotional dysregulation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PRE-AND-POST-ONSET COVID-19 STUDIES** | | | | | | | | | | | | | | | | | |
| Creese et al (2020) | PHQ-9 GAD-7 (D, A) | - | - | - | - | - | - | (Y+) | - | - | - | - | - | - | - | - | - |
| Gallagher et al (2020) | GHQ12 (D) | - | - | - | - | - | - | (Y+) | - | - | - | - | - | - | - | - | - |
| Kwong et al (2020) ALSPAC-parents | sMFQ GAD-7 (D, A) | - | - | - | - | - | - | - | - | (Y+) | - | - | - | - | - | (Y+) | - |
| Kwong et al (2020) ALSPAC-young | sMFQ GAD-7 (D, A) | - | (Y+) | - | - | - | - | - | - | (N) | - | - | - | - | (Y+) | (Y+) | - |
| Kwong et al (2020) Gen Scot | PHQ9, GAD7 (D, A) | - | (Y+) | - | - | - | - | - | - | (Y+) | - | - | - | - | (Y+++) | (Y+) | - |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Proto & Zhang (2021) | GHQ-12 (Mental Health Deterioration) | (Y, U) | (Y, U) | (Y, U) | (Y, U) | (N) | - | - | - | - | - | - | - | - | - | (N) | - |
| Rimfield et al (2021) | CRISIS<br>SDQ<br>GAD-7<br>SMFQ<br>CASE – Self-harm<br>(Conduct, emotional, hyperactivity, peer problems, prosocial behaviour, A, D, behavioural problems, self-harm). | - | - | - | - | - | - | - | - | (Y) | - | - | - | - | - | - | - |
| Rutland-Lawes et al (2021) | CES-D-SF (D) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Sharp et al (2021) | GHQ12<br>AUDIT-C<br>(common mental health disorders, Hazardous alcohol use) | - | - | - | - | - | (Y++) | - | - | - | - | - | - | - | - | - | - |
| Warne et al (2021) | WEMWBS<br>GAD-7<br>sMFQ<br>(Wellbeing, A, D) | - | - | - | - | - | (N) | - | - | - | - | - | - | - | (Y) | - | - |

**PRE-ONSET AND DURING COVID-19 STUDIES**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fancourt et al (2021) | GAD-7, PHQ-9 (A, D) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Groarke et al (2021) | PHQ-9 (D) | - | - | - | - | - | - | (Y+++) | - | - | - | - | - | - | - | - | (Y+++) |
| Heinen et al (2021) | SHAI (Health A) | - | - | - | - | - | - | - | - | - | (Y++) | - | - | - | - | - | - |
| Kannangara et al (2021) | CORE-10 GAD-7 (Psychological distress, A) | - | - | - | - | - | - | (Y++) | - | - | - | - | - | D (Y-) A (N) | - | - | - |
| Stevenson & Wakefield (2021) | HADS, SBQR (D, A, Self-harm) | - | - | - | - | - | - | (Y+++) | - | - | - | - | - | - | (Y++) | - | - |
| Stroud & Gutman (2021) | GHQ-12 (Mental Health Distress) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Wood et al (2021) | WEMWBS A-contentment D-enthusiasm Warr's scale | - | - | - | - | - | (Y) | (Y-) | - | - | - | - | - | - | - | - | - |

**TRAJECTORY-BASED STUDIES**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| McPherson et al (2021) Class 1 (severe but stable) | GAD-7<br>PHQ-9<br>Life Events Checklist for DSM-5<br>PCL-5<br>(A, D, PTSD) | - | - | - | - | - | (N) | D (Y, U)<br>A (N)<br>PTSD (Y, U) | D (Y, U)<br>A (N)<br>PTSD (N) | - | - | - | - | - | - | - | - |
| McPherson et al (2021) Class 2 (increasing symptoms) | GAD-7<br>PHQ-9<br>Life Events Checklist for DSM-5<br>PCL-5<br>(A, D, PTSD) | - | - | - | - | - | (N) | (N) | (N) | - | - | - | - | - | - | - | - |
| McPherson et al (2021) Class 3 (improving symptoms) | GAD-7<br>PHQ-9<br>Life Events Checklist for DSM-5<br>PCL-5<br>(A, D, PTSD) | - | - | - | - | - | (N) | D (Y, U)<br>A (N)<br>PTSD (N) | (N) | - | - | - | - | - | - | - | - |
| Saunders et al (2021) Class 2 (increasing symptoms) | PHQ-9<br>GAD-7<br>(D, A) | D (Y+)<br>A (N) | (Y+) | D (Y-)<br>A (Y+) | D (Y+)<br>A (Y+) | D (N)<br>A (Y+) | D (Y+)<br>A (Y+) | - | - | - | - | - | - | - | - | - | - |
| Saunders et al (2021) Class 3 (moderate but stable) | PHQ-9<br>GAD-7<br>(D, A) | D (N)<br>A (Y+) | (Y+) | (Y-) | (Y+) | (N) | (Y+) | - | - | - | - | - | - | - | - | - | - |
| Saunders et al (2021) Class 4 (symptoms worsening but improving after lockdown | PHQ-9<br>GAD-7<br>(D, A) | D (N)<br>A (Y+) | (Y+) | (Y-) | (Y+) | (N) | D (N)<br>A (Y+) | - | - | - | - | - | - | - | - | - | - |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| measures were lifted) | | | | | | | | | | | | | | | | | |
| Saunders et al (2021) Class 5 (severe initial A that decreases to normal range- during lockdown) | GAD-7 (A) | A (Y+) | A (Y+) | A (Y+) | A (Y+) | (N) | A (Y+) | - | - | - | - | - | - | - | - | - | - |
| Shevlin et al (2021) Class 1 (increasing symptoms) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | - | - | - | - | - | - | (Y+) | - | - | (Y+) | A-D (Y-) PTSD (N) | (N) | - | - | - | - |
| Shevlin et al (2021) Class 2 (severe but stable) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | - | - | - | - | - | - | (Y+) | - | - | A-D (Y+) PTSD (N) | A-D (Y-) PTSD (N) | (Y+) | - | - | - | - |
| Shevlin et al (2021) Class 3 (improving symptoms) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | - | - | - | - | - | - | (Y+) | - | - | (Y+) | A-D (Y-) PTSD (N) | A-D (N) D (N) PTSD (Y+) | - | - | - | - |
| Shevlin et al (2021) Class 4 (worsening symptoms) | Patient Health Questionnaire A and D Scale ITQ (A-D, PTSD) | - | - | - | - | - | - | (Y+) | - | - | A-D (Y+) PTSD (N) | A-D (Y-) PTSD (N) | A-D (Y-) PTSD (N) | - | - | - | - |
| Shevlin et al (2021) moderate but stable) | ITQ (PTSD) | - | - | - | - | - | - | PTSD (Y+) | - | - | PTSD (N) | PTSD (N) | PTSD (Y+) | - | - | - | - |

*Note.* For coefficient *β* effect sizes, small effect sizes are between 0.10–0.29 medium effect sizes are between 0.30–0.49 and large effect sizes are 0.50 or greater (Cohen, 1988). For odds ratios and relative risk ratios 1.32, 2.38, and 4.70 are small, moderate, and large respectively (Olivier et al., 2017). (N) Not significant risk predictor (Y) Significant predictor (-) Not applicable (+) Positive relationship (-) Negative relationship. (+/++/+++): positive small/moderate/ large effect sizes (-/--/---): negative small/moderate/ large effect sizes (C) Covariate (U) Unspecified (D) Depression (A) Anxiety. (A-D) Anxiety-Depression (PTSD) Post Traumatic Stress Disorder

**Table 5**

*Results of relationship between COVID-19 related stressors and psychopathology.*

| Study | Measures | Fears about COVID-19 | Friends/ family contracting COVID-19 | Losing close ones due to COVID-19 | Caring responsibilities | Change in child care arrangements | Difficulty accessing food | Difficulty accessing medication / treatment | Lockdown | COVID-19 symptoms | Self-isolation | Worried about government |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PRE-AND-POST-ONSET COVID-19 STUDIES** | | | | | | | | | | | | |
| **Creese et al (2020)** | PHQ-9 GAD-7 (D, A) | - | - | - | - | - | - | - | - | (Y) | - | - |
| Gallagher et al (2020) | GHQ12 (D) | - | - | - | - | - | - | (N) | - | - | - | - |
| Kwong et al (2020) ALSPAC-parents | sMFQ GAD-7 (D, A) | - | - | - | - | - | - | - | - | (Y+) | (Y+) | - |
| Kwong et al (2020) ALSPAC-young | sMFQ GAD-7 (D, A) | - | - | - | - | - | - | - | - | D (Y+) A (N) | (Y+) | - |
| Kwong et al (2020) Gen Scot | PHQ9, GAD7 (D, A) | - | - | - | - | - | - | - | - | D (Y+) A (N) | - | - |
| Proto & Zhang (2021) | GHQ-12 (Mental Health Deterioration) | - | - | - | - | - | - | - | - | - | - | - |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Rimfield et al (2021) | CRISIS<br>SDQ<br>GAD-7<br>SMFQ<br>CASE – Self - harm | - | (Y+) | (Y+) | - | - | - | - | (Y) | (Y) | - | - |
| Rutland-Lawes et al (2021) | CES-D-SF (D) | - | - | - | - | - | - | - | - | - | - | - |
| Sharp et al (2021) | GHQ12<br>AUDIT-C (common mental health disorders, Hazardous alcohol use) | - | - | (Y) | (Y+) | (Y) | (Y+++) | (Y+++) | - | - | - | - |
| Warne et al (2021) | WEMWBS<br>GAD-7<br>sMFQ (Wellbeing, A, D) | - | - | - | - | - | - | - | - | - | - | - |
| **PRE-ONSET AND DURING COVID-19 STUDIES** | | | | | | | | | | | | |
| **Fancourt et al (2021)** | GAD-7, PHQ-9 (A, D) | - | - | - | - | - | - | - | - | - | - | - |
| Groarke et al (2021) | PHQ-9 (D) | - | - | - | - | - | - | - | - | - | - | - |
| Heinen et al (2021) | SHAI (Health A) | - | (N) | - | - | - | - | - | - | - | - | - |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kannangara et al (2021) | CORE-10<br>GAD-7<br>(Psychological distress, A) | (Y++) | - | - | - | - | - | - | - | - | - | - |
| Stevenson & Wakefield (2021) | HADS,<br>SBQR<br>(D, A, Self-harm) | - | - | - | - | - | - | - | - | - | - | - |
| Stroud & Gutman (2021) | GHQ-12<br>(Mental Health Distress) | - | - | - | | - | - | - | | - | - | - |
| Wood et al (2021) | WEMWBS<br>A-contentment<br>D-enthusiasm<br>Warr's scale | - | - | - | - | - | - | - | - | - | - | - |

**TRAJECTORY-BASED STUDIES**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| McPherson et al (2021)<br>Class 1 (severe but stable) | GAD-7<br>PHQ-9<br>Life Events Checklist for DSM-5<br>PCL-5<br>(A, D, PTSD) | (N) | - | - | - | - | - | - | - | - | (N) | D (N)<br>A (N)<br>PTSD (Y, U) |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| McPherson et al(2021) Class 3 (increasing symptoms) | GAD-7<br>PHQ-9<br>Life Events Checklist for DSM-5<br>PCL-5<br>(A, D, PTSD) | (N) | - | - | - | - | - | - | - | - | D (N)<br>A (Y, U)<br>PTSD (N) | (N) |
| McPherson et al (2021) Class 4 (improving symptoms) | GAD-7<br>PHQ-9<br>Life Events Checklist for DSM-5<br>PCL-5<br>(A, D, PTSD) | (N) | - | - | - | - | - | - | - | - | (N) | (Y, U) |
| Saunders et al (2021) Class 2 (increasing symptoms) | PHQ-9<br>GAD-7<br>(D, A) | - | - | - | (Y+) | - | - | - | - | - | - | - |
| Saunders et al (2021) Class 3 (moderate but stable) | PHQ-9<br>GAD-7<br>(D, A) | - | - | - | (Y+) | - | - | - | - | - | - | - |
| Saunders et al (2021) Class 4 (symptoms worsening but improving after lockdown measures were lifted) | PHQ-9<br>GAD-7<br>(D, A) | - | - | - | (N) | - | - | - | - | - | - | - |
| Saunders et al (2021) Class 5 (severe initial A that decreases to normal range- during lockdown) | GAD-7<br>(A) | - | - | - | (N) | - | - | - | - | - | - | - |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Shevlin et al (2021) Class 1(increasing symptoms) | Patient Health Questionnaire A and D Scale ITQ (D, A, PTSD) | A (Y+) D (Y+) PTSD (N) | A (Y+) D (Y+) PTSD (N) | - | - | - | - | - | - | (N) | - | - |
| Shevlin et al (2021) Class 2 (severe but stable) | Patient Health Questionnaire A and D Scale ITQ (D, A, PTSD) | (N) | (N) | - | - | - | - | - | - | (N) | - | - |
| Shevlin et al (2021) Class 3 (improving symptoms) | Patient Health Questionnaire A and D Scale ITQ (D, A, PTSD) | D (Y++) A (Y++) PTSD (N) | A (N) PTSD (Y+) | - | - | - | - | - | - | (N) | - | - |
| Shevlin et al (2021) Class 4 (worsening symptoms) | Patient Health Questionnaire A and D Scale ITQ (D, A, PTSD) | (N) | (N) | - | - | - | - | - | - | (N) | - | - |
| Shevlin et al (2021) (moderate but stable) | Patient Health Questionnaire A and D Scale ITQ (D, A, PTSD) | D (N) A (N) PTSD (Y++) | (N) | - | - | - | - | - | - | D (N) A (N) PTSD (Y++) | - | - |

*Note.* For coefficient $\beta$ effect sizes, small effect sizes are between 0.10–0.29 medium effect sizes are between 0.30–0.49 and large effect sizes are 0.50 or greater (Cohen, 1988). For odds ratios and relative risk ratios 1.32, 2.38, and 4.70 are small, moderate, and large respectively (Olivier et al., 2017). (N) Not significant risk predictor (Y) Significant predictor (-) Not applicable (+) Positive relationship (-) Negative relationship. (+/++/+++): small/moderate/ large effect sizes (-/--/---): small/moderate/ large effect sizes (C) Covariate (U) Unspecified (D) Depression (A) Anxiety. (A-D) Anxiety-Depression (PTSD) Post Traumatic Stress Disorder

**Table 6**

*Results of quality of appraisal using Newcastle-Ottawa Scale (NOS), adapted for longitudinal studies.*

| Study | Sample representativeness | Non-exposed cohort | Ascertainment of exposure | Outcome of interest | Adjustment for confounders | Assessment of the outcome | Follow up | Score (0-9) |
|---|---|---|---|---|---|---|---|---|
| Kannangara et al. (2021) | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 5 |
| Groarke et al. (2021) | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 4 |
| Fancourt et al. (2021) | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 5 |
| Heinen et al. (2021) | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 5 |
| Sharp et al. (2021) | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 5 |
| Saunders et al. (2021) | 0 | 1 | 1 | 0 | 1 | 0 | 2 | 5 |
| McPherson et al. (2021) | 0 | 1 | 0 | 1 | 2 | 0 | 2 | 6 |
| Warne et al. (2021) | 0 | 1 | 1 | 1 | 2 | 0 | 1 | 6 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Proto & Zhang (2021) | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 7 |
| Stroud & Gutman (2021) | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 7 |
| Creese et al. (2020) | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 3 |
| Shevlin et al. (2021) | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 4 |
| Stevenson & Wakefield (2021) | 0 | 1 | 0 | 1 | 2 | 0 | 2 | 6 |
| Gallagher et al. (2020) | 0 | 1 | 1 | 1 | 2 | 0 | 1 | 7 |
| Rimfeld et al. (2021) | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 6 |
| Wood et al. (2021) | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 4 |
| Kwong et al. (2020) | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 5 |
| Ruthland-Lawes et al. (2021) | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 8 |

## 3.3 Risk Factors of Psychopathology

### 3.3.1 Age

Twelve studies included age as a predictor or a control variable in relation to mental health outcomes related to the COVID-19 pandemic (Table 2).

*a. Pre-and-post-onset COVID-19 Studies*

Four studies examined the relationship between age and depression, and two focused on anxiety. These indicated that younger adults experienced higher levels of depression (Gallagher et al., 2020; Rutland-Lawes et al., 2020; Kwong et al., 2020). Kwong et al. (2020) reported that younger age was associated with a small but significant increase in depression and anxiety during the pandemic amongst the ALSPAC parent (42-81 years old) and the Generation Scotland cohorts (27-100 years old) but not the ALSPAC-young cohort (27-29 years old). Rutland-Lawes et al. (2020) also found that younger age was predictive of worse depressive symptoms. Furthermore, gender-stratified analyses demonstrated that men older than 65 had higher levels of depression compared to women older than 65. Notably, Gallagher et al. (2020) found that younger age was a significant predictor of depression in the presence of variables such as female gender and married or partnered status; however, after controlling for confounding factors, including cancer, age was no longer associated with increases in depression. Creese et al. (2021) found that age was not significantly associated with worsening depressive or anxiety symptoms amongst middle and older aged adults (50-96 years old).

*b. Pre-onset and during COVID-19 Studies*

Two out of five studies reported younger age to be a significant predictor of depression and anxiety (Fancourt et al., 2021; Woods et al., 2021). Both observed that younger age was a risk factor for higher levels of depression and anxiety at the start of the lockdown in a cohort of adults aged 18-60 years or older. Whilst symptoms improved over the 20-week course of the study, depression and anxiety remained higher in younger adults (<30 years old) compared to older adults (>50 years old), which persisted after the easing of lockdown restrictions. Wood et al. (2021) studied a sample of university employees aged 18 and above. They found that at the start of the study (the first two months of the initial lockdown in Spring 2020), older age (≥50 years old) was associated with higher levels of wellbeing, even when controlling for gender, education, and university affiliation. However, at the end of the study (Autumn 2020), this association was no longer significant (Wood et al., 2021). Whilst Groarke et al. (2021) found that younger age was associated with worse depressive symptoms at the start of the pandemic, it did not appear to influence the rate of change over time. Similarly, Stroud & Gutman (2021) and Heinen et al. (2021) found that age did not predict worsening mental health during the pandemic.

*c. Trajectory-based Studies*

Three studies examined the association between age and different trajectories of psychopathology (McPherson et al., 2021; Saunders et al., 2021; Shevlin et al., 2021). Saunders et al. (2021) found that younger age (age 18-29 vs above 60) was associated with various anxiety and depression trajectories: 'increasing symptoms', 'symptoms remaining moderate but stable', 'improving symptoms' and 'symptoms worsening but improving after lockdown measures were lifted'. On the other hand, McPherson et al. (2020) found that younger age was only associated with the 'increasing symptoms' trajectory of anxiety when

including age, gender, living situation, key worker status, and employment status as covariates. In this study, younger age was not associated with any of the depression and PTSD trajectories. Finally, Shevlin et al. (2021) identified various anxiety-depression trajectories but did not observe any association between younger age and these trajectories. When examining the association between age and PTSD trajectories, they found that younger individuals were more likely to belong to the 'symptoms remaining moderate but stable throughout lockdowns' PTSD trajectory.

*Summary*

Overall, the studies conducted pre-and post-onset of COVID-19, during the pandemic, and the trajectory-based studies, reported mixed findings. Whilst most of the studies reported a significant association between age and psychopathology, whereby younger age was associated with increasing depression and anxiety symptoms across the pandemic, some studies did not find a significant association or identify a consistent trajectory (where examined), or the association became non-significant when other factors were controlled for.

### 3.3.2 Gender

Eleven studies examined gender as either a predictor or control variable of psychopathology (Table 2).

*a. Pre-and-post-onset COVID-19 Studies*

Four studies in this category reported findings on the relationship between gender and psychopathology. These indicated that compared to males, females were at a higher risk of developing depression and anxiety after the onset of the pandemic and during the subsequent lockdowns (Gallagher et al., 2020; Kwong et al., 2020; Rimfeld et al., 2021; Rutland-Lawes

et al., 2021). Kwong et al. (2020) found that being female was associated with a moderate to significant increase in depression and anxiety amongst all cohorts; the ALSPAC-young cohort (27-29 years old), the ALSPAC parent cohort (42-81 years old), and the Generation Scotland cohort (27-100 years old). Rutland-Lawes et al. (2021) also found higher rates of depression in females than males after the onset of the pandemic in their study of middle and older aged adults (≥ 50 years old); however, the reverse was seen amongst individuals over 65 years of age. Gallagher et al. (2020) also found that gender remained a significant predictor of psychopathology after controlling for age, partnered status, and pre-COVID-19 depression levels. Additionally, when cancer status was included, gender was no longer associated with depression. Rimfeld et al. (2021) found that compared to males, females were at an increased risk of a range of mental health issues, including hyperactivity, emotional issues, depression, general anxiety, and behaviour problems. By contrast, gendered differences were not found for conduct problems, peer problems, and self-harming behaviours. The prevalence of psychopathology tended to decrease more quickly in males compared to females over the pandemic (12% vs 6%), although this difference was not statistically significant.

*b. Pre-onset and During COVID-19 Studies*

Four studies in this category reported findings on psychopathology and gender. Two found that females reported worsening wellbeing during the pandemic (Stroud & Gutman, 2021; Wood et al., 2021), and two indicated that females had increasing rates of anxiety and depression (Fancourt et al., 2021; Groarke et al., 2021). Furthermore, Stroud & Gutman (2021) found that not only did young female adults have significantly worse mental health, but they also showed more variation across the pandemic compared to males, with the mental health of females improving during the easing of restrictions and worsening when restrictions

were tightened. By contrast, there was little change in males' mental health throughout the pandemic. Finally, in a sample of individuals working in higher education, Wood et al. (2021) found that males reported better mental wellbeing and higher anxiety-contentment during the initial phase of the COVID-19 pandemic (Spring 2020), even when controlling for age, education, and university affiliation. However, the gender difference was no longer significant in Autumn 2020.

*c. Trajectory-based Studies*

Three studies examined trajectories of mental health symptoms during the pandemic split by gender (McPherson et al., 2021; Saunders et al., 2021; Shevlin et al., 2021). Saunders et al. (2021) found being female was significantly associated with the 'symptoms remaining severe but stable', 'symptoms remaining moderate but stable', and 'improving symptoms during lockdowns' for both anxiety and depression trajectories, but not the 'increasing symptoms' trajectory for either condition. In the McPherson et al. (2021) study, gender was only included as a covariate, but was significantly associated with the 'improving symptoms' anxiety trajectory when controlling for demographic factors, such as age, relationship status, and living arrangements. However, gender was not associated with the 'symptoms remaining severe but stable' anxiety trajectory at baseline and the 'increasing symptoms' anxiety trajectory. By contrast, gender was not associated with any of the depression trajectories in this study. In terms of PTSD trajectories, they found that males were more likely to be in the 'symptoms remaining moderate but stable' trajectory. However, this association was not evident in other PTSD trajectories. Finally, Shevlin et al. (2021) found that being male was only associated with 'symptoms remaining severe and stable' anxiety-depression trajectory. For PTSD, they found that males were more likely to be in the 'symptoms remaining moderate but stable' trajectory but found no gender difference for other PTSD trajectories.

*Summary*

Overall, women were more likely than men to have higher rates of anxiety and depression across studies. Notably, some studies indicated that other variables, such as age, may affect these findings. For trajectories, some gender differences were observed, but these findings were inconsistent throughout the studies, varied depending on the symptoms of interest, with some failing to identify a significant association between gender and psychopathology.

### 3.3.3. Financial Status

Twelve studies examined the effect of financial status on the development of psychopathology in relation to COVID-19 (Table 2).

*a. Pre-and-post-onset COVID-19 Studies*

Of the five pre-and-post-onset pandemic studies that investigated the impact of financial status on psychopathology, one study reported a significant association. Kwong et al. (2020) found that pre-pandemic financial problems were associated with higher anxiety and depression in ALSPAC-young, ALSPAC-parent, and Generation Scotland cohorts. However, when examining the relationship between pre-pandemic income and psychopathology, the findings varied in the different cohorts. Higher pre-pandemic income was associated with lower depression in the ALSPAC-parent and Generation Scotland cohorts but not in the ALSPAC-young cohort. For anxiety, higher pre-pandemic income was associated with lower anxiety in ALSPAC-young and Generation Scotland cohorts, but not in ALSPAC-parent cohort. Four studies reported no significant association between financial status and a change in symptoms of psychopathology amongst young adults (Rimfeld et al., 2021) and middle and older aged adults (Creese et al., 2021; Rutland-Lawes et al., 2021;

Sharp et al., 2021). Sharp et al. (2021) found a small but non-significant increase in common mental health disorders among UK veterans, with financial difficulties associated with increased odds of reporting mental health difficulties.

*b. Pre-onset and During COVID-19 Studies*

Four studies conducted during the COVID-19 pandemic examined the relationship between financial status and psychopathology. Two studies found that individuals from lower-income households (household income < £30,000) and those reporting COVID-related financial distress were at a greater risk of developing poor mental health at the start of the pandemic and that these individuals remained at higher risk at follow-up during the pandemic (Fancourt et al., 2021; Stevenson & Wakefield., 2021). Whilst Stroud & Gutman (2021) found that lower income was associated with worse mental health for young adults at the start of the pandemic, it did not appear to influence the rate of change over time. Similarly, Heinen et al. (2020) did not find any association between change in financial situation and health anxiety.

*c. Trajectory-based Studies*

Three trajectory studies examined the relationship between financial status and psychopathology. McPherson et al. (2021) examined the relationship between financial status and trajectories of anxiety, depression, and PTSD. They found that financial status was positively associated with anxiety, depression, and PTSD symptoms across all time points. However, this was no longer significant when controlling for sociodemographic factors, such as age, relationship status, and living arrangements. Saunders et al. (2021) found that earning less than £30,000 was associated with three anxiety and depression trajectories: ‘increasing symptoms’, ‘symptoms remaining moderate but stable’, and ‘improving symptoms’. However, this association was not observed amongst individuals who experienced severe

initial anxiety at the beginning of the pandemic, which subsequently reduced to normal levels during the lockdown. Shevlin et al. (2021) found that lower income was only associated with the 'symptoms remaining severe but stable' anxiety-depression trajectory, whilst experiencing a loss of income was only associated with the 'improving symptoms' trajectory (Shevlin et al., 2021). In this study, none of the PTSD trajectories were significantly associated with financial status.

*Summary*

Overall, the studies had inconsistent findings, with some indicating that there was an association between financial status and psychopathology and others finding no significant association. Financial status was associated with poor mental health outcomes for individuals who were younger and had an income of less than £30,000. Furthermore, the findings were also inconsistent throughout the studies on psychopathology trajectories.

### 3.3.4. Pre-existing Mental Health Conditions

Eleven studies examined pre-existing mental health conditions as a possible risk factor for the development of psychopathology (Table 2).

*a. Pre-and-post-onset COVID-19 Studies*

Six studies conducted before and after the onset of the COVID-19 pandemic examined the association between pre-existing mental health conditions and psychopathology. Five studies reported that individuals with pre-existing mental health conditions were more likely to experience higher levels of psychopathology, such as anxiety and depression. This finding was consistent across different age groups (Gallagher et al., 2020; Kwong et al., 2020; Rimfeld et al., 2021; Sharp et al., 2021; Warne et al., 2021). Notably, in the Rimfeld et al. (2021) study, young people (20-30 years old) with pre-existing

mental health problems had elevated levels of psychopathology, such as self-harm, conduct problems, peer difficulties, depression, and self-harm early on during the pandemic. However, these elevated levels reduced and returned to baseline over time, apart from general anxiety and hyperactivity.

*b. Pre-onset and during COVID-19 Studies*

Two of three studies found that pre-existing mental health conditions were significantly associated with psychopathology, including health anxiety (Heinen et al., 2021), anxiety, and depression (Fancourt et al., 2021) at baseline and at subsequent time points. By contrast, Stroud & Gutman (2021) found that having a pre-existing mental health condition was associated with adverse mental health for young adults (18-25 years old) at baseline (Spring 2020), but not at follow-up.

*c. Trajectory-based Studies*

Two studies examined the association between pre-existing mental health conditions and different trajectories of psychopathology (McPherson et al., 2021; Saunders et al., 2021). Saunders et al. (2021) found a significant association between pre-existing mental health conditions and all anxiety and depression trajectories, with the 'increasing symptoms' trajectory having the highest risk of developing psychopathology. By contrast, McPherson et al. (2021) found that pre-existing mental health conditions were only significantly associated with the 'symptoms remaining severe but stable' depression and PTSD trajectory when controlling for gender, age, relationship status, living situation, key worker status, and employment status. Although having a pre-existing mental health condition was identified as a risk factor for experiencing clinically significant symptoms of depression and PTSD in the first four weeks of the study, it was not associated with the 'improving symptoms' or

'increasing symptoms' trajectories (McPherson et al., 2020). In contrast, having a pre-existing mental health condition was not associated with any of the anxiety trajectories.

*Summary*

Overall, these findings suggest that individuals with pre-existing mental health conditions were at a higher risk of experiencing significant symptoms of psychopathology. Studies consistently found that having a pre-existing mental health condition, such as anxiety and depression, was associated with higher rates of psychopathology. However, several studies found that these effects varied depending on when they were measured throughout the respective studies. The findings were inconsistent across all the studies that examined the psychopathology trajectories, with one study not finding a significant association between pre-existing mental health conditions and the development of psychopathology.

### 3.3.5. Pre-existing Physical Health Conditions

Nine studies examined the association between pre-existing physical health conditions and psychopathology during the COVID-19 pandemic (Table 2).

*a. Pre-and-post-onset COVID-19 Studies*

Four studies conducted before and after the onset of the COVID-19 pandemic examined the association between pre-existing physical health conditions and psychopathology. These studies reported that individuals with pre-existing physical health conditions were more likely to experience worsening of common mental health disorders such as depression and anxiety. This was evident across different age groups (Kwong et al., 2020; Rutland-Lawes et al., 2021; Sharp et al., 2021). Kwong et al. (2020) examined two groups with an increased risk of adverse consequences of COVID-19: asthma and obesity. This study found that pre-pandemic obesity was associated with higher depression and

anxiety during the COVID-19 pandemic in the ALSPAC-young, ALSPAC-parent, and Generation Scotland cohorts. However, the findings varied when examining the relationship between asthma and psychopathology; pre-pandemic asthma status increased the risk of depression in the Generation Scotland cohort but not in either ALSPAC cohort. Additionally, pre-pandemic asthma status was associated with higher anxiety in the ALSPAC-young and Generation Scotland cohorts but not in the ALSPAC-parent cohort. Rutland-Lawes et al. (2021) also found that having a physical health condition increased the risk of depressive symptoms. Being unemployed due to a long-term sickness was also associated with increased risk. In contrast, Creese et al. (2020) found no evidence that having a physical health condition was associated with an increased risk of severe COVID-19, which predicted worsening symptoms of depression or anxiety for individuals aged 50 and above, even after controlling for potential confounds such as loneliness, activity level, gender, employment status, and history of a psychiatric condition.

*b. Pre-onset and during COVID-19 Studies*

Two studies conducted during the COVID-19 pandemic examined the link between pre-existing physical health conditions and psychopathology. One study reported that having a pre-existing physical health condition elevated health anxiety at baseline (Spring 2020), though this was not related to the increase in health anxiety scores at follow-up (Autumn 2020) (Heinen et al., 2021). In contrast, Stroud & Gutman (2021) observed that having a long-standing illness, such as asthma, cancer, diabetes, epilepsy, stroke, or congestive heart disease, did not predict adverse mental health outcomes amongst young adults aged between 18-25 years old.

*c. Trajectory-based Studies*

Three studies examined the effects of pre-existing physical health conditions on psychopathology trajectories. Saunders et al. (2020) found that having a pre-existing physical health condition was associated with several anxiety and depression trajectories: 'increasing symptoms', 'symptoms remaining moderate but stable', 'improving symptoms', and 'anxiety symptoms worsening but improving after lockdown measures were lifted'. By contrast, having a pre-existing physical health condition did not predict any of the trajectories for anxiety, depression, and PTSD in the study by McPherson et al. (2020), when controlling for demographic factors, including gender, age, relationship status, living situation, and key workers status. Finally, Shevlin et al. (2021) reported that individuals with pre-existing physical health conditions were more likely to belong to the 'symptoms remaining severe but stable' and 'improving symptoms' trajectories for anxiety-depression. Pre-existing health conditions were not associated with any of the PTSD trajectories (Shevlin et al., 2021).

*Summary*

The studies conducted before and after the onset of the COVID-pandemic and during the pandemic reported mixed findings on the effects of pre-existing physical health conditions on psychopathology. Some studies found that having a pre-existing health condition is associated with an increased risk of depression and anxiety, whereas others did not. Additionally, the findings were inconsistent in the studies that examined psychopathology trajectories, with some finding pre-existing health conditions associated with various depression and anxiety trajectories and others finding pre-existing health conditions were not predictive.

### 3.3.6. Education

Five studies examined whether lower prior educational attainment acted as a risk factor for developing psychopathology in relation to the COVID-19 pandemic (Table 2).

*a. Pre-and-post-onset COVID-19 Studies*

Two studies examined the association between education and anxiety or depression before and after the onset of the COVID-19 pandemic. In the Kwong et al. (2020) study, the findings varied in different cohorts. Lower educational level was associated with high levels of depression in the ALSPAC-parent and Generation Scotland cohorts, but not in the ALSPAC-young cohort. They also reported higher levels of anxiety in the ALSPAC-parent and ALSPAC-young cohorts but not in the Generation Scotland cohort. In contrast, Rutland-Lawes et al. (2021) found no association between educational level prior to the pandemic and a change in depressive symptoms.

