Understanding Society

Working Paper Series

2025 – 05

May 2025

Survey mode change by necessity: Evaluating survey dataset performance in a global pandemic

Nicole D. James[1] and Jamie C. Moore[1]

[1]Institute for Social and Economic Research, University of Essex, UK

Understanding Society

Economic and Social Research Council

Non-technical summary

The COVID-19 pandemic significantly affected how surveys were administered. One change was suspending face-to-face (F2F) interviewing, the primary mode for many surveys, and shifting to mainly web-based designs. Another was more frequent data collection. The former mode shift had already been occurring in surveys pre-pandemic, but at a slower pace and not to the same extent. Hence, these design changes were made with limited information on their impact on dataset performance in terms of non-response bias risks and bias risk causes: variation in population sub-group non-response. This paper investigates the extent to which information on such questions in pre-pandemic surveys was predictive of similar in pandemic surveys in two surveys fielded by *Understanding Society*: the UK Household Longitudinal Study (UKHLS). The UKHLS main survey is an annual panel survey with a mixed mode (including F2F) design. In response to the pandemic, the UKHLS COVID-19 Study was fielded, in which main survey participants were invited to complete (mostly) bi-monthly web questionnaires. Representativeness indicators are used to quantify dataset performance in terms of bias risks and their causes. Longitudinal datasets including respondents who have also responded in all prior waves are considered along with cross-sectional datasets. Findings suggest that information from the main survey was of limited value for predicting bias risks and their causes in the COVID-19 Study. The implications of these findings, both for surveys during the pandemic and for surveys more generally, are then discussed.

Survey Mode Change by Necessity: Evaluating survey dataset performance during a global pandemic

Nicole D. James[1*] and Jamie C. Moore[1]

[1]Institute for Social and Economic Research, University of Essex

Corresponding author: Nicole D. Jamies, Institute for Social and Economic Research, University of Essex, Colchester, Wivenhoe Park, Essex CO4 3SQ, United Kingdom, njames@essex.ac.uk.

Abstract:

The COVID-19 pandemic affected how surveys were administered. Web based designs were used instead of face-to-face (F2F) interviewing, and data collection was more frequent. Changes were made with limited information about impacts survey estimate non-response biases and their causes. We examine the extent to which information on such questions in pre-pandemic surveys was predictive of similar in pandemic surveys in two *Understanding Society*: the UK Household Longitudinal Study (UKHLS) datasets: the main survey and the COVID-19 Study. We find that main survey information was of limited predicted value for the COVID-19 Study. The implications of these findings are then discussed.

Keywords: survey dataset performance; non-response bias; panel surveys; attrition; UK Household Longitudinal Study; representativeness indicators; mixed mode designs.

JEL classification: C81, C83

Acknowledgements:

This research was funded by the University of Essex Social Sciences Doctoral Scholarship, awarded to Nicole D. James.

The Understanding Society survey is funded by ESRC grants awarded to Nick Buck (RES-586-47-0002, ES/K005146/1) and Michaela Benzeval (ES/N00812X/1, ES/S007253/1, ES/T002611/1, ES/Y003071/1, ES/Y010469/1), with co-funding from various Government Departments. The data are collected by the National Centre for Social Research (NatCen) and Verian (formerly Kantar Public). The COVID-19 Study was funded by the Economic and Social Research Council (ES/K005146/1) and the Health Foundation (2076161). Fieldwork for the survey was carried out by Ipsos MORI and Kantar Public (now Verian). The data are distributed by the UK Data Service (main survey: 10.5255/UKDA-SN-6614-20; COVID-19 Study: 10.5255/UKDA-SN-8644-11).

1. Introduction

General population panel surveys aim to collect data from a sample that reflects a population over time. However, a challenge is that response rates are declining (de Leeuw & de Heer 2002; Luiten et al. 2020). Non-response is important because it reduces dataset size and survey estimate precision (Groves et al. 2009). In addition, if it differs across sample subgroups, estimates can deviate from population values (non-response biases), causing invalid inference.

There are various ways surveys can seek to minimize non-response biases. Bias prevention measures, such as offering incentives to low response subgroups, are used before or during fieldwork to reduce differential non-response (e.g. Groves 2006; Groves et al. 2009; Peytchev et al. 2010). Bias adjustment measures, such as supplying non-response weights (e.g. Valliant et al. 2018; see Little and Rubin (2020) for other methods), are used after to reduce remaining biases. An interaction also exists between the two: prevention measure success improves bias adjustment effectiveness (e.g. Moore et al. 2024; Schouten et al. 2016).

1.1. Survey mode and non-response biases

The mode by which interviews are conducted is an important determinant of biases. They may be face-to-face (F2F), or by telephone, paper or web. In the past, F2F has mostly been used in general population surveys in the UK. It has higher response rates than other modes, but also higher costs. Recently, less costly web mode has become increasingly used (Baker et al. 2010; Couper et al. 2007; Lugtig et al. 2014; Schonlau & Couper 2017; Schonlau et al. 2009).

However, response rates tend to be lower and differential subgroup non-response higher than with F2F mode (Cornesse & Bosnjak 2018; Daikeler et al. 2020; Nicolaas et al. 2014). Hence, many surveys implement mixed mode designs in which web non-respondents are followed up F2F or by telephone (Bianchi et al. 2017; Burton & Jäckle 2020; Cornesse & Bosnjak 2018; Couper et al. 2007; Nicolaas et al. 2014).

1.2. The COVID-19 pandemic and non-response biases

The impact of mode on biases was especially important during the COVID-19 pandemic. First, many countries enacted restrictions to slow virus spread that significantly impacted on surveys. F2F mode was often not possible, with mostly web or telephone used instead. This caused difficulties regarding predicting likely biases and their causes i.e. differences in sub-group non-response that any bias minimization efforts would seek to address – at affected survey waves. As noted in section 1.1, similar mode changes were occurring before the pandemic, but at a slower pace and not to the extent now necessary. Hence, it was not known if pre-pandemic information was of use for such a task.

Second, there was a need for information on the impacts of the pandemic. This was required in a timely manner, which was often not possible with existing surveys, so new more frequently fielded surveys, often with eligible samples drawn from existing surveys, were initiated (e.g., Blom et al. 2020; Brown et al. 2021; Burton et al. 2020; Gummer et al. 2020). These surveys were subject to questions regarding the usefulness of pre-pandemic information from parent surveys for predicting biases and their causes in the same way that existing surveys were, with the addition that their increased frequencies might also impact on performance.