*b. Pre-onset and During COVID-19 Studies*

Two studies conducted during the COVID-19 pandemic examined the relationship between education and psychopathology. Fancourt et al. (2020) found that individuals with lower educational levels reported higher levels of anxiety and depression symptoms. Although their symptoms reduced as the lockdowns continued, they remained at greater risk. Wood et al. (2021), in their sample of university staff, found that at the start of the study (phase one or Spring 2020), non-graduates had lower scores for anxiety-contentment (indicating poorer wellbeing) compared to graduates, even when controlling for age, gender, and university affiliation. However, this was not replicated in phase two (Autumn 2020). In addition, educational status was not associated with depression-enthusiasm and mental wellbeing measures at either time point.

*c. Trajectory-based Studies*

One trajectory study reported findings on the relationship between education and psychopathology. Saunders et al. (2021) found that different education levels were associated with different anxiety and depression trajectories. For depression, individuals with A Levels or equivalent were more likely to belong to the 'increasing symptoms' trajectory, whereas individuals with low levels of education attainment (GCSE or below) were more likely to belong to the 'symptoms worsening but improving after lockdown measures were lifted' trajectory. Having a low level of education attainment (GCSE or below) was associated with two anxiety trajectories, 'increasing symptoms' and 'symptoms worsening but improving after lockdown measures were lifted'. Level of education was not associated with any other trajectories.

*Summary*

Overall, the studies suggest that a lower education level was associated with a greater risk for psychopathology following the onset and throughout the pandemic. Lower education level was associated with an increased risk for depression and anxiety. Only one study examined the impact of education level on the trajectories of psychopathology. Different levels of educational attainment were associated with differing trajectories for depression and anxiety.

### 3.3.7. Ethnicity

Six studies examined the relationship between ethnicity and psychopathology during the pandemic (Table 2).

*a. Pre-and-post-onset COVID-19 Studies*

Only one study conducted before and after the onset of the COVID-19 pandemic reported findings on the relationship between ethnicity and psychopathology. Rutland-Lawes et al. (2021) observed that individuals who did not identify as Black, Asian, or a Minority Ethnicity (BAME) reported higher levels of depression than BAME individuals. Moreover, gender-stratified analyses indicated that this association was only significant for women, suggesting that not being from a BAME background increased the risk of developing depression in women only.

*b. Pre-onset and During COVID-19 Studies*

Three studies examined ethnicity in relation to psychopathology during the COVID-19 pandemic. These studies all found that ethnicity was not predictive of mental health difficulties during the pandemic (Fancourt et al., 2021; Heinen et al., 2021; Stroud & Gutman, 2021).

*c. Trajectory-based Studies*

Two studies reported the association between ethnicity and different trajectories of psychopathology. Saunders et al. (2021) found that individuals from the BAME group were more likely to be associated with one anxiety and depression trajectory – 'symptoms remaining moderate but stable'. Ethnicity was not associated with any other trajectories. In contrast, Shevlin et al. (2021) found no significant associations between ethnicity and anxiety-depression or PTSD trajectories.

*Summary*

Of the six studies which examined the association between ethnicity and the development of psychopathology during the COVID-19 pandemic, only one found a significant association. Not identifying as a woman from a BAME background was associated with an increased risk of depression. The findings from the studies that examined the trajectories of psychopathology during the COVID-19 pandemic were not consistent, and one failed to find a significant association between ethnicity and psychopathology trajectories.

### 3.4 Lifestyle factors

#### 3.4.1 Living arrangements

Seven studies examined the impact of living arrangements on psychopathology during the COVID-19 pandemic (Table 3).

*a. Pre-and-post-onset COVID-19 Studies*

Three studies examined living arrangements and their association with psychopathology before and after the onset of the COVID-19 pandemic. These studies showed that living alone was a significant risk factor for common mental health disorders (Sharp et al., 2021), specifically depression (Rutland-Lawes et al., 2021; Kwong et al., 2021). Notably, Sharp et al. (2021) observed that the strength of this association was reduced when other potential confounding variables, such as drinking hazardously, and a prior history of mental health problems were controlled for. Additionally, Kwong et al. (2021) found that living alone during the pandemic was not associated with anxiety in both the ALSPAC cohorts and the Generation Scotland cohort.

*b. Pre-onset and During COVID-19 Studies*

Only one study conducted during the pandemic examined the relationship between living arrangements and psychopathology. Fancourt et al. (2020) found that living alone was a significant risk factor for increased depression during lockdown. Individuals living alone had the highest levels of depression compared to people living with children and people living with others but no children. On the contrary, in this study, individuals with children had the highest levels of anxiety compared to the other two groups. Although their symptoms reduced over the course of the study, they remained at a greater risk.

*c. Trajectory-based Studies*

Three studies examined the association of living arrangements with different trajectories of psychopathology. One study found that individuals in the 'symptoms remaining moderate but stable' anxiety trajectory were more likely to report living in overcrowded accommodations. On the other hand, individuals in the 'symptoms worsening but improving after lockdown measures were lifted' trajectory were more likely to report living with children or living alone. However, the study did not find a significant association between living arrangements and anxiety trajectories (Saunders et al., 2021). In addition, living alone was associated with various trajectories of depression symptoms, namely 'increasing symptoms', 'symptoms remaining moderate but stable', and 'symptoms worsening but improving after lockdown measures were lifted' (Saunders et al., 2021). Individuals in the 'increasing symptoms' trajectory were also more likely to report living in overcrowded conditions, whilst those belonging to the 'symptoms worsening but improving after lockdown measures were lifted' trajectory were more likely to report living with children or others (Saunders et al., 2021). Conversely, McPherson et al. (2021) did not find any significant association with any of the trajectories for depression when including gender,

age, relationship status, and key workers status as covariates. Finally, Shevlin et al. (2021) found that belonging to the ‘symptoms remaining severe but stable’ anxiety-depression trajectory was associated with living alone, whereas belonging to the ‘symptoms remaining moderate but stable' PTSD trajectory was associated with living with children. This study did not find any significant association with any of the trajectories for anxiety-depression or PTSD.

*Summary*

Overall, the studies suggested a relationship between living arrangements and the development of psychopathology during the COVID-19 pandemic. Living alone was consistently associated with an increased risk for depression. In contrast, living with children appeared to be associated with anxiety. However, the findings were inconsistent across all studies that examined the trajectories of psychopathology during the COVID-19 pandemic, with some studies failing to find any significant association between living arrangements and mental health outcomes.

### 3.5 Psychological factors

#### 3.5.1 Loneliness

Seven studies examined the relationship between loneliness and psychopathology (Table 4).

*a. Pre-and-post-onset COVID-19 Studies*

Two studies examined loneliness and its association with psychopathology before and after the onset of the COVID-19 pandemic. In a cohort of individuals between 55 and 96 years old, Creese et al. (2020) found that 50% of the differences in psychopathology were

attributable to loneliness experienced during the pandemic. In this study, psychopathology was measured before and after the onset of the pandemic, but loneliness was only measured during the pandemic. By contrast, Gallagher et al. (2020), who measured both loneliness prior to and during the pandemic, found that it was loneliness during the pandemic (rather than prior loneliness) that significantly increased the risk of depression among people living with cancer. The association remained significant even after controlling for various factors such as age, gender, cancer group, prior depression, and living arrangements.

*b. Pre-onset and During COVID-19 Studies*

Three studies that were conducted during the pandemic examined the relationship between loneliness and psychopathology. These studies found that higher levels of loneliness were associated with an increased risk of psychological distress and anxiety symptoms (Kannagara et al., 2021; Stevenson & Wakefield., 2021) and poorer wellbeing (Wood et al., 2021) at both the baseline and follow-up, even when demographic factors, such as age and gender were controlled for (Stevenson & Wakefield., 2021; Wood et al., 2021).

*c. Trajectory-based Studies*

Two studies examined the association between loneliness and different trajectories of psychopathology. McPherson et al. (2021) found that baseline loneliness was associated with the 'symptoms remaining severe but stable' and 'improving symptoms' trajectories of depression symptoms when gender, age, relationship status, living situation, and key worker status were controlled for. In addition, higher baseline loneliness only increased the odds of being in the 'symptoms remaining severe but stable' PTSD trajectory. In this study, baseline loneliness was not found to be a predictor of anxiety (McPherson et al., 2021). Shevlin et al. (2021) found that higher levels of loneliness were associated with anxiety-depression trajectories such as 'increasing symptoms', 'symptoms remaining moderate but stable',

‘symptoms remaining severe but stable’, and ‘symptoms worsening but improving after lockdown measures were lifted’. In terms of trajectories of PTSD symptoms, similar effects were observed.

*Summary*

Overall, the studies suggested there was an association between loneliness and the development of psychopathology during the COVID-19 pandemic. Loneliness during the pandemic, as opposed to prior loneliness, was associated with a higher risk of depression, anxiety, and poorer wellbeing. Notably, the findings were inconsistent across all the studies examining psychopathology trajectories. Some studies did not find a significant association between loneliness and anxiety outcomes, whilst others indicated higher levels of loneliness may be associated with multiple depression trajectories, with a more severe trajectory for PTSD.

## 4. Discussion

This systematic review sought to investigate the risk factors that predicted psychopathology during the COVID-19 pandemic in the UK by evaluating studies conducted before and after the onset of the pandemic, during the pandemic, and studies that examined psychopathology trajectories. Most studies reported that the prevalence of psychopathology during the COVID-19 pandemic was higher than pre-pandemic levels, with anxiety and depression being the most measured mental health symptoms. The psychopathology trajectories experienced after the onset of the pandemic were variable and ranged from individuals having no significant symptoms improvements in symptoms or lack thereof whilst others reported worsening symptoms over time.

The conceptual framework utilised in this review categorised the risk factors associated with psychopathology development. The four main risk categories were sociodemographic factors (age, gender, pre-existing physical health conditions, pre-existing mental health conditions, education level, financial status, and ethnicity), psychological factors (loneliness), lifestyle factors (living arrangements), and COVID-19-related stressors (e.g., working from home and mask-wearing). However, as only a few studies examined COVID-19-related stressors (see Table 5), this category was omitted from the review. As such, the three main risk categories, and the findings from the studies which investigated their roles in predicting the onset and course of psychopathology, are interpreted below.

Numerous studies have shown that younger adults are more vulnerable to mental health problems (Sowell et al., 2001; Kessler et al., 2005). However, the studies included in this systematic review produced inconsistent findings. Some studies found a significant association between younger age and a heightened risk of depression and anxiety during the COVID-19 pandemic (Kwong et al., 2021; Rutland-Lawes et al., 2021), whereas others did not (Creese et al., 2021; Heinen et al., 2021; Kwong et al., 2021). These results may be

reflective of the studies' sample characteristics and variations in methodological approaches used. For example, the ALSPAC-young cohort included in the Kwong et al. (2021) study had a very narrow age range (27-29 years old), which likely contributed to the lack of a significant association between younger age and depression. Similarly, the non-significant findings observed in the study by Creese et al. (2021) could be skewed by their sample, which overrepresented middle-aged adults. Further non-significant results may also be indicative of the disproportionate health effects of COVID-19 on older adults, which may have increased psychopathology in this age group (Ayalon et al., 2021; Kwong et al., 2021).

Where age effects were observed, it is notable that younger individuals appeared to experience worsening anxiety symptoms even after the easing of lockdown measures (McPherson et al., 2021). This aligns with other studies that have shown younger adults had worse mental health symptoms than older adults during the pandemic, potentially due to differences in resilience (Webb & Chen, 2022). Beyond anxiety and depression, the association between age and other psychopathology trajectories, such as PTSD, was inconsistent (McPherson et al., 2021; Shevlin et al., 2021). Where observed, the significant associations between younger age and belonging to the 'symptoms remaining moderate but stable throughout lockdown' trajectory was indicative of pre-existing symptomatology. However, it should be noted that the data collection method used may bias studies towards the inclusion of psychologically distressed individuals (Chauvenet et al., 2020).

In terms of gender, overall, the findings suggested that females had a significantly higher risk of developing depression and anxiety following the start of the COVID-19 pandemic. This aligns with previous research that acknowledges gender as a well-known risk factor for psychopathology (Cahil, 2006; Kuehner, 2017). The gendered difference in psychopathology risk observed in this review may reflect the differences in coping styles, genetic factors, and hormonal fluctuations, as well as the gender disparities in wealth and

income that disproportionately impact women (Patel et al., 2018). During the COVID-19 pandemic, many women experienced increased childcare responsibilities and work disruptions prevalent in female-dominated job sectors such as nursing and social work, which may have influenced their higher risk of psychopathology (Andrew et al., 2020; Sirois & Owens, 2021). Interestingly, older age (>65 years old) was protective against depression in females (Rutland-Lawes et al., 2021). Pre-pandemic epidemiological studies have previously noted this relationship (Bebbington et al., 1998) which may be due to better social support networks and community connections in older women (Chi & Chou, 2001) or may be due to differences in work and childcare demands across age groups. Notably, not all studies observed a gender difference: gender was not significantly associated with psychopathology when controlling for variables such as cancer status in the study by Gallagher et al. (2020). However, it should be noted that 97% of breast cancer patients in this study were female, inevitably leading to an overrepresentation of women in the sample, skewing results (Gallagher et al., 2020).

In terms of changes in symptoms, very few studies examined how variations in the restrictions imposed during the pandemic related to the course of psychopathology, specifically in women. In the studies described in this review, it was notable that women appeared to experience improving anxiety symptoms during lockdowns. This suggests that whilst women were more likely to have clinically significant anxiety scores at the start of the lockdown, they showed improvements over time. This surprising result may be due to females engaging in more stress-reducing activities and having greater support during the pandemic (Mascherini et al., 2021).

Conversely, males were at a higher risk of developing moderately severe PTSD symptomatology that persisted throughout the pandemic (McPherson et al., 2021; Shevlin et al., 2021). However, this contradicts the wider literature, which posits that being female is an

established risk marker for traumatic stress (Olff, 2017; O'Connor et al., 2021). A possible explanation for this finding is that men are at increased risk of COVID-19-related morbidity and mortality, which may increase their risk of PTSD symptomatology (Pradhan & Olsson, 2020). This finding appears to be unique to COVID-19-related PTSD. Notably, the studies that reported these findings had a sample that underrepresented men, and further research is required (McPherson et al., 2021).

Financial stressors such as income insecurity have been linked to an increased risk of psychopathology (Lund et al., 2010). Unexpectedly, in this review, financial stressors were not exclusively linked to an increase in psychopathology, despite the significant economic disruption caused by the COVID-19 pandemic. These mixed findings may reflect the heterogeneity of the measures used to define financial status in the different studies, as well as the differences in the samples examined. Some of the studies included found that particular individuals may be less vulnerable to financial struggles (Kwong et al., 2021; Rimfeld et al., 2021; Rutland-Lawes et al., 2021); for example, as many older adults are retired, the financial impacts of the pandemic may have been less pertinent, as they may have had higher levels of accrued wealth and financial stability (Rutland-Lawes et al., 2021). Conversely, younger adults may have lesser financial responsibilities. Finally, it is also possible that the furlough scheme implemented by the UK government may have mitigated the impact of financial stressors on psychopathology during the pandemic (Jacques Wels et al., 2022).

Consistent with previous research, individuals with pre-existing mental health conditions were at higher risk of developing psychopathology during the pandemic (Gallagher et al., 2020; Kwong et al., 2020; Rimfeld et al., 2021; Sharp et al., 2021; Warne et al., 2021). This trend may be attributed to lockdown measures which resulted in reduced social contact and community support, and difficulty accessing mental health treatment which exacerbated pre-pandemic psychopathology symptoms (Holmes et al., 2020).

Similarly, the findings reported by the trajectory-based studies stated that pre-existing mental health conditions were associated with the 'symptoms remaining severe but stable' depression and anxiety trajectories (McPherson et al., 2021; Saunders et al., 2021). This is in line with existing research findings showing that during the COVID-19 pandemic, individuals with pre-existing mental health conditions did not always experience a change in psychopathology symptomatology from their pre-pandemic symptoms (Lewis et al., 2022). Many studies in this current review did not collect data on if the participants were receiving treatments for their mental health conditions, and this may have significantly impacted the symptomatology described in these studies (McPherson et al., 2021; Saunders et al., 2021).

The studies included in this systematic review also observed inconsistent findings regarding the relationship between pre-existing health conditions and psychopathology during the COVID-19 pandemic, despite these conditions being known risk factors for mental health disorders (Matheson et al., 2014). As with age, the findings were dependent on various factors, such as demographics and the type of medical condition examined. The association between specific medical conditions (diabetes, cancer, and cardiovascular disease) and an increased risk of psychopathology was not significant amongst adults of various ages. Cardiovascular disorders and cancer are generally less common in younger adults and hence may not be associated with an increased risk of psychopathology (Ezzati et al., 2012). Another plausible explanation for this finding is that older adults, and individuals with chronic medical conditions, may have already been successfully managing their health conditions prior to the pandemic and, therefore, may have developed better resilience and coping strategies (Tarsitani et al., 2022). Moreover, these individuals are more likely to adopt protective behaviours which may have given them a sense of control, such as social distancing and adhering to health guidelines (e.g., shielding), thereby reducing their exposure to the virus and potentially reducing the likelihood of developing psychopathology (Filindassi

et al., 2022).

Broadly consistent across studies, individuals with lower educational attainment were more likely to experience worsening anxiety and depressive symptoms during the pandemic. These findings highlight the robust impact of SES on mental health, given previous associations between educational attainment and SES (Lorant et al., 2003). This trend is not unique to the COVID-19 pandemic and has been observed in various pre-pandemic studies (Lorant et al., 2003). People with lower educational attainment may be more likely to have less stable jobs, lower incomes, less job security, and less control over their work, which can contribute to mental health issues (Lorant et al., 2003). The broader socioeconomic context of the pandemic is integral in the interpretation of these findings. Individuals with lower educational attainment are more likely to have jobs that do not allow remote work, which can lead to financial strain and increase their risk of contracting COVID-19 (Shaw et al., 2021). These individuals may also be more likely to live in crowded or multi-generational households, increasing the risk of transmission and making it harder to practice physical distancing (Shaw et al., 2021). The lack of access to healthcare, social support, and information about mental health that is common among individuals with lower educational attainment (Patel et al., 2018) can further exacerbate the impact of these stressors.

On the other hand, the findings that individuals with better educational attainment were more likely to experience increasing depressive symptoms over time suggest that this group may be more vulnerable to the long-term effects of the pandemic. This could be related to the fact that individuals with higher educational attainment may have more responsibilities, such as work and family obligations, which can lead to greater stress and pressures which exacerbate psychopathology (Greenhaus & Beutell, 1985). However, the limited number of trajectory studies conducted during the COVID-19 pandemic means that the pattern of findings can only be considered preliminary.

Interestingly, most of the studies in this review did not report a significant association between ethnicity and the risk of developing psychopathology. Moreover, one study reported that non-BAME individuals were more vulnerable to developing depression and that identifying as BAME was protective amongst middle-aged and older women (Rutland-Lawes et al., 2021). These findings do not align with the typical health patterns that indicate BAME individuals disproportionately experienced increased morbidity and mortality rates during the pandemic (Townsend & Kyle, 2020). One possibility is that because BAME individuals were underrepresented in several other COVID-19-related studies and accounted for only 4% of the entire sample, these studies may have lacked the statistical power to detect the impact of COVID-19 on psychopathology in BAME individuals (Rutland-Lawes et al., 2021). Additionally, the lack of a significant association may have been due to a ceiling effect because BAME individuals had such high levels of psychopathology pre-pandemic, there may have been less scope for the COVID-19 pandemic to have a significant impact on their mental health (Brooks et al., 2022).

Living arrangements were a significant predictor of COVID-19-related psychopathology in the studies identified in this review. More specifically, living alone was a significant risk factor for depression (Rutland-Lawes et al., 2021; Kwong et al., 2021). Other studies have found this association and have posited it may be due to the social isolation and loneliness resulting from the strict lockdown measures in the UK during the pandemic (Robb et al., 2020). In terms of other living arrangements, living with children was associated with an increased risk of anxiety and a reduction of symptoms as the pandemic went on (Fancourt et al., 2020). Parenting responsibilities and the challenges of balancing work and child-rearing during the pandemic may have contributed to the increased anxiety symptomatology, considering parenting stress is a risk factor for anxiety disorders (McLeod et al., 2007). In addition, the uncertainty and unpredictable nature of COVID-19 might have impacted the

mental health of individuals living with children who were anxious about their children becoming unwell (Saunders et al., 2021). Interventions that provide support and resources for parents, such as telehealth parenting programs or flexible work arrangements, may contribute to an improvement in anxiety symptomatology described in this review (Hall & Bierman, 2015).

Finally, loneliness was a significant risk factor for increased psychopathology during the COVID-19 pandemic (Creese et al., 2020; Gallagher et al., 2020). This finding is consistent with pre-pandemic studies that investigated how loneliness can increase the risk of mental health problems (Holt-Lunstad et al., 2010). This may be due to social isolation and reduced social connections as a result of lockdown and physical distancing measures (Robb et al., 2020). The trajectory-based studies found various results regarding baseline loneliness and psychopathology. There was a significant association between loneliness and depression but not anxiety (McPherson et al., 2021; Shevlin et al., 2021). This is consistent with results from another study which found that the association between loneliness and anxiety did not change over time, suggesting the pandemic did not impact these anxiety trajectories (Steen et al., 2022).

**Strengths, Limitations, and Future Directions**

This systematic review provided a detailed appraisal of the nuances in the development of psychopathology during the COVID-19 pandemic. The studies included in this systematic review have several strengths. They had large sample sizes with rich data, which may increase the generalisability of the findings for certain groups. Furthermore, the studies conducted before and after the onset of the pandemic permitted the comparison of baseline data with follow-up data collected during the pandemic. The findings from studies that were conducted during the pandemic permitted investigations into the immediate effects

of the pandemic on mental health outcomes. Additionally, the trajectory-based studies conducted during the pandemic allowed for a detailed investigation into the distinct patterns of change in mental health outcomes and how they evolved over time. It is also noteworthy that whilst most sociodemographic factors identified, such as gender and ethnicity, are time-invariant variables, the COVID-19 pandemic might have introduced new temporal effects that interact with them. For example, the pandemic's impact on mental health, access to healthcare, or economic opportunities might vary over time for different gender, ages, and ethnic groups. Longitudinal studies help capture these evolving dynamics and also aid in identifying vulnerable populations and identify various trajectories of psychopathology that are potentially associated with time-invariant factors over the course of the pandemic. For example, one study found that female sex and younger age predicted depressive symptoms during the initial stage of the pandemic but not subsequent changes over time (Ebrahimi et al., 2022). Moreover, as demonstrated in the three trajectory-based studies, the trajectory of mental health differed according to age and sex (McPherson et al., 2021; Saunders et al., 2021; Shevlin et al., 2021).

Nevertheless, several limitations were noted. First, this systematic review did not include Wales, Scotland, or Northern Ireland as terms in the search strategy. As such, some studies from these regions may have been missed. Second, despite the large sample sizes, some studies may have underrepresented certain groups, including BAME individuals, as mentioned above, limiting the generalisability of the findings. Third, only half of the studies had pre-pandemic data, which made it difficult to establish the timing of onset and chronicity of psychopathology. Fourth, several studies were conducted using online data collection methods, which potentially excluded participants with limited digital engagement, such as the elderly (Mellon & Prosser, 2017). Fifth, most of the data were self-reported. Whilst this may provide meaningful information regarding symptomatology, it cannot serve a diagnostic

function, so the findings may differ in individuals with clinical diagnoses. Sixth, most of these studies investigated time-invariant factors, such as sociodemographic factors, and relatively few examined how time-variant factors, such as lifestyle factors and COVID-19 related stressors, were linked to psychopathology during the pandemic. Hence, the association between time-variant risk factors and psychopathology remains unclear. Seventh, many of these studies were conducted during the first phase of the pandemic. It is still unclear how predictors operate in increasing the risk of psychopathology and the extent to which they vary depending on the stage of the pandemic, particularly considering the more stringent restrictions implemented during the second peak of the COVID-19 pandemic. Eighth, it should be noted that results from some studies were based on findings from covariates. However, the role of the covariates in predicting risk may be subject to mutual adjustment and the Table 2 Fallacy (Westreich & Greenland, 2013). Therefore, should be treated with caution as they may over/underestimate the effect of the key variable. Lastly, the discrepancies in methodological approaches, such as the heterogeneity of the control variables used across studies, made it difficult to make simple comparisons across studies regarding the development of psychopathology. Indeed, whilst this review provides information on the independent effects of these risk factors, it cannot provide information on the possible interactions between risk factors.

## 5. Conclusion

The COVID-19 pandemic interacted with several risk factors to increase the risk of developing mental health issues. These included female gender, lower educational attainment, living alone or with children, pre-existing mental health conditions, and loneliness. Risk factors such as younger age, financial struggles, physical health conditions, and ethnicity status were less consistently associated with different forms of

psychopathology. Many of the studies lacked data on several time-variant risk factors and the different trajectories of psychopathology during the COVID-19 pandemic. Therefore, this systematic review indicates a need for high-quality, representative studies to further investigate how COVID-19 may have impacted people living in the UK. Nevertheless, these findings indicate that effective preventive measures and interventions tailored to the needs of high-risk population groups are essential for the mental health of individuals in future pandemics.

# Chapter 3

## Stable vs. Variable Predictors of Mental Health in Individuals Residing in England during the COVID-19 Pandemic


### Abstract

Much research has been done into the mental health impact of the COVID-19 pandemic and how it is related to time-invariant factors such as gender and ethnicity. However, there is a paucity of research examining the long-term mental health trajectories across different pandemic stages and the impact of COVID-19-related stressors (e.g., financial instability and working from home) on mental health. The present study explored the predictors of self-reported mental health in residents of England at different stages of the pandemic. It specifically assessed responses to 34 poll questions related to COVID-19 from a longitudinal study which followed 589 adults regularly between October 2020 to March 2021. Time points were classified into four periods, namely, baseline (October 5th to November 4th, 2020), light lockdown (November 5th to December 1st, 2020), an uncertain period (December 2nd, 2020, to January 5th, 2021) and full lockdown (January 5th to March 28th, 2021). There was a significant decline in mental health during the first phase of the study with a subsequent recovery in mental health over the remaining study period, despite the implementation of more stringent restrictions. Two complimentary analytic methods were taken to identify the predictors of mental health over the course of the study. Both approaches consistently identified several COVID-19-related predictors of mental health regardless of the study period (e.g., trusting the government to meet public needs and increased awareness of one's bodily signals). Some of these predicted changes in mental health at each time period and others at specific time points. In addition, other predictors, such as agreeing with travel restrictions, concerns about other's health risks, and relationship

issues with one's significant other, were associated with changes in mental health at different phases of the pandemic. Some predictors were only identified in one but not the other analytic method and therefore, there is some uncertainty about their role. The study identified a decline and then recovery in mental health over the course of the study, suggesting that individuals may have adapted to the constantly changing lockdown measures. The propensity to develop mental health problems was associated with a range of COVID-19 related stresses relating to finance, government response / restrictions, as well as health awareness and risk.

## 1. Introduction

The COVID-19 pandemic prompted many countries to adopt lockdown measures to curtail the spread of the virus and limit the number of fatalities. A nationwide lockdown was implemented in the UK on March 23rd, 2020 (Cucinotta & Vanelli, 2020). People were instructed to stay at home and only leave their houses for essential reasons, such as exercise (limited to once per day), buying essential household items, seeking medical attention, or going to work if they were classified as a key worker (e.g., healthcare workers, emergency services, and food delivery drivers). Non-essential businesses were closed, and people were prohibited from visiting family or friends outside their households (Hadjidemetriou et al., 2020). Although these restrictions aimed to protect lives by reducing the spread of the virus, they may have had unintended consequences by exacerbating stressors, such as financial adversities and concerns about COVID-19 infection, and ultimately increasing the risk of psychopathology. Indeed, research suggests that the restrictions implemented in the first lockdown (April-June 2020) during the early phase of the COVID-19 pandemic led to at least a 10% increase in anxiety and depression when compared to pre-pandemic levels (Daly et al., 2020; Kwong et al., 2020).

Whilst the literature raises concerns about the impact of initial restrictions on wellbeing, more recent longitudinal work suggests a complex pattern (Robinson et al., 2022). A recent meta-analysis suggested that mental health symptoms decreased to pre-pandemic levels following the first wave of the pandemic, which was the initial surge in cases and hospitalisations that began in late February and peaked in April 2020 (Robinson et al., 2022). Several studies suggest that in the UK, psychopathology increased significantly during the first lockdown and persisted at an elevated level (Burdett et al., 2021; Pierce et al., 2020) before eventually returning to pre-pandemic levels around July-September 2020 when lockdown restrictions were reduced (Daly & Robinson, 2021). These findings may suggest that individuals may have adjusted to the challenges of the pandemic or there was a reduction in health and financial concerns (as financial support was introduced in the UK and knowledge regarding severity and risk increased). Additionally, there was a reduction in lockdown restrictions, which may have helped alleviate psychological distress (Fancourt et al., 2021).

In the UK, a second wave of infections occurred in late 2020, resulting in a second national lockdown, followed by a third national lockdown in January 2021, with tighter restrictions, such as schools closing and hotel quarantine for people entering the country (Robinson et al., 2022). In terms of mental health symptoms, evidence from a limited number of studies suggests that in young adults, mental health symptoms increased during the second wave of the pandemic (Daly & Robinson, 2022). However, the three studies that examined this (Carr et al., 2021; Thorpe et al., 2022; Rimfeld et al., 2021) revealed no clear pattern. Whilst some studies suggest that mental health symptoms fluctuated in alignment with the enforcement and relaxation of restrictions, with greater mental health symptoms during lockdowns (Carr et al., 2021; Thorpe et al., 2022), a third study observed worsening

symptoms during the first lockdown, that recovered and remained at pre-pandemic levels regardless of subsequent lockdown restrictions (Rimfeld et al., 2021).

Notably, whilst these studies indicate changing mental health symptoms at the population level, no studies have examined the predictors of mental health symptoms across the pandemic and whether these varied in response to changes in restrictions. For example, whilst concerns about friends and family being infected, financial concerns, and controversies regarding face masks have been linked to stress and anxiety across the pandemic, it is not yet known whether the effect of these stressors varied across the pandemic (Wang et al., 2020; Sharp et al., 2021; Stevenson & Wakefield, 2021). Fluctuations are expected due to measures such as the furlough scheme implemented by the UK government, which may have alleviated some financial concerns during the later pandemic stages (Wang et al., 2022). Similarly, whilst evidence suggests that individuals exhibited high anxiety and fear about themselves or their loved ones being infected at early stages during the pandemic (Sharp et al., 2021), as more information about the virus became available, it is possible that anxiety may have decreased or increased; both more information regarding individual risk, as well as the emergence of new variants, may have impacted such fears (Su et al., 2021). Indeed, these examples suggest that the predictors of mental health symptoms across the pandemic may vary across lockdown stages.

**Aims**

Given this knowledge gap, this study aimed to examine 1) the trends of self-reported mental health across different phases of the pandemic and 2) the impact of COVID-19-related stressors and the extent to which the impact of these predictors varies across pandemic stages.

# 2. Methods

## 2.1 Study Design

This is an exploratory, secondary data analytic study. It utilized data from a prospective, longitudinal study – The Attitudes About COVID-19 And Health (ATTACH) (Hood et al., 2021). The ATTACH study was designed to examine the impact of the pandemic on mental and physical health in adults from the general population and those most at risk of adverse effects (e.g., pre-existing mental health conditions, chronic medical illness, older adults) and involved daily ratings of symptoms and beliefs.

## 2.2 Data source

This study analysed data from the UK ATTACH cohort, a prospective, ongoing study conducted nationwide during the COVID-19 pandemic, with arms in the UK, the United States (US), and Mexico. The research team designed and developed the study between March and April 2020. Data collection commenced on June 26th, 2020, in the UK, July 27th, 2020, in the United States, and October 10th, 2020, in Mexico. The ATTACH study partnered with Air My Opinion (AMO) in the UK. This smartphone app-enabled the gathering of longitudinal poll data regarding participants' attitudes and beliefs about COVID-19 restrictions, as well as their experiences of specific policy interventions (e.g., mask-wearing, lockdown) and mental health. Ethical approval for the study was obtained from the University College London (UCL) Research Ethics Committee (18177/001) and the Royal Holloway University of London (RHUL) Research and Ethics Committee.

## 2.3 Participants

Recruitment was done through convenience and snowball sampling strategies, social media networks and advertising, involvement from community stakeholders and organisations, research recruitment sites, and university websites and newsletters. Partnerships with charity organisations also aided recruitment through emails, social media advertising, and via web pages to ensure the maximisation of heterogeneity in the sample and to ensure the representation of vulnerable and marginalised groups. To be eligible, potential participants had to: 1) be at least 16 years old, 2) be residing in the UK, 3) be English proficient, 4) have access to a smartphone and the internet, and 5) provide informed electronic consent to participate in the study before completing daily poll questions and monthly surveys.

## 2.4 Materials and Measures

*a) AMO App*

The AMO app was designed between the research team and app developer using the Flutter framework, which has embedded encryption, and is General Data Protection Regulation (GDPR) compliant (Hood et al., 2021). Participants could freely install the app on an internet-enabled Android or iOS operating system smartphone. Each phone number was associated with a unique one-way encryption participant key which feeds directly into a secure response fire-wall protected database. Sociodemographic information was stored in a separate secure firewall-protected database. Data protection registration was obtained for this study (UCL Data Protection Registration Number: Z6364106/2020/04/110).