1.3. Quantifying non-response biases

Quantifying biases is often difficult because non-respondent information does not exist, and population values are not available (see Hand et al. 2018). Hence, in early work, the response rate was often used as an indirect indicator of risks of biases, with high rates presumed to indicate lower risks (Schouten et al. 2011, 2012). However, empirical work has not found a correlation between response rates and biases (Groves 2006; Groves & Peytcheva 2008; Schouten et al. 2009), so alternative indicators have been sought.

One set of indicators that are useful in this regard are representativeness indicators (Schouten et al. 2012: see also section 2.2). These evaluate how well respondents reflect the eligible sample by quantifying variation in sample member response propensities estimated using auxiliary information available for all members. Low variation suggests that respondents are a random subset of the sample with respect to auxiliary covariates (dataset representativeness), and that bias risks are low. In addition, partial indicators exist that decompose propensity variation into that associated with auxiliary covariates and categories. These provide information of the causes of bias risks, and enable identification of covariates for inclusion in models underlying bias adjustments in the former case and of under-represented sub-groups that should be targeted by bias prevention measures in the latter (for alternative indicators, see Little and Vartivarian 2005; Nagelkerke 1991; Särndal 2011; Wagner 2010).

1.4 Research questions

Little work exists on how mode and frequency changes impacted on (risks of) biases and their causes in pandemic surveys, or on whether impacts differed from those in pre-pandemic surveys i.e., whether knowledge of the latter was useful to predict the former. These questions are of broad relevance. The pandemic was unprecedented in recent times, but similar could happen again, with comparable effects on surveys. In addition, even without such events, web may completely replace F2F in surveys in the future, so information on biases when F2F is not used is of value. This paper addresses these knowledge gaps by evaluating and comparing bias risks in datasets from *Understanding Society*: the UK Household Longitudinal Study (UKHLS: Institute for Social and Economic Research 2024) and the UKHLS COVID-19 Study, a higher frequency survey of the UKHLS main survey eligible sample fielded during the pandemic (Institute for Social and Economic Research 2021). Pre-pandemic, the main survey used F2F, web and telephone modes. Both were restricted to the latter two modes during the pandemic.

Two research questions are investigated: 1) how do bias risks in the pre-pandemic UKHLS main survey compare to those in the COVID-19 Study; and 2) how do their causes, differential sample subgroup non-response, compare in the two surveys. Representativeness indicators are used to evaluate bias risks and their causes. The paper proceeds as follows. In section 2, the two surveys, representativeness indicators and the evaluation approach are described. In section 3, results are reported. In section 4, the implications of findings for survey design are discussed.

2 Methods

2.1. Data

Understanding Society: The UK Household Longitudinal Study (UKHLS) is a household panel survey of people in the UK. Annual interviews are sought from all adults in sampled HHs. The survey began in 2009, with F2F interviews. At wave 3, telephone mode was introduced, and at wave 7 web mode. It currently has a sequential mixed-mode design: some participants are allocated to web (around 80%, a percentage that has grown over time) and others to F2F, with follow up in other modes. The eligible sample is constructed from probability samples, with non-response carefully modelled (Lynn & Kaminska 2010). By the end of 2024, 14 waves of data had been released. See Institute for Social and Economic Research (2024) for more details.

In April 2020 the UKHLS team fielded the UKHLS COVID-19 Study, a primarily web-based survey focusing on the impacts of the pandemic and government policy responses (Burton et al. 2020). The survey was fielded more frequently than the UKHLS main survey, mostly monthly or bi-monthly. The eligible sample was those aged 16+ in HHs participating in main survey waves 8 or 9, who had not attrited, died or emigrated before the Study began. In total, nine waves were fielded, the last in September 2021. At waves 1 and 6, some web non-respondents were followed up by telephone. These interviews are not considered in this paper. See Institute for Social and Economic Research (2021) for more details of the Study.

2.2 Representativeness Indicators

Representativeness indicators (R-indicators and Coefficients of Variation of response propensities (CVs)) quantify variation in response propensities estimated by regression using auxiliary covariates available for all sample members (Schouten et al. 2012). If covariates and survey variables are correlated, low variation (representativeness) implies low bias risk. CVs are comparable across datasets, and statistical inference is possible. Supporting indicator use, Schouten et al. (2016) report that high representativeness reduces biases, though Nishimura et al. (2017) find that performance depends on auxiliary covariate – survey variable correlations.

Overall CVs quantify dataset representativeness. The overall CV is, for sample size *n* and auxiliary covariate set ***x*** producing the propensity vector $p_{\boldsymbol{x}}$

$$\widehat{CV}(p_{\boldsymbol{x}}) = \frac{\sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(\hat{p}_i - \hat{\bar{p}})^2}}{\hat{\bar{p}}}, \quad (1)$$

where $\hat{p}_i$ is the response propensity of subject *i* and $\hat{\bar{p}}$ average response propensity. The numerator term is the response propensity standard deviation, *SD*. Weights can be used to map the sample to the population. The less propensities differ, the smaller the overall CV and the greater dataset representativeness. The overall R-indicator, $\hat{R}(p_{\boldsymbol{x}}) = 1 - 2SD$, is the *SD* scaled to between 0 and 1 (larger values imply greater representativeness). Schouten et al. (2009: see also Moore et al. 2018) advise using CVs when response rates differ because dividing *SD* by $\hat{\bar{p}}$ means they are less likely to falsely suggest high representativeness at very low or very high response rates due to low propensity variation. In addition, CVs are on a

scale meaningful to designers: the overall CV predicts maximal absolute survey variable standardized non-response bias. As evaluated dataset response rates differ (see 'Results'), CVs are used in this paper.

Partial covariate (category) CVs quantify response propensity variation associated with auxiliary covariates i.e., the causes of non-representativeness and bias risk. Two forms exist. Unconditional CVs (CV_us) quantify univariate associations with propensity variation. Conditional CVs (CV_cs) quantify multivariate associations i.e., propensity variation associated with the covariate after the impacts of other covariates have been accounted for. CV_us are useful for identifying covariates to include in bias adjustment models and under-represented subgroups to target with bias prevention measures. CV_cs are useful for ensuring measures are efficient i.e. that covariates with correlated impacts are not (both) included in bias adjustments (model overfitting causes precision loss: see Little and Vartivarian 2005), and under-represented groups with correlated impacts are not (both) targeted by bias prevention measures. CV_us and CV_cs, sampling bias adjustments, and CV standard errors (which can be converted into 95% Confidence Intervals (CIs) for statistical inference) are described in the Appendix.