*b) COVID-19-related stressors and Poll Questions*

The ATTACH study research team developed daily poll questions by conducting literature reviews, video conference meetings and using reliable sources of COVID-19 information, such as the WHO (Hood et al., 2021). These questions tracked attitudes, behaviours, and beliefs related to the COVID-19 pandemic and fit into categories about COVID-19 worry, government trust, personal concerns, health and wellbeing, and habits. All questions had three Likert response options (e.g., yes, somewhat, or no). Most questions were repeated every two weeks. During this study, there were 76 poll questions, but this study focused on the 34 questions that were repeatedly and consistently asked across time points (Appendix A)

*c) Baseline Measures*

Participants were asked to provide sociodemographic information, including age, gender, race, relationship status, employment status, key worker status, pre-existing mental health, and physical health conditions at the start of the study. In addition, participants were asked to complete baseline mental health measures (see Hood et al., 2021 for full details). Measures examined in this study were the Patient Health Questionnaire (PHQ-9) and the Patient-Reported Outcomes Measurement Information System (PROMIS) Anxiety-Adult Short Form. Depressive symptoms were measured with the PHQ-9, a nine-item instrument with scores ranging between 0 and 27, with higher scores indicating worse depressive symptoms (Kroenke et al., 2001). PROMIS consists of 7 items, assessing self-reported fear, anxious misery, hyperarousal, and somatic symptoms (Cella et al., 2010). Scores range from 36.3 to 82.7, with higher scores indicating worse anxiety (Cella et al., 2010).

d) Mental health

The mental health poll question was chosen as the dependent variable: “In the past week, how would you describe your mental health?” The response options were poor, average, or good.

e) Geographical inclusion criteria

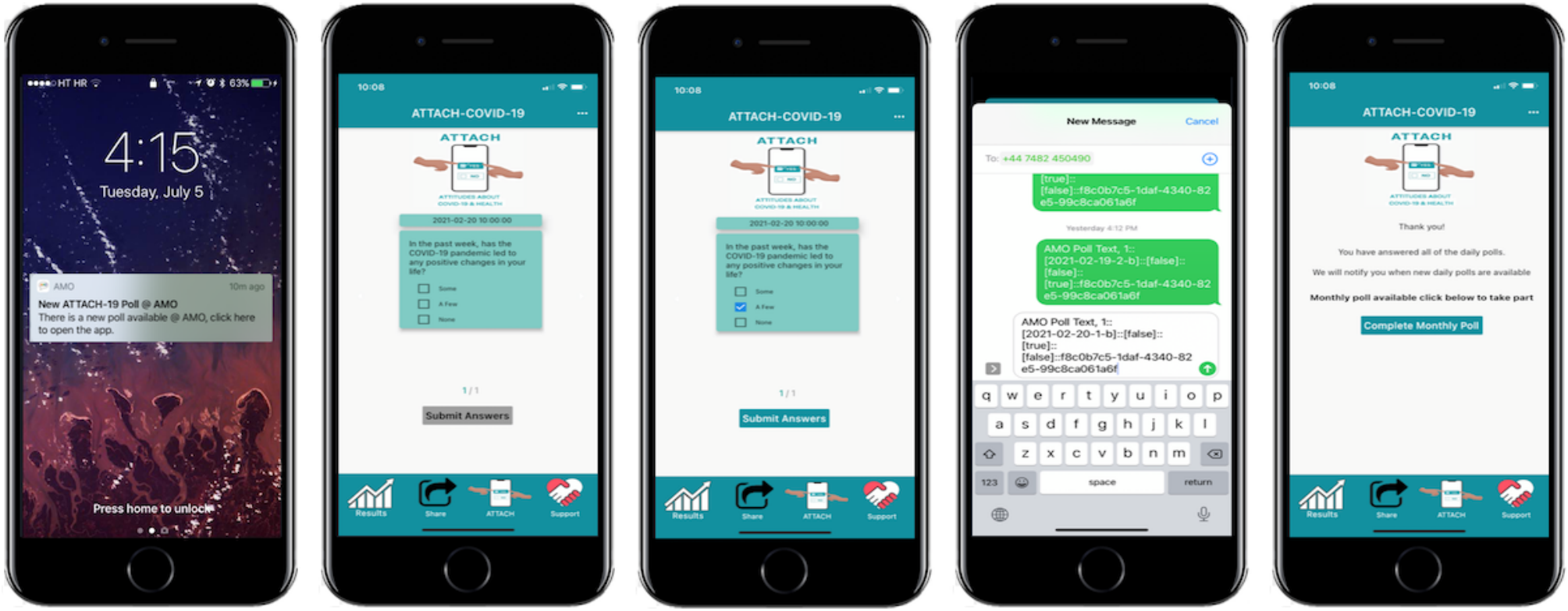
Participants provided the first five characters of their UK postcode (i.e., postcode sector) on the AMO smartphone app. In this study, each participant’s postcode sector was assessed, and only those participants with postcodes within England were selected (Crone, 2017).

**2.5 Procedures**

Participants in the UK downloaded the AMO smartphone app to complete consent and provide their demographics and the first part of their postcode. They received push notifications on their smartphones twice daily to complete one-minute polls at 10 a.m. and 2 p.m., which were removed after 24 hours. Once the participants completed the daily poll questions, they could then click on an embedded link (with a unique access code) in the app to complete their baseline measures via Research Electronic Data Capture tools (REDCap) hosted at UCL (Figure 2). If the responses indicated that the participant experienced high levels of stigma due to their medical condition or severe mental health symptoms, a pop-up message providing mental health resources and the study email address, monitored regularly by a clinical psychologist to offer additional resources or referrals, was displayed. After completing the survey, participants were redirected to the study webpages on the UCL Child Health Institute website, which provided links to mental health resources (e.g., Mind), COVID-19 information (e.g., government sources), and authoritative medical information (e.g., National Health Service [NHS]). Daily poll question results, presented as pie charts, were accessible through the app or the study's Twitter account to promote engagement.

**Figure 2**

*Schematic of an Attitudes About COVID-19 and Health study notification and poll question on the AMO smartphone app*




*Note.* From *Hood et al (2021).*

## 2.6. Data Processing

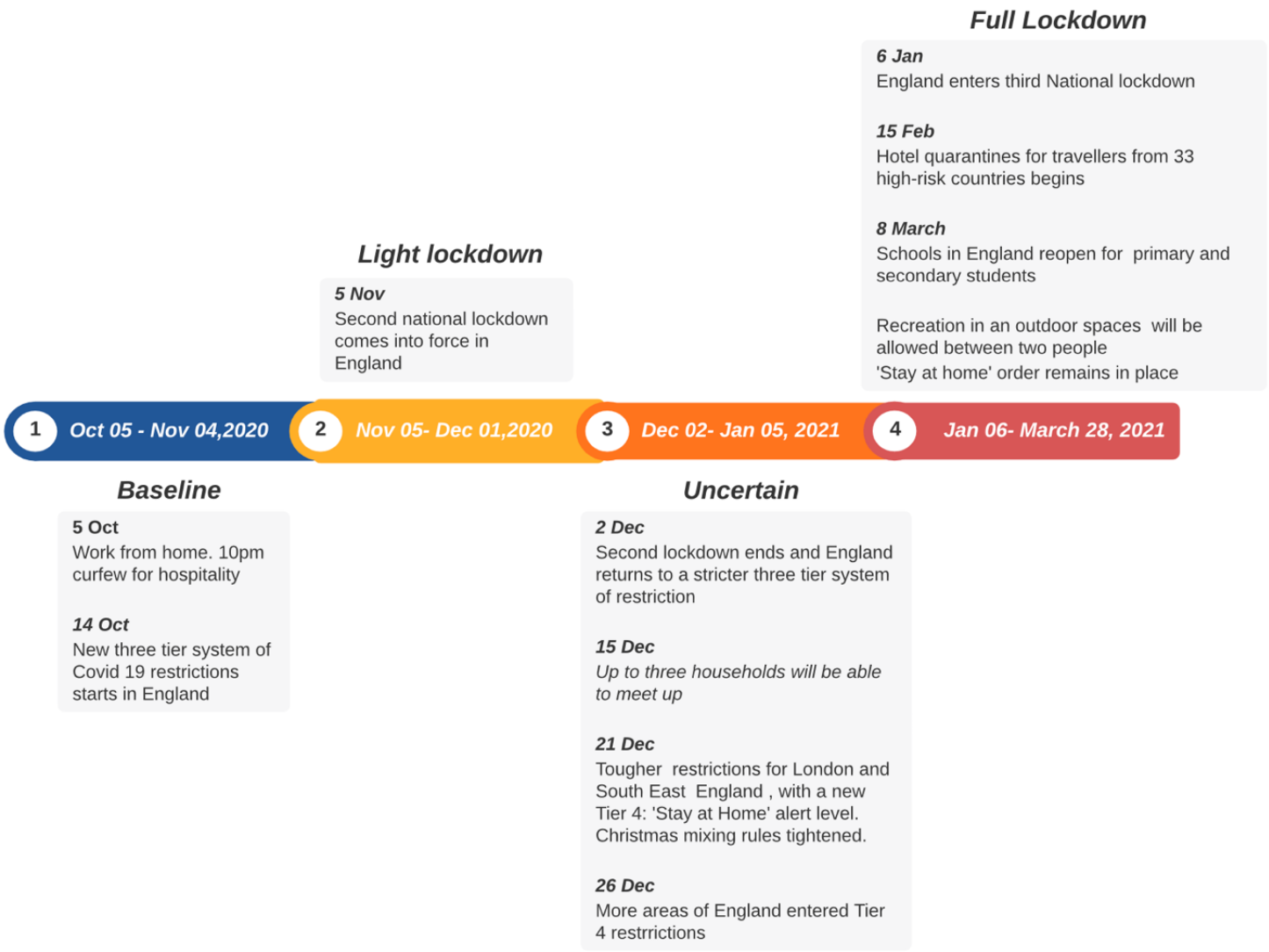
Data processing was carried out in four stages: a) classification of time points, b) data preparation and cleaning, c) validation of the poll questions, and d) timepoint comparison.

*a) Classification of Timepoints*

As COVID-19 restrictions differed across the world and within the UK, this study focused on participants residing in England only. We also restricted the analysis to October 5th, 2020, until March 28th, 2021. October was selected as the start date as recruitment into the study was maximal (n= 1191) in October 2020. March 28th was chosen as the end date as Step 1 of 'Roadmap out of lockdown', that is, the *'rule of six'* (permitting outdoor gatherings of either six people or two households) commenced on March 29th (Baker et al., 2021; *Timeline of UK government coronavirus lockdowns and Restrictions*, 2022). The study phases, which were selected based on the restrictions applicable at the time, are shown in Figure 3 below.

**Figure 3**

*Timeline of COVID-19 restrictions and lockdowns in the UK from October 2020 to March 2021.*




*Phase 1*: From October 5th to November 4th, 2020, there were relatively few restrictions (*'baseline period'*). Individuals were encouraged to work from home if possible, and a new three-tier system of local lockdowns was imposed to control the virus's spread and avoid a national lockdown. This system had three levels of restrictions, with tier one being the least restrictive and tier three being the most restrictive.

*Phase 2*: From November 5th to December 1st, 2020, England entered a four-week national 'circuit breaker' lockdown (*'light lockdown'*). During this time, individuals were required to stay at home as much as possible and only to leave for essential reasons, such as education, work, or to provide care. Non-essential shops, restaurants, pubs, and gyms were closed. Individuals were not allowed to mix with other households indoors or outdoors except for support bubbles.

*Phase 3*: From December 2nd to January 5th, 2021, England entered an *'uncertain'* period due to the lifting and imposing of lockdown restrictions. Individuals were allowed to form "Christmas bubbles" in up to three households. However, the decision was revoked with stricter measures imposed in several areas due to the rise of COVID-19 cases.

*Phase 4*: From January 6th to March 28th, 2021, England entered a *'full lockdown'* period, where stricter measures were implemented, including closing schools, non-essential shops, and hospitality venues. Individuals could only leave their homes for essential purposes (e.g., medical reasons, exercise, and key workers). Furthermore, international travellers travelling to the UK from high-risk countries were required to quarantine in a government-approved facility for ten days. Schools reopened on March 8th, and recreation in outdoor places for two people was allowed, but the 'stay at home' order remained in place.

*b) Data Preparation and Cleaning*

Only participants who completed at least one time point for each poll question were included in this study (N=589/1191). Appendix B gives the number and proportion of missing data for each poll question. Missing data analysis indicated that the data were missing at random. Accordingly, the imputation of missing data was performed by imputing the most occurring mode for each variable (Azur et al., 2011). Table 7 shows the total 35 variables and response items included in this study. Because of the nature of some of the poll

questions, the answers were recoded to create binary and ordinal variables. For example, poll questions that begin with “Do” or “Have you” were recoded with “Yes” coded as one and “No” coded as zero. On the other hand, poll questions that started with “How” or were categorical in nature were retained as ordinal variables. As some of the poll questions were asked multiple times within each period, we reduced the variables into a single variable for each period by averaging the total of the repeated question in each period, with the average rounded up to 1 if ≥ .5, or otherwise 0. Appendix C gives the number of responses to each poll question at each time point. It is evident that for the poll questions concerning contact tracing and mask wearing, very few participants (ranging between 1-12 people) reported that they did not wear a mask or that they have faith in contact tracing.

Spearman rho correlations were examined to identify redundancy amongst the variables and to reduce the number of items examined (rs:>0.8) (Rosenthal, 1991). The correlations ranged from -.29 to .33, showing non-significant or weakly significant associations between variables at baseline. Similar findings, and to a limited extent, moderately significant associations were found within light lockdown (-.38 to .40), uncertain period (-.34 to .47), as well as full lockdown (-.49 to .5). Given that there were no issues of multicollinearity or redundancy, all 35 variables were included in all further analyses. The bivariate Spearman correlations between variables within the baseline, light lockdown, uncertain and full lockdown periods are shown in Appendix D1-D4.

**Table 7**

*Table showing the variables and response items included in the study.*

| Variables code | Poll questions | Response | Category |
|---|---|---|---|
| Comply measures | In the past week, has it been difficult to fully comply with the current pandemic measures outlined by the government? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| ContactTracing | Do you think contact tracing methods are working? | No, Unsure, Yes | 0: No + Unsure<br>1: Yes |
| MaskTransport | In the past week, did you wear a mask when in moderate/high-risk situations (e.g., shops, public transport) | No, Sometimes, Very | 0: No<br>1: Sometimes + Very |
| KeyworkersPPE | Are you concerned that key workers have the PPE they need? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| TravelRestrictions | Do you agree with the government's current travel restrictions? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| TestLevels | Do you think that the current COVID-19 testing levels are adequate? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| MeasuresClear | In the past week, have you felt that the reasons for the current pandemic measures have been made clear? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| BodySignals | In the past week, how much attention have you paid to signals from your body (e.g., breathing, stomach, heart)? | None, A little, A lot | 0: None<br>1: A little<br>2: A lot |
| HealthSocial | In the past week, have you been able to access all of the social or health services you needed? | No, Not required, Yes | 0: No +: Not required<br>1: Yes |

| | | | |
|---|---|---|---|
| VigourousActivity | In the past week, how often did you do any vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling? | None, Some, Most days | 0: None<br>1: Some<br>2: Most days |
| HealthRisk | In the past week, from whom have you been most concerned about health risks? | Others, Loved ones, Myself | 0: Others<br>1: Loved ones<br>2: Myself |
| OlderFriend | In the past week, have you been worried about your parent's or older friends' health? | Not at all, A little, A lot | 0: Not at all<br>1: A little<br>2: A lot |
| NormalActivities | In the past week, have you been able to enjoy your normal day-to-day activities? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| TimeOutside | In the past week, how much time have you spent outside the home? (e.g., shopping, parks, etc.) | None, A little, A lot | 0: None<br>1: A little<br>2: A lot |
| PositiveChange | In the past week, has the COVID-19 pandemic led to any positive changes in your life? | None, A few, Some | 0: None<br>1: A few +: Some |
| WorriedInfect | In the past week, how worried have you been about being infected with COVID-19? | Not at all, Somewhat, Very | 0: Not at all<br>1: Somewhat<br>2: Very |
| MostWorriedCovid | In the past week, what has worried you the most about the COVID-19 pandemic? | Finance, Security, Health | 0: Finance<br>1: Security<br>2: Health |
| ApartCovid | In the past week, have you felt that the COVID-19 pandemic could bring people together or tear people apart? | Apart, Unsure, Together | 0: Apart + Unsure<br>1: Together |
| ConcernFinances | In the past week, have you been more concerned than usual about your finances? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| JobSecurity | In the past week, have you been worried about your job security? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |

| | | | |
|---|---|---|---|
| FinanceUK | In the past week, have you been worried about the UK's economic stability? | Not at all, A little, A lot | 0: Not at all<br>1: A little + A lot |
| FinanceYour | In the past month, have you been concerned about the financial stability of your living situation? | Not at all, A little, A lot | 0: Not at all<br>1: A little + A lot |
| ReassureGovern | In the past week, have you been reassured by the governments' response? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| TrustCOVID | In the past week, have you trusted the government to do everything in their power to ensure that the basic needs of the public are met? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| Workedhome | For the majority of the past week, have you worked from home? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| VoluntaryWork | In the past week, have you been involved in voluntary work? | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| NegativeSpouse | In the past week have you felt that COVID-19 has had a negative impact on your relationship with your spouse or significant other? | No, Somewhat, Yes | 0: No<br>1: Somewhat +Yes |
| CancelEvent | In the past month, have you had to cancel an event that was important to you? (e.g., holiday, party etc.) | No, Postponed, Yes | 0: No<br>1: Postponed +Yes |
| SocialMedia | In the past week, have you spent more time than usual using social media (e.g., Facebook, WhatsApp, Instagram) | No, Somewhat, Yes | 0: No<br>1: Somewhat + Yes |
| Interactions | In the past week, have most of your interactions been: | Online, A mix of both, In-person | 0: Online<br>1: A mix of both<br>2: In-person |
| MentalHealth | In the past week, how would you describe your mental health? | Poor, Average, Good | 0: Poor<br>1: Average<br>2: Good |

| | | | |
|---|---|---|---|
| HopeFuture | In the past week, have you felt hopeful about the future? | No, Somewhat, Yes | 0: No<br>1: Somewhat +: Yes |
| HopeCovidEnd | In the past week, how hopeful have you been that the COVID-19 pandemic will end soon? | No, Somewhat, Yes | 0: No<br>1: Somewhat +: Yes |
| ProvideFamily | In the past week, how much help or support have you PROVIDED to family, friends, or neighbours? | None, A little, A lot | 0: None<br>1: A little<br>2: A lot |
| ReceiveFamily | In the past week, how much help or support have you RECEIVED from family, friends, or neighbours? | None, A little, A lot | 0: None<br>1: A little<br>2: A lot |

*c) Validation of Poll Questions*

The convergent validity of a subset of poll questions against baseline or validated measures was assessed using Spearman correlations or chi-square analyses as appropriate. The matching of poll questions against other measures for validation was completed based on their relevance to the construct being measured or based on previously reported findings where comparative measures were unavailable. Measures used for comparison with poll questions included sociodemographic variables, the PHQ-9, and the PROMIS- Anxiety measures. The significance level was set at $p < .05$, where $r_s$; 0.1, 0.3 and 0.5 indicate small, medium, and large effect sizes, respectively (Cohen, 1988).

We first examined the correlation between the primary outcome measure from the poll question on mental health (*MentalHeath*) with the questionnaire measures (PHQ-9 measure of depression and PROMIS-anxiety scale) collected at baseline. The mental health question was weakly but significantly correlated with the PHQ-9 ($r_s$ (589)= -.18, $p$<.01) and the PROMIS-Anxiety measures ($r_s$ (589)= -.20, $p$ <.01). In addition, the correlation of the mental health rating with the baseline mental health diagnosis was examined. The correlation ($r_s$ (557)= -.11, $p$<.01) indicated that participants who rated their mental health as good were less likely to have a pre-existing mental health diagnosis (Alonzi et al., 2020). The results provided some support for the convergent validity of mental health measure. N.B. The correlations were negative, as expected.

There were several other significant correlations between poll questions and baseline measures. *JobSecurity* was positively correlated with the PHQ-9 measure ($r_s$(589)=.09, $p$<.05), indicating that participants who had increasing worries about their job tended to have higher depressive symptoms, as we would expect from previous research (Wilson et al., 2021). Similarly, feeling hopeful about the future, *HopeFuture* ($r_s$ (589)= -.1, $p$<.05), and being hopeful that the COVID-19 pandemic would end soon, *HopeCovidEnd* ($r_s$(589)=.09,

$p$<.05), were both negatively correlated with depressive symptoms, again as expected based on previous research (Javier-Aliaga et al., 2022). Conducting more vigorous physical activity (*VigorousActivity)* was also correlated with depression in the expected direction based on previous research $r_s$ (589*)* = -.136, $p$<.01 (Schuch et al., 2020).

Beyond correlations with the depression scale, participants with pre-existing health conditions (*Pre-existingMedicalConditions)* were more likely to be concerned about contracting COVID-19 (*WorriedInfect*) as expected ($r_s$ (559) =.1, $p$=.021) (Alonzi et al., 2020). Participants who were more concerned than usual about finances, *FinanceYour* ($r_s$ (589)=.23, $p$<.01) and paid more attention to their bodily signals, *BodySignals* ($r_s$ (589) =.13, $p$<.01) had higher anxiety scores (Brewer et al., 2021), whereas trusting the government to meet public needs, *TrustCovid* ($r_s$ (589) =-.2, $p$<.01) were associated with lower anxiety scores (McPherson et al., 2021).

Whilst the majority of poll items showed expected associations, not all associations were as expected. Chi-square tests revealed that worrying about health*, WorriedInfect* was not significantly associated with a pre-existing physical health condition as expected though a trend was observed $x^{2.}$ (1, $N$=559) =3.59, $p$=.06 (Alonzi et al., 2020). Similarly, there was no statistically notable relationship between travelling to work and being a key worker $x^{2.}$ (1, $N$=570) =.57, $p$=.45 (Alonzi et al., 2020). Overall, these results indicate some validity of the poll question items, and all were retained for further analyses.

*d) Timepoint Comparison*

Given that this study aimed to test changes in mental health from the baseline to subsequent time points, a simple coding analysis was undertaken. The simple coding approach allows each level to be compared to the reference level (Daly et al., 2016). The general rule for simple coding is outlined in Table 8.1 below. In simple coding, each period

is compared to the reference period. The regression output in the simple coding scheme means that the intercept corresponds to the mean of all cells means. The general rule is that the reference group is never coded anything but -1/4. Each contrast compares a specific level with the reference group, which is coded as 3/4. Thus, for the first contrast, it is level 2, which is coded 3/4, and all other levels are -1/4. Since there are four periods and the values must add up to one, there must be three levels coded as -1/4 and one level as 3/4.

**Table 8.1**

*General rule of simple coding*

| | **Contrast 1** | **Contrast 2** | **Contrast 3** |
|---|---|---|---|
| **Category Level** | **Level 1 vs Level 2** | **Level 1 vs Level 3** | **Level 1 vs Level 4** |
| 1 | -1/k | -1/k | -1/k |
| 2 | (k-1)/k | -1/k | -1/k |
| 3 | -1/k | (k-1)/k | -1/k |
| 4 (k) | -1/k | -1/k | (K-1)/k |

In our study, baseline mental health was used as the reference level. In this approach, 1) the mean of mental health during the light lockdown period is compared to the mean of mental health during the baseline, which will constitute *Period 1*, 2) the mean of mental health during the uncertain period was then compared with the mean of mental health during the baseline, which constitutes *Period 2*, and 3) the mean of mental health during the full lockdown was compared with the mean of mental health during baseline, which constitutes *Period 3.* The complete coding scheme is shown in Table 8.2.

**Table 8.2**

*Simple coding across the period levels.*

| | Period 1 | Period 2 | Period 3 |
|---|---|---|---|
| **Period** | Level 1 vs Level 2 | Level 1 vs Level 3 | Level 1 vs Level 4 |
| **1 (Baseline)** | -1/4 | -1/4 | -1/4 |
| **2 (Light Lockdown)** | 3/4 | -1/4 | -1/4 |
| **3 (Uncertain)** | -1/4 | 3/4 | -1/4 |
| **4 (Full Lockdown)** | -1/4 | -1/4 | 3/4 |

### 2.7. Statistical Analysis

Descriptive statistics summarised the demographic, clinical characteristics, and response rates to the questions of the participants. Chi-square analyses were conducted across the time periods of the study to determine if responses changed over time. Data analyses were carried out using IBM SPSS Statistics Version 28. Alpha was set at $p<.05$.

An interactive fixed-effect model with simple contrast coding was implemented using R Version 4.1.1. The model tested the relationship between predictors and the mental health outcome variable across time points. Notably, although there were 34 poll questions or independent variables, three variables (interactions, most worried covid, and health risk had to be dummy coded to convey all the necessary information). Furthermore, this interactive fixed-effect model approach has several strengths. Firstly, fixed-effect models consider dynamic relationships between the independent and dependent variables. This is especially helpful when exploring the associations between COVID-19-related stressors and mental health, which is likely to change dynamically over time. Secondly, the model explores

within-individual variation, which automatically controls for observed and unobserved individual heterogeneities, such as time-invariant factors (Wooldridge, 2010).

This model incorporated vectors of observable regressors with unknown time-varying coefficients and a combination of constant (intercept) vectors of factors, vectors of common factors and idiosyncratic errors (Bai, 2009). The time-varying coefficients are also referred to as latent factors, while the unit-specific intercepts are called factor loadings (Xu, 2017).

The proposed interactive fixed effect model was mathematically presented by Bai (2009) as follows:

$$Y_{it} = X_{it}' \beta + u_{it} \qquad (1)$$

Here, $X_{it}$ are $k \times 1$ observable regressors, and $\beta$ are $k \times 1$ unknown coefficients. The $u_{it}$ part of the equation can be further decomposed as:

$$u_{it} = \lambda_i' F_t + \varepsilon_{it} \qquad (2)$$

Where $\lambda_i$ are $n \times 1$ vector of intercepts or factor loading, $F_t$ are $n \times 1$ vector of common factors such that $\lambda_i' F_t = \lambda_{i1} F_{t1} + \ldots + \lambda_{in} F_{tn}$ and $\varepsilon_{it}$ are idiosyncratic errors which are unobservable. The interactive fixed effect approach treats the unobservable $\lambda_i$ and $F_t$ as a fixed effect parameter to be estimated along with the observable regressors $X_{it}$. In order to compare the interaction effects of the period between the baseline and each of the other periods, the simple code matrix was contrasted with the period factor variables and an interactive fixed effect model was constructed such that:

$$Y_{it} = X_{it}' \beta + u_{itl} \quad (3)$$

Where $tl = t_1 - t_2, t_1 - t_3, t_1 - t_4$

Here, $tl$ is the simple coding between a post-period level compared to the baseline.

Random-effects models were also conducted to assess the panel structure of the data, and Hausman tests were used to confirm the selection of fixed-effects models over random-effects models if $p < .05$ (Hausman, 1978).

To assess the potential impact of mutual adjustment on the multivariate model, 34 separate interactive fixed effect models were conducted, testing the association between each poll question and the mental health outcome over the three phases of the study.

It is important to note that the chances of an increased error rate for setting a p-value of .05 is possible. However, given the exploratory nature of our study, we decided to include these for completeness.

## 3. Results

### 3.1. Participants

The poll questions were completed by 272 individuals at baseline (22.84%), 263 (22%) during the light lockdown, 282 (23.68%) during the uncertain period and 186 (15.62%) during the full lockdown. The eligible samples were those who completed at least one time point for each poll question (N=589). As previously mentioned, missing data were imputed (see Section 2.6b).

Table 9 shows the descriptive analysis of the sociodemographic variables for all participants. In summary, participants at baseline had a mean age of 58.09±13.73 years. The majority (N=453; 76.9%) identified as female, were White (N=534; 90.7%), married (N=324; 55%), had attained a college or university qualification (N=274; 46.5%), and had English as their first language (N=437; 74.2%). In addition, 262 (44.5%) participants were retired, and 127 (21.6%) were key workers. A subgroup of participants reported a pre-existing mental health condition (N=118; 20%), with 55 (9.3%) reporting mental-health comorbidities. One hundred eighty-six (31.6%) participants reported a pre-existing physical health condition.

**Table 9**

*Participants' demographic characteristics*

| Variables | Frequency (N=589) | Percentage (%) |
|---|---|---|
| **Sex** | | |
| Male | 136 | 23.1 |
| Female | 453 | 76.9 |
| **Age** | | |
| 16-22 | 8 | 1.4 |
| 23-40 | 82 | 13.9 |
| 41-64 | 277 | 47 |
| 65-74 | 192 | 32.6 |
| 75+ | 30 | 5.1 |
| **Race** | | |
| Arab | 1 | 0.2 |
| Asian | 9 | 1.5 |
| Black | 3 | 0.3 |
| Mixed/multiple ethnic groups | 15 | 2.5 |
| White | 534 | 90.7 |
| **Relationship status** | | |
| Civil partnership | 5 | 0.8 |
| In a relationship | 89 | 15.1 |
| Married | 324 | 55 |
| Single | 119 | 20.2 |
| Widowed | 27 | 4.6 |
| **Education** | | |
| College or university | 274 | 46.5 |
| Higher education (e.g., a-levels) | 83 | 14.1 |
| Post-graduate degree | 177 | 30.1 |
| Primary school | 1 | 0.2 |
| Secondary school up to 16 years | 30 | 5.1 |
| **Language** | | |
| English | 546 | 92.7 |
| Other | 19 | 3.4 |
| **Employment status** | | |
| Employed- travelling to work | 111 | 18.8 |
| Employed- working from home | 97 | 16.5 |
| Employed- mix of work and home | 2 | 0.3 |
| Disabled- not working | 20 | 3.4 |
| Furloughed | 4 | 0.7 |
| Homemaker | 11 | 1.9 |
| Retired | 262 | 44.5 |
| Self-employed | 11 | 1.9 |

| | | |
|---|---|---|
| Semi-retired | 3 | 0.5 |
| Sick leave | 4 | 0.7 |
| Student | 15 | 2.5 |
| Unemployed | 8 | 1.4 |
| Other (e.g., carer, casual/freelance, parental leave etc.) | 11 | 2 |
| **Key/essential Worker status** | | |
| Yes | 127 | 21.6 |
| No | 443 | 75.2 |
| **Medical Condition** | | |
| No | 373 | 63.3 |
| Yes | 186 | 31.6 |
| **Pre-existing Mental health condition** | | |
| No | 439 | 74.5 |
| Yes | 118 | 20 |
| Prefer not to say | 8 | 1.4 |

Good mental health was reported by 82.7% of participants at baseline, but this proportion decreased during light lockdown (71.5%). Only 5-6% of the participants reported poor mental health at each time point (Appendix C). Those that reported average mental health increased from 12.2% at baseline to 22.4% during the light lockdown. The reduction in mental health ratings from baseline to light lockdown was significant $\chi^2$ (2, $N$ = 589) = 22.99, $p$ <.001. However, mental health significantly improved from the light lockdown to the uncertain period $\chi^2$ (2, $N$ = 589) = 22.19, $p$ <.001) and returned to the baseline level in the uncertain perio*d* $\chi^2$ (2, $N$ = 589) = 1.25, $p$ =.54 and this improvement was sustained during full lockdown (baseline to full lockdown) $\chi^2$ (2, $N$ = 589) = .13, $p$ =.94.

### 3.2. Results of Regression Analyses

First, a multivariate fixed-effect ordinal logistic regression model, which examines how the predictor variables (poll items) influenced mental health over time is included in Appendix E. It shows the interaction between each poll item and a time predictor to assess changes in mental health alongside estimated regression coefficients and odds ratios.

According to the model fit, these variables accounted for 31.7% of the variance in changes in mental health (R-squared), and the model analysis demonstrated a significant link between many of the poll items and mental health.

Next, 34 separate interactive fixed effect models were conducted, testing the association between each poll question and the mental health outcome over the three phases of the study. These analyses aimed to assess the potential impact of mutual adjustment on the multivariate model.

The results of these analyses and how they compare to the multivariate results are summarised in Appendix F. The table highlights the analyses where the statistical significance of the results differed between the regression models (i.e., significant in 1 model but not the other). It should be noted that the results for the time period from the multivariate model are repeated in the table (although they do not change) to ease comparison with the results of the independent poll questions models.

It was notable that in the multivariate analysis (MA), 33 of the 150 tests conducted (22%) reached statistical significance at the $p<.05$ level. Amongst these 33 significant results, 28 remained significant in the individual poll question analyses, and just 5 became non-significant. By contrast, in the 238 tests conducted in the individual poll question analyses (IPQA), 95 tests (40%) reached statistical significance ($p<.05$).

The table in Appendix G provides a simplified graphic summary of the significant findings from the analyses with arrows indicating the direction of effect (negative or positive) on mental health of each poll questions. Arrows in bold indicate the associations that survive Bonferroni correction. The table highlights which poll questions were consistently associated

with mental health, by showing which results were significant in both analyses or were significant in only one analysis.

It can also be seen that a few poll questions showed a general association with mental health (termed stable predictors hereon). Some were not associated with changes in mental health at any time point (e.g., *BodySignals*; *TrustCovid),* but others were stably associated with mental health and were also predictive of changes in mental health at some time point (e.g., *ConcernFinance*). Yet others were only associated with changes in mental health at one time point or another.

### 3.2.1 Stable Predictors of Mental Health

*Results that were significant in the multivariate and individual poll question analyses*

Several stable predictors were significantly associated with mental health outcomes. These included:-Being concerned about finances (*ConcernFinance*; $p<.001$(MA & IPQA)),financial stability (*FinanceYour*; $p<.001$), greater trust in the government's commitment to meet the public's basic needs *(TrustCovid*; $p<.001$(MA & IPQA)), doing volunteering work *(VoluntaryWork; p*<.001(MA & IPQA)), and increased awareness of one's bodily signals (*BodilySignals*; $p=.015$ (MA) & $p<.001$ (IPQA))were all associated with poorer mental health throughout the pandemic. Conversely, being more hopeful about the future (*HopeFuture; p*=.042 (MA) *&* $p<.001$(IPQA)), enjoying typical day-to-day activities (*NormalActivities*; $p<.001$(MA & IPQA)) were all associated with better mental health.

*Results that were significant in only the multivariate analysis*

Two variables associated with social interaction, specifically online social interaction (*InteractionsOnlin*e; $p=.012$) and a mix of online and in-person interaction

(*InteractionsMixofBoth*; *p*=.030) were associated with better mental health only when considered in the multivariate model.

*Results that were significant in only the individual poll question analyses.*

Having difficulty fully complying with the government's pandemic guidelines (*ComplyMeasures; p*=.001), experiencing worries about job security (*JobSecurity*; *p*=.002), and concerns about finances (*MostWorriedCovid Finance; p*=.<.001) were all associated with poorer mental health across the pandemic. Conversely, concerns about keyworkers having the PPE they needed (*KeyWorkersPPE; p=.032),* concerns about personal security (*MostWorriedCovid Security; p*=.<.001) as well as feeling reassured by the governments' response *(ReassureGovern*; *p*=.003) was associated with better mental health only in the individual poll question analyses.

### 3.2.2 Predictors of changes in Mental Health at every time point.

*Results that were significant in the multivariate and individual poll analyses*

Several stable predictors were found to be significantly associated with the changes in mental health across all time periods. An increase in concerns about the UK's economic stability (*FinanceUK*) was associated with a decrease in mental health during the light lockdown (*p*=.017 (MA) & *p*=.004 (IPQA)), with this association becoming stronger in later periods (the uncertain period; *p*=.019 (MA) & *p*=.003 (IPQA) and full lockdown; *p*=.004 (MA) & *p*<.001 (IPQA). Individuals who perceived the contact tracing method as effective (*ContactTracing*) were consistently associated with deterioration in mental health (light lockdown; *p*<.001 (MA) & *p*=.025 (IPQA), the uncertain period; *p*=.003 (MA) & *p*=.029 (IPQA), and full lockdown; *p*=.001(MA) & *p*=.006 (IPQA). In contrast, an increase in social media usage (*SocialMedia*) was associated with positive changes in mental health compared to the baseline at all three time periods (*p*<.001(MA & IPQA)).

*Results that were significant in only the independent poll question analyses.*

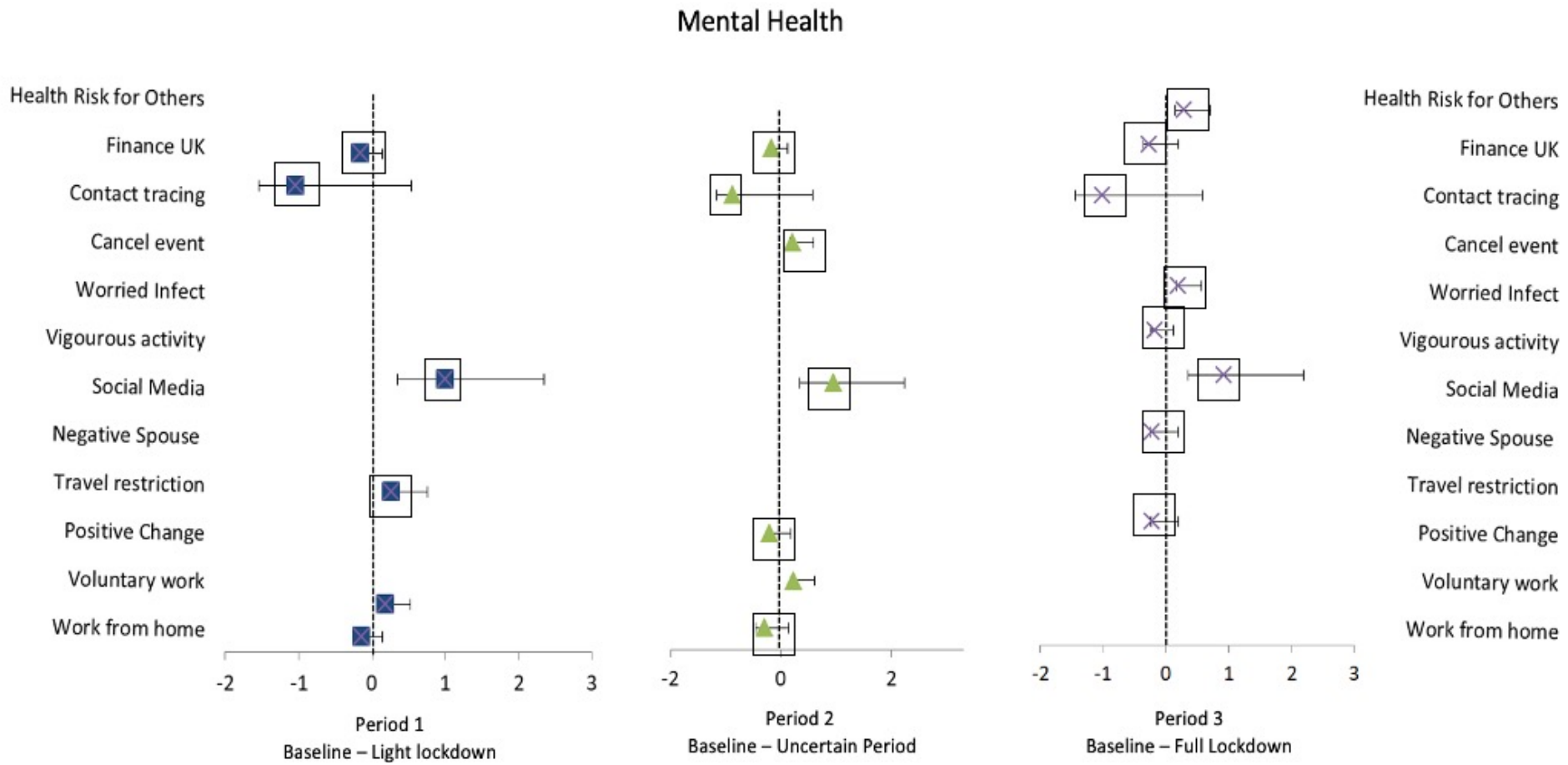
In addition to the stable association detected in both analyses for concerns about the financial stability of one's living situation (*FinanceYour)*, this variable was also consistently associated with a decline in mental health at each phase of the study (light lockdown; $p$=.04, uncertain period; $p$=.03 and full lockdown $p$=.023).

### 3.2.3 Predictors of change at specific time points.

Figure 4 shows the forest plot of standardised $\beta$ coefficients +/- S.E. for significant predictors of changes in mental health across phases of the pandemic from the multivariate analysis. Note that non-significant changes are omitted for ease of interpretation. Results that were also significant in the individual poll question analysis are denoted by a box surrounding the estimate. Please see Appendix F for full details.

**Figure 4**

*Forest plot for significant predictors of changes in mental health across different phases of the pandemic.*




*Note.* Boxes around results indicate associations that were significant in both methods of analyses

*Results that were significant in the multivariate and individual poll question analyses*

Several independent variables were found to be significantly associated with a decline in mental health across different time points. These included: - working from home (*WorkedHome*) which predicted a decrease in mental health during the uncertain period ($p$<.001); (*TravelRestrictions*) which predicted better mental health during light lockdown ($p$=.013 (MA) & $p$=.001 (IPQA)) but not in later periods. Feeling that the COVID-19 pandemic had a negative impact on relationships with their spouse or significant other (*NegativeSpouse*) was only associated with poor mental health during full lockdown ($p$=.025 (MA) & $p$<.001 (IPQA)). Additionally, a negative association with mental health was found for perceiving positive changes in one's life due to the COVID-19 pandemic (*PositiveChange*) in the uncertain period ($p$=.021(MA) & $p$=.001 (IPQA)) and full lockdown ($p$=.028 (MA) & $p$<.001 (IPQA)), but this was not evident in light lockdown ($p$=.229 (MA) & $p$=.059 (IPQA)). Poorer mental health was also associated with vigorous activity (*VigorousActivity*) but only during full lockdown ($p$= .004 (MA) & $p$<.001 (IPQA)).

Some predictors were associated with improvements in mental health. These included: - Cancelling events (*CancelEvent*) which predicted better mental health during just the uncertain period ($p$=.005 (MA) & $p$<.001(IPQA)). Similarly, an increase in worry about COVID-19 infection (*WorriedInfect*) was associated with better mental health in full lockdown ($p$=.019 (MA) & $p$=.022 (IPQA)) and individuals who worried about other's health risks (*HealthRiskfOthers*) reported better mental health during this period ($p$<.001(MA & IPQA)).

It should be noted that the direction of effect was different in the MA and IPQA results for *HealthRisk f LovedOnes* ($p$=<.001 (MA) & (IPQA)).

*Results that were significant in only the multivariate analysis*

Working from home (*WorkedHome*) predicted a decrease in mental health in the light lockdown phase ($p$=.048). Similarly, an increase in voluntary work (*VoluntaryWork*) was associated with improving mental health during the light lockdown period ($p$=.022) and the uncertain period ($p$=.006) compared to baseline period.

*Results that were significant in only the individual poll question analyses*

Participants who wore a mask when in moderate/high-risk situations (*MaskTransport; p*=.016*)* reported better mental health during light lockdown. Individuals who agreed that the reasons for the current pandemic measures were made clear (*MeasuresClear; p*=.048) was only associated with better mental health during the uncertain period. People with concerns about finance *(ConcernFinance)* had a decrease in mental health during light lockdown ($p$=.005) and full lockdown ($p$=.018). Individuals who believed that the pandemic could bring people together (*ApartCovid; p*=.006) experienced a decline in their mental health during the uncertain period. Cancelling events (*CancelEvent)* was associated with improving mental health during the light lockdown ($p$=.048) but poorer mental health during the full lockdown ($p$=0.012). Poorer mental health was associated with vigorous activity *(VigorousActivity)* during the uncertain period ($p$=.005). Those that received a great deal of help and support from family friends or neighbours reported improving mental health particularly during the full lockdown period *(Receivefamily; p*<.001*).* By contrast, those who were able to access all the social or health services they needed (*HealthSocial; p*<.001*)* experienced a decline in their mental health during the full lockdown.

### 3.2.4 Non-significant Predictors

*Results that were non-significant in both analyses*

The following variables did not predict mental health in both analyses: believing COVID-19 testing levels were adequate (*TestLevels*), feeling hopeful the COVID-19 pandemic will end soon (*HopeCovidEnd*), the amount of help or support provided to family, friends, or neighbours (*ProvideFamily*), being worried about parents' or older friends' health (*OlderFriend*), the amount of time spent outside (*TimeOutside*), and specific worries (e.g., health) about the COVID-19 pandemic (*MostWorriedCovidHealth*).

*Results that were non-significant in only the multivariate analysis.*

Ability to comply with pandemic measures outlined by the government (*ComplyMeasures*), wearing a mask when in moderate or high risk situations (*MaskTransport*), concerns about key workers having PPE (*KeyWorkersPPE*), feeling that the reason for the current pandemic measures had been made clear (*MeasuresClear*), feeling reassured by the government's response to the COVID-19 pandemic (*ReassureGovern*), the amount of help or support received from family, friends, or neighbours (*ReceiveFamily*), being able to access all necessary social or health services (*HealthSocial*), worries about job security (*JobSecurity*) and feeling that the COVID-19 pandemic could tear people apart (*ApartCovid*) did not predict mental health outcome in the multivariate analysis.

## 4. Discussion

This study explored the impact of COVID-19-related stressors on the mental health of individuals residing in England during the COVID-19 pandemic between October 2020 and March 2021. Our aim was to undertake an exploratory study of the trends in self-reported mental health across different phases of the pandemic and whether specific COVID-19 stressors were associated with changes in mental health symptoms during different phases of the pandemic as the restrictions imposed varied.

Whilst an *atheoretic*/data-driven perspective has the advantage of allowing for flexibility in the exploration of data, thereby helping to discover complex relationships and generate theories, a theory driven perspectives has the advantage that it enables researchers to design studies to test established theories and prior research, reducing the risk of spurious associations and false discovery (Maass et al., 2018). In light of the dearth of well-defined theoretical predictions concerning the influence of socioeconomic factors on mental health during the COVID-19 pandemic and the subsequent impact of restrictions, an exploratory approach was adopted. Our aim was to explore the data and discover potential associations and patterns of interplay between socioeconomic factors and mental health outcomes and thereby generate hypotheses to test in future research.

As this was an exploratory analyses of a complex longitudinal data set, a number of challenges in data analysis and the interpretation of the results arose. Our primary analyses involved a multivariate fixed effects regression analysis of the data. This had the advantage of minimising the number of tests performed and provided an opportunity to examine the effects of our putative predictor in the presence of other predictors. However, this approach makes it more challenging to interpret the results, as it is unclear to what extent mutual adjustment impacted the findings. To address this issue, we also ran separate fixed effects regression models for each poll question, in order to determine if the predictors identified in

the multivariate model also predicted mental health outcomes in the simpler analyses. The drawback of this approach is that it increased the number of tests performed and the likelihood of type 1 error. In this respect, it was noteworthy that the individual poll question analyses identified more significant results than the multivariate analysis, which may reflect type 1 error. However, as illustrated in Appendix G, there was a good deal of overlap in the results from the analyses, especially amongst the predictors that were most strongly associated with the mental health outcome. Accordingly, the discussion will first focus on the findings where both the multivariate and individual poll question analyses predicted the mental health outcome. Next the discussion considers the findings that were only significant in one rather than both sets of analyses. Here the importance of the association is less clear, and the interpretation has to be more tentative and speculative, as the findings might either represent the greater propensity to type 1 error or the effects of mutual adjustment.

It should be noted that in some instances, the poll question response rates were very low frequency for some answers, yet the questions strongly predicted the mental health outcome variable. Less importance should be given to these associations as they applied to such a small proportion of our sample.

**4.1 Changes in mental health during the study**

Our chi-square analysis results demonstrated a decline in self-reported mental health between the baseline and light lockdown periods. This was followed by improvements in mental health with recovery approaching baseline levels.

A notable finding observed in 31/34 of the individual poll question analyses was a significant reduction in mental health observed in period 1 (baseline-light lockdown). This decline in mental health was also identified in our chi-square analysis, but the period 1 change was nonsignificant in the multivariate analysis. The absence of a significant period 1 change in the multivariate analysis may reflect the effects of mutual adjustment: that is to

say, the decline in mental health observed in period 1 was potentially accounted for by the joint effects of the poll question predictors.

Our findings are similar to the wider literature which has indicated the initial decline in mental health during the second lockdown of the COVID-19 pandemic (Daly & Robinson, 2022). This may have been due to factors such as anxieties about the pandemic and the associated health risk, concerns about the restrictions being imposed on everyday life and concerns regarding the potential impact of the pandemic on socioeconomic factors such as increased unemployment (Escudero-Castillo et al., 2021). Despite continuing and more severe restrictions, our participants showed an improvement in their mental health. These findings differ from prior research that suggested mental health fluctuates in tandem with the enforcement and relaxation of restrictions, with more individuals experiencing more significant mental health symptoms during lockdowns (Carr et al., 2021; Thorpe et al., 2022). The difference in findings may reflect the discrepancies in mental health measures, the duration of the studies, the classification of the periods of restrictions, and the characteristics of the samples under investigation. Our findings may reflect that restrictions may provide some reassurance against health risks or may reflect that at the time period examined, there was an increase in the roll-out of vaccinations, more explicit guidance was provided by the government and health organisations, and furlough schemes had been extended (which allowed individuals to receive an income or partial wages without working). All of these may have alleviated some psychological distress as the COVID-19 pandemic progressed (Wang et al., 2022). In addition, people may have adapted to the pandemic stressors and had some resilience to the effects of restrictions during this second wave of the pandemic.

Apart from the fluctuation in mental health described above, this study aimed to investigate the predictors of mental health outcomes. The results are summarised in Appendix G and are discussed by considering the strength of evidence for an association. The strongest

evidence for an association was taken to be provided by results of a significant association in both the multivariate and the individual poll question analyses. Results that were only significant in one or other but not both sets of analyses are considered to be more tentative and are interpreted cautiously, given the possibility of statistical artifacts.

### 4.2 Predictors associated with mental health in both MA and IPQA

*Stable Predictors.*

Several predictors were stably associated with mental health outcomes. These included being concerned about finances, having financial stability, trust in the government, doing volunteering work, paying attention to bodily signals, enjoying day-to-day normal activities and being hopeful about the future. The COVID-19 pandemic undoubtedly brought unprecedented social, economic, and health challenges to the nation (Escudero-Castillo et al., 2021). Although the furlough scheme aimed to provide financial support and mitigate the economic impact, the uncertainty about the long-term effects of the pandemic on employment prospects and financial stability may have created a persistent and ongoing concern for individuals. Escudero-Castillo et al. (2021) found that unemployed and furloughed individuals had worse mental health than those who were employed, possibly due to a lack of a daily routine, a shared purpose in the workplace, and being confined to their homes. As financial concerns are routinely associated with mental health – not only during pandemic situations (Frasquilho et al., 2015) – it is perhaps not surprising that financial concerns remained a stable predictor.

Individuals who trusted the government's commitment to meeting the public's basic needs, and those who trusted lockdown measures, were more likely to report poor mental health. Researchers have indicated that having more trust in the government increases compliance with health policies, including testing, restrictions, and quarantining (Bavel et al., 2020). Therefore, those with greater trust in the government may become more isolated,

leading to poorer mental health. It may similarly contribute to “learned helplessness”, also negatively impacting mental health (Williams et al., 2021).

In addition, in the UK, many reports were made regarding government officials breaking lockdown rules, and studies have indicated this may have had a negative impact on the public’s confidence in the government and lockdown measures, also known as the “Cummings Effect” (Fancourt et al., 2020). Resentment over the government breaking the lockdown rules may also have more adversely impacted those who were more compliant with the restrictions.

The finding that volunteering was associated with poorer mental health is somewhat surprising but aligns with studies that have shown that as the pandemic progressed, there was a decline in elderly and more educated volunteers, possibly due to strict restrictions and risks of contracting COVID-19 (Dederichs, 2022). Whilst speculative, this may have led to the volunteering group as a whole having poorer mental health due to demographic changes.

The association between greater attention to bodily signals and poorer mental health during the pandemic may reflect the significant health risks of contracting COVID-19. Those more aware of their bodily signals may be more prone to interpret normal bodily sensations (e.g., cough, shortness of breath and fatigue) as signs of potential infections (Brewer et al., 2021). The finding is in keeping with non-pandemic literature, which has demonstrated a link between interoceptive sensibility (attention to bodily sensations) and psychopathology, such as anxiety (Brewer et al., 2021).

By contrast to predictor of poorer mental health, being hopeful about the future was associated with better mental health throughout the study period. This result is unsurprising as other studies have found an association between hope and resilience during the pandemic, with less hopeful individuals reporting more fear about COVID-19, which in turn increased symptoms of depression, anxiety, and stress (Javier-Aliaga et al., 2022; Gupta et al., 2022;

Lee & Gallagher, 2018). Similarly, we found a positive relationship between enjoyment in day-to-day activities and mental health. Research has indicated that during the pandemic, many individuals adopted new daily recreational activities, such as baking, which gave them physical and psychological fulfilment (Güler et al., 2021). Engaging in pleasurable and satisfying daily activities has been linked to improved mental health outcomes, including reduced symptoms of depression and anxiety (Craske et al., 2019). This is, therefore, expected that throughout the pandemic-induced stress and uncertainty, as well as the accompanying social isolation, the activities may have served as a means of coping and providing a sense of normalcy.

*Predictors of changes in Mental Health at every time point in both MA & IPQA*

In terms of predictors of changes in mental health, three predictors were found to be significantly associated with changes in mental health across all periods in both analyses. Worrying about the UK's economic stability and feeling contact tracing was effective were associated with decreased mental health, whereas using social media was associated with improved mental health. As stated previously, lockdown measures spurred concerns about the pandemic's immediate and long-term economic consequences, such as job losses, financial instability, and business closure (Escudero-Castillo et al., 2021). In line with other studies, throughout the COVID-19 pandemic, there was a global increase in economic anxiety due to the closing of businesses and workplaces throughout the pandemic (Bareket-Bojmel et al., 2021). Fluctuations in lockdown restrictions and uncertainty are likely to have altered worries about the UK's economic stability, with these changes associated with changes in mental health. Surprisingly and in contrast to other studies (e.g., Kawakami et al., 2021), our study found that a belief that contact tracing was effective was associated with poorer mental health. However, less than eight people responded to questions about contact tracing; therefore, this result must be interpreted with caution as it may reflect a statistical artefact

(see Appendix C) (Gignac & Zajenkowski, 2020). Finally, increased engagement with social media platforms was associated with improving mental health, contrary to the literature highlighting the negative impact of social media use (Syrdal & Briggs, 2018). It is possible that social media provided a sense of connection, community, and engagement during times when physical and social interaction was limited (Syrdal & Briggs, 2018). However, it should be noted that the mean age of the sample in this study was 58 years of age. As this age group does not commonly use social media to the same extent as 18–40-year-olds (Mellon & Prosser, 2017), it may be that the impact of social media use on wellbeing varies depending on the age of the participants, how they use social media, and the extent to which they use this regularly.

*Predictors of change at specific time points in both MA & IPQA*

*Period 1 (Baseline-Light Lockdown)*

The positive relationship between agreeing with travel restrictions and mental health outcomes during the light lockdown period suggests that individuals may have been initially more accepting of the restrictions and reassured by their enforcement.

*Period 2 (Baseline to Uncertain period)*

Working from home was associated with deterioration of mental health during the uncertain period in both analyses. The uncertainty about what would happen may have increased feelings of job insecurity and occupational isolation (Escudero-Castillo et al., 2021). The non-significant relationship during the full lockdown period may reflect the fact that working from home was mandatory, and there was better support and implementation of work-from-home policies (Wood et al., 2021).

Those who reported a positive impact of the pandemic reported worsening mental health during the uncertain period. This finding may have been driven by intolerance of

uncertainty, which has been previously linked to adverse psychological outcomes during the COVID-19 pandemic (Nikopoulou et al., 2022).

During the uncertain period, restrictions impacted the Christmas plans of many individuals (Munro, 2020), yet the widespread cancellation of plans was associated with better mental health during the uncertain period. This might be because individuals could avoid the potential stressors of Christmas (Mutz, 2016) and potential risk of exposure to loved ones to COVID-19.

*Period 3 (Baseline to Full Lockdown)*

The poorer mental health reported by those who endorsed worse relationships with significant others during full lockdown is in keeping with other reports that have noted that the quality of the relationship with a significant other deteriorated during prolonged lockdowns (Panzeri et al., 2020). Factors such as financial hardships, worries about the pandemic, and less responsive support may impact the quality of intimate relationships, which is further nuanced by individual characteristics, such as attachment insecurity and pre-existing mental health (Pietromonaco & Overall, 2021). As discussed for Period 2, positive change was associated with poorer mental health in Period 3.

In general, vigorous exercise was not linked to mental health in this study. Other studies have found a significantly positive association between exercise and mental health (Ai et al., 2021). However, during the full lockdown, the numbers undertaking vigorous exercise significantly reduced, and those that engaged in vigorous activity reported poorer mental health, indicating differential effects according to context (Ai et al., 2021). It may be that individuals who experienced poorer mental health were more likely to engage in physical activity as is often recommended, resulting in this unexpected direction of association.

As the number of COVID-19 cases increased in December 2020 and the full lockdown was implemented, individuals reported increased worry about COVID-19 infection

and the risk to others, but their overall ratings of mental wellbeing improved. This may reflect a feeling of reassurance from the protective effects of the stricter restrictions (Munro, 2020).

There was a significant but different direction of effect of the association between concerns about health risks of loved ones and mental health in full lockdown in the MA compared with the IPQA, highlighting a statistical artifact and likely mutual adjustment.

### 4.3 Significant results only from the MA.

*Stable predictors*

Individuals who engaged in online and a mix of online and in-person social interactions demonstrated better mental health outcomes than those who solely relied on in-person interactions across throughout the study period in the MA. The COVID-19 pandemic significantly altered social interactions, limited in-person interactions, and increased the reliance on online platforms for communication and connection (Saud et al., 2020). Unsurprisingly, modes of interaction remained a stable predictor, given that they offered a valuable means of social connection, particularly during periods of physical isolation and increased risk of COVID-19 infection (Saud et al., 2020).

*Predictors of change at specific time points in MA only*

*Period 1 (Baseline-Light Lockdown)*

Working from home was weakly associated with poorer mental health during the first lockdown. This result may simply represent a chance finding as a consequence of mutual adjustment or reflect the impact of being more isolated in the work environment or stress arising from the shift to remote working (Escudero-Castillo et al., 2021). The finding that voluntary work was associated with improved mental health during the early periods might

reflect an increased sense of purpose and social connection, especially when fewer movement restrictions were imposed (Thoits et al., 2001).

*Period 2 (Baseline to Uncertain period)*

Voluntary work was also associated with an improvement of mental health in Period 2 as discussed in Period 1 above.

### 4.4 Results that were significant in only the IPQA.

*Stable predictors*

Stable predictors of poorer mental health included having difficulty fully complying with the government's pandemic guidelines and experiencing worries about job security or finances. By contrast, stable predictors positively impacting mental health outcomes were concerns about key workers having the PPE they need, concerns about personal security and feeling reassured by the government's response.

Individuals finding it challenging to comply with the pandemic guidelines might be more likely to feel hopeless and that the compliance is pointless. As described earlier, the uncertainties brought about by the pandemic include economic instability and job insecurity (due to the closure of shops, furloughs, and redundancies). This might explain why individuals reporting concerns about their job security or having the most worries about their finances had poorer mental health regardless of the stages of the pandemic (Escudero-Castillo et al., 2021).

Surprisingly, concerns about the availability of PPE positively impacted mental health, despite widespread problems in obtaining and distributing PPE to healthcare workers in the UK as the pandemic progressed (Hoernke et al., 2021). This finding may reflect a type 1 error. Alternatively, people with poorer mental health may have felt that difficulties in the availability of PPE was not pertinent to them and was the least of their worries. People who

said that they were most concerned about personal security, as opposed to finance or health had significantly better mental health perhaps, reflecting the fact that they weren't worried about health and finance risks, which were major concerns to others. As discussed above, people who felt reassured by the government's handling of the pandemic felt safer and more secured.

*Predictors of changes in Mental Health at every time point in IPQA only*

In addition to the noted association found in both analyses, concerns about the financial stability of one's living situation were associated with changes in mental health at each time point, further highlighting the potential importance of this factor.

*Predictors of change at specific time points in IPQA only*

*Period 1 (Baseline-Light Lockdown)*

The association with mask-wearing and the changes in mental health in light lockdown and no other time points may simply reflect the fact that the number of respondents who said no to the question was so low at each time point (12;6;1 and 1).

Those individuals who were concerned about their finances experienced a mental health decline during light lockdown. The changes in lockdown restrictions (e.g., closure of shops and restrictions on various business activities) may have given rise to additional worries about financial security (Bareket-Bojmel et al., 2021).

Over and above the association between cancelling events and improvement in mental health during the uncertain period observed in the MA and IPQA, the IPQA alone also showed an association between cancelling events and better mental health during the light

lockdown. This may again reflect mitigation of potential risk of exposure to COVID-19 infection.

*Period 2 (Baseline to Uncertain period)*

There was a marginally significant association between feeling that the pandemic measures were clear and improvements in mental health during the uncertain period. This weak association may be a statistical artefact or reflect the benefits of the government clearly explaining the measures and providing reassurance during a time when there was an increase in COVID-19 cases and rapid changes in guidelines.

The findings that those individuals who believed the pandemic could foster unity experienced poorer mental health during the uncertain period, may reflect a potential misalignment with reality during that period (e.g., forced cancellation of Christmas celebrations), leading to increased frustration, disappointment, or feelings of isolation (Burns et al., 2023).

In addition to the significant negative association found between vigorous activity and mental health during the full lockdown in both analyses, the IPQA also revealed similar findings for the uncertain period. It may be that the stress and anxiety prompted people to engage in vigorous activity.

*Period 3 (Baseline to Full Lockdown)*

Those individuals who were concerned about their finances experienced a mental health decline during full lockdown as they did during Period 1. This may reflect the impact of formal lockdowns on work restrictions.

Cancelling event was associated with a reduction in mental health during full lockdown in contrast to the direction of effect observed in Period 1. The change in the

direction of effect may reflect the fact that by the time full lockdown was implemented, people had already ceased to schedule events such as weddings or social activities by that stage but became distressed by the inability to attend funerals (Millar et al., 2020).

The finding that individuals who received substantial help and support from family, friends, or neighbours reported improved mental health, particularly during the full lockdown, suggests that during the full lockdown, when isolation and limited interactions prevailed, a strong support network might have mitigated feelings of loneliness and provided emotional solace. Wider literature has highlighted that familial support plays a protective role in mental health outcomes (Li & Xu, 2022). Surprisingly, individuals who could access health and social services reported a decline in their mental health solely during the full lockdown. This finding may reflect that only the most troubled individuals could access services during this period.

### 4.5 Results that were non-significant in both MA and IPQA.

Our study showed several predictors were not associated with mental health outcomes at any time in both analyses. Unexpectedly, believing test levels were adequate, hopefulness about the pandemic ending, specific health concerns, concerns about the risk to older friends or relatives, and spending time outside were not significantly associated with mental health. Studies have noted the subjectivity in the response to COVID-19 stressors and how differing coping mechanisms such as problem-solving, avoidance, denial, and withdrawal may affect how restrictions affect people in the UK (Götmann & Bechtoldt, 2021). Whilst these results are surprising, it may be that the extent to which these factors relate to mental health depends greatly on contextual factors and individual differences. Interestingly, providing family support was not significantly associated with mental health outcomes. This finding may

reflect varying family dynamics before the pandemic, such as the lack of a close-knit relationship that continued to persist during the lockdowns (Gayatri & Puspitasari, 2022).

### 4.6 Results that were non-significant in only the MA.

Finally, the fact that *ComplyMeasures*, *MaskTransport*, *KeyWorkersPPE*, *MeasuresClear*, *ReassureGovern*, *ReceiveFamily*, *HealthSocial, JobSecurity, ApartCovid* and *MostWorriedCovid* were non-significant in the MA may reflect the effect of mutual adjustments or type 1 error. Accordingly, these findings need to be interpreted cautiously.

## Strengths and Limitations

This study had various strengths, including a prospective longitudinal approach, utilising a sample from the population in England and including a large number of COVID-19-related stressors. The timing and duration of the study also enabled investigations of the impact of the different stages of restrictions on mental health and risk factors.

Despite these strengths, several limitations should also be considered when interpreting the findings. First, due to the rapidly evolving nature of the COVID-19 pandemic, it was not possible to externally validate or pilot test the poll questions prior to their use in this study. However, we were able to examine the validity of our mental health question over and above its evident face validity by examining its association with the PHQ-9 and PROMIS-anxiety scale. The correlations were weak, which indicates weak convergent validity. Although this raises doubts about the validity of our measure, it may also reflect the fact that our mental health measure was broad in scope *("In the past week, how would you describe your mental health?")* and measured mental health in terms of it being good, average, or poor rather than simply focusing on the presence of symptoms of low mood/depression or anxiety as measured by the PHQ-9 and PROMIS-anxiety scale. As such,

other types of mental health problems from the wide range of mental health conditions may have also contributed to our measure. Future validations of this item would be required to fully test this.

Furthermore, although we specified time points when the main changes in restrictions were implemented, there was regional variation in the way in which restrictions were implemented. Due to the restricted sample size, it was not possible to capture this variation, and a more comprehensive approach to this would reflect this nuance. Additionally, there may have been a lag between the announcement and implementation of restrictions, and it may be that the psychological reactions to anticipated change may have impacted mental health (Moore et al., 2021). Future research may attempt to capture this by replicating these results and adjusting periods from announcements to implementation.

Another limitation was that the utilisation of the AMO app was not uniform across age groups, with younger people surprisingly being less likely to utilise the app despite their familiarity with digital technology (Mellon & Prosser, 2017). In addition, the accessibility of the mobile phone app may have been limited amongst marginalized communities, as well as those with reading and motor skill difficulties. Moreover, SES constraints might have excluded low-income individuals due to restricted access to digital devices and the internet (termed data poverty; Lucas et al., 2020), whilst language and literacy barriers could have posed challenges for certain population segments in comprehending and responding to the poll questions effectively (Davis & Farmer, 2016). Our sample was more likely to be White and from higher educational backgrounds. Together this suggests our findings cannot be considered to be representative of the English population, and this limits the generalisability of our findings.

Additionally, this study focused exclusively on the later stages of the pandemic. As early data was not available, these results cannot speak to the impact of the pandemic,

compared to pre-pandemic levels, specifically. However, given a wealth of research examining the first lockdown period (e.g., (Fancourt et al., 2021), there is still utility in examining the impact of subsequent waves.

Finally, the analyses conducted are unable to determine the basis for the association between the predictors and mental health (Sigurvinsdottir et al., 2020). More specifically, because the pandemic and the restrictions were nationwide, there was no available control/comparative group who were not exposed to the pandemic. Consequently, our results cannot determine whether COVID-19-related stressors caused mental health problems or vice versa, whether the relationship is bidirectional, or whether some underlying unmeasured third factor gave rise to associations.