2.3 Evaluation Methods

CVs are used to evaluate bias risks in the two studied surveys. Cross-sectional (all respondents to the wave) and longitudinal (only respondents to the wave in question and all previous waves) datasets are evaluated as both are used by researchers. Eight auxiliary covariates

available in both surveys are used in response propensity estimation / have their impacts on representativeness quantified (see Table 1). All are correlates of propensities in the main survey or similar surveys (e.g. Lugtig et al. 2014; Lynn and Borkowska 2018; Uhrig 2008). Sample members with missing values for any covariate are excluded from datasets.

That said, such covariates do not exist for main survey wave 1 non-respondents. Hence, the survey evaluation sample is defined as all wave 1 respondents (= 46,885 individuals). The first respondents considered are from wave 2, then each wave after up to and including wave 9, the last pre-pandemic. For comparability, the same approach is used for the COVID-19 Study (= 14,777 individuals), even though the majority of sample members possess main wave 9 information (some do not due to non-response to the wave). This though, only applies to cross-sectional datasets. Longitudinal dataset evaluations begin with wave 3 respondents (who also responded to wave 2).

The evaluation samples are also weighted. The wave 1 non-response weights supplied with the two surveys are used. For the main survey, this is 'a_indinus_xw', the survey selection weight adjusted for wave 1 non-response. For the COVID-19 Study, it is 'ca_betaindin_xw', the main survey wave 9 cross-sectional weight (the selection weight adjusted for waves 1-9 non-response then post-calibrated to 2019 UK population estimates) adjusted for COVID-19 Study non-response (Institute for Social and Economic Research 2021, 2024). These weights are primarily applied to map the evaluation samples to the survey eligible samples, so that bias risks are measured in comparison to them. However, given the purpose for their release, they also map the evaluation samples (and evaluations quantify bias risks compared to) to the UK population at different time points: March 2009-January

2011 with the main survey, and June 2019 with the COVID-19 Study. It should be noted that this mapping is in theory as weights are imperfect, but empirical work has shown that main survey weighted survey estimates perform well in approximating population benchmarks (Benzeval et al. 2020; Borkowska 2019), and that COVID-19 Study wave 1 weighted estimates closely approximate similar main survey wave 9 weighted estimates (Moore et al. 2024).

There was no alternative to using weights mapping evaluation samples to the UK population at different times given the disparity in time periods covered by the two sets of datasets. It should also be noted that the COVID-19 evaluation sample is a subset of the main sample that includes long-term respondents who are likely positively disposed towards the survey. However, even given this, the evaluations still address the question of whether pre-pandemic main survey bias risks are useful to predict those in the COVID-19 Study. In evaluations, overall CVs and their 95% CIs are computed for each considered dataset to quantify overall representativeness / bias risk. In addition, to identify risk causes in terms of auxiliary covariates / categories associated with response propensity variation, partial CV_us and CV_cs and their 95% CIs are computed. The R code of de Heij et al. (2015) is used to compute indicators.

3. Results

3.1 Response Rates

Longitudinal dataset response rates (RRs) are reported in Figure 1 (see Appendix Table A7 for tabulation). The main survey wave 3 RR is 0.61. It decreases at a decreasing rate to 0.30 at

wave 9. COVID-19 Study RRs are higher, at 0.71 at wave 3 then decreasing to 0.44 at wave 9. The rate of decrease is fairly constant until wave 6, slows slightly to wave 8, then increases at wave 9. This is probably related to the serology testing for COVID-19 antibodies offered at wave 8 and the greater financial incentives offered at wave 8 and 9 (Institute for Social and Economic Research 2021), which are likely to have slowed drop-out by respondents.

Cross-sectional dataset RRs are reported in Appendix Figure A2 (see Appendix Table A1 for tabulation). They are higher than for longitudinal datasets, as expected given less restrictive inclusion criteria. The main survey RR at wave 2 is 0.75. It decreases at an uneven, slightly decreasing rate to 0.40 at wave 9. COVID-19 Study RRs are again higher. The wave 2 RR is 0.79. It decreases at an increasing rate until wave 6, increases slightly to wave 8 then decreases to 0.66 at wave 9. Post wave 7, this pattern is again likely due to offering serology testing and financial incentives. The increase in the RR implies that this led previous non-respondents to re-engage with the survey, as well as slowing drop-out among respondents.

3.2 Overall CVs

3.2.1. Longitudinal datasets

Overall CVs are reported in Fig. 2 (see Table 2 for tabulation and 95% CIs). Lower values indicate higher representativeness and lower bias risk. For both surveys, all differ significantly

from 0, implying non-trivial non-representativeness i.e., that respondents are non-random subsets of (weighted: see section 3.3) evaluation samples with respect to auxiliary covariates. They also increase across waves, in the main survey from 0.19 at wave 3 to 0.41 at wave 9 and in the COVID-19 Study from 0.16 to 0.30 at wave 7, then at a lower rate to 0.31 at wave 9. The change at waves 8-9 in the Study is likely related to reduced drop-out rates caused by offering serology testing and increased financial incentives (see also section 3.1).

3.2.2. Cross-sectional datasets

Overall CVs are reported in Appendix Figure A1 (see Appendix Table A2 for tabulation and 95% CIs). For both surveys, all differ significantly from 0, implying non-trivial non-representativeness. They also mostly increase across waves. In the main survey, they increase from 0.12 at wave 2 to 0.32 at wave 9. In the COVID-19 Study they are slightly smaller and increase from 0.12 to 0.21 at wave 7, then decrease to 0.14 at wave 9. Again, changes at Study waves 8-9 are likely related to the serology testing and increased financial incentives offered.

3.3 Covariate unconditional CVs (CV_us)

3.3.1. Longitudinal datasets

Covariate CV_us are reported in Figure 2 (see Appendix Table A8 for tabulation and 95% CIs). Zero values indicate no association with response propensity variation i.e., that respondents

are a random subset of the sample with respect to the covariate. All main survey CV_us differ significantly from 0. Age CV_us are largest and increase across waves. Tenure and Marital Status CV_us are slightly smaller and also increase across waves. Next are Highest Qualification CV_us, increase more quickly across waves, then Ethnicity and HH Composition CV_us, which all exhibit increases. Then are Employment Status CV_us, which increase slightly. Sex CV_us are smallest and are stable across waves.