## 5. Conclusion

Between Oct 2020 and March 2021, England encountered significant changes in exposure to COVID-19 and a range of policy measures were implemented to try to prevent the spread of the disease and protect public health services from being overwhelmed. Our results indicated that the implementation of COVID-19 restrictions led to a decline in mental health with gradual recovery during later phases of our study and despite the increasing stringency of restrictions. This suggest that people adapted to the pandemic related stresses.

Several unique COVID-19 -related stressors in both analyses were stably associated with poorer mental health regardless of the study period. Some of these predicted changes in mental health at each time period and others at specific time points. In addition, other COVID-19 related stressors were only associated with changes in mental health at specific time points. Our findings not only highlight the multifaceted nature of the impact of the pandemic on mental health but also how responses have changed over time in complex ways.

The results provide a rich source of evidence for hypothesis generation and future research to test.

# Chapter 4

# Integration, Impact, and Dissemination

## 4.1. Integration

*a) Synergy between the Systematic Review and Empirical Study*

There has been a surge of interest in the impact of the COVID-19 pandemic on mental health, with considerable effort undertaken to identify the risk factors for psychopathology during this period (Saunders et al., 2021). However, research on psychopathology during the COVID-19 pandemic is limited by the use of cross-sectional data, and emerging longitudinal studies have reported inconsistent findings (Wang & Cheng, 2020). Furthermore, whilst many studies have examined known predictors (e.g., gender, age), very few studies have examined whether the COVID-19 pandemic resulted in any unique COVID-19-related stressors that may have contributed to mixed and unexpected findings (Germani et al., 2020; Horesh et al., 2020; Sherman et al., 2021). Furthermore, as most research has focused on the first phase of the pandemic, adequate investigation into the impact of changes in the lockdown restrictions on mental health outcomes has not been conducted. Hence, the aim of this research was twofold. Firstly, to examine the state of the evidence base on the relationship between well-established risk factors and psychopathology during the COVID-19 pandemic and secondly, to clarify the impact of COVID-19-related stressors and how changes in lockdown restrictions influenced changes in mental health.

This topic was chosen because of the reported consequences that the COVID-19 pandemic has had on global mental health (Fancourt et al., 2021). Given the unprecedented

nature of the pandemic, understanding risk and resilience factors for mental health during such adversity is critical for developing effective interventions to support the most vulnerable (Coulombe et al., 2020). Moreover, given that pandemics and other global crises are likely to happen again, it is even more crucial to gain a deeper understanding of the factors contributing to the mental health outcomes of the general public during a national or global health crisis (Madhav, 2017). Together, undertaking such research will have significant consequences for future pandemic planning and policy.

As a trainee clinical psychologist, it is essential to be aware of the mental health challenges my patients might have faced during the COVID-19 pandemic and to be able to offer them appropriate support and treatment. I was intrigued by the possibility of heterogeneity in mental health responses during the COVID-19 pandemic and the specific stressors that may have impacted mental health differently across different periods during the pandemic. In addition, I was also interested in examining whether the restrictions might have created these stressors or if changes in the restrictions simply exacerbated established predictors of mental illness. Much of my clinical experience in training has strongly emphasised the importance of the Biopsychosocial model in addressing one's presenting difficulties (Borrell-Carrio, 2004). I have worked with adults with mild to severe needs and varying presenting difficulties in primary and secondary settings. I recognised how the broader socio-economic context of the COVID-19 pandemic might exacerbate or maintain one's difficulties and have critically informed formulation and interventions. The COVID-19 pandemic and the population-wide restrictions on social activity and work, therefore, presented a novel situation to investigate how environmental changes can impact mental health and interact with risk factors such as age, gender, and prior history of physical and mental health problems (Mutch, 2020).

A systematic review was undertaken to examine the existing evidence base of longitudinal studies examining psychopathology's risk and resilience factors during the COVID-19 pandemic. Although sampling and methodological differences between the studies make it difficult to draw firm conclusions, the findings overall suggest that the female gender, living alone or with children, having a pre-existing mental health condition, lower education attainment, and loneliness impact mental health. Interestingly, other known risk factors such as younger age, financial struggles, physical health conditions and ethnicity status were less consistently associated with different forms of psychopathology. One essential contribution of the systematic review was the relatively robust findings that some of these well-known risk factors remain relevant during the pandemic.

Interestingly, of the 18 papers reviewed, less than five studies examined the impact of COVID-19-related stressors on mental health and only to a minimal extent. All of the studies in the systematic review mainly focused on the relationship between sociodemographic factors, which are time-invariant, individual characteristics. It is unclear how mental health impact is related to time-varying factors such as COVID-19-related stressors. Most importantly, only two studies covered the period until March 2021, and the findings were inconsistent, meaning that our understanding of the impact on later stages of the pandemic is not well known. Together, it is unclear how time-varying predictors increase the risk of psychopathology and the extent to which they vary depending on the stage of the pandemic, especially because more stringent restrictions were implemented during the second peak of the COVID-19 pandemic (Aknin et al., 2022).

Therefore, the empirical study aimed to address these gaps by examining the mental health trends following the early phase of the pandemic and exploring the impact of COVID-19-related stressors on mental health and how these stressors may vary in predicting mental health depending on the restriction measures imposed. The empirical study adopted an

exploratory approach, utilising an English population sample from the UK ATTACH longitudinal study that exploited the potential of technology, using a mobile phone app to assess mental health, with the potential to improve convenience and reach a wider population (Hood et al., 2021). This study examined 34 potential COVID-19-related stressors by using a combined data analysis approach. We found that concerns about one's finances, trusting the government in meeting public needs, doing volunteering work and increased awareness of one's bodily signals were all negatively associated with mental health, whereas being hopeful about the future, enjoyment in day-to-day activities were positively associated with mental health at all time points. Further, concern about the UK's economy and those reporting contact tracing as effective were associated with worsening mental health at each period, whereas increased social media use improved mental health.

This study also showed the relationship between COVID-19-related stressors and changes in mental health at specific periods (baseline, light lockdown, uncertain period, and full lockdown). Working from home, agreeing with travel restrictions, concerns about other's health risk, engaging in vigorous activity, and those who reported a negative impact on the relationship with significant other, and having the belief that the pandemic led to positive changes in one's life were associated with negative changes in mental health at different periods. In contrast, worrying about infections, and cancelling events were associated with better mental health at different periods during the COVID-19 pandemic. Furthermore, several predictors were also revealed through different analytical approaches. Finally, this empirical study also found several COVID-19-related stressors did not seem to be relevant to mental health outcomes during the pandemic.

Overall, both pieces of work identified time-variant and time-invariant factors that increased the risk of poorer mental wellbeing during the pandemic. In addition, the relationship between time-invariant factors and mental health might differ across different

pandemic phases. However, longitudinal research using validated and consistent measures of psychopathology, a larger and more representative sample, along with better measures of psychopathology are needed to confirm this pattern of results. Nevertheless, this research provides novel insights into the predictors of mental health during the later stages of the COVID-19 pandemic in England.

*b) Reflections on the Work*

Because of the impact of the pandemic on research and recruitment of participants and their assessments, I decided to analyse secondary data to avoid the challenges of doing primary research. However, a shortcoming of doing secondary analysis was that the choice of topic area could not duplicate or overlap with topics that were already being investigated by the research team. Consequently, there were restrictions on the variables that could be examined to avoid overlapping aims.

I was pleased to identify that despite the expectation of a "catastrophic effect" of the COVID-19 pandemic on mental health, the findings in this study did not suggest a prolonged deterioration in mental health following stricter and longer restrictions. This indicates that the sample has a fair degree of resilience and perhaps an adaptation to the pandemic, casting doubts on the proposition that there was a "tsunami" of mental health problems because of the COVID-19 pandemic (Shevlin et al., 2021). However, I am aware that the mental health measure was only weakly correlated with standardised measures such as the PHQ-9. The validity of the mental health question is thus unknown.

The ATTACH study was the only study in the UK that exploited the potential of technology, using a mobile phone app to assess mental health, bridge physical distance barriers, and reach a larger portion of the population (Hood et al., 2021). However, there are drawbacks to this approach, including the validity of single-item questions (Schmidt, 2018).

Given that younger people were likely to be more familiar with digital technology, it was surprising that the study sample consisted of more older people; hence, the study findings do not truly represent the general English population. Further, those marginalised communities may not have access to digital devices, limiting the reach of these populations (Davis & Farmer, 2016). These findings and experience made me consider both the benefits and limitations of technology and how this might bias results.

This research was initiated whilst the pandemic was ongoing, and consequently, more work was done remotely, with fewer face-to-face meetings with the research team and my supervisor. Remote working facilitates arranging meetings and is more time efficient, but the reduced interpersonal contact has drawbacks. This has made me reflect on the challenges of conducting research in isolation and highlighted the importance of working as part of a team, particularly under time or resource constraints. With the research team based in different countries, this made liaison more challenging and highlighted the importance of communication. Having previously worked as a research assistant on large-scale longitudinal studies, I witnessed the benefits of teamwork in this context, such as deciding on the best ways to recode the variables, determining the most appropriate statistical analyses, and collaborating to meet research deadlines. This is particularly relevant when conducting clinical research as the dual role of scientist-practitioner requires balancing clinical duties with research responsibilities.

Although a fundamental competency of clinical psychologists is to conduct research, I noticed that clinical research often has a lower priority than more pressing priorities, such as doing clinical work or achieving clinical targets (Chow & Chang, 2008). One way to employ our research skills as clinical psychologists is through endeavours like service-related or quality improvement projects, whereby multi-disciplinary staff research to inform their assessments and treatment strategies (Alderwick et al., 2017). Further, clinical psychologists

should demonstrate leadership, collaboration, and supervisory skills and use task shifting by creating links with local universities to develop clinically relevant postgraduate projects.

### 4.2. Impact

*a) Clinical and Research Implications*

This is an exploratory observational study, therefore, taking the findings as having any clear clinical significance is premature. Nonetheless, both the systematic review and empirical study hold theoretical and clinical significance within clinical psychology. The results confirmed previous research demonstrating the importance of gender, living arrangement, lower education attainment and prior mental health problems on mental health. Moreover, the findings highlight the complex effects of the pandemic and the restrictions implemented on risk and protective effects on mental health. Together, both pieces of work add to the existing literature by focusing on the unique context of the COVID-19 pandemic and provide insights into the dynamic nature of mental health and the importance of tailoring interventions to specific phases of the pandemic.

By highlighting the importance of considering time-variant factors such as COVID-19-related stressors, our findings can inform theoretical models of psychopathology and refine existing clinical interventions. The Cognitive Behavioural Model that addresses maladaptive thoughts, such as catastrophising or over-generalisation of the negative impact of COVID-19 and its behavioural activation component (e.g., increasing engagement in pleasurable daily activities), may help address social isolation, coping with disruptions, managing remote work-related challenges or financial support and stress management (Beck, 1979; Selvapandiyan, 2022). In addition, the third-wave cognitive behavioural model incorporates mindfulness-based approaches and acceptance-based strategies, emphasising the importance of accepting and experiencing complex thoughts and situations (Kahl et al.,

2012). This model aims to cultivate a non-judgmental and compassionate stance towards oneself which is essential during adversity (Kahl et al., 2012).

The findings of the empirical study are also relevant to social psychology by exploring the impact of social and environmental factors, such as lockdown measures and government responses, on mental health. It also intersects with health psychology by examining the psychological consequences of COVID-19-related stressors and their implications for wellbeing. Whilst the primary focus is psychology, the work extends to other academic disciplines such as sociology and public health. Sociologically, it sheds light on the social determinants of mental health during a pandemic and the implications of social inequalities (Hosseinzadeh et al., 2022). In public health, the study contributes to understanding the psychological impact of COVID-19-related stressors and can inform strategies for promoting mental wellbeing in the population (Hotopf et al., 2020). Most importantly, the empirical study found that prolonged restrictions did not give rise to poorer mental wellbeing and suggested that people may be resilient and able to adapt to adversity. These findings will help inform the debates surrounding the advantages and disadvantages of restrictions on mental health, ultimately informing public health policy on balancing the effects of lockdown measures.

Different groups within the general population may have different attitudes towards the risks posed by the pandemic and, therefore, more or less compliance with the restrictions. Some studies have reported that younger people are less likely to comply (Wright & Fancourt, 2021). This could be examined as a future component of this research. Further research will improve the methods in readiness for future outbreaks, including better mental health measures, better means of collecting and capturing data and engaging and reaching more disadvantaged and vulnerable groups.

*b) Personal Impact*

The research has reiterated the importance of invariant and variant factors in developing mental health difficulties during the COVID-19 pandemic. Cognitive Behavioural Therapy (CBT) can help individuals develop resilience in the face of adversity, improve coping skills, and may lower the long-term effects of pandemic-related stressors. As the primary therapeutic model taught at RHUL is CBT, I will be able to use my knowledge and these models for many of my patients and prioritise cognitive and behavioural factors and emotional experiences of the COVID-19 pandemic. It will be vital for me to carry my research findings forward and consider broader socio-economic contexts in clinical formulations and interventions. It is essential to consider this when working with adults across all settings. I am particularly keen to integrate my knowledge of risk and resilience factors into my clinical work. I personally contracted COVID-19 and was also obliged to adhere to the restrictions and follow the local NHS policy, which gave me insights into the stressors of the pandemic.

### 4.3. Dissemination

The findings of this study will be shared with those who participated, as well as researchers and clinicians in similar areas. The empirical study findings have been presented to current trainees on the RHUL DClinPsy course to increase awareness of the risk and resilience factors of poor mental health and will help guide potential interest in this area for future DClinPsy research projects. In addition, I will be working with some public members to create a lay blog post on findings to put on the ATTACH website so that participants can access study findings. In addition, I will be sharing the findings with general public information websites such as the Conversation. We hope to submit the systematic review and

empirical study to several journals, for example, ‘The Journal of Clinical Psychology’ or ‘Frontiers in Psychology’.

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# Appendices

## Appendix A

## Poll questions.

| Poll questions |
| --- |
| In the past week, has it been difficult to fully comply with the current pandemic measures outlined by the government? |
| Do you think contact tracing methods are working? |
| In the past week, did you wear a mask when in moderate/high risk situations (e.g., shops, public transport) |
| Are you concerned that key workers have the PPE they need? |
| Do you agree with the government's current travel restrictions? |
| Do you think that the current COVID-19 testing levels are adequate? |
| In the past week, have you felt that the reasons for the current pandemic measures have been made clear? |
| In the past week, how much attention have you paid to signals from your body (e.g., breathing, stomach, heart)? |
| In the past week, have you been able to access all of the social or health services you needed? |
| In the past week, how often did you do any vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling? |
| In the past week, from whom have you been most concerned about health risk? |
| In the past week, have you been worried about your parent's or older friends' health? |
| In the past week, have you been able to enjoy your normal day-to-day activities? |
| In the past week, how much time have you spent outside the home? (e.g., shopping, parks, etc.) |

| |
|---|
| In the past week, has the COVID-19 pandemic led to any positive changes in your life? |
| In the past week, how worried have you been about being infected with COVID-19? |
| In the past week, what has worried you the most about the COVID-19 pandemic? |
| In the past week, have you felt that the COVID-19 pandemic could bring people together or tear people apart? |
| In the past week have you been more concerned than usual about your finances? |
| In the past week, have you been worried about your job security? |
| In the past week, have you been worried about the UK's economic stability? |
| In the past month, have you been concerned about the financial stability of your living situation? |
| In the past week, have you been reassured by the government'' response? |
| In the past week, have you trusted the government to do everything in their power to ensure that the basic needs of the public are met? |
| For the majority of the past week, have you worked from home? |
| In the past week, have you been involved in voluntary work? |
| In the past week have you felt that COVID-19 has had a negative impact on your relationship with your spouse or significant other? |
| In the past month, have you had to cancel an event that was important to you? (e.g., holiday, party etc.) |
| In the past week, have you spent more time than usual using social media (e.g., Facebook, WhatsApp, Instagram) |
| In the past week, have most of your interactions been: |
| In the past week, how would you describe your mental health? |
| In the past week, have you felt hopeful about the future? |
| In the past week, how hopeful have you been that the COVID-19 pandemic will end soon? |
| In the past week, how much help or support have you PROVIDED to family, friends, or neighbours? |

In the past week, how much help or support have you RECEIVED from family, friends, or neighbours?

In the past week, have you worried that lifting social distancing measures will affect your health?

In the past week, have you felt that the reasons for the current pandemic measures have been made clear?

In the past week, have you worried that there will be another pandemic?

In the past week, have you spent more time than usual exercising outside?

In the past week, have you worried that there will be a second wave of the COVID-19 pandemic?

In the past week, have you spent more time than usual using your mobile phone?

Do you think a coronavirus vaccine will be available in the next few months?

Will you get the COVID-19 vaccine when it is recommended and available to you?

Do you agree with the new school closures?

Do you think the current safety measures in schools are adequate?

In the past week, how concerned have you been new COVID-19 variants?

Are you or do you know someone experiencing “long COVID1-” symptoms

Will you get or have or already received the COVID-19 vaccine when it is recommended and available to you?

Do you feel that in-person schooling is safe?

During this month, have you or do you plan to attend a gathering/party etc?

Do you currently think that traveling by public transportation (e.g., bus, tube, train) are safe?

In the past month, have you agreed with your local Tier levels?

In the past month, have you been worried about shortages of essential items in the UK (e.g., food, medicine)?

During the past month, do you feel that the Tier level restrictions in your area have been made clear?

Do you think that there is currently a scientific consensus on how to manage the COVID-19 pandemic?

During the past month, have you missed/cancelled any medical appointments/surgeries etc?

Do you think the government is sharing information about COVID-19 with the public effectively?

How do you think that the UK is managing the COVID-19 pandemic in comparison to other countries?

Do you think that the NHS can handle the current level of COVID-19 patients needing hospitalisation?

In the past month, have you had a COVID test and what was the result?"

During the past week, have you felt closer to your friends?

During the past week, have you spent more time with your friends/family?

Do you feel that in-person schooling is safe?

During the past week, have you felt closer to your family?

During the past week, have you spent more time with your family?

In the past week have you felt that COVID-19 has had a negative impact on your family?

In the past week, have you worried that there will be another pandemic?

In the past week, have you felt that the current pandemic measures are?

In the past week, how worried have you been about the on-going COVID-19 pandemic?

In the past week, have you or anyone in your household tested positive for COVID-19?

In the past week, have you or anyone in your household received medical treatment for COVID-19?

In the past week, have you followed social distancing measures?

In the past week, have you or anyone in your household experienced any COVID-19 symptoms (e.g., cough, fever, loss of smell)?

In the past week, how much difficulty have you had limiting close contact with people outside of your home?

In the past week, what do you think the government has been prioritizing most in their response to the COVID-19 pandemic?

During the past week, have you spent more time with your friends?

## Appendix B

**Table showing the number of responses and missing data of the 35 poll questions at each time point**

| | | | Baseline | | Light Lockdown | | Uncertain | | Full Lockdown | |
|---|---|---|---|---|---|---|---|---|---|---|
| Variables code | Poll questions | Response | N | Missing (%) | N | Missing (%) | N | Missing (%) | N | Missing (%) |
| ComplyMeasures | In the past week, has it been difficult to fully comply with the current pandemic measures outlined by the government? | No<br>Somewhat<br>Yes | 303 | 48.6 | 320 | 45.7 | 327 | 44.5 | 344 | 41.6 |
| ContactTracing | Do you think contact tracing methods are working? | No<br>Unsure<br>Yes | 349 | 40.7 | 307 | 47.9 | 321 | 45.5 | 326 | 44.7 |
| MaskTransport | In the past week, did you wear a mask when in moderate/high-risk situations (e.g., shops, public transport) | No<br>Sometimes<br>Very | 361 | 38.7 | 333 | 43.5 | 305 | 48.2 | 339 | 42.4 |
| KeyworkersPPE | Are you concerned that key workers have the PPE they need? | No<br>Somewhat<br>Yes | 338 | 42.6 | 327 | 44.5 | 306 | 48 | 336 | 43 |
| TravelRestrictions | Do you agree with the government's current travel restrictions? | No<br>Somewhat<br>Yes | 341 | 42.1 | 328 | 44.3 | 307 | 47.9 | 334 | 43.3 |
| TestLevels | Do you think that the current COVID-19 testing levels are adequate? | No<br>Somewhat<br>Yes | 343 | 41.8 | 298 | 49.4 | 326 | 44.7 | 321 | 45.5 |
| MeasuresClear | In the past week, have you felt that the reasons for the current pandemic measures have been made clear? | No<br>Somewhat<br>Yes | 313 | 46.9 | 336 | 43 | 328 | 44.3 | 295 | 49.9 |
| BodySignals | In the past week, how much attention have you paid to signals from your body (e.g., breathing, stomach, heart)? | None<br>A little<br>A lot | 304 | 48.4 | 312 | 47 | 331 | 43.8 | 344 | 41.6 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| HealthSocial | In the past week, have you been able to access all of the social or health services you needed? | No<br>Not required<br>Yes | 326 | 44.7 | 323 | 45.2 | 334 | 43.3 | 340 | 42.3 |
| VigourousActivity | In the past week, how often did you do any vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling? | None<br>Some<br>Most days | 305 | 48.2 | 329 | 44.1 | 319 | 45.8 | 346 | 41.3 |
| HealthRisk | In the past week, from whom have you been most concerned about health risks? | Others<br>Loved ones<br>Myself | 310 | 47.4 | 326 | 44.7 | 323 | 45.2 | 313 | 46.9 |
| OlderFriend | In the past week, have you been worried about your parent's or older friends' health? | Not at all<br>A little<br>A lot | 347 | 41.1 | 301 | 48.9 | 330 | 44 | 336 | 43 |
| NormalActivities | In the past week, have you been able to enjoy your normal day-to-day activities? | No<br>Somewhat<br>Yes | 310 | 47.4 | 327 | 44.5 | 316 | 46.3 | 331 | 43.8 |
| TimeOutside | In the past week, how much time have you spent outside the home? (e.g., shopping, parks, etc.) | None<br>A little<br>A lot | 308 | 47.7 | 324 | 45 | 319 | 45.8 | 333 | 43.5 |
| PositiveChange | In the past week, has the COVID-19 pandemic led to any positive changes in your life? | None<br>A few<br>Some | 321 | 45.5 | 334 | 43.3 | 318 | 46 | 334 | 43.3 |
| WorriedInfect | In the past week, how worried have you been about being infected with COVID-19? | Not at all<br>Somewhat<br>Very | 315 | 46.5 | 323 | 45.2 | 324 | 45 | 329 | 44.1 |
| MostWorriedCovid | In the past week, what has worried you the most about the COVID-19 pandemic? | Finance<br>Security<br>Health | 308 | 47.7 | 316 | 46.3 | 319 | 45.8 | 340 | 42.3 |
| ApartCovid | In the past week, have you felt that the COVID-19 pandemic could bring people together or tear people apart? | Apart<br>Unsure<br>Together | 349 | 40.7 | 310 | 47.4 | 329 | 44.1 | 328 | 44.3 |
| ConcernFinances | In the past week, have you been more concerned than usual about your finances? | No<br>Somewhat<br>Yes | 312 | 47 | 337 | 42.8 | 365 | 38 | 305 | 48.2 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| JobSecurity | In the past week, have you been worried about your job security? | No<br>Somewhat<br>Yes | 346 | 41.3 | 303 | 48.6 | 335 | 43.1 | 335 | 43.1 |
| FinanceUK | In the past week, have you been worried about the UK's economic stability? | Not at all<br>A little<br>A lot | 342 | 41.9 | 311 | 47.2 | 332 | 43.6 | 328 | 44.3 |
| FinanceYour | In the past month, have you been concerned about the financial stability of your living situation? | Not at all<br>A little<br>A lot | 339 | 42.4 | 337 | 42.8 | 318 | 46 | 331 | 43.8 |
| ReassureGovern | In the past week, have you been reassured by the governments' response? | No<br>Somewhat<br>Yes | 306 | 48 | 328 | 44.3 | 323 | 45.2 | 340 | 42.3 |
| TrustCOVID | In the past week, have you trusted the government to do everything in their power to ensure that the basic needs of the public are met? | No<br>Somewhat<br>Yes | 313 | 46.9 | 328 | 44.3 | 369 | 37.4 | 318 | 46 |
| Workedhome | For the majority of the past week, have you worked from home? | No<br>Somewhat<br>Yes | 313 | 46.9 | 323 | 45.2 | 365 | 38 | 307 | 47.9 |
| VoluntaryWork | In the past week, have you been involved in voluntary work? | No<br>Somewhat<br>Yes | 317 | 46.2 | 331 | 43.8 | 326 | 44.7 | 340 | 42.3 |
| NegativeSpouse | In the past week have you felt that COVID-19 has had a negative impact on your relationship with your spouse or significant other? | No<br>Somewhat<br>Yes | 299 | 49.2 | 325 | 44.8 | 319 | 45.8 | 340 | 42.3 |
| CancelEvent | In the past month, have you had to cancel an event that was important to you? (e.g., holiday, party etc.) | No<br>Postponed<br>Yes | 333 | 43.5 | 331 | 43.8 | 329 | 44.1 | 335 | 43.1 |
| SocialMedia | In the past week, have you spent more time than usual using social media (e.g., Facebook, WhatsApp, Instagram) | No<br>Somewhat<br>Yes | 297 | 49.6 | 336 | 43 | 318 | 46 | 336 | 43 |
| Interactions | In the past week, have most of your interactions been: | Online<br>A mix of both<br>In-person | 316 | 46.3 | 327 | 44.5 | 315 | 46.5 | 343 | 41.8 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| MentalHealth | In the past week, how would you describe your mental health? | Poor<br>Average<br>Good | 313 | 46.9 | 331 | 43.8 | 373 | 36.7 | 315 | 46.5 |
| HopeFuture | In the past week, have you felt hopeful about the future? | No<br>Somewhat<br>Yes | 302 | 48.7 | 322 | 45.3 | 326 | 44.7 | 332 | 43.6 |
| HopeCovidEnd | In the past week, how hopeful have you been that the COVID-19 pandemic will end soon? | No<br>Somewhat<br>Yes | 325 | 44.8 | 323 | 45.2 | 321 | 45.5 | 314 | 46.7 |
| ProvideFamily | In the past week, how much help or support have you PROVIDED to family, friends, or neighbours? | None<br>A little<br>A lot | 312 | 47 | 337 | 42.8 | 313 | 46.9 | 321 | 45.5 |
| ReceiveFamily | In the past week, how much help or support have you RECEIVED from family, friends, or neighbours? | None<br>A little<br>A lot | 311 | 47.2 | 333 | 43.5 | 318 | 46 | 339 | 42.4 |

## Appendix C

**Descriptive statistics of the poll question responses at each phase of the study.**

| | Restrictions | | | | Statistics | |
|---|---|---|---|---|---|---|
| **Variable** | **Baseline** | **Light-Lockdown** | **Uncertain** | **Full-Lockdown** | $X^2$ | ***P* value** |
| **Comply Measures** | | | | | | |
| **No** | 491(83.4) | 503(85.4) | 491(83.4) | 559(94.9) | 46.82 | <0.001 |
| **Yes** | 98(16.6) | 86(14.6) | 98(16.6) | 30(5.1) | | |
| **Worked Home** | | | | | | |
| **No** | 127(21.6) | 127(21.6) | 484(82.2) | 63(10.7) | | |
| **Yes** | 462(78.4) | 462(78.4) | 105(17.8) | 526(89.3) | 832 | <0.001 |
| **Concern Finance** | | | | | | |
| **No** | 512(86.9) | 489(83) | 540(91.7) | 550(93.4) | | |
| **Yes** | 77(13.1) | 100(17) | 49(8.3) | 39(6.6) | 39.03 | <0.001 |
| **Voluntary Work** | | | | | | |
| **No** | 526(89.3) | 508(86.2) | 503(85.4) | 537(91.2) | 12.07 | 0.007 |
| **Yes** | 63(10.7) | 81(13.8) | 86(14.6) | 52(8.8) | | |
| **Positive Change** | | | | | | |
| **No** | 525(89.1) | 493(83.7) | 522(88.6) | 533(90.5) | 14.69 | 0.002 |
| **Yes** | 64(10.9) | 96(16.3) | 67(11.4) | 56(9.5) | | |
| **Mask Transport** | | | | | | |
| **No** | 12(2) | 6(1) | 1(0.2) | 1(0.2) | 16.54 | <0.001 |
| **Yes** | 577(98) | 583(99) | 588(99.8) | 588(99.8) | | |
| **Key Workers PPE** | | | | | | |
| **No** | 69(11.7) | 80(13.6) | 71(12.1) | 44(7.5) | 12.18 | 0.007 |
| **Yes** | 520(88.3) | 509(86.4) | 518(87.9) | 545(92.5) | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Travel Restriction** | | | | | | |
| **No** | 49(8.3) | 42(7.1) | 23(3.9) | 6(1) | 39.69 | <0.001 |
| **Yes** | 540(91.7) | 547(92.9) | 566(96.1) | 583(99) | | |
| **Test Levels** | | | | | | |
| **No** | 498(84.6) | 512(86.9) | 448(76.1) | 47(8) | 1080.21 | <0.001 |
| **Yes** | 91(15.4) | 77(13.1) | 141(23.9) | 542(92) | | |
| **Negative Spouse** | | | | | | |
| **No** | 509(86.4) | 516(87.6) | 500(84.9) | 544(92.4) | 17.18 | <0.001 |
| **Yes** | 80(13.6) | 73(12.4) | 89(15.1) | 45(7.6) | | |
| **Normal Activities** | | | | | | |
| **No** | 46(7.8) | 97(16.5) | 81(13.8) | 42(7.1) | 36.63 | <0.001 |
| **Yes** | 543(92.2) | 492(83.5) | 508(86.2) | 547(92.9) | | |
| **Reassured Govern** | | | | | | |
| **No** | 504(85.6) | 135(22.9) | 138(23.4) | 57(9.7) | 895.7 | <0.001 |
| **Yes** | 85(14.4) | 454(77.1) | 451(76.6) | 532(90.3) | | |
| **Hope Future** | | | | | | |
| **No** | 98(16.6) | 66(11.2) | 51(8.7) | 30(5.1) | 44.73 | <0.001 |
| **Yes** | 491(83.4) | 523(88.8) | 538(91.3) | 559(94.9) | | |
| **Measures Clear** | | | | | | |
| **No** | 82(13.9) | 59(10) | 56(9.5) | 28(4.8) | | |
| **Yes** | 507(86.1) | 530(90) | 533(90.5) | 561(95.2) | 28.87 | <0.001 |
| **Social Media** | | | | | | |
| **No** | 581(98.6) | 483(82) | 513(87.1) | 526(89.3) | | |
| **Yes** | 8(1.4) | 106(18) | 76(12.9) | 63(10.7) | 89.31 | <0.001 |
| **Vigorous Activity** | | | | | | |
| **None** | 445(75.6) | 438(74.4) | 462(78.4) | 509(86.4) | 35.58 | <0.001 |
| **Some days** | 93(15.8) | 99(16.8) | 89(15.1) | 63(10.7) | | |
| **Most days** | 51(8.7) | 52(8.8) | 38(6.5) | 17(2.9) | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Worried Infect** | | | | | | |
| **Not at all** | 90(15.3) | 93(15.8) | 62(10.5) | 41(7) | 85.78 | <0.001 |
| **Somewhat** | 460(78.1) | 461(78.3) | 471(80) | 539(91.5) | | |
| **Very** | 39(6.6) | 35(5.9) | 56(9.5) | 0(0) | | |
| **Hope Covid End** | | | | | | |
| **No** | 529(89.8) | 422(71.6) | 493(83.7) | 71(12.1) | 1063.8 | <0.001 |
| **Somewhat** | 43(7.3) | 139(23.6) | 86(14.6) | 508(86.2) | 8 | |
| **Yes** | 17(2.9) | 28(4.8) | 10(1.7) | 10(1.7) | | |
| **Mental Health** | | | | | | |
| **Poor** | 30(5.1) | 36(6.1) | 39(6.6) | 30(5.1) | 37.95 | <0.001 |
| **Average** | 72(12.2) | 132(22.4) | 71(12.1) | 76(12.9) | | |
| **Good** | 487(82.7) | 421 (71.5) | 479 (81.3) | 483(82) | | |
| **Provide Family** | | | | | | |
| **None** | 60(10.2) | 62(10.5) | 52(8.8) | 19(3.2) | 50.62 | <0.001 |
| **A little** | 472(80.1) | 470(79.8) | 481(81.7) | 547(92.9) | | |
| **A lot** | 57(9.7) | 57(9.7) | 56(9.5) | 23(3.9) | | |
| **Receive Family** | | | | | | |
| **None** | 115(19.5) | 132(22.4) | 449(76.2) | 67(11.4) | 740.25 | <0.001 |
| **A little** | 443(75.2) | 425 (72.2) | 111(18.8) | 508(86.2) | | |
| **A lot** | 31(5.3) | 32(5.4) | 29(4.9) | 14(2.4) | | |
| **Body Signals** | | | | | | |
| **None** | 34(5.8) | 48(8.1) | 48(8.1) | 20(3.4) | 29.96 | <0.001 |
| **A little** | 469(79.6) | 459(77.9) | 459(77.9) | 518(87.9) | | |
| **A lot** | 86(14.6) | 82(13.9) | 82(13.9) | 51(8.7) | | |
| **Time Outside** | | | | | | |
| **None** | 16(2.7) | 22(3.7) | 25(4.2) | 18(3.1) | 58.60 | <0.001 |
| **A little** | 475(80.6) | 496(84.2) | 508(86.2) | 550(93.4) | | |
| **A lot** | 98(16.6) | 71(12.1) | 56(9.5) | 21(3.6) | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Cancel Event** | | | | | | |
| **No** | 121(20.5) | 120(20.4) | 91(15.4) | 512(86.9) | 896.39 | <0.001 |
| **Yes** | 468(79.5) | 469(79.6) | 498(84.6) | 77(13.1) | | |
| **Older Friend** | | | | | | |
| **Not at all** | 92(15.6) | 43(7.3) | 66(11.2) | 39(6.6) | 33.22 | <0.001 |
| **A little/ A lot** | 497(84.4) | 546(92.7) | 523(88.8) | 550(93.4) | | |
| **Job Security** | | | | | | |
| **No** | 520(88.3) | 539(91.5) | 523(88.8) | 547(92.9) | 9.73 | 0.021 |
| **Yes** | 69(11.7) | 50(8.5) | 66(11.2) | 42(7.1) | | |
| **Trust Covid** | | | | | | |
| **No** | 533(90.5) | 507(86.1) | 551(93.6) | 532(90.3) | 18.69 | <0.001 |
| **Yes** | 56(9.5) | 82(13.9) | 38(6.5) | 57(9.7) | | |
| **Contact Tracing** | | | | | | |
| **No** | 585(99.3) | 582(98.8) | 581(98.6) | 581(98.6) | 1.61 | 0.66 |
| **Yes** | 4(0.7) | 7(1.2) | 8(1.4) | 8(1.4) | | |
| **Finance UK** | | | | | | |
| **Not at all** | 442(75) | 462(78.4) | 462(78.4) | 533(90.5) | 52.02 | <0.001 |
| **A little/A lot** | 147(25) | 127(21.6) | 127(21.6) | 56(9.5) | | |
| **Finance Your** | | | | | | |
| **Not at all** | 454(77.1) | 456(77.4) | 474(80.5) | 524(89) | 35.15 | <0.001 |
| **A little/A lot** | 135(22.9) | 133(22.6) | 115(19.5) | 65(11) | | |
| **Health Social** | | | | | | |
| **No** | 449(76.2) | 460(78.1) | 449(76.2) | 507(86.1) | 23.62 | <0.001 |
| **Yes** | 140(23.8) | 129(21.9) | 140(23.8) | 82(13.9) | | |
| **Apart Covid** | | | | | | |
| **Apart** | 449(76.2) | 537(91.2) | 526(89.3) | 557(94.6) | 106.41 | <0.001 |
| **Together** | 140(23.8) | 52(8.8) | 63(10.7) | 32(5.4) | | |
| **Interactions** | | | | | | |
| **Online** | 80(13.6) | 432(73.3) | 452(76.7) | 81(13.8) | 948.97 | <0.001 |
| **A mix of both** | 470(79.8) | 133(22.6) | 120(20.4) | 501(85.1) | | |
| **In-person** | 39(6.6) | 24(4.1) | 17(2.9) | 7(1.2) | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Most Worried Covid** | | | | | | |
| **Finance** | 36(6.1) | 34(5.8) | 37(6.3) | 20(3.4) | 25.71 | |
| **Security** | 525(89.1) | 540(91.7) | 532(90.3) | 565(95.9) | | <0.001 |
| **Health** | 28(4.8) | 15(2.5) | 20(3.4) | 4(0.7) | | |
| **Health Risk** | | | | | | |
| **None** | 465(78.9) | 373(63.3) | 483(82) | 481(81.7) | 145.64 | <0.001 |
| **Some** | 97(16.5) | 216(36.7) | 81(13.8) | 88(14.9) | | |
| **Most days** | 27(4.6) | 0(0) | 25(4.2) | 20(3.4) | | |

## Appendix D1

## Table showing bivariate spearman correlations between variables during baseline.

| Correlations | Spearman's rho | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| **1** | **ComplyMeasures** | - | | | | | | | | | | | | | | | | |
| **2** | **WorkedHome** | -.212** | - | | | | | | | | | | | | | | | |
| **3** | **ConcernFinances** | .192** | -.207** | - | | | | | | | | | | | | | | |
| **4** | **VoluntaryWork** | .185** | -0.077 | 0.045 | - | | | | | | | | | | | | | |
| **5** | **PositiveChange** | .108** | -0.06 | .172** | .091* | - | | | | | | | | | | | | |
| **6** | **MaskTransport** | 0 | 0.025 | -0.015 | 0.011 | 0.05 | - | | | | | | | | | | | |
| **7** | **KeyworkersPPE** | -0.064 | .196** | -0.031 | -0.062 | 0.025 | 0.06 | - | | | | | | | | | | |
| **8** | **TravelRestrictions** | -.146** | 0.08 | 0.007 | -0.035 | -0.033 | .261** | .081* | - | | | | | | | | | |
| **9** | **TestLevels** | 0.036 | -.101* | 0.043 | -0.026 | .138** | -0.005 | -.253** | -0.007 | - | | | | | | | | |
| **10** | **NegativeSpouse** | .235** | -.158** | .228** | 0.071 | .085* | 0.057 | -.087* | -0.078 | -0.032 | - | | | | | | | |
| **11** | **NormalActivities** | -.142** | .140** | -.187** | -0.063 | -.203** | 0.048 | -0.027 | .141** | 0.019 | -.199** | - | | | | | | |
| **12** | **ReassureGovern** | -0.015 | -.292** | .084* | 0.061 | .105* | -0.009 | -.211** | 0.071 | .306** | .147** | 0.011 | - | | | | | |
| **13** | **HopeFuture** | -.192** | .224** | -.178** | -0.067 | -0.034 | 0.032 | .149** | .278** | -.112** | -.195** | .210** | -0.037 | - | | | | |
| **14** | **MeasuresClear** | -.281** | .202** | -.237** | -.146** | -.112** | 0.011 | 0.021 | .216** | 0.05 | -.141** | .102* | 0.067 | .294** | - | | | |
| **15** | **SocialMedia** | 0.066 | 0.018 | 0.042 | -0.041 | -0.041 | 0.017 | -.094* | -0.071 | -0.01 | .082* | -0.021 | 0.035 | -.105* | 0.005 | - | | |
| **16** | **VigourousActivity** | .086* | -.121** | .088* | .171** | .235** | 0.005 | -.149** | -.117** | .204** | .165** | -.128** | .199** | -.191** | -.138** | -0.004 | - | |
| **17** | **WorriedInfect** | -0.029 | 0.03 | -0.009 | -0.047 | -0.072 | 0.026 | .189** | .109** | -0.038 | -0.038 | 0.076 | 0.027 | 0.072 | .117** | -0.074 | -.176** | - |
| **18** | **HopeCovidEnd** | 0.046 | -.118** | -0.011 | 0.069 | 0.061 | -.106* | -.118** | -0.058 | .123** | .115** | -0.028 | .199** | -0.002 | -0.041 | 0.008 | .175** | -0.027 |
| **19** | **MentalHealth** | -.166** | .273** | -.311** | -.145** | -0.023 | -0.03 | .125** | 0.053 | -0.064 | -.230** | .277** | -.085* | .289** | .141** | -.186** | -0.051 | -0.028 |
| **20** | **ProvideFamily** | .107** | -0.025 | .094* | .115** | .090* | -0.002 | 0.055 | 0.024 | 0.015 | .115** | 0.068 | -0.006 | 0.077 | 0.073 | -0.032 | .091* | .100* |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **21** | **ReceiveFamily** | 0.006 | .146** | -0.051 | 0.021 | -0.041 | -0.043 | .083* | 0.063 | -.119** | -0.007 | .104* | -.162** | .222** | .175** | 0.002 | -.086* | .094* |
| **22** | **BodySignals** | .114** | 0.03 | .192** | 0.058 | .081* | -0.024 | 0.031 | -0.015 | .109** | 0.043 | 0.007 | .120** | -.096* | -0.072 | 0.046 | .117** | .102* |
| **23** | **TimeOutside** | .209** | -.104* | -0.013 | .108** | .088* | 0.072 | -.094* | -.168** | .122** | 0.076 | 0.009 | 0.061 | -.102* | -.172** | 0.031 | .310** | -.255** |
| **24** | **CancelEvent** | 0.001 | .096* | -.164** | -0.055 | -.106* | .105* | 0.063 | .106* | -0.073 | -0.068 | 0.071 | -.090* | .111** | .184** | -0.049 | -.194** | .111** |
| **25** | **OlderFriend** | -0.046 | .098* | 0.028 | -0.002 | 0.045 | .137** | .221** | .192** | -.153** | -0.007 | -0.003 | -0.036 | 0.059 | .151** | -0.03 | -.186** | .280** |
| **26** | **JobSecurity** | 0.05 | -0.018 | .250** | 0.079 | .110** | 0.053 | -.146** | -0.043 | .107** | 0.071 | -.130** | 0.031 | -.107** | -.082* | .094* | .099* | -0.037 |
| **27** | **TrustCovid** | 0.011 | -.161** | 0.012 | -0.019 | 0.017 | 0.047 | -.116** | 0.077 | .198** | 0.074 | 0.051 | .410** | -0.057 | .114** | 0.012 | 0.081 | -0.029 |
| **28** | **ContactTracing** | 0.019 | -0.068 | 0.029 | -0.029 | -0.029 | 0.012 | -.098* | 0.025 | .136** | -0.033 | 0.024 | .201** | 0.037 | 0.033 | .169** | .096* | -0.029 |
| **29** | **FinanceUK** | .259** | -.112** | .160** | .156** | .139** | -0.028 | -.095* | -.196** | .101* | .184** | -.168** | 0.042 | -.290** | -.233** | 0.068 | .206** | 0.018 |
| **30** | **FinanceYour** | .093* | -0.076 | .376** | 0.06 | .082* | 0.021 | -.153** | -0.011 | .147** | .173** | -.157** | .109** | -.136** | -.084* | 0.041 | .140** | 0.08 |
| **31** | **HealthSocial** | .136** | -0.076 | .115** | .129** | .177** | -0.004 | -.119** | -.121** | .203** | .081* | -0.031 | .111** | -.168** | -.133** | 0.003 | .262** | -0.078 |
| **32** | **ApartCovid** | .083* | -0.024 | .091* | 0.065 | .087* | 0.024 | -0.069 | 0.009 | .081* | .093* | -.090* | .088* | -.115** | -0.075 | 0.003 | .116** | -0.022 |
| **33** | **Interactions** | 0.001 | -0.04 | -0.013 | -0.046 | -0.037 | 0.033 | -0.027 | -.112** | -.083* | -0.068 | .176** | -0.026 | -0.003 | -0.026 | -0.014 | 0.065 | -0.071 |
| **34** | **MostWorriedCovid** | -0.053 | 0.035 | -.123** | -0.036 | -.086* | -0.042 | -0.062 | .100* | 0.017 | 0.015 | .162** | -0.013 | -0.045 | .089* | -0.04 | 0.049 | 0.039 |
| **35** | **HealthRisk** | .107** | -.275** | .236** | .087* | .110** | -0.022 | -0.057 | -.090* | .134** | .236** | -.120** | .184** | -.200** | -.177** | -0.019 | .138** | 0.038 |

| **Correlations** | **Spearman's rho** | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
| **1** | **ComplyMeasures** | | | | | | | | | | | | | | | | | | |
| **2** | **WorkedHome** | | | | | | | | | | | | | | | | | | |
| **3** | **ConcernFinances** | | | | | | | | | | | | | | | | | | |
| **4** | **VoluntaryWork** | | | | | | | | | | | | | | | | | | |
| **5** | **PositiveChange** | | | | | | | | | | | | | | | | | | |
| **6** | **MaskTransport** | | | | | | | | | | | | | | | | | | |
| **7** | **KeyworkersPPE** | | | | | | | | | | | | | | | | | | |
| **8** | **TravelRestrictions** | | | | | | | | | | | | | | | | | | |
| **9** | **TestLevels** | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **10** | **NegativeSpouse** | | | | | | | | | | | | | | | | | | |
| **11** | **NormalActivities** | | | | | | | | | | | | | | | | | | |
| **12** | **ReassureGovern** | | | | | | | | | | | | | | | | | | |
| **13** | **HopeFuture** | | | | | | | | | | | | | | | | | | |
| **14** | **MeasuresClear** | | | | | | | | | | | | | | | | | | |
| **15** | **SocialMedia** | | | | | | | | | | | | | | | | | | |
| **16** | **VigourousActivity** | | | | | | | | | | | | | | | | | | |
| **17** | **WorriedInfect** | | | | | | | | | | | | | | | | | | |
| **18** | **HopeCovidEnd** | - | | | | | | | | | | | | | | | | | |
| **19** | **MentalHealth** | - | | | | | | | | | | | | | | | | | |
| **20** | **ProvideFamily** | -0.055 | - | | | | | | | | | | | | | | | | |
| **21** | **ReceiveFamily** | 0.006 | -0.047 | - | | | | | | | | | | | | | | | |
| **22** | **BodySignals** | -0.062 | 0.063 | .321** | - | | | | | | | | | | | | | | |
| **23** | **TimeOutside** | -0.079 | -.162** | .091* | 0.062 | - | | | | | | | | | | | | | |
| **24** | **CancelEvent** | .092* | 0.005 | 0.048 | -0.012 | 0.031 | - | | | | | | | | | | | | |
| **25** | **OlderFriend** | -.103* | 0.075 | .127** | .244** | -0.04 | 0.031 | - | | | | | | | | | | | |
| **26** | **JobSecurity** | -.135** | 0.039 | .090* | .114** | 0.028 | -.174** | .244** | - | | | | | | | | | | |
| **27** | **TrustCovid** | .088* | -.163** | -0.008 | 0.017 | 0.05 | -0.032 | -0.063 | -0.032 | - | | | | | | | | | |
| **28** | **ContactTracing** | 0.045 | -0.077 | 0.003 | -.166** | 0.016 | .128** | -.107** | -0.068 | -0.046 | - | | | | | | | | |
| **29** | **FinanceUK** | .178** | 0.038 | 0.001 | -0.018 | 0.03 | 0.022 | -0.009 | -0.021 | 0.034 | .114** | - | | | | | | | |
| **30** | **FinanceYour** | .083* | -.139** | -0.029 | -.083* | .168** | .172** | -0.037 | -.130** | .180** | -0.053 | -0.048 | - | | | | | | |
| **31** | **HealthSocial** | 0.074 | -.269** | -0.012 | -0.039 | .133** | 0.005 | -.203** | -0.01 | .379** | 0.016 | .102* | .190** | - | | | | | |
| **32** | **ApartCovid** | .195** | -.140** | .113** | -0.067 | .120** | .135** | -.190** | -.111** | .107** | 0.064 | .100* | .259** | .160** | - | | | | |
| **33** | **Interactions** | .100* | -.178** | 0.024 | -.107** | .101* | .089* | -.170** | -0.078 | .119** | -0.004 | -0.046 | .139** | .113** | .325** | - | | | |
| **34** | **MostWorriedCovid** | -.081* | 0.04 | .135** | .099* | -.094* | .163** | .115** | 0.03 | -0.053 | -.091* | 0.014 | -0.057 | -.094* | -0.035 | -0.052 | - | | |
| **35** | **HealthRisk** | -0.058 | -0.046 | 0.058 | 0.046 | 0.075 | -.097* | 0.043 | -0.031 | -0.05 | 0.014 | 0.004 | -.133** | -0.028 | 0.071 | .120** | 0.027 | - | - |

*** correlation is significant at the 0.01 level (2-tailed), * correlation is significant at the 0.05 level (2-tailed)*

## Appendix D2

## Table showing bivariate spearman correlations between variables during light lockdown.

| Correlations | Spearman's rho | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| **1** | **ComplyMeasures** | - | | | | | | | | | | | | | | | | |
| **2** | **WorkedHome** | -.192** | - | | | | | | | | | | | | | | | |
| **3** | **ConcernFinances** | .197** | -0.06 | - | | | | | | | | | | | | | | |
| **4** | **VoluntaryWork** | 0.044 | -0.03 | .095* | - | | | | | | | | | | | | | |
| **5** | **PositiveChange** | .091* | -0.037 | .082* | .117** | - | | | | | | | | | | | | |
| **6** | **MaskTransport** | -0.054 | .193** | 0.001 | -0.009 | -0.001 | - | | | | | | | | | | | |
| **7** | **KeyworkersPPE** | -.131** | .093* | -.124** | -.101* | -0.067 | .108** | - | | | | | | | | | | |
| **8** | **TravelRestrictions** | -.147** | .095* | -.103* | -0.043 | -0.056 | .235** | 0.044 | - | | | | | | | | | |
| **9** | **TestLevels** | .182** | -0.054 | .147** | 0.079 | .170** | 0.039 | -.214** | -0.01 | - | | | | | | | | |
| **10** | **NegativeSpouse** | .195** | -.103* | .255** | .089* | 0.015 | -0.013 | -.092* | -.196** | .129** | - | | | | | | | |
| **11** | **NormalActivities** | -.153** | .179** | -.214** | -.168** | 0.01 | 0.046 | .131** | .215** | -0.045 | -.194** | - | | | | | | |
| **12** | **ReassureGovern** | -.152** | .166** | -0.076 | -.146** | -.087* | 0.025 | 0.02 | .320** | -0.04 | -.199** | .237** | - | | | | | |
| **13** | **HopeFuture** | -.082* | .128** | -.112** | 0.001 | -0.062 | 0.018 | .095* | .153** | -.134** | -.095* | .249** | .216** | - | | | | |
| **14** | **MeasuresClear** | -.118** | .224** | -0.03 | 0.035 | -.082* | 0.079 | 0.049 | .193** | -0.072 | -0.08 | .096* | .397** | .150** | - | | | |
| **15** | **SocialMedia** | .094* | -.131** | .165** | .121** | 0.08 | 0.004 | -.098* | -.128** | 0.041 | .186** | -.149** | -.144** | -.114** | -0.079 | - | | |
| **16** | **VigourousActivity** | .204** | -.167** | .101* | .192** | .145** | 0.059 | -.132** | -0.069 | .146** | .101* | -.142** | -.228** | -0.057 | -.178** | 0.072 | - | |
| **17** | **WorriedInfect** | -.094* | 0.048 | 0.009 | -0.049 | -.112** | 0.018 | .135** | 0.077 | -0.064 | 0.029 | 0.041 | .087* | -0.021 | .181** | 0.028 | -.137** | - |
| **18** | **HopeCovidEnd** | .126** | -.203** | .114** | .090* | .173** | -0.054 | -.137** | -.142** | .182** | .150** | -.127** | -.143** | 0.041 | -.109** | 0.074 | .272** | -.222** |
| **19** | **MentalHealth** | -.151** | .135** | -.379** | -.137** | -0.073 | .121** | .087* | .248** | -.146** | -.358** | .264** | .173** | .285** | .115** | -.247** | -0.037 | 0.016 |
| **20** | **ProvideFamily** | .082* | 0.064 | 0.058 | .172** | 0.028 | 0.073 | -0.007 | -0.049 | -0.06 | 0.03 | -0.069 | 0.072 | 0.042 | .133** | 0.038 | .126** | 0.013 |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **21** | **ReceiveFamily** | -0.02 | .121** | -0.057 | -0.028 | -0.066 | -0.032 | .173** | 0.035 | -.104* | -.111** | 0.04 | .101* | 0.036 | .141** | -.144** | -.161** | 0.062 |
| **22** | **BodySignals** | 0.017 | -0.047 | 0.045 | 0.047 | 0.025 | 0.012 | .107** | -.081* | 0.063 | 0.015 | -0.059 | -0.06 | -0.074 | 0 | 0.058 | .092* | .147** |
| **23** | **TimeOutside** | .198** | -.146** | -.100* | 0.032 | .123** | .104* | -0.054 | 0.002 | 0.072 | 0.057 | -0.005 | -0.077 | 0.003 | -.166** | -0.002 | .252** | -.257** |
| **24** | **CancelEvent** | -0.053 | .186** | -.131** | -0.043 | -.142** | .117** | .107** | 0.007 | -.129** | -0.027 | 0.071 | .135** | .154** | .084* | -0.059 | -.091* | 0.066 |
| **25** | **OlderFriend** | -.124** | .123** | 0.005 | -0.04 | -.141** | -0.028 | .155** | 0.074 | -.220** | -.112** | .122** | .142** | .169** | .145** | -0.038 | -.108** | .173** |
| **26** | **JobSecurity** | .098* | -0.033 | .317** | 0.055 | 0.064 | 0.031 | -0.021 | -.081* | .225** | .126** | -0.045 | -0.037 | -.124** | -0.04 | .127** | 0.058 | 0.062 |
| **27** | **TrustCovid** | 0.056 | -.171** | .145** | .110** | .101* | 0.041 | -.284** | 0.035 | .208** | .087* | -0.033 | .103* | -0.044 | 0.02 | .144** | .149** | 0 |
| **28** | **ContactTracing** | 0.043 | -0.019 | 0.034 | -0.044 | -0.006 | 0.011 | -0.002 | 0.03 | .097* | -0.041 | -0.036 | 0.06 | -0.011 | 0.037 | -0.011 | 0.01 | 0.026 |
| **29** | **FinanceUK** | .122** | -.137** | .137** | .090* | .126** | 0.012 | -.117** | -.176** | .115** | .129** | -.212** | -.274** | -.272** | -.196** | .131** | .175** | 0.013 |
| **30** | **FinanceYour** | .122** | -0.043 | .556** | .150** | .190** | 0.055 | -.118** | -0.055 | .188** | .191** | -.187** | -.169** | -.156** | -0.023 | .212** | .147** | 0.037 |
| **31** | **HealthSocial** | .153** | -.231** | .143** | .087* | .155** | 0.054 | -.245** | -0.013 | .257** | 0.05 | -.119** | -.121** | -.085* | -.110** | 0.051 | .213** | -0.063 |
| **32** | **ApartCovid** | -0.061 | -0.026 | 0.003 | .084* | .154** | 0.032 | -0.016 | 0.016 | .146** | 0.046 | -0.023 | -0.001 | -0.041 | 0.024 | .103* | .116** | .091* |
| **33** | **Interactions** | .265** | -.305** | .126** | 0.057 | .191** | 0.014 | -.147** | -0.045 | .198** | .160** | -.158** | -.187** | -.099* | -.174** | 0.07 | .370** | -.161** |
| **34** | **MostWorriedCovid** | -0.056 | 0.014 | -.142** | -0.043 | 0.064 | -0.069 | .112** | -0.074 | -.081* | -0.049 | .112** | 0.039 | 0.074 | .083* | -.088* | -.096* | .152** |
| **35** | **HealthRisk** | 0.015 | 0.005 | -0.016 | 0.003 | -0.031 | 0.042 | 0.003 | -0.049 | 0.018 | 0.002 | 0.005 | -0.046 | -0.031 | -0.004 | 0.001 | .081* | 0.011 |

| **Correlations** | **Spearman's rho** | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
| **1** | **ComplyMeasures** | | | | | | | | | | | | | | | | | | |
| **2** | **WorkedHome** | | | | | | | | | | | | | | | | | | |
| **3** | **ConcernFinances** | | | | | | | | | | | | | | | | | | |
| **4** | **VoluntaryWork** | | | | | | | | | | | | | | | | | | |
| **5** | **PositiveChange** | | | | | | | | | | | | | | | | | | |
| **6** | **MaskTransport** | | | | | | | | | | | | | | | | | | |
| **7** | **KeyworkersPPE** | | | | | | | | | | | | | | | | | | |
| **8** | **TravelRestrictions** | | | | | | | | | | | | | | | | | | |
| **9** | **TestLevels** | | | | | | | | | | | | | | | | | | |
| **10** | **NegativeSpouse** | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **11** | **NormalActivities** | | | | | | | | | | | | | | | | | | |
| **12** | **ReassureGovern** | | | | | | | | | | | | | | | | | | |
| **13** | **HopeFuture** | | | | | | | | | | | | | | | | | | |
| **14** | **MeasuresClear** | | | | | | | | | | | | | | | | | | |
| **15** | **SocialMedia** | | | | | | | | | | | | | | | | | | |
| **16** | **VigourousActivity** | | | | | | | | | | | | | | | | | | |
| **17** | **WorriedInfect** | | | | | | | | | | | | | | | | | | |
| **18** | **HopeCovidEnd** | - | | | | | | | | | | | | | | | | | |
| **19** | **MentalHealth** | -.188** | - | | | | | | | | | | | | | | | | |
| **20** | **ProvideFamily** | 0.046 | -0.027 | - | | | | | | | | | | | | | | | |
| **21** | **ReceiveFamily** | -.210** | .103* | .269** | - | | | | | | | | | | | | | | |
| **22** | **BodySignals** | .118** | -.108** | .131** | -0.001 | - | | | | | | | | | | | | | |
| **23** | **TimeOutside** | .108** | 0.04 | 0.07 | -.119** | -.102* | - | | | | | | | | | | | | |
| **24** | **CancelEvent** | -.247** | .161** | .132** | .118** | -0.032 | -0.002 | - | | | | | | | | | | | |
| **25** | **OlderFriend** | -.097* | .110** | 0.01 | .091* | 0.001 | -.161** | 0.069 | - | | | | | | | | | | |
| **26** | **JobSecurity** | 0.073 | -.179** | 0.033 | -0.058 | .095* | -0.001 | -0.073 | -0.008 | - | | | | | | | | | |
| **27** | **TrustCovid** | .168** | -.120** | 0.007 | -.178** | -0.035 | 0.015 | -.150** | -.113** | 0.036 | - | | | | | | | | |
| **28** | **ContactTracing** | 0.04 | -0.08 | -0.033 | 0.008 | 0.054 | -0.063 | -0.022 | -0.029 | .135** | .137** | - | | | | | | | |
| **29** | **FinanceUK** | .175** | -.219** | 0.009 | -0.081 | 0.073 | .148** | -.186** | -.107** | .137** | 0.016 | -0.019 | - | | | | | | |
| **30** | **FinanceYour** | .157** | -.368** | 0.027 | -.110** | 0.058 | -0.038 | -.221** | -0.051 | .302** | .170** | .128** | .191** | - | | | | | |
| **31** | **HealthSocial** | .220** | -.150** | -0.018 | -.209** | .134** | 0.046 | -.313** | -.183** | 0.03 | .238** | 0.056 | .251** | .156** | - | | | | |
| **32** | **ApartCovid** | .127** | -0.042 | .099* | -0.005 | .093* | 0.012 | -.110** | -0.074 | 0.056 | .134** | 0.021 | .099* | .090* | .139** | - | | | |
| **33** | **Interactions** | .297** | -.152** | 0.028 | -.156** | 0.035 | .219** | -.224** | -.143** | .104* | .091* | 0.002 | .166** | .212** | .251** | .110** | - | | |
| **34** | **MostWorriedCovid** | -0.042 | 0.068 | 0.077 | 0.06 | .127** | -0.068 | 0.047 | -0.03 | -.115** | -0.007 | -0.042 | -0.071 | -.183** | -.084* | 0.036 | -.098* | - | |
| **35** | **HealthRisk** | -0.054 | 0.015 | -0.056 | -0.015 | -0.043 | -0.018 | 0.009 | 0.01 | -0.017 | 0.06 | 0.047 | -0.056 | -0.04 | -0.037 | -0.013 | 0.022 | -0.013 | - |

*** correlation is significant at the 0.01 level (2-tailed), * correlation is significant at the 0.05 level (2-tailed)*

## Appendix D3

## Table showing bivariate spearman correlations between variables during the uncertain period.

| Correlations | Spearman's rho | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| **1** | **ComplyMeasures** | - | | | | | | | | | | | | | | | | |
| **2** | **WorkedHome** | .09* | - | | | | | | | | | | | | | | | |
| **3** | **ConcernFinances** | .18** | .2** | - | | | | | | | | | | | | | | |
| **4** | **VoluntaryWork** | .24** | .22** | .084* | - | | | | | | | | | | | | | |
| **5** | **PositiveChange** | .16** | .1* | 0.066 | .200** | - | | | | | | | | | | | | |
| **6** | **MaskTransport** | -.092* | 0.02 | -.137** | 0.017 | 0.015 | - | | | | | | | | | | | |
| **7** | **KeyworkersPPE** | -0.073 | 0 | -.134** | -0.068 | 0.001 | .111** | - | | | | | | | | | | |
| **8** | **TravelRestrictions** | -.286** | -0.021 | -.130** | -.090* | -0.066 | .205** | .087* | - | | | | | | | | | |
| **9** | **TestLevels** | .219** | .186** | .119** | .185** | .213** | 0.023 | -.232** | -.092* | - | | | | | | | | |
| **10** | **NegativeSpouse** | .232** | .126** | .251** | .175** | .118** | -.098* | -.106* | -.086* | .152** | - | | | | | | | |
| **11** | **NormalActivities** | -.139** | -.136** | -.183** | -0.058 | -0.074 | .103* | .155** | .225** | -0.053 | -.189** | - | | | | | | |
| **12** | **ReassureGovern** | -.216** | -.161** | -.109** | -.203** | -.143** | -0.023 | -0.008 | .220** | -0.056 | -.192** | .210** | - | | | | | |
| **13** | **HopeFuture** | -.122** | -.172** | -.082* | -0.027 | 0.053 | .134** | 0.071 | .250** | -.096* | -.123** | .210** | .200** | - | | | | |
| **14** | **MeasuresClear** | -.228** | 0.045 | -.154** | -.145** | -0.048 | .127** | 0.004 | .383** | -0.049 | -.138** | .207** | .340** | .188** | - | | | |
| **15** | **SocialMedia** | .154** | .125** | .086* | 0.056 | .117** | 0.016 | -0.06 | -.184** | .211** | .135** | -.140** | -.122** | -.098* | -.100* | - | | |
| **16** | **VigourousActivity** | .170** | .183** | .081* | .266** | .273** | 0.021 | -.156** | -.107** | .168** | .130** | -.089* | -.152** | -0.02 | -.114** | .137** | - | |
| **17** | **WorriedInfect** | -0.073 | 0.02 | .143** | -0.077 | -0.005 | .092* | 0.016 | .153** | -0.05 | 0.009 | -0.052 | -0.029 | -0.006 | 0.058 | .110** | 0.003 | - |
| **18** | **HopeCovidEnd** | 0.066 | .192** | 0.05 | .235** | .264** | 0.018 | -0.022 | -.101* | .183** | .083* | -.106* | -0.07 | 0.005 | 0.002 | .120** | .248** | -.093* |
| **19** | **MentalHealth** | -.152** | -.313** | -.299** | -.149** | -.148** | .098* | 0.077 | .150** | -.161** | -.176** | .313** | .178** | .242** | .224** | -.275** | -.163** | -0.052 |
| **20** | **ProvideFamily** | 0.015 | -0.069 | .111** | .140** | .132** | .097* | .103* | .146** | 0.019 | .093* | -0.04 | -0.001 | .103* | 0.032 | -0.029 | .086* | .142** |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **21** | **ReceiveFamily** | .200** | .217** | .212** | .288** | .300** | 0.023 | -0.069 | -.107** | .124** | .237** | -.216** | -.314** | -.134** | -.135** | .090* | .274** | 0.043 |
| **22** | **BodySignals** | 0.009 | .098* | 0.045 | 0.076 | .154** | .091* | -0.047 | 0.039 | -0.012 | .105* | -.178** | -.118** | 0.031 | -0.015 | 0.055 | 0.068 | 0.012 |
| **23** | **TimeOutside** | .225** | -0.038 | 0.012 | .127** | .099* | 0.006 | -0.021 | -0.069 | .105* | 0.033 | 0.027 | -.088* | .091* | -.113** | 0.001 | .246** | -.140** |
| **24** | **CancelEvent** | -0.011 | -.145** | -.126** | -0.036 | -.143** | .096* | .130** | 0.035 | -.134** | -.148** | .088* | .085* | .202** | 0.038 | -0.046 | -.115** | -0.009 |
| **25** | **OlderFriend** | -0.044 | -0.06 | 0.01 | -.082* | -0.008 | .116** | .199** | .095* | -0.078 | 0 | .124** | .083* | .120** | .087* | 0.024 | -.178** | .185** |
| **26** | **JobSecurity** | .101* | .158** | .341** | .082* | .127** | 0.015 | -.133** | -0.04 | 0.066 | .211** | -.155** | -0.058 | -0.044 | -.105* | .168** | 0.048 | .188** |
| **27** | **TrustCovid** | 0.013 | .221** | .096* | 0.028 | 0.058 | 0.011 | -.200** | 0.017 | .258** | .082* | -.096* | .145** | 0.007 | 0.062 | .146** | .100* | -0.071 |
| **28** | **ContactTracing** | 0.026 | 0.022 | -0.035 | -0.049 | 0.05 | 0.005 | -0.047 | -0.052 | .140** | 0.032 | -.081* | 0.03 | 0.036 | 0.038 | 0.042 | .087* | -0.063 |
| **29** | **FinanceUK** | .176** | .241** | .096* | .169** | .124** | -0.079 | -0.034 | -.171** | .103* | .171** | -.222** | -.246** | -.279** | -.196** | .180** | .211** | -0.007 |
| **30** | **FinanceYour** | .159** | .185** | .472** | .160** | .174** | 0.02 | -.120** | -.100* | .216** | .211** | -.276** | -.081* | -.153** | -.132** | .091* | .148** | .183** |
| **31** | **HealthSocial** | .168** | .188** | 0.063 | .153** | .101* | 0.023 | -0.051 | -0.073 | .191** | .199** | -.090* | -.124** | -.126** | -0.05 | .213** | .299** | -0.015 |
| **32** | **ApartCovid** | 0.052 | .140** | 0.015 | .199** | .187** | 0.014 | -0.074 | -0.015 | .179** | 0.038 | -.133** | -0.003 | 0.048 | 0 | .162** | .194** | -0.005 |
| **33** | **Interactions** | .286** | .125** | .112** | .161** | .195** | -.094* | -.158** | -.114** | .190** | .164** | -.094* | -.153** | -0.066 | -.130** | 0.041 | .383** | -.120** |
| **34** | **MostWorriedCovid** | -.124** | -0.073 | -.172** | -.103* | -0.02 | .131** | .085* | 0.07 | -0.066 | -.131** | 0.044 | -0.01 | .129** | .105* | 0.001 | -.091* | 0.074 |
| **35** | **HealthRisk** | .106* | .176** | .216** | .140** | 0.053 | -.083* | -.135** | 0.007 | .204** | .118** | -.087* | -.144** | -0.072 | -.090* | .109** | .155** | .096* |

| **Correlations** | **Spearman's rho** | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
| **1** | **ComplyMeasures** | | | | | | | | | | | | | | | | | | |
| **2** | **WorkedHome** | | | | | | | | | | | | | | | | | | |
| **3** | **ConcernFinances** | | | | | | | | | | | | | | | | | | |
| **4** | **VoluntaryWork** | | | | | | | | | | | | | | | | | | |
| **5** | **PositiveChange** | | | | | | | | | | | | | | | | | | |
| **6** | **MaskTransport** | | | | | | | | | | | | | | | | | | |
| **7** | **KeyworkersPPE** | | | | | | | | | | | | | | | | | | |
| **8** | **TravelRestrictions** | | | | | | | | | | | | | | | | | | |
| **9** | **TestLevels** | | | | | | | | | | | | | | | | | | |
| **10** | **NegativeSpouse** | | | | | | | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **11** | **NormalActivities** | | | | | | | | | | | | | | | | | | |
| **12** | **ReassureGovern** | | | | | | | | | | | | | | | | | | |
| **13** | **HopeFuture** | | | | | | | | | | | | | | | | | | |
| **14** | **MeasuresClear** | | | | | | | | | | | | | | | | | | |
| **15** | **SocialMedia** | | | | | | | | | | | | | | | | | | |
| **16** | **VigourousActivity** | | | | | | | | | | | | | | | | | | |
| **17** | **WorriedInfect** | | | | | | | | | | | | | | | | | | |
| **18** | **HopeCovidEnd** | - | | | | | | | | | | | | | | | | | |
| **19** | **MentalHealth** | -.149** | - | | | | | | | | | | | | | | | | |
| **20** | **ProvideFamily** | -0.049 | 0.007 | - | | | | | | | | | | | | | | | |
| **21** | **ReceiveFamily** | .225** | -.217** | .225** | - | | | | | | | | | | | | | | |
| **22** | **BodySignals** | 0.037 | -.169** | .175** | .177** | - | | | | | | | | | | | | | |
| **23** | **TimeOutside** | 0.031 | 0.061 | .096* | .085* | 0.035 | - | | | | | | | | | | | | |
| **24** | **CancelEvent** | -.188** | .264** | .083* | -.123** | -.144** | 0.044 | - | | | | | | | | | | | |
| **25** | **OlderFriend** | -.098* | .141** | 0.08 | -0.072 | 0.028 | -.097* | .191** | - | | | | | | | | | | |
| **26** | **JobSecurity** | 0.06 | -.187** | 0.033 | 0.069 | .141** | -0.063 | -0.057 | 0.007 | - | | | | | | | | | |
| **27** | **TrustCovid** | .126** | -.138** | -0.004 | 0.069 | -0.047 | 0.076 | -.117** | -.082* | 0.06 | - | | | | | | | | |
| **28** | **ContactTracing** | .143** | -.091* | -0.07 | 0 | 0.018 | 0.063 | -.153** | -0.051 | 0.051 | .148** | - | | | | | | | |
| **29** | **FinanceUK** | .160** | -.236** | -0.017 | .218** | 0.063 | 0.074 | -.153** | -0.062 | .141** | 0.014 | 0.01 | - | | | | | | |
| **30** | **FinanceYour** | .172** | -.337** | 0.073 | .254** | 0.071 | -0.053 | -.192** | -0.002 | .395** | 0.08 | .090* | .138** | - | | | | | |
| **31** | **HealthSocial** | .167** | -.262** | 0.067 | .252** | .116** | .095* | -.214** | -.206** | .105* | .162** | 0.003 | .124** | .107** | - | | | | |
| **32** | **ApartCovid** | .222** | -.165** | 0.033 | .131** | 0.054 | 0.012 | -.171** | -0.051 | -0.036 | .177** | .102* | 0.046 | 0.051 | .155** | - | | | |
| **33** | **Interactions** | .239** | -.167** | 0.031 | .324** | 0.039 | .173** | -0.053 | -.196** | .091* | .101* | 0.07 | .130** | .197** | .214** | .156** | - | | |
| **34** | **MostWorriedCovid** | 0.012 | -0.008 | 0.014 | -0.035 | 0.045 | -0.051 | -0.039 | 0.02 | -0.073 | -0.066 | 0.058 | -.153** | -0.067 | 0.037 | 0.066 | -0.048 | - | |
| **35** | **HealthRisk** | .138** | -.198** | 0.056 | .182** | -0.045 | .097* | -.136** | -.106* | .114** | .179** | 0.061 | .207** | .222** | .149** | .124** | .208** | -0.03 | - |