COVID-19 Study CV_us are mostly slightly smaller than in the main survey. All differ significantly from 0, and most increase across waves, though they often stabilize at waves 8-9, likely due to the serology testing and increased financial incentives offered. As with the main survey, Age CV_us are largest, increase to wave 7, then stabilize. Otherwise, covariate ranking mostly differs from the main survey. HH Composition CV_us are second largest and increase to wave 7 then stabilize. Next are Employment Status CV_us, which exhibit a similar pattern, and Marital Status CV_us, which increase to wave 7, stabilize at wave 8, then increase at wave 9. After are Tenure and Ethnicity CV_us, which increase across waves. Smallest CV_us are for Highest Qualification, which also increase across waves, and Sex, which remain stable.

3.3.2. Cross-sectional datasets

Covariate CV_us are reported in Appendix Figure A2 (see Appendix Table A3 for tabulation and 95% CIs). They are a similar size to with longitudinal datasets. For the main survey, all are significantly different from 0. Covariate impact ranking is similar to that in longitudinal datasets. Age CV_us are largest and increase across waves. Next largest are for Tenure and

Martial Status, which also increase across waves, and Highest Qualification, which (similar to in the longitudinal datasets) increase at a faster rate than for other covariates. Following this are Employment Status CV_us, which are stable until wave 6 then increase, and Household Composition and Ethnicity CV_us, which both increase slightly. Sex CV_us are smallest and remain stable.

COVID-19 Study CV_us tend to be slightly smaller than for the main survey, though they almost always differ significantly from 0. Again, for many covariates they increase across waves, but often also stabilize or decrease at waves 8 and 9. Covariate impact ranking mostly differs from that in the main survey datasets. Age CV_us are largest, increase to wave 7 then decrease. Next largest are HH Composition CV_us, then Employment Status CV_us, the Marital Status CV_us, which all increase to wave 7 then decrease. Following this are Tenure CV_us, which increase slightly to wave 7 then decrease slightly, and Highest Qualification CV_us, which increase and decrease across waves. Then are Ethnicity CV_us, which increase slightly to wave 7 then decrease slightly. Sex CV_us are smallest and increase and decrease across waves.

3.4 Covariate conditional CVs (CV_cs)

3.4.1. Longitudinal datasets

Covariate CV_cs are reported in Figure 3 (see Appendix Table A9 for tabulations and 95% CIs). Zero values indicate that respondents are a random subset of the sample with respect to the covariate when the effects of the others are accounted for. Main survey CV_cs are smaller than CV_us, suggesting correlations between impacts, but are also almost always significantly

different from 0. Covariate ranking in terms of impact is comparable to that with CV_us. Age CV_cs are largest and increase across waves. Next are Highest Qualification CV_cs, which again increase (at a higher rate) across waves. Following this are Ethnicity and Tenure CV_cs, which both increase across waves. Then are HH Composition, Marital Status and Sex CV_cs, which increase slightly across waves. Employment Status CV_cs are smallest and remain stable.

COVID-19 Study CV_cs are often slightly smaller than for the main survey. They are also smaller than CV_us, though all differ significantly from 0. Covariate ranking is comparable to that with CV_us and differs from in the main survey datasets. Age CV_cs are the largest and increase across waves. Next largest are Highest Qualification and HH Composition CV_cs, which also increase across waves. Then are Tenure, Ethnicity and Sex CV_cs, which all increase slightly across waves. Marital Status and Employment status CV_cs are smallest and remain stable.

3.4.2. Cross-sectional datasets

CV_cs are reported in Appendix Figure A3 (see Appendix Table A4 for tabulation and 95% CIs). They are of a similar size to for the longitudinal datasets. Main survey CV_cs are all smaller than CV_u equivalents, suggesting correlations between impacts, but also almost always differ significantly from 0. Covariate impact ranking is comparable to that with CV_us and in the longitudinal datasets. Age CV_cs are largest and increase across waves. Almost as large are Highest Qualification and Tenure CV_cs, which also increase. Next are Ethnicity CV_cs, which increase as well, then HH Composition CV_cs, which remain stable, then Sex CV_cs, which

increase. The smallest CV_cs are for Marital Status and Employment Status, which remain stable.

COVID-19 Study CV_cs are often slightly smaller than for the main survey. They are also smaller than CV_us, though they almost always differ significantly from 0. Changes across waves vary. Covariate impact ranking is similar to that with CV_us but differs from the main survey. Age has the largest CV_cs, which increase to wave 6 then decrease slightly. Next largest are CV_cs for Highest Qualification, HH Composition and Sex, which vary across waves. After are Tenure, Marital status and Ethnicity CV_cs, which remain stable. Employment Status CV_cs are smallest and also remain stable.

3.5. Category CV_us

3.5.1. Longitudinal datasets

It is not possible to report category CVs for all covariates due to space constraints. Hence, they are reported for three important covariates: Age, Highest Qualification, and Tenure. With CV_us, positive values indicate over-representation and negative values under-representation. Zero values indicate that respondents are a random subset of the evaluation sample with respect to the category. Longitudinal dataset CV_us for the focal covariates are reported in Figures 4, 6 and 8 (see Appendix Table A10 for tabulations for all covariates and 95% CIs). Main survey Age CV_us are almost always significant, implying non-trivial associated non-representativeness. Those aged 16-34 are all increasingly under-represented across waves, and those aged 35-64 increasingly over-represented. Those aged 65+ are over-

represented at wave 3 but become under-represented from wave 7. Highest Qualification CV_us are mostly significant. Degree is increasing over-represented, and No qualifications increasingly under-represented. A-Level, GCSE or Other qualifications are slightly less under-represented than No qualifications or become so by wave 9. Tenure CV_us are almost always significant. Those who own their home are increasingly over-represented, and those who rent it increasingly under-represented. Those in the Other category are almost always slightly under-represented.

COVID-19 Study Age CV_us are mostly significant. Those aged 16-34 all become increasingly under-represented to wave 7, then become slightly less under-represented or stabilize at waves 8-9 (as previously mentioned, these patterns are likely to be due to reduced drop out caused by serology testing and increased financial incentives being offered at these waves). 35–44-year-olds also exhibit this pattern, unlike in the main survey, in which they are over-represented. Those aged 54-64 and 65+ are increasing over-represented (differences with the latter category compared to in the main survey likely reflect the shorter time period covered by the Study). Concerning Highest Qualifications, Degree is always significantly over-represented, whereas other categories are under-represented or non-significant. CV_us are roughly similar across waves. Tenure CV_us follow a pattern similar to that in the main survey. Those who own their home are increasingly significantly over-represented, and those who rent it increasing under-represented. CV_us for the Other category are non-significant. COVID-19 Study CV_us are mostly smaller than for the main survey.

3.5.2. Cross-sectional datasets

Category CV_us are reported in Appendix Figs. A4, A6, and A8 (see Appendix Table A5 for tabulations and 95% CIs). Main survey Age CV_us are almost all significant. Those aged 16-34 are increasingly under-represented across waves, and those aged 35-64 increasingly over-represented. Those aged 65+ begin over-represented but become under-represented by wave 5. CV_us for Highest Qualification Degree and No qualifications are all significant, with the former increasingly over-represented, and the latter increasingly under-represented. CV_us for A level, GCSE and Other are either non-significant, or suggest slight under-representation, with significance depending on wave. With Tenure, those who own their home become increasingly over-represented, and those who rent increasingly under-represented. The Other category is either slightly over-represented, or CV_us are non-significant.

COVID-19 Study Age CV_us follow a similar pattern to longitudinal dataset CV_us in terms of category under- or over-representation. After wave 7 though, most become less under- or over-represented, a pattern that is likely to be related to reduced respondent drop out and re-engagement of previous non-respondents due to the serology testing and increased financial incentives offered (see also section 3.1). Again, similar to with the longitudinal datasets, Highest Qualifications Degree is always significantly over-represented, with CV_us stable across waves. Those with other qualifications, A-Levels, or No qualifications are slightly but significantly under-represented at waves 3-9, waves 8-9 and wave 9 respectively, while those with GCSEs have a non-significant impact. With Tenure, those who own their home are over-represented, and those who rent it under-represented. CV_us increase in magnitude

slightly to wave 7, then decrease at waves 8-9. CV_us for the Other category are non-significant. COVID-19 Study CV_us are mostly smaller than those for the main survey.

3.6. Category CV_cs

3.6.1. Longitudinal datasets

CV_cs larger than zero indicate solely attributable non-representativeness associated with the category i.e., that respondents are not a random subset of the evaluation sample with respect to the category when the impacts of the other covariates are accounted for. Longitudinal dataset focal covariate CV_cs are reported in Figures. 5, 7 and 9 (see Appendix Table A11 for tabulation and 95% CIs). Main survey Age CV_cs are all significant and increase across waves and are largest for 55–64-year-olds. For the other categories, increases sometimes slow after wave 6. Highest Qualification CV_cs are also all significant and increase, with those for Degree and No Qualifications highest. Tenure CV_cs are almost always significant. CV_cs for those who own their home or rent it increase across waves. Other category CV_cs also do so but at a lower rate.

COVID-19 Study Age CV_cs are always significant. As in the main survey, CV_cs for 55–64-year-olds are largest. CV_cs for those aged 65+ are smallest, with CV_cs for other categories in-between. CV_cs mostly increase to wave 6, then stabilize. Highest Qualification CV_cs are always significant. Those for the Other category are largest, increase unevenly to wave 7, then decrease slightly. CV_cs for the other categories are similar, but increase slightly across waves, remain similar, or even (in the case of A-Levels) decrease from wave 6. Tenure CV_cs

are almost always significant. CV_cs for those who own their home or rent it are largest and increase across waves. COVID-19 Study CV_cs are mostly smaller than main survey CV_cs.

3.6.2. Cross-sectional datasets

CV_cs for the focal covariates are reported in Appendix Figures. A5, A7, and A9 (see Appendix Table A6 for tabulations and 95% CIs). Main survey Age CV_cs are always significant and tend to increase across waves. Those for 55–64-year-olds are largest, with those for other categories smaller and similar. Highest Qualification CV_cs are always significant. Those for Degree and No Qualifications are highest. All increase across waves. Tenure CV_cs are mostly significant. CV_cs for those who own their home or rent it are largest and increase across waves. CV_cs for the Other category are much smaller and remain similar.

COVID-19 Study Age CV_cs are always significant. CV_cs for 55–64-year-olds are largest, and CV_cs for those aged 65+ smallest, with those for other categories, which are similar, falling in-between. They tend to increase to waves 5-6, then stabilize or decrease. CV_cs for Highest Qualification are almost always significant. No category is always largest or smallest, though at wave 9 the Other category is slightly larger than the others. CV_cs for Tenure are mostly significant. For those who own their home, they increase slightly to wave 7, then decrease slightly. For renters, they increase slightly to wave 6, then stabilize. CV_cs are mostly smaller than those for the main survey.

4. Discussion

This paper evaluated whether non-response bias risks and their causes in the pre-COVID-19 pandemic UKHLS main survey were predictive of those in the UKHLS COVID-19 Study. The main survey is an annual panel survey that uses F2F, telephone and web modes. The COVID-19 Study was a primarily web-based survey (due to restrictions to slow the spread of the virus) fielded to collect information about pandemic impacts at a higher frequency (mostly monthly or bi-monthly), with an eligible sample drawn from main survey participants. Even given such differences in frequency and mode, the only information available on bias risks in the COVID-19 Study was from the main survey. This was also the case for bias risk causes, differential non-response among sample sub-groups. These are important because surveys often seek to address them by using bias prevention measures such as targeted incentives (e.g., Groves 2006; Groves et al. 2009; Peytchev et al. 2010) and / or bias adjustment measures such as non-response weights (e.g., Bianchi and Biffignandi 2017; Valliant et al. 2018).

Both longitudinal datasets including only respondents to the wave and all previous waves and cross-sectional datasets including all respondents were evaluated. Evaluation samples consisted of wave 1 respondents because no information existed on main survey wave 1 non-respondents. Response rates generally decreased across waves, though less so in cross-sectional datasets. Rates of decrease also slowed (in longitudinal datasets) or rates actually increased (in cross-sectional datasets) at waves 8-9 in the COVID-19 Study, likely due to serology (COVID-19 antibody) testing and increased financial incentives to complete the survey being offered at these waves and reducing drop-out among respondents and leading to non-respondents to re-engage with the Study. Rates were also higher in cross-sectional

datasets, due to the less restrictive inclusion criteria, and were higher in the COVID-19 Study. The latter result may be due to Study duration (18 months) compared to the studied main survey waves (9 years). Another factor is likely to be that the Study eligible sample includes long-term main survey respondents positively disposed towards surveys.