*** correlation is significant at the 0.01 level (2-tailed), * correlation is significant at the 0.05 level (2-tailed)*

## Appendix D4

## Table showing bivariate spearman correlations between variables during full lockdown.

| Correlations | Spearman's rho | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| **1** | **ComplyMeasures** | - | | | | | | | | | | | | | | | | |
| **2** | **WorkedHome** | -.095* | - | | | | | | | | | | | | | | | |
| **3** | **ConcernFinances** | .094* | -.173** | - | | | | | | | | | | | | | | |
| **4** | **VoluntaryWork** | 0.04 | -0.03 | 0.06 | - | | | | | | | | | | | | | |
| **5** | **PositiveChange** | .136** | -.150** | .193** | .185** | - | | | | | | | | | | | | |
| **6** | **MaskTransport** | -.178** | .119** | -.155** | 0.01 | 0.01 | - | | | | | | | | | | | |
| **7** | **KeyworkersPPE** | -.081* | .194** | -.184** | -.185** | -.106* | .145** | - | | | | | | | | | | |
| **8** | **TravelRestrictions** | -.130** | .184** | -.109** | -0.03 | -0.03 | .407** | 0.04 | - | | | | | | | | | |
| **9** | **TestLevels** | -0.07 | .121** | -.199** | -.195** | -.118** | .140** | 0.04 | .157** | - | | | | | | | | |
| **10** | **NegativeSpouse** | .108** | -.211** | .206** | .113** | .125** | -.143** | -0.04 | -.098* | -.151** | - | | | | | | | |
| **11** | **NormalActivities** | -.146** | .118** | -.298** | -.123** | -0.02 | .149** | .172** | .103* | .113** | -.293** | - | | | | | | |
| **12** | **ReassureGovern** | -.159** | .147** | -.098* | -.101* | -.168** | .126** | -0.01 | .196** | .455** | -.252** | .222** | - | | | | | |
| **13** | **HopeFuture** | -.087* | .145** | -.125** | -0.04 | -0.03 | .178** | .140** | .207** | .160** | -.137** | .176** | .264** | - | | | | |
| **14** | **MeasuresClear** | -.166** | .155** | -.101* | -0.04 | -0.01 | .185** | .149** | .295** | .199** | -.116** | .093* | .278** | .202** | - | | | |
| **15** | **SocialMedia** | 0.02 | -.200** | .129** | .144** | .094* | 0.01 | -0.05 | -0.02 | -0.04 | .190** | -.203** | -.147** | -.145** | -0.03 | - | | |
| **16** | **VigourousActivity** | .164** | -.163** | .171** | .155** | .141** | 0.02 | -.172** | -0.01 | -.116** | .088* | -.178** | -.154** | -0.06 | -.137** | .132** | - | |
| **17** | **WorriedInfect** | -.175** | .224** | 0.00 | -0.03 | -.082* | .138** | 0.06 | .219** | .101* | -.106* | .157** | .103* | .149** | .182** | -0.03 | -.137** | - |
| **18** | **HopeCovidEnd** | -.111** | .167** | -.177** | -.147** | -.251** | .105* | .119** | 0.02 | .199** | -.176** | .186** | .303** | .283** | .140** | -0.08 | -.177** | .102* |
| **19** | **MentalHealth** | -.134** | .205** | -.338** | -.195** | -.207** | .101* | .124** | 0.04 | .136** | -.364** | .288** | .194** | .240** | 0.06 | -.346** | -.222** | .153** |
| **20** | **ProvideFamily** | -0.01 | 0.05 | 0.07 | .150** | 0.01 | .155** | .103* | 0.00 | -.111** | -0.08 | -0.04 | -.100* | 0.06 | 0.07 | 0.01 | -0.01 | .138** |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **21** | **ReceiveFamily** | 0.05 | .190** | -.243** | -.131** | -.136** | -0.01 | .200** | 0.07 | 0.02 | -.180** | .114** | 0.08 | .116** | 0.08 | -.146** | -.181** | .084* |
| **22** | **BodySignals** | 0.08 | .097* | .164** | .181** | .223** | .122** | 0.04 | 0.01 | -.106* | .089* | -.117** | -.106* | 0.01 | 0.01 | -0.03 | .263** | 0.01 |
| **23** | **TimeOutside** | 0.06 | 0.03 | -.111** | 0.04 | .084* | 0.00 | -0.05 | -0.06 | 0.03 | -0.01 | -0.05 | -.083* | -0.06 | -0.06 | 0.02 | .147** | -0.04 |
| **24** | **CancelEvent** | .185** | -.224** | .241** | .252** | .201** | 0.02 | -.120** | -.161** | -.165** | .268** | -.245** | -.231** | -.093* | -.103* | .224** | .209** | -.159** |
| **25** | **OlderFriend** | -.094* | .173** | -0.04 | -.110** | -0.01 | .155** | .184** | .109** | .148** | 0.00 | 0.01 | 0.07 | 0.00 | .133** | -0.02 | -.187** | .215** |
| **26** | **JobSecurity** | .086* | -.203** | .377** | .170** | .270** | 0.01 | -.197** | 0.03 | -.162** | .144** | -.257** | -.110** | -.176** | -.093* | .139** | .136** | 0.03 |
| **27** | **TrustCovid** | -0.05 | -.240** | 0.03 | .101* | .129** | 0.01 | -.322** | 0.03 | 0.05 | 0.08 | -0.04 | .107** | 0.00 | 0.07 | .184** | .188** | -.083* |
| **28** | **ContactTracing** | 0.04 | -0.05 | -0.03 | .119** | .162** | 0.01 | -.134** | 0.01 | 0.04 | 0.02 | -0.02 | 0.04 | -0.04 | -.112** | .102* | 0.08 | -0.08 |
| **29** | **FinanceUK** | .162** | -.131** | .216** | 0.06 | .211** | 0.01 | -.106* | -.082* | -.182** | .168** | -.203** | -.383** | -.162** | -.091* | .131** | .248** | 0.00 |
| **30** | **FinanceYour** | .116** | -.211** | .495** | .139** | .237** | -.117** | -.250** | -0.02 | -.156** | .286** | -.281** | -.123** | -.190** | -0.05 | .106* | .174** | 0.04 |
| **31** | **HealthSocial** | .197** | -.242** | .189** | .203** | .288** | 0.02 | -.222** | -0.01 | -.189** | .217** | -.232** | -.233** | -.130** | -0.05 | .194** | .318** | -.098* |
| **32** | **ApartCovid** | 0.05 | -.159** | 0.06 | .084* | .305** | 0.01 | -0.05 | -0.05 | -.123** | 0.02 | 0.01 | 0.00 | 0.06 | 0.02 | .184** | .165** | -.138** |
| **33** | **Interactions** | -0.03 | 0.07 | -.136** | -0.06 | -.084* | -0.02 | .135** | 0.01 | .159** | -.120** | .252** | .268** | .221** | -0.03 | -.278** | -.267** | .151** |
| **34** | **MostWorriedCovid** | -.124** | .092* | -.376** | -0.02 | -0.04 | .201** | .156** | 0.07 | 0.02 | -0.06 | .294** | 0.02 | 0.05 | 0.01 | -0.01 | -0.08 | .095* |
| **35** | **HealthRisk** | .182** | -.267** | .203** | .135** | .307** | 0.02 | -.196** | -.136** | -.209** | .175** | -.216** | -.239** | -.251** | -.084* | .221** | .194** | -0.07 |

| **Correlations** | **Spearman's rho** | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
| **1** | **ComplyMeasures** | | | | | | | | | | | | | | | | | | |
| **2** | **WorkedHome** | | | | | | | | | | | | | | | | | | |
| **3** | **ConcernFinances** | | | | | | | | | | | | | | | | | | |
| **4** | **VoluntaryWork** | | | | | | | | | | | | | | | | | | |
| **5** | **PositiveChange** | | | | | | | | | | | | | | | | | | |
| **6** | **MaskTransport** | | | | | | | | | | | | | | | | | | |
| **7** | **KeyworkersPPE** | | | | | | | | | | | | | | | | | | |
| **8** | **TravelRestrictions** | | | | | | | | | | | | | | | | | | |
| **9** | **TestLevels** | | | | | | | | | | | | | | | | | | |
| **10** | **NegativeSpouse** | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **11** | **NormalActivities** | | | | | | | | | | | | | | | | | | |
| **12** | **ReassureGovern** | | | | | | | | | | | | | | | | | | |
| **13** | **HopeFuture** | | | | | | | | | | | | | | | | | | |
| **14** | **MeasuresClear** | | | | | | | | | | | | | | | | | | |
| **15** | **SocialMedia** | | | | | | | | | | | | | | | | | | |
| **16** | **VigourousActivity** | | | | | | | | | | | | | | | | | | |
| **17** | **WorriedInfect** | | | | | | | | | | | | | | | | | | |
| **18** | **HopeCovidEnd** | - | | | | | | | | | | | | | | | | | |
| **19** | **MentalHealth** | .214** | - | | | | | | | | | | | | | | | | |
| **20** | **ProvideFamily** | 0.01 | .130** | - | | | | | | | | | | | | | | | |
| **21** | **ReceiveFamily** | 0.08 | .295** | .124** | - | | | | | | | | | | | | | | |
| **22** | **BodySignals** | -.133** | -.138** | .164** | 0.00 | - | | | | | | | | | | | | | |
| **23** | **TimeOutside** | -0.02 | 0.08 | -0.08 | -0.05 | -0.04 | - | | | | | | | | | | | | |
| **24** | **CancelEvent** | -.150** | -.327** | .104* | -.228** | .148** | .091* | - | | | | | | | | | | | |
| **25** | **OlderFriend** | 0.05 | .084* | .185** | .170** | -0.06 | -.128** | -.120** | - | | | | | | | | | | |
| **26** | **JobSecurity** | -.218** | -.211** | .092* | -.176** | .134** | -0.06 | .284** | -0.01 | - | | | | | | | | | |
| **27** | **TrustCovid** | 0.01 | -.211** | -0.07 | -.178** | 0.05 | .083* | .146** | -.167** | .132** | - | | | | | | | | |
| **28** | **ContactTracing** | 0.03 | -.139** | -0.06 | -.094* | 0.03 | -0.06 | 0.04 | -.087* | .138** | .160** | - | | | | | | | |
| **29** | **FinanceUK** | -.172** | -.246** | 0.04 | -.117** | .105* | 0.06 | .149** | -0.08 | .180** | .090* | -0.04 | - | | | | | | |
| **30** | **FinanceYour** | -.222** | -.367** | -0.01 | -.188** | .154** | -0.03 | .281** | -0.02 | .492** | .160** | .146** | .255** | - | | | | | |
| **31** | **HealthSocial** | -.084* | -.369** | 0.03 | -.151** | .157** | 0.01 | .295** | -.090* | .193** | .217** | .122** | .338** | .344** | - | | | | |
| **32** | **ApartCovid** | -0.02 | -0.06 | -0.03 | 0.07 | .140** | 0.05 | -0.05 | -.147** | 0.02 | .327** | .101* | -0.05 | 0.06 | .207** | - | | | |
| **33** | **Interactions** | .104* | .230** | 0.03 | .166** | -.169** | -.114** | -.108** | 0.08 | -0.07 | -.171** | -.121** | -.321** | -.167** | -.274** | -.167** | - | | |
| **34** | **MostWorriedCovid** | -0.01 | .187** | 0.04 | .154** | -0.01 | 0.07 | -.125** | 0.07 | -.195** | -.099* | 0.02 | -.334** | -.279** | -.168** | 0.03 | .144** | - | |
| **35** | **HealthRisk** | -.145** | -.492** | -0.08 | -.135** | -0.02 | 0.04 | .199** | -.128** | .236** | .265** | .141** | .324** | .320** | .375** | .177** | -.261** | -.139** | - |

*** correlation is significant at the 0.01 level (2-tailed), * correlation is significant at the 0.05 level (2-tailed)*

## Appendix E

**Table showing the interactive fixed-effect ordinal logistic regression model.**

| | mentalhealth | | |
|---|---|---|---|
| Predictors | Estimates | CI | *p* |
| period f [1] | -0.51 | -1.17 – 0.15 | 0.129 |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 |
| complymeasures | 0.04 | -0.04 – 0.11 | 0.322 |
| workedhome | -0.03 | -0.10 – 0.04 | 0.381 |
| concernfinances | -0.21 | -0.30 – -0.13 | **<0.001** |
| voluntarywork | -0.16 | -0.24 – -0.08 | **<0.001** |
| positivechange | -0.00 | -0.08 – 0.07 | 0.926 |
| masktransport | 0.06 | -0.45 – 0.57 | 0.810 |
| keyworkersppe | -0.06 | -0.14 – 0.01 | 0.112 |
| travelrestrictions | 0.02 | -0.12 – 0.17 | 0.762 |
| testlevels | -0.03 | -0.10 – 0.04 | 0.389 |
| negativespouse | -0.20 | -0.27 – -0.13 | **<0.001** |

| | mentalhealth | | |
|---|---|---|---|
| Predictors | Estimates | CI | *p* |
| normalactivities | 0.20 | 0.12 – 0.28 | **<0.001** |
| reassuregovern | -0.01 | -0.08 – 0.06 | 0.796 |
| hopefuture | 0.09 | 0.00 – 0.17 | **0.042** |
| measuresclear | 0.03 | -0.05 – 0.11 | 0.468 |
| socialmedia | -0.45 | -0.55 – -0.35 | **<0.001** |
| vigourousactivity | 0.01 | -0.04 – 0.06 | 0.630 |
| worriedinfect | 0.03 | -0.03 – 0.10 | 0.271 |
| hopecovidend | -0.03 | -0.09 – 0.02 | 0.233 |
| providefamily | -0.02 | -0.09 – 0.04 | 0.453 |
| receivefamily | 0.04 | -0.01 – 0.10 | 0.139 |
| bodysignals | -0.07 | -0.12 – -0.01 | **0.015** |
| timeoutside | 0.05 | -0.02 – 0.12 | 0.134 |
| cancelevent | 0.03 | -0.04 – 0.09 | 0.384 |

| | mentalhealth | | |
|---|---|---|---|
| Predictors | Estimates | CI | *p* |
| olderfriend | 0.02 | -0.06 – 0.10 | 0.702 |
| jobsecurity | 0.05 | -0.04 – 0.14 | 0.248 |
| trustcovid | -0.22 | -0.30 – -0.13 | **<0.001** |
| contacttracing | 0.06 | -0.16 – 0.28 | 0.584 |
| financeuk | -0.06 | -0.12 – 0.01 | 0.113 |
| financeyour | -0.17 | -0.24 – -0.10 | **<0.001** |
| healthsocial | -0.03 | -0.09 – 0.03 | 0.330 |
| apartcovid | 0.01 | -0.07 – 0.09 | 0.864 |
| interactions Online | 0.19 | 0.04 – 0.34 | **0.012** |
| interactions mixofboth | 0.16 | 0.02 – 0.30 | **0.030** |
| mostworriedcovid Finance | 0.05 | -0.15 – 0.25 | 0.603 |
| mostworriedcovid Security | 0.05 | -0.12 – 0.22 | 0.566 |
| healthrisk f Others | 0.08 | -0.06 – 0.22 | 0.242 |
| healthrisk f Lovedones | 0.01 | -0.13 – 0.15 | 0.890 |
| period f [1] * complymeasures | -0.07 | -0.22 – 0.09 | 0.408 |
| period f [2] * complymeasures | -0.05 | -0.20 – 0.10 | 0.527 |
| period f [3] * complymeasures | 0.05 | -0.16 – 0.26 | 0.648 |
| period f [1] * workedhome | -0.14 | -0.28 – -0.00 | **0.048** |
| period f [2] * workedhome | -0.30 | -0.45 – -0.15 | **<0.001** |
| period f [3] * workedhome | -0.16 | -0.33 – 0.01 | 0.068 |
| period f [1] * concernfinances | -0.14 | -0.32 – 0.04 | 0.136 |
| period f [2] * concernfinances | -0.02 | -0.23 – 0.18 | 0.821 |
| period f [3] * concernfinances | -0.10 | -0.34 – 0.13 | 0.386 |
| period f [1] * voluntarywork | 0.18 | 0.03 – 0.34 | **0.022** |
| period f [2] * voluntarywork | 0.23 | 0.06 – 0.39 | **0.006** |

| | mentalhealth | | |
|---|---|---|---|
| Predictors | Estimates | CI | *p* |
| period f [3] * voluntarywork | 0.00 | -0.18 – 0.18 | 0.988 |
| period f [1] * positivechange | -0.10 | -0.26 – 0.06 | 0.229 |
| period f [2] * positivechange | -0.21 | -0.39 – -0.03 | **0.021** |
| period f [3] * positivechange | -0.22 | -0.42 – -0.02 | **0.028** |
| period f [1] * masktransport | 0.44 | -0.01 – 0.89 | 0.056 |
| period f [2] * masktransport | 0.18 | -0.87 – 1.23 | 0.741 |
| period f [3] * masktransport | 0.33 | -0.87 – 1.53 | 0.588 |
| period f [1] * keyworkersppe | -0.14 | -0.30 – 0.03 | 0.108 |
| period f [2] * keyworkersppe | -0.12 | -0.29 – 0.05 | 0.179 |
| period f [3] * keyworkersppe | -0.16 | -0.36 – 0.04 | 0.115 |

| | mentalhealth | | |
|---|---|---|---|
| Predictors | Estimates | CI | *p* |
| period f [1] * travelrestrictions | 0.27 | 0.06 – 0.48 | **0.013** |
| period f [2] * travelrestrictions | -0.17 | -0.44 – 0.10 | 0.221 |
| period f [3] * travelrestrictions | 0.07 | -0.40 – 0.55 | 0.764 |
| period f [1] * testlevels | 0.08 | -0.09 – 0.24 | 0.365 |
| period f [2] * testlevels | 0.14 | -0.01 – 0.29 | 0.064 |
| period f [3] * testlevels | 0.01 | -0.19 – 0.22 | 0.892 |
| period f [1] * negativespouse | -0.11 | -0.28 – 0.06 | 0.207 |
| period f [2] * negativespouse | 0.10 | -0.06 – 0.26 | 0.242 |
| period f [3] * negativespouse | -0.22 | -0.42 – -0.03 | **0.025** |
| period f [1] * normalactivities | -0.17 | -0.35 – 0.02 | 0.083 |
| period f [2] * normalactivities | -0.15 | -0.34 – 0.05 | 0.142 |

| | mentalhealth | | |
|---|---|---|---|
| Predictors | Estimates | CI | *p* |
| period f [3] * normalactivities | -0.10 | -0.33 – 0.13 | 0.377 |
| period f [1] * reassuregovern | -0.08 | -0.25 – 0.08 | 0.311 |
| period f [2] * reassuregovern | -0.02 | -0.19 – 0.14 | 0.781 |
| period f [3] * reassuregovern | -0.07 | -0.28 – 0.14 | 0.509 |
| period f [1] * hopefuture | 0.06 | -0.11 – 0.23 | 0.481 |
| period f [2] * hopefuture | -0.05 | -0.23 – 0.14 | 0.597 |
| period f [3] * hopefuture | -0.01 | -0.24 – 0.22 | 0.925 |
| period f [1] * measuresclear | 0.05 | -0.14 – 0.23 | 0.618 |
| period f [2] * measuresclear | 0.16 | -0.03 – 0.35 | 0.097 |
| period f [3] * measuresclear | -0.20 | -0.44 – 0.03 | 0.088 |
| period f [1] * socialmedia | 1.00 | 0.66 – 1.35 | **<0.001** |
| period f [2] * socialmedia | 0.95 | 0.60 – 1.30 | **<0.001** |
| period f [3] * socialmedia | 0.92 | 0.57 – 1.27 | **<0.001** |
| period f [1] * vigourousactivity | 0.00 | -0.09 – 0.09 | 0.986 |
| period f [2] * vigourousactivity | -0.09 | -0.19 – 0.01 | 0.074 |
| period f [3] * vigourousactivity | -0.17 | -0.29 – -0.06 | **0.004** |
| period f [1] * worriedinfect | 0.06 | -0.06 – 0.18 | 0.332 |
| period f [2] * worriedinfect | 0.07 | -0.05 – 0.20 | 0.252 |
| period f [3] * worriedinfect | 0.20 | 0.03 – 0.37 | **0.019** |
| period f [1] * hopecovidend | 0.00 | -0.12 – 0.12 | 0.993 |
| period f [2] * hopecovidend | 0.06 | -0.07 – 0.19 | 0.393 |

| | mentalhealth | | |
|---|---|---|---|
| Predictors | Estimates | CI | *p* |
| period f [3] * hopecovidend | 0.03 | -0.12 – 0.18 | 0.708 |
| period f [1] * providefamily | -0.00 | -0.13 – 0.12 | 0.964 |
| period f [2] * providefamily | 0.02 | -0.10 – 0.15 | 0.712 |
| period f [3] * providefamily | 0.11 | -0.07 – 0.28 | 0.232 |
| period f [1] * receivefamily | 0.03 | -0.08 – 0.14 | 0.591 |
| period f [2] * receivefamily | 0.04 | -0.07 – 0.16 | 0.446 |
| period f [3] * receivefamily | 0.12 | -0.02 – 0.27 | 0.086 |
| period f [1] * bodysignals | 0.04 | -0.08 – 0.16 | 0.528 |
| period f [2] * bodysignals | -0.01 | -0.13 – 0.10 | 0.819 |
| period f [3] * bodysignals | 0.06 | -0.09 – 0.21 | 0.447 |

| | mentalhealth | | |
|---|---|---|---|
| Predictors | Estimates | CI | *p* |
| period f [1] * timeoutside | 0.07 | -0.07 – 0.21 | 0.319 |
| period f [2] * timeoutside | 0.07 | -0.07 – 0.22 | 0.314 |
| period f [3] * timeoutside | 0.16 | -0.02 – 0.34 | 0.081 |
| period f [1] * cancelevent | 0.10 | -0.04 – 0.24 | 0.164 |
| period f [2] * cancelevent | 0.22 | 0.06 – 0.37 | **0.005** |
| period f [3] * cancelevent | 0.10 | -0.06 – 0.27 | 0.230 |
| period f [1] * olderfriend | 0.03 | -0.15 – 0.21 | 0.735 |
| period f [2] * olderfriend | -0.02 | -0.18 – 0.15 | 0.856 |
| period f [3] * olderfriend | -0.06 | -0.26 – 0.13 | 0.541 |
| period f [1] * jobsecurity | -0.08 | -0.26 – 0.11 | 0.419 |

| | mentalhealth | | |
|---|---|---|---|
| Predictors | Estimates | CI | *p* |
| period f [2] * jobsecurity | 0.07 | -0.11 – 0.25 | 0.427 |
| period f [3] * jobsecurity | 0.11 | -0.10 – 0.32 | 0.301 |
| period f [1] * trustcovid | 0.07 | -0.11 – 0.26 | 0.427 |
| period f [2] * trustcovid | -0.05 | -0.27 – 0.17 | 0.676 |
| period f [3] * trustcovid | -0.02 | -0.23 – 0.19 | 0.836 |
| period f [1] * contacttracing | -1.04 | -1.58 – -0.50 | **<0.001** |
| period f [2] * contacttracing | -0.87 | -1.44 – -0.30 | **0.003** |
| period f [3] * contacttracing | -1.01 | -1.59 – -0.44 | **0.001** |
| period f [1] * financeuk | -0.16 | -0.30 – -0.03 | **0.017** |
| period f [2] * financeuk | -0.17 | -0.30 – -0.03 | **0.019** |
| period f [3] * financeuk | -0.27 | -0.46 – -0.09 | **0.004** |
| period f [1] * financeyour | 0.07 | -0.09 – 0.22 | 0.395 |
| period f [2] * financeyour | -0.06 | -0.22 – 0.09 | 0.411 |
| period f [3] * financeyour | 0.09 | -0.09 – 0.28 | 0.328 |
| period f [1] * healthsocial | -0.09 | -0.23 – 0.05 | 0.222 |
| period f [2] * healthsocial | -0.02 | -0.16 – 0.13 | 0.833 |
| period f [3] * healthsocial | -0.09 | -0.26 – 0.08 | 0.303 |
| period f [1] * apartcovid | 0.10 | -0.07 – 0.26 | 0.267 |
| period f [2] * apartcovid | -0.01 | -0.17 – 0.15 | 0.895 |
| period f [3] * apartcovid | 0.21 | -0.01 – 0.43 | 0.062 |
| period f [1] * interactions f Online | 0.12 | -0.14 – 0.38 | 0.361 |
| period f [2] * interactions f Online | 0.08 | -0.22 – 0.38 | 0.607 |
| period f [3] * interactions f Online | 0.17 | -0.27 – 0.60 | 0.450 |

| | mentalhealth | | |
|---|---|---|---|
| Predictors | Estimates | CI | *p* |
| period f [1] * interactions f mixofboth | 0.03 | -0.21 – 0.28 | 0.783 |
| period f [2] * interactions f mixofboth | 0.04 | -0.25 – 0.33 | 0.777 |
| period f [3] * interactions f mixofboth | 0.01 | -0.40 – 0.43 | 0.945 |
| period f [1] * mostworriedcovid f Security | -0.10 | -0.40 – 0.19 | 0.497 |
| period f [2] * mostworriedcovid f Security | 0.21 | -0.06 – 0.49 | 0.131 |
| period f [3] * mostworriedcovid f Security | -0.18 | -0.71 – 0.35 | 0.494 |
| period f [1] * healthrisk f Others | -0.14 | -0.45 – 0.17 | 0.371 |
| period f [1] * mostworriedcovid f Finance | -0.10 | -0.46 – 0.26 | 0.590 |
| period f [2] * mostworriedcovid f Finance | 0.00 | -0.34 – 0.34 | 0.988 |
| period f [3] * mostworriedcovid f Finance | -0.26 | -0.84 – 0.32 | 0.386 |
| period f [2] * healthrisk f Others | -0.13 | -0.45 – 0.18 | 0.416 |
| period f [3] * healthrisk f Others | 0.28 | 0.13 – 0.42 | **<0.001** |
| period f [1] * healthrisk f Lovedones | -0.19 | -0.50 – 0.12 | 0.221 |
| period f [2] * healthrisk f Lovedones | -0.18 | -0.50 – 0.14 | 0.263 |
| Observations | 2356 | | |
| $R^2$ / $R^2$ adjusted | 0.317 / 0.006 | | |

**Appendix F**

**Table showing Multivariate vs. Individual Poll Question analyses.**

| | Multivariate Analysis | | | Individual analysis | | |
|---|---|---|---|---|---|---|
| | **mentalhealth** | | | **mentalhealth** | | |
| Predictors | Estimates | CI | *p* | Estimates | CI | *p* |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.11* | *-0.17 – -0.06* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.03 | -0.09 – 0.03 | 0.292 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.02 | -0.07 – 0.03 | 0.482 |
| *complymeasures* | *0.04* | *-0.04 – 0.11* | *0.322* | *-0.13* | *-0.21 – -0.05* | ***0.001*** |
| period f [1] * complymeasures | -0.07 | -0.22 – 0.09 | 0.408 | -0.08 | -0.23 – 0.07 | 0.32 |
| period f [2] * complymeasures | -0.05 | -0.20 – 0.10 | 0.527 | 0.01 | -0.14 – 0.15 | 0.942 |
| period f [3] * complymeasures | 0.05 | -0.16 – 0.26 | 0.648 | -0.01 | -0.22 – 0.20 | 0.946 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.025 / -0.305 | |
| period f [1] | -0.51 | -1.17 – 0.15 | 0.129 | -0.06 | -0.18 – 0.06 | 0.3 |
| *period f [2]* | *-0.19* | *-1.28 – 0.90* | *0.738* | *0.16* | *0.06 – 0.26* | ***0.002*** |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.05 | -0.19 – 0.10 | 0.548 |
| *workedhome* | *-0.03* | *-0.10 – 0.04* | *0.381* | *0.09* | *0.03 – 0.15* | ***0.006*** |
| *period f [1] * workedhome* | *-0.14* | *-0.28 – -0.00* | ***0.048*** | *-0.07* | *-0.20 – 0.07* | *0.327* |
| period f [2] * workedhome | -0.3 | -0.45 – -0.15 | **<0.001** | -0.36 | -0.51 – -0.22 | **<0.001** |

| | | | | | | |
|---|---|---|---|---|---|---|
| period f [3] * workedhome | -0.16 | -0.33 – 0.01 | 0.068 | 0.03 | -0.13 – 0.19 | 0.741 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.036 / -0.290 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.08* | *-0.13 – -0.02* | ***0.004*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.03 | -0.08 – 0.02 | 0.242 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0 | -0.06 – 0.05 | 0.87 |
| concernfinances | -0.21 | -0.30 – -0.13 | **<0.001** | -0.33 | -0.42 – -0.25 | **<0.001** |
| *period f [1] * concernfinances* | *-0.14* | *-0.32 – 0.04* | *0.136* | *-0.21* | *-0.36 – -0.06* | ***0.005*** |
| period f [2] *concernfinances | -0.02 | -0.23 – 0.18 | 0.821 | -0.09 | -0.26 – 0.09 | 0.337 |
| *period f [3] *concernfinances* | *-0.1* | *-0.34 – 0.13* | *0.386* | *-0.23* | *-0.42 – -0.04* | ***0.018*** |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.059 / -0.259 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.13* | *-0.18 – -0.07* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.03 | -0.09 – 0.02 | 0.226 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0 | -0.05 – 0.06 | 0.869 |
| voluntarywork | -0.16 | -0.24 – -0.08 | **<0.001** | -0.26 | -0.34 – -0.18 | **<0.001** |
| *period f [1] *voluntarywork* | *0.18* | *0.03 – 0.34* | ***0.022*** | *0.08* | *-0.08 – 0.25* | *0.318* |
| *period f [2] * voluntarywork* | *0.23* | *0.06 – 0.39* | ***0.006*** | *0.1* | *-0.07 – 0.26* | *0.242* |
| period f [3] * voluntarywork | 0 | -0.18 – 0.18 | 0.988 | -0.18 | -0.37 – 0.00 | 0.052 |