To evaluate bias risks, Coefficients of variation of response propensities were computed (CVs: Schouten et al. 2012). These measure how well respondents reflect the sample by quantifying variation in response propensities estimated using auxiliary covariates available for all sample members. Low variation implies respondents are a random subset of the sample with respect to auxiliary covariates i.e. that they are representative of the sample and bias risks are low. It also suggests that bias adjustments will perform well in reducing remaining biases, since their performance increases with dataset representativeness (Moore et al. 2024; Schouten et al. 2016). Statistical inference is also possible. In addition, partial CVs exist that decompose propensity variation into that associated with auxiliary covariates and their categories. These identify covariates for inclusion in models underlying bias adjustments, and under-represented sub-groups to target with bias prevention measures.

For the main survey, eight auxiliary covariates (Sex, Ethnicity, Age, Employment status, HH composition, Marital status, Highest qualification and Tenure) from wave 1 were used, with non-response weights from the same wave applied to map evaluation sample members to their eligible sample and the UK population (see section 2.3 for discussion). For the COVID-19 Study, similar main survey wave 9 (the last wave pre-pandemic) covariates were used, with the Study wave 1 non-response weights applied. Overall CVs implied that all datasets were significantly non-representative of evaluation samples. Representativeness mostly decreased

across waves, although in the COVID-19 Study decreases slowed (in longitudinal datasets) or representativeness increased (in cross-sectional datasets) at waves 8-9. The latter was likely again due to serology testing and financial incentives being offered and its impact on dropout and non-response. Cross-sectional datasets were more representative than longitudinal datasets, probably due to the less restrictive inclusion criteria. COVID-19 Study datasets were more representative than main survey datasets, likely due to similar reasons to those for higher Study response rates.

Two types of partial CV were computed. Unconditional CVs (CV_us) quantify univariate associations between covariates (categories) and response propensity variation i.e. the extent to which respondents are a non-random subset of the sample with respect to the covariate. Conditional CVs (CV_cs) quantify the extent to which respondents are a similarly non-random subset of the sample when the impacts of the other covariates are accounted for. CV_cs are used to test whether CV_u identified impacts are also correlated with other covariates and hence are useful for ensuring efficient bias adjustments and targeting of under-represented groups (see also section 2). In all datasets, CV_us implied non-trivial non-representativeness associated with each of the eight covariates in response propensity models. In most cases, this remained when CV_cs were computed. Both indicators tended to increase across waves, although, similar to with overall CVs, in the COVID-19 Study they often stabilized / decreased at waves 8-9. Also similar to overall CVs, they were slightly smaller in the COVID-19 Study than main survey datasets, and in cross-sectional than longitudinal datasets. In addition, the ranking of covariate impacts differed between surveys, a topic that is returned to below.

Category CVs for the covariates Age, Highest Qualification and Tenure were focused on in the paper due to space constraints (see the Appendix for CVs for the other covariates). CV_us were similar in longitudinal and cross-sectional datasets but differed between surveys. They were slightly smaller in cross-sectional than longitudinal datasets, and in the COVID-19 Study than the main survey datasets. They again often decreased across main survey waves but stabilized or increased at Study waves 8-9. Beyond this, with Age in the main survey 35–44-year-olds were over-represented and those 65+ went from being over- to under-represented, whereas in the COVID-19 Study the two categories were respectively under- and over-represented. Highest Qualification No qualifications was increasingly under-represented in the main survey, but only slightly so in the COVID-19 Study. Tenure CV_us were comparable in the two surveys. Analogous patterns existed with CV_cs.

These differences in category CVs drive the between survey differences in the ranking of covariate impacts on representativeness noted previously. Likely reasons for four of them are given below. They can be grouped into two categories that are probably also relevant for the reasons for the others: those linked to the survey designs, and those linked to changes in living conditions during the pandemic. In the first category, the stabilization of / increased representativeness at COVID-19 Study waves 8-9, in contrast to the mostly continued decreases in the main survey, was likely due to serology testing and financial incentives being offered. In a similar vein, that those aged 65+ were under-represented at later waves of the main survey but over-represented in the COVID-19 Study was likely due to 9 years of accumulated mortality among main survey sample members, whereas Study duration was only 18 months. In the second category, that Highest Qualification No Qualification was less

under-represented in the COVID-19 Study was likely due to members being furloughed from their jobs during parts of the pandemic and having more time to complete the survey. In addition, the Age 35-44 category was over-represented in the main survey but under-represented in the COVID-19 Study may reflect school closures during parts of the pandemic, which would have reduced the time parents had to complete surveys due to needing to supervise children (a similar pattern also existed with HH Composition Couple with Children: see Appendix).

A limitation of this research is that actual survey estimate non-response biases were not quantified. This was because relevant population benchmarks were not available, which is often the case in these scenarios (see: Hand et al. 2018). However, it should be noted that the evaluation samples were weighted to map them to the original sample, and to the UK population. This approach though, relied on the weights performing this task adequately: see Benzeval et al. (2020) & Moore et al. (2024) for evidence supporting this assumption. In addition, the weights mapped the two studied surveys to the UK population at different time points: March 2009-January 2011 with the main survey, and June 2019 with the COVID-19 Study. Unfortunately, given the timespans covered by the two sets of datasets evaluated, there was no alternative to this. That said, the evaluations still address the research question that is the focus of the paper: whether bias risks in the main survey were useful to predict those in the COVID-19 Study.

Notwithstanding these limitations, the research findings imply that bias risks and their causes in the pre-pandemic UKHLS main survey did not predict similar in the COVID-19 Study. This is unsurprising given the changes in survey design in terms of data collection

frequency and mode(s) and the changes in living conditions during the pandemic but has not previously been shown. It is emphasized that this does not mean that the COVID-19 Study datasets were of poor quality: indeed, the findings suggest they were more representative of their weighted evaluation sample than in the main survey (equally, the main survey has previously been shown to support high quality inferences (Benzeval et al. 2020). Rather, it means that the main survey was of limited value for informing on COVID-19 Study datasets. This is with respect to both overall bias risks and response propensity variation associated with auxiliary covariates: the causes of risks. The latter is of note as it suggests that if bias prevention or adjustment measures used to improve datasets given such issues in the main survey had been used in the COVID-19 Study, their outcomes may have differed. Fortunately, this was not the case, with custom bias prevention (telephone sampling of web non-respondents at several waves, which was not studied here, see also section 2.2.1) and adjustment (newly developed, empirically evaluated non-response weights, see Moore et al. 2024) techniques instead being used in the Study.

These findings are important despite the end of the COVID-19 pandemic and the COVID-19 Study. Other pandemics may occur in future and lead to a demand for similar new surveys. In addition, the shift to less costly web mode was already occurring in the main survey, albeit at a slower pace and not to the same extent (Institute for Social and Economic Research 2022), and it is not inconceivable that one day it may completely replace F2F (though currently there are no plans to do so), so information on scenarios where the latter is not used is of value. Should either of these events occur, the findings imply that targeted research will be needed to properly predict impacts on bias risks and their causes.

The findings also have relevance beyond the two UKHLS surveys. Other new surveys were fielded during the COVID-19 pandemic (e.g. Blom et al. 2020; Brown et al. 2021; Burton et al. 2020; Gummer et al. 2020). These were often also derived from existing surveys but with increased collection frequencies and mode differences and fielded with limited information on how changes would impact on bias risks and their causes. In addition, the shift towards increased web mode use outside of the pandemic is universal (Bianchi et al. 2017; Burton & Jäckle 2020; Cornesse & Bosnjak 2018; Couper et al. 2007; Institute for Social and Economic Research 2024; Nicolaas et al. 2014). Hence, that in such situations information from existing surveys is likely to be of limited use for prediction is of value. The findings here though, are unlikely to be of use for making more specific inferences. The CVs used to evaluate risks depend on the auxiliary covariates used to model response propensities (Schouten et al. 2009, 2012). Response propensity correlates can differ between surveys, and even when similarities exist, signs of associations can vary (Behr et al. 2005; Luiten et al. 2020). Hence, as with the UKHLS surveys, in these surveys targeted research will be needed to accurately predict the effects of such design changes on datasets.

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Appendix

1. Partial unconditional and conditional CVs (CV_us and CV_cs) derivation

CV_us and CV_cs are derived from respectively the between and within ANOVA variance decomposition components, and bounded by the overall CV. CV_us quantify univariate associations with propensity variation. Using the same notation as in the main text, the CV_u for covariate Z with *K* categories is

$$\widehat{CV}_u(Z, p_{\boldsymbol{x}}) = \frac{\sqrt{\frac{1}{n}\sum_{k=1}^{K} n_k(\hat{\bar{p}}_k - \hat{\bar{p}})^2}}{\hat{\bar{p}}}, \quad (1)$$

where n_k is covariate category k size, and $\hat{\bar{p}}_k$ is the mean response propensity in k. Large values suggest substantial between category variability and non-representativeness associated with Z. Category CVs decompose and are bounded by covariate CVs. The CV_u for category *k* of Z is

$$\widehat{CV}_u(Z_k, p_{\boldsymbol{x}}) = \frac{\sqrt{\frac{n_k}{n}}(\hat{\bar{p}}_k - \hat{\bar{p}})}{\hat{\bar{p}}}. \quad (2)$$

Values can be positive or negative, implying respectively over- or under-representation. CV_cs quantify associations conditional on the other auxiliary covariates. The CV_c for covariate Z is:

$$\widehat{CV}_c(Z, p_{\boldsymbol{x}}) = \frac{\sqrt{\frac{1}{n}\sum_{l=1}^{L}\sum_{i\in l}(p_i - \hat{\bar{p}}_l)^2}}{\hat{\bar{p}}}, \quad (3)$$

where $\hat{\bar{p}}_l$ is the mean propensity of the *l*th of *L* cells resulting from cross-classifying ***x*** excluding Z and propensity modelling given this covariate subset. The CV_c for category *k* of Z is

$$\widehat{CV}_c(Z_k, p_{\boldsymbol{x}}) = \frac{\sqrt{\frac{1}{n}\sum_{l=1}^{L}\sum_{i\in l} h_i(p_i - \hat{\bar{p}}_l)^2}}{\hat{\bar{p}}}, \quad (4)$$

where h_i indicates whether subject *i* is in *k*. Large CV_cs imply substantial solely attributed non-representativeness. In addition, adjustments to correct biases caused by estimating

propensities exist, as do approximate standard errors that when converted into 95% Confidence Intervals (CV ± 1.96 × SE) enable inference regarding (comparative) representativeness or otherwise (de Heij et al. 2015). Population level analysis is also possible by applying sample weights.

Table A1: Response Rates (RR) for the cross-sectional UKHLS main survey and COVID-19 Study datasets.

Wave	MAIN	COVID
2	0.75	0.79
3	0.65	0.76
4	0.59	0.74
5	0.55	0.70
6	0.49	0.64
7	0.46	0.65
8	0.44	0.69
9	0.40	0.66

Note: Response rates are conditional on response to wave 1.

Table A2: Overall CVs for the cross-sectional UKHLS main survey and COVID-19 Study datasets. 95% Confidence Intervals in brackets. Italics indicate significance.

Wave	MAIN	COVID
2	*0.12 (0.11 - 0.12)*	*0.12 (0.11 - 0.13)*
3	*0.16 (0.16 - 0.17)*	*0.14 (0.13 - 0.15)*
4	*0.19 (0.18 - 0.20)*	*0.15 (0.14 - 0.16)*
5	*0.21 (0.21 - 0.22)*	*0.17 (0.16 - 0.18)*
6	*0.24 (0.23 - 0.25)*	*0.20 (0.19 - 0.21)*
7	*0.26 (0.25 - 0.27)*	*0.21 (0.19 - 0.22)*
8	*0.28 (0.28 - 0.29)*	*0.16 (0.15 - 0.17)*
9	*0.32 (0.30 - 0.33)*	*0.14 (0.13 - 0.15)*

Table A3: Covariate CV_us for the cross-sectional UKHLS main survey and COVID-19 Study datasets. 95% CIs in brackets. Italics indicate significance.