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| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.042 / -0.281 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.1* | *-0.16 – -0.05* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | 0 | -0.05 – 0.06 | 0.867 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.03 | -0.02 – 0.08 | 0.261 |
| *positivechange* | *0* | *-0.08 – 0.07* | *0.926* | *-0.12* | *-0.19 – -0.04* | ***0.002*** |
| period f [1] * positivechange | -0.1 | -0.26 – 0.06 | 0.229 | -0.16 | -0.32 – 0.01 | 0.059 |
| period f [2] * positivechange | -0.21 | -0.39 – -0.03 | **0.021** | -0.3 | -0.47 – -0.12 | **0.001** |
| period f [3] * positivechange | -0.22 | -0.42 – -0.02 | **0.028** | -0.38 | -0.56 – -0.19 | **<0.001** |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.031 / -0.296 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.68* | *-1.14 – -0.22* | ***0.004*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.34 | -1.41 – 0.73 | 0.533 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.34 | -1.41 – 0.73 | 0.533 |
| masktransport | 0.06 | -0.45 – 0.57 | 0.81 | 0.17 | -0.34 – 0.69 | 0.508 |
| *period f [1] * masktransport* | *0.44* | *-0.01 – 0.89* | *0.056* | *0.57* | *0.11 – 1.03* | ***0.016*** |
| period f [2] * masktransport | 0.18 | -0.87 – 1.23 | 0.741 | 0.31 | -0.76 – 1.39 | 0.565 |
| period f [3] * masktransport | 0.33 | -0.87 – 1.53 | 0.588 | 0.34 | -0.74 – 1.41 | 0.538 |
| Observations | | 2356 | | 2356 | | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.020 / -0.312 | |

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| period f [1] | -0.51 | -1.17 – 0.15 | 0.129 | -0.08 | -0.23 – 0.07 | 0.311 |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | 0.05 | -0.11 – 0.21 | 0.513 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.04 | -0.22 – 0.14 | 0.657 |
| *keyworkersppe* | *-0.06* | *-0.14 – 0.01* | *0.112* | *0.09* | *0.01 – 0.17* | ***0.032*** |
| period f [1] * keyworkersppe | -0.14 | -0.30 – 0.03 | 0.108 | -0.05 | -0.21 – 0.11 | 0.554 |
| period f [2] * keyworkersppe | -0.12 | -0.29 – 0.05 | 0.179 | -0.09 | -0.26 – 0.08 | 0.287 |
| period f [3] * keyworkersppe | -0.16 | -0.36 – 0.04 | 0.115 | 0.03 | -0.16 – 0.22 | 0.746 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.020 / -0.311 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.45* | *-0.65 – -0.26* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.16 | -0.40 – 0.08 | 0.197 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.25 | -0.66 – 0.17 | 0.252 |
| *travelrestrictions* | *0.02* | *-0.12 – 0.17* | *0.762* | *0.22* | *0.08 – 0.36* | ***0.002*** |
| period f [1] * travelrestrictions | 0.27 | 0.06 – 0.48 | **0.013** | 0.36 | 0.15 – 0.56 | **0.001** |
| period f [2] * travelrestrictions | -0.17 | -0.44 – 0.10 | 0.221 | 0.13 | -0.12 – 0.38 | 0.295 |
| period f [3] * travelrestrictions | 0.07 | -0.40 – 0.55 | 0.764 | 0.24 | -0.19 – 0.66 | 0.271 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.030 / -0.297 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.1* | *-0.16 – -0.05* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.02 | -0.07 – 0.04 | 0.541 |

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| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.06 | -0.21 – 0.09 | 0.441 |
| testlevels | -0.03 | -0.10 – 0.04 | 0.389 | 0 | -0.07 – 0.07 | 0.971 |
| period f [1] * testlevels | 0.08 | -0.09 – 0.24 | 0.365 | -0.15 | -0.31 – 0.00 | 0.057 |
| period f [2] * testlevels | 0.14 | -0.01 – 0.29 | 0.064 | -0.06 | -0.21 – 0.08 | 0.376 |
| period f [3] * testlevels | 0.01 | -0.19 – 0.22 | 0.892 | 0.01 | -0.17 – 0.20 | 0.878 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.019 / -0.312 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.11* | *-0.16 – -0.05* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.03 | -0.09 – 0.02 | 0.211 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0 | -0.05 – 0.06 | 0.909 |
| negativespouse | -0.2 | -0.27 – -0.13 | **<0.001** | -0.36 | -0.43 – -0.29 | **<0.001** |
| period f [1] * negativespouse | -0.11 | -0.28 – 0.06 | 0.207 | -0.14 | -0.31 – 0.02 | 0.079 |
| period f [2] * negativespouse | 0.1 | -0.06 – 0.26 | 0.242 | 0.06 | -0.09 – 0.21 | 0.446 |
| period f [3] * negativespouse | -0.22 | -0.42 – -0.03 | **0.025** | -0.33 | -0.51 – -0.14 | **<0.001** |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.071 / -0.243 | |
| period f [1] | -0.51 | -1.17 – 0.15 | 0.129 | -0.14 | -0.31 – 0.02 | 0.092 |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.09 | -0.27 – 0.08 | 0.278 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.19 | -0.39 – 0.01 | 0.058 |
| normalactivities | 0.2 | 0.12 – 0.28 | **<0.001** | 0.33 | 0.26 – 0.41 | **<0.001** |

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| period f [1] * normalactivities | -0.17 | -0.35 – 0.02 | 0.083 | 0.05 | -0.13 – 0.23 | 0.584 |
| period f [2] * normalactivities | -0.15 | -0.34 – 0.05 | 0.142 | 0.09 | -0.09 – 0.27 | 0.315 |
| period f [3] * normalactivities | -0.1 | -0.33 – 0.13 | 0.377 | 0.2 | -0.01 – 0.41 | 0.063 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.059 / -0.259 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.21* | *-0.30 – -0.12* | ***<0.001*** |
| *period f [2]* | *-0.19* | *-1.28 – 0.90* | *0.738* | *-0.12* | *-0.21 – -0.03* | ***0.009*** |
| *period f [3]* | *-0.37* | *-1.66 – 0.92* | *0.573* | *-0.14* | *-0.28 – -0.01* | ***0.041*** |
| *reassuregovern* | *-0.01* | *-0.08 – 0.06* | *0.796* | *0.1* | *0.03 – 0.16* | ***0.003*** |
| period f [1] * reassuregovern | -0.08 | -0.25 – 0.08 | 0.311 | 0.11 | -0.04 – 0.25 | 0.159 |
| period f [2] * reassuregovern | -0.02 | -0.19 – 0.14 | 0.781 | 0.12 | -0.03 – 0.26 | 0.121 |
| period f [3] * reassuregovern | -0.07 | -0.28 – 0.14 | 0.509 | 0.15 | -0.03 – 0.32 | 0.109 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.023 / -0.307 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.17* | *-0.32 – -0.03* | ***0.02*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.08 | -0.24 – 0.09 | 0.366 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.02 | -0.20 – 0.24 | 0.853 |
| hopefuture | 0.09 | 0.00 – 0.17 | **0.042** | 0.2 | 0.11 – 0.28 | **<0.001** |
| period f [1] * hopefuture | 0.06 | -0.11 – 0.23 | 0.481 | 0.05 | -0.11 – 0.21 | 0.559 |

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| period f [2] * hopefuture | -0.05 | -0.23 – 0.14 | 0.597 | 0.03 | -0.14 – 0.21 | 0.702 |
| period f [3] * hopefuture | -0.01 | -0.24 – 0.22 | 0.925 | -0.05 | -0.28 – 0.18 | 0.647 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.032 / -0.295 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.21* | *-0.37 – -0.05* | ***0.009*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.19 | -0.35 – -0.03 | **0.021** |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.11 | -0.10 – 0.32 | 0.291 |
| *measuresclear* | *0.03* | *-0.05 – 0.11* | *0.468* | *0.1* | *0.02 – 0.19* | ***0.019*** |
| period f [1] * measuresclear | 0.05 | -0.14 – 0.23 | 0.618 | 0.1 | -0.07 – 0.27 | 0.265 |
| *period f [2] * measuresclear* | *0.16* | *-0.03 – 0.35* | *0.097* | *0.18* | *0.00 – 0.35* | ***0.048*** |
| period f [3] * measuresclear | -0.2 | -0.44 – 0.03 | 0.088 | -0.13 | -0.35 – 0.09 | 0.237 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.026 / -0.303 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.09* | *-0.14 – -0.04* | ***0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.01 | -0.06 – 0.04 | 0.723 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.02 | -0.03 – 0.07 | 0.465 |
| socialmedia | -0.45 | -0.55 – -0.35 | **<0.001** | -0.51 | -0.62 – -0.41 | **<0.001** |
| period f [1] * socialmedia | 1 | 0.66 – 1.35 | **<0.001** | 0.89 | 0.53 – 1.24 | **<0.001** |
| period f [2] * socialmedia | 0.95 | 0.60 – 1.30 | **<0.001** | 0.87 | 0.51 – 1.23 | **<0.001** |

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| period f [3] * socialmedia | 0.92 | 0.57 – 1.27 | **<0.001** | 0.76 | 0.39 – 1.13 | **<0.001** |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.072 / -0.241 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.11* | *-0.17 – -0.06* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | 0.01 | -0.05 – 0.07 | 0.766 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.03 | -0.02 – 0.09 | 0.275 |
| *vigourousactivity* | *0.01* | *-0.04 – 0.06* | *0.63* | *-0.06* | *-0.10 – -0.01* | ***0.02*** |
| period f [1] * vigourousactivity | 0 | -0.09 – 0.09 | 0.986 | -0.02 | -0.11 – 0.06 | 0.597 |
| *period f [2] * vigourousactivity* | *-0.09* | *-0.19 – 0.01* | *0.074* | *-0.13* | *-0.22 – -0.04* | ***0.005*** |
| period f [3] * vigourousactivity | -0.17 | -0.29 – -0.06 | **0.004** | -0.2 | -0.30 – -0.09 | **<0.001** |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.028 / -0.301 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.13* | *-0.24 – -0.01* | ***0.035*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.05 | -0.18 – 0.07 | 0.418 |
| *period f [3]* | *-0.37* | *-1.66 – 0.92* | *0.573* | *-0.18* | *-0.34 – -0.03* | ***0.023*** |
| worriedinfect | 0.03 | -0.03 – 0.10 | 0.271 | 0.06 | -0.00 – 0.13 | 0.06 |
| period f [1] * worriedinfect | 0.06 | -0.06 – 0.18 | 0.332 | 0 | -0.11 – 0.12 | 0.937 |
| period f [2] * worriedinfect | 0.07 | -0.05 – 0.20 | 0.252 | 0.02 | -0.10 – 0.14 | 0.714 |
| period f [3] * worriedinfect | 0.2 | 0.03 – 0.37 | **0.019** | 0.19 | 0.03 – 0.35 | **0.022** |

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| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.021 / -0.311 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.08* | *-0.14 – -0.03* | ***0.003*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.01 | -0.06 – 0.05 | 0.789 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.06 | -0.17 – 0.06 | 0.331 |
| hopecovidend | -0.03 | -0.09 – 0.02 | 0.233 | -0.05 | -0.10 – 0.00 | 0.056 |
| period f [1] * hopecovidend | 0 | -0.12 – 0.12 | 0.993 | -0.11 | -0.22 – 0.01 | 0.071 |
| period f [2] * hopecovidend | 0.06 | -0.07 – 0.19 | 0.393 | -0.12 | -0.25 – 0.02 | 0.085 |
| period f [3] * hopecovidend | 0.03 | -0.12 – 0.18 | 0.708 | 0.06 | -0.08 – 0.21 | 0.394 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.026 / -0.304 | |
| period f [1] | -0.51 | -1.17 – 0.15 | 0.129 | -0.1 | -0.23 – 0.03 | 0.129 |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.04 | -0.18 – 0.09 | 0.517 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.1 | -0.28 – 0.09 | 0.306 |
| providefamily | -0.02 | -0.09 – 0.04 | 0.453 | 0 | -0.07 – 0.06 | 0.955 |
| period f [1] * providefamily | 0 | -0.13 – 0.12 | 0.964 | -0.02 | -0.14 – 0.10 | 0.736 |
| period f [2] * providefamily | 0.02 | -0.10 – 0.15 | 0.712 | 0.02 | -0.11 – 0.14 | 0.804 |
| period f [3] * providefamily | 0.11 | -0.07 – 0.28 | 0.232 | 0.09 | -0.09 – 0.26 | 0.323 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.018 / -0.314 | |

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| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.14* | *-0.25 – -0.04* | ***0.008*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | 0 | -0.09 – 0.09 | 0.958 |
| *period f [3]* | *-0.37* | *-1.66 – 0.92* | *0.573* | *-0.27* | *-0.40 – -0.13* | ***<0.001*** |
| *receivefamily* | *0.04* | *-0.01 – 0.10* | *0.139* | *0.07* | *0.02 – 0.12* | ***0.01*** |
| period f [1] * receivefamily | 0.03 | -0.08 – 0.14 | 0.591 | 0.03 | -0.08 – 0.14 | 0.638 |
| period f [2] * receivefamily | 0.04 | -0.07 – 0.16 | 0.446 | -0.07 | -0.18 – 0.03 | 0.184 |
| *period f [3] * receivefamily* | *0.12* | *-0.02 – 0.27* | *0.086* | *0.28* | *0.15 – 0.42* | ***<0.001*** |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.033 / -0.294 | |
| period f [1] | -0.51 | -1.17 – 0.15 | 0.129 | -0.09 | -0.23 – 0.05 | 0.21 |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | 0.07 | -0.07 – 0.21 | 0.332 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.03 | -0.13 – 0.19 | 0.726 |
| bodysignals | -0.07 | -0.12 – -0.01 | **0.015** | -0.11 | -0.17 – -0.05 | **<0.001** |
| period f [1] * bodysignals | 0.04 | -0.08 – 0.16 | 0.528 | -0.03 | -0.15 – 0.09 | 0.59 |
| period f [2] * bodysignals | -0.01 | -0.13 – 0.10 | 0.819 | -0.09 | -0.22 – 0.03 | 0.127 |
| period f [3] * bodysignals | 0.06 | -0.09 – 0.21 | 0.447 | -0.04 | -0.18 – 0.11 | 0.624 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.026 / -0.303 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.21* | *-0.36 – -0.05* | ***0.01*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.03 | -0.19 – 0.13 | 0.707 |

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| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.1 | -0.30 – 0.09 | 0.302 |
| timeoutside | 0.05 | -0.02 – 0.12 | 0.134 | 0.03 | -0.05 – 0.10 | 0.479 |
| period f [1] * timeoutside | 0.07 | -0.07 – 0.21 | 0.319 | 0.08 | -0.06 – 0.21 | 0.261 |
| period f [2] * timeoutside | 0.07 | -0.07 – 0.22 | 0.314 | 0 | -0.14 – 0.14 | 0.994 |
| period f [3] * timeoutside | 0.16 | -0.02 – 0.34 | 0.081 | 0.09 | -0.09 – 0.27 | 0.313 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.018 / -0.314 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.23* | *-0.35 – -0.11* | ***<0.001*** |
| *period f [2]* | *-0.19* | *-1.28 – 0.90* | *0.738* | *-0.24* | *-0.37 – -0.11* | ***<0.001*** |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.01 | -0.11 – 0.08 | 0.824 |
| cancelevent | 0.03 | -0.04 – 0.09 | 0.384 | 0 | -0.06 – 0.06 | 0.926 |
| period f [1] * cancelevent | 0.1 | -0.04 – 0.24 | 0.164 | 0.13 | 0.00 – 0.27 | **0.048** |
| period f [2] * cancelevent | 0.22 | 0.06 – 0.37 | **0.005** | 0.26 | 0.11 – 0.40 | **<0.001** |
| *period f [3] * cancelevent* | *0.1* | *-0.06 – 0.27* | *0.23* | *-0.2* | *-0.35 – -0.04* | ***0.012*** |
| Observations | | 2356 | | 2356 | | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | 0.035 / -0.291 | | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.28* | *-0.46 – -0.11* | ***0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.11 | -0.26 – 0.04 | 0.137 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.11 | -0.29 – 0.06 | 0.206 |
| olderfriend | 0.02 | -0.06 – 0.10 | 0.702 | 0.08 | -0.00 – 0.16 | 0.061 |

| | | | | | | |
|---|---|---|---|---|---|---|
| period f [1] * olderfriend | 0.03 | -0.15 – 0.21 | 0.735 | 0.17 | -0.01 – 0.36 | 0.063 |
| period f [2] * olderfriend | -0.02 | -0.18 – 0.15 | 0.856 | 0.1 | -0.07 – 0.26 | 0.246 |
| period f [3] * olderfriend | -0.06 | -0.26 – 0.13 | 0.541 | 0.12 | -0.07 – 0.30 | 0.222 |
| Observations | | 2356 | | 2356 | | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | 0.020 / -0.311 | | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.11* | *-0.16 – -0.06* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.02 | -0.07 – 0.03 | 0.429 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0 | -0.05 – 0.05 | 0.954 |
| *jobsecurity* | *0.05* | *-0.04 – 0.14* | *0.248* | *-0.14* | *-0.24 – -0.05* | ***0.002*** |
| period f [1] * jobsecurity | -0.08 | -0.26 – 0.11 | 0.419 | -0.17 | -0.35 – 0.01 | 0.062 |
| period f [2] * jobsecurity | 0.07 | -0.11 – 0.25 | 0.427 | -0.07 | -0.24 – 0.10 | 0.433 |
| period f [3] * jobsecurity | 0.11 | -0.10 – 0.32 | 0.301 | -0.11 | -0.30 – 0.08 | 0.266 |
| Observations | | 2356 | | 2356 | | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | 0.023 / -0.307 | | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.11* | *-0.16 – -0.06* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.03 | -0.08 – 0.03 | 0.33 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.01 | -0.04 – 0.06 | 0.73 |
| trustcovid | -0.22 | -0.30 – -0.13 | **<0.001** | -0.28 | -0.37 – -0.19 | **<0.001** |
| period f [1] * trustcovid | 0.07 | -0.11 – 0.26 | 0.427 | -0.02 | -0.19 – 0.15 | 0.847 |

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|---|---|---|---|---|---|---|
| period f [2] * trustcovid | -0.05 | -0.27 – 0.17 | 0.676 | -0.14 | -0.35 – 0.06 | 0.175 |
| period f [3] * trustcovid | -0.02 | -0.23 – 0.19 | 0.836 | -0.16 | -0.35 – 0.02 | 0.088 |
| Observations | | 2356 | | 2356 | | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | 0.039 / -0.286 | | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.12* | *-0.17 – -0.07* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.02 | -0.07 – 0.03 | 0.372 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0 | -0.05 – 0.05 | 0.947 |
| contacttracing | 0.06 | -0.16 – 0.28 | 0.584 | -0.11 | -0.35 – 0.13 | 0.359 |
| period f [1] * contacttracing | -1.04 | -1.58 – -0.50 | **<0.001** | -0.65 | -1.22 – -0.08 | **0.025** |
| period f [2] * contacttracing | -0.87 | -1.44 – -0.30 | **0.003** | -0.66 | -1.26 – -0.07 | **0.029** |
| period f [3] * contacttracing | -1.01 | -1.59 – -0.44 | **0.001** | -0.84 | -1.43 – -0.25 | **0.006** |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.023 / -0.308 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.08* | *-0.14 – -0.03* | ***0.005*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | 0.01 | -0.04 – 0.07 | 0.657 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.03 | -0.02 – 0.09 | 0.26 |
| *financeuk* | *-0.06* | *-0.12 – 0.01* | *0.113* | *-0.18* | *-0.25 – -0.11* | ***<0.001*** |
| period f [1] * financeuk | -0.16 | -0.30 – -0.03 | **0.017** | -0.18 | -0.31 – -0.06 | **0.004** |
| period f [2] * financeuk | -0.17 | -0.30 – -0.03 | **0.019** | -0.19 | -0.32 – -0.06 | **0.003** |

| | | | | | | |
|---|---|---|---|---|---|---|
| period f [3] * financeuk | -0.27 | -0.46 – -0.09 | **0.004** | -0.39 | -0.55 – -0.23 | **<0.001** |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.039 / -0.285 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.09* | *-0.15 – -0.04* | ***0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.01 | -0.06 – 0.05 | 0.799 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.01 | -0.06 – 0.04 | 0.716 |
| financeyour | -0.17 | -0.24 – -0.10 | **<0.001** | -0.3 | -0.37 – -0.23 | **<0.001** |
| *period f [1] * financeyour* | *0.07* | *-0.09 – 0.22* | *0.395* | *-0.13* | *-0.25 – -0.01* | ***0.04*** |
| *period f [2] * financeyour* | *-0.06* | *-0.22 – 0.09* | *0.411* | *-0.14* | *-0.27 – -0.01* | ***0.03*** |
| *period f [3] * financeyour* | *0.09* | *-0.09 – 0.28* | *0.328* | *-0.17* | *-0.32 – -0.02* | ***0.023*** |
| Observations | | 2356 | | 2356 | | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | 0.056 / -0.264 | | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.09* | *-0.15 – -0.04* | ***0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.01 | -0.06 – 0.05 | 0.86 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.04 | -0.02 – 0.09 | 0.186 |
| *healthsocial* | *-0.03* | *-0.09 – 0.03* | *0.33* | *-0.11* | *-0.17 – -0.05* | ***<0.001*** |
| period f [1] * healthsocial | -0.09 | -0.23 – 0.05 | 0.222 | -0.12 | -0.26 – 0.01 | 0.063 |
| period f [2] * healthsocial | -0.02 | -0.16 – 0.13 | 0.833 | -0.1 | -0.23 – 0.03 | 0.127 |
| *period f [3] * healthsocial* | *-0.09* | *-0.26 – 0.08* | *0.303* | *-0.31* | *-0.45 – -0.16* | ***<0.001*** |

| | | | | | | |
|---|---|---|---|---|---|---|
| Observations | | 2356 | | 2356 | | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | 0.031 / -0.296 | | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.12* | *-0.17 – -0.06* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | 0 | -0.06 – 0.06 | 0.967 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.01 | -0.05 – 0.06 | 0.822 |
| apartcovid | 0.01 | -0.07 – 0.09 | 0.864 | -0.03 | -0.11 – 0.05 | 0.434 |
| period f [1] * apartcovid | 0.1 | -0.07 – 0.26 | 0.267 | 0 | -0.17 – 0.17 | 0.976 |
| *period f [2] * apartcovid* | *-0.01* | *-0.17 – 0.15* | *0.895* | *-0.22* | *-0.38 – -0.06* | ***0.006*** |
| period f [3] * apartcovid | 0.21 | -0.01 – 0.43 | 0.062 | -0.09 | -0.29 – 0.12 | 0.404 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.021 / -0.309 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.21* | *-0.30 – -0.13* | ***<u><0.001</u>*** |
| *period f [2]* | *-0.19* | *-1.28 – 0.90* | *0.738* | *-0.1* | *-0.19 – -0.01* | ***0.027*** |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.01 | -0.05 – 0.06 | 0.804 |
| *interactions f Online* | *0.19* | *0.04 – 0.34* | ***0.012*** | *0.01* | *-0.05 – 0.07* | *0.685* |
| period f [1] * interactions f Online | 0.12 | -0.14 – 0.38 | 0.361 | 0.15 | -0.00 – 0.30 | 0.054 |
| period f [2] * interactions f Online | 0.08 | -0.22 – 0.38 | 0.607 | 0.12 | -0.03 – 0.27 | 0.119 |
| period f [3] * interactions f Online | 0.17 | -0.27 – 0.60 | 0.45 | -0.1 | -0.26 – 0.06 | 0.225 |
| Observations | | 2356 | | | 2356 | |

| | | | | | | |
|---|---|---|---|---|---|---|
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.024 / -0.306 | |
| period f [1] | -0.51 | -1.17 – 0.15 | 0.129 | -0.06 | -0.16 – 0.03 | 0.205 |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | 0.03 | -0.07 – 0.12 | 0.601 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.09 | -0.22 – 0.04 | 0.174 |
| *interactions f mixofboth* | *0.16* | *0.02 – 0.30* | ***0.03*** | *0.01* | *-0.04 – 0.07* | *0.622* |
| period f [1] * interactions f mixofboth | 0.03 | -0.21 – 0.28 | 0.783 | -0.13 | -0.27 – 0.01 | 0.071 |
| period f [2] * interactions f mixofboth | 0.04 | -0.25 – 0.33 | 0.777 | -0.12 | -0.26 – 0.03 | 0.107 |
| period f [3] * interactions f mixofboth | 0.01 | -0.40 – 0.43 | 0.945 | 0.1 | -0.05 – 0.24 | 0.2 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.023 / -0.308 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.12* | *-0.17 – -0.07* | ***<0.001*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.02 | -0.07 – 0.03 | 0.398 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0 | -0.05 – 0.05 | 0.893 |
| *mostworriedcovid Finance* | *0.05* | *-0.15 – 0.25* | *0.603* | *-0.22* | *-0.32 – -0.11* | ***<0.001*** |
| period f [1] * mostworriedcovid Finance | -0.1 | -0.46 – 0.26 | 0.59 | -0.03 | -0.26 – 0.20 | 0.803 |

| | | | | | | |
|---|---|---|---|---|---|---|
| period f [2] * mostworriedcovid Finance | 0 | -0.34 – 0.34 | 0.988 | -0.1 | -0.33 – 0.13 | 0.389 |
| period f [3] * mostworriedcovid Finance | -0.26 | -0.84 – 0.32 | 0.386 | -0.2 | -0.47 – 0.07 | 0.143 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.026 / -0.304 | |
| period f [1] | -0.51 | -1.17 – 0.15 | 0.129 | -0.13 | -0.30 – 0.04 | 0.142 |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | -0.15 | -0.32 – 0.02 | 0.089 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | -0.11 | -0.34 – 0.12 | 0.343 |
| *mostworriedcovid Security* | *0.05* | *-0.12 – 0.22* | *0.566* | *0.25* | *0.16 – 0.34* | ***<0.001*** |
| period f [1] * mostworriedcovid Security | -0.1 | -0.40 – 0.19 | 0.497 | 0 | -0.18 – 0.19 | 0.976 |
| period f [2] * mostworriedcovid Security | 0.21 | -0.06 – 0.49 | 0.131 | 0.13 | -0.05 – 0.31 | 0.164 |
| period f [3] * mostworriedcovid Security | -0.18 | -0.71 – 0.35 | 0.494 | 0.09 | -0.14 – 0.33 | 0.437 |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.035 / -0.291 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.2* | *-0.31 – -0.09* | ***<0.001*** |
| *period f [2]* | *-0.19* | *-1.28 – 0.90* | *0.738* | *-0.13* | *-0.24 – -0.01* | ***0.028*** |
| *period f [3]* | *-0.37* | *-1.66 – 0.92* | *0.573* | *-0.32* | *-0.43 – -0.21* | ***<0.001*** |

| | | | | | | |
|---|---|---|---|---|---|---|
| *healthrisk f Others* | *0.08* | *-0.06 – 0.22* | *0.242* | *0.12* | *0.06 – 0.17* | ***<0.001*** |
| period f [1] * healthrisk f Others | -0.14 | -0.45 – 0.17 | 0.371 | 0.11 | -0.02 – 0.24 | 0.107 |
| period f [2] * healthrisk f Others | -0.13 | -0.45 – 0.18 | 0.416 | 0.13 | -0.01 – 0.26 | 0.062 |
| period f [3] * healthrisk f Others | 0.28 | 0.13 – 0.42 | **<0.001** | 0.4 | 0.26 – 0.53 | **<0.001** |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.042 / -0.282 | |
| *period f [1]* | *-0.51* | *-1.17 – 0.15* | *0.129* | *-0.09* | *-0.15 – -0.03* | ***0.003*** |
| period f [2] | -0.19 | -1.28 – 0.90 | 0.738 | 0 | -0.06 – 0.06 | 0.912 |
| period f [3] | -0.37 | -1.66 – 0.92 | 0.573 | 0.05 | -0.01 – 0.11 | 0.085 |
| *healthrisk f Lovedones* | *0.01* | *-0.13 – 0.15* | *0.89* | *-0.1* | *-0.16 – -0.05* | ***<0.001*** |
| period f [1] * healthrisk f Lovedones | -0.19 | -0.50 – 0.12 | 0.221 | -0.12 | -0.26 – 0.01 | 0.079 |
| period f [2] * healthrisk f Lovedones | -0.18 | -0.50 – 0.14 | 0.263 | -0.12 | -0.26 – 0.03 | 0.114 |
| *period f [3] * healthrisk f Lovedones* | *0.28* | *0.13 – 0.42* | ***<0.001*** | *-0.34* | *-0.48 – -0.20* | ***<0.001*** |
| Observations | | 2356 | | | 2356 | |
| $R^2$ / $R^2$ adjusted | | 0.317 / 0.006 | | | 0.033 / -0.294 | |

*Note* P-values that survived Bonferroni correction for multiple testing are underlined in the table to aid interpretation. Results that differ between multivariate and independent poll question analyses are italicised.

**Appendix G**
**Table summarising findings: Multivariate and Independent poll question analyses across time points**

| | Main effect | | PERIOD 1 | | PERIOD 2 | | PERIOD 3 | |
|---|---|---|---|---|---|---|---|---|
| Variables code | MA | IPQA | MA | IPQA | MA | IPQA | MA | IPQA |
| ComplyMeasures | | **↓** | | | | | | |
| Workedhome | | ↑ | ↓ | | **↓** | **↓** | | |
| ConcernFinances | **↓** | **↓** | | ↓ | | | | ↓ |
| VoluntaryWork | **↓** | **↓** | ↑ | | ↑ | | | |
| PositiveChange | | ↓ | | | ↓ | **↓** | ↓ | **↓** |
| MaskTransport | | | | ↑ | | | | |
| KeyworkersPPE | | ↑ | | | | | | |
| TravelRestrictions | | ↑ | ↑ | **↑** | | | | |
| TestLevels | | | | | | | | |
| NegativeSpouse | **↓** | **↓** | | | | | ↓ | **↓** |
| NormalActivities | **↑** | **↑** | | | | | | |
| ReassureGovern | | ↑ | | | | | | |
| HopeFuture | ↑ | **↑** | | | | | | |
| MeasuresClear | ↑ | ↑ | | | | ↑ | | |
| SocialMedia | **↓** | **↓** | **↑** | **↑** | **↑** | **↑** | **↑** | **↑** |
| VigourousActivity | | ↓ | | | | ↓ | **↓** | **↓** |
| WorriedInfect | | | | | | | ↑ | ↑ |
| HopeCovidEnd | | | | | | | | |
| ProvideFamily | | | | | | | | |

| | Main effect | | PERIOD 1 | | PERIOD 2 | | PERIOD 3 | |
|---|---|---|---|---|---|---|---|---|
| Variables code | MA | IPQA | MA | IPQA | MA | IPQA | MA | IPQA |
| ReceiveFamily | | **↑** | | | | | | **↑** |
| BodySignals | ↓ | **↓** | | | | | | |
| TimeOutside | | | | | | | | |
| CancelEvent | | | | ↑ | ↑ | **↑** | | ↓ |
| OlderFriend | | | | | | | | |
| JobSecurity | | ↓ | | | | | | |
| TrustCOVID | **↓** | **↓** | | | | | | |
| ContactTracing | | | **↓** | ↓ | **↓** | ↓ | **↓** | ↓ |
| FinanceUK | | **↓** | ↓ | ↓ | ↓ | ↓ | **↓** | **↓** |
| FinanceYour | **↓** | **↓** | | ↓ | | ↓ | | ↓ |
| HealthSocial | | **↓** | | | | | | **↓** |
| ApartCovid | | | | | | **↓** | | |
| Interactions f Online | ↑ | | | | | | | |
| Interactions f MixofBoth | ↑ | | | | | | | |
| MostWorriedCovid Finance | | **↓** | | | | | | |
| MostWorriedCovid Security | | **↑** | | | | | | |
| HealthRisk f Others | | **↑** | | | | | **↑** | **↑** |
| HealthRisk f LovedOnes | | **↓** | | | | | **↑** | **↓** |

*Note* Multivariate Analysis (MA) Independent Poll Question Analyses (IPQA) Positive relationship (↑) Negative relationship (↓) Arrows in bold survived Bonferroni Correction.