	MAIN				COVID			
Wave	Sex	Ethnicity	Age	Employment Status	Sex	Ethnicity	Age	Employment Status
2	*0.02 (0.01 - 0.02)*	*0.05 (0.04 - 0.05)*	*0.09 (0.08 - 0.09)*	*0.04 (0.03 - 0.04)*	*0.02 (0.01 - 0.03)*	*0.04 (0.03 - 0.05)*	*0.08 (0.07 - 0.09)*	*0.04 (0.03 - 0.05)*
3	*0.03 (0.02 - 0.03)*	*0.06 (0.06 - 0.07)*	*0.11 (0.11 - 0.12)*	*0.04 (0.04 - 0.05)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.11 (0.10 - 0.12)*	*0.06 (0.06 - 0.07)*
4	*0.02 (0.02 - 0.03)*	*0.07 (0.06 - 0.07)*	*0.13 (0.12 - 0.14)*	*0.05 (0.04 - 0.05)*	0.01 (-0.00 - 0.02)	*0.04 (0.03 - 0.05)*	*0.13 (0.12 - 0.14)*	*0.07 (0.06 - 0.08)*
5	*0.02 (0.02 - 0.03)*	*0.07 (0.07 - 0.08)*	*0.15 (0.14 - 0.16)*	*0.04 (0.04 - 0.05)*	*0.02 (0.01 - 0.03)*	*0.04 (0.03 - 0.05)*	*0.14 (0.13 - 0.15)*	*0.07 (0.06 - 0.08)*
6	*0.03 (0.02 - 0.04)*	*0.08 (0.07 - 0.09)*	*0.17 (0.16 - 0.18)*	*0.05 (0.04 - 0.06)*	*0.03 (0.02 - 0.04)*	*0.05 (0.04 - 0.07)*	*0.16 (0.15 - 0.17)*	*0.08 (0.07 - 0.09)*
7	*0.02 (0.01 - 0.03)*	*0.08 (0.07 - 0.09)*	*0.18 (0.17 - 0.19)*	*0.07 (0.06 - 0.08)*	*0.04 (0.02 - 0.05)*	*0.06 (0.04 - 0.07)*	*0.17 (0.16 - 0.18)*	*0.11 (0.09 - 0.12)*
8	*0.02 (0.01 - 0.03)*	*0.08 (0.07 - 0.09)*	*0.20 (0.19 - 0.21)*	*0.08 (0.07 - 0.09)*	*0.03 (0.02 - 0.04)*	*0.05 (0.04 - 0.06)*	*0.12 (0.11 - 0.13)*	*0.07 (0.06 - 0.08)*
9	*0.03 (0.01 - 0.04)*	*0.09 (0.08 - 0.10)*	*0.22 (0.21 - 0.23)*	*0.10 (0.09 - 0.12)*	*0.04 (0.02 - 0.05)*	*0.03 (0.02 - 0.05)*	*0.10 (0.09 - 0.11)*	*0.05 (0.04 - 0.06)*

Wave	Household Composition	Marital Status	Highest Qualification	Housing Tenure	Household Composition	Marital Status	Highest Qualification	Housing Tenure
2	*0.05 (0.05 - 0.06)*	*0.07 (0.07 - 0.08)*	*0.02 (0.01 - 0.02)*	*0.06 (0.06 - 0.07)*	*0.06 (0.05 - 0.07)*	*0.06 (0.05 - 0.07)*	*0.04 (0.03 - 0.05)*	*0.04 (0.03 - 0.05)*
3	*0.07 (0.06 - 0.08)*	*0.09 (0.09 - 0.10)*	*0.05 (0.04 - 0.05)*	*0.09 (0.08 - 0.10)*	*0.07 (0.07 - 0.08)*	*0.07 (0.06 - 0.08)*	*0.03 (0.02 - 0.04)*	*0.04 (0.03 - 0.05)*
4	*0.07 (0.07 - 0.08)*	*0.10 (0.10 - 0.11)*	*0.07 (0.07 - 0.08)*	*0.11 (0.11 - 0.12)*	*0.08 (0.07 - 0.09)*	*0.08 (0.07 - 0.09)*	*0.02 (0.01 - 0.03)*	*0.04 (0.03 - 0.05)*
5	*0.08 (0.07 - 0.08)*	*0.12 (0.11 - 0.12)*	*0.09 (0.08 - 0.10)*	*0.13 (0.12 - 0.13)*	*0.10 (0.09 - 0.11)*	*0.08 (0.07 - 0.10)*	*0.04 (0.03 - 0.05)*	*0.06 (0.05 - 0.07)*
6	*0.08 (0.07 - 0.09)*	*0.13 (0.12 - 0.14)*	*0.11 (0.10 - 0.12)*	*0.14 (0.13 - 0.15)*	*0.12 (0.11 - 0.13)*	*0.10 (0.09 - 0.11)*	*0.05 (0.03 - 0.06)*	*0.07 (0.06 - 0.08)*
7	*0.08 (0.07 - 0.09)*	*0.13 (0.12 - 0.14)*	*0.13 (0.12 - 0.14)*	*0.15 (0.14 - 0.16)*	*0.13 (0.12 - 0.14)*	*0.10 (0.09 - 0.11)*	*0.03 (0.02 - 0.04)*	*0.08 (0.06 - 0.09)*
8	*0.09 (0.08 - 0.10)*	*0.14 (0.13 - 0.15)*	*0.15 (0.14 - 0.16)*	*0.16 (0.15 - 0.17)*	*0.08 (0.07 - 0.09)*	*0.08 (0.07 - 0.09)*	*0.04 (0.03 - 0.05)*	*0.07 (0.06 - 0.08)*
9	*0.09 (0.08 - 0.10)*	*0.15 (0.14 - 0.16)*	*0.17 (0.16 - 0.18)*	*0.18 (0.17 - 0.19)*	*0.07 (0.06 - 0.08)*	*0.08 (0.07 - 0.09)*	*0.04 (0.03 - 0.05)*	*0.06 (0.05 - 0.07)*

Table A4: Covariate CV_cs for the cross-sectional UKHLS main survey and COVID-19 Study datasets. 95% CIs in brackets. Italics indicate significance.

	MAIN				COVID			
Wave	Sex	Ethnicity	Age	Employment Status	Sex	Ethnicity	Age	Employment Status
2	*0.01 (0.01 - 0.02)*	*0.03 (0.03 - 0.04)*	*0.04 (0.04 - 0.05)*	*0.01 (0.00 - 0.01)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.04 (0.03 - 0.05)*	*0.01 (0.00 - 0.02)*
3	*0.02 (0.01 - 0.03)*	*0.04 (0.04 - 0.05)*	*0.06 (0.05 - 0.06)*	0.01 (-0.00 - 0.01)	*0.03 (0.02 - 0.04)*	*0.01 (0.00 - 0.02)*	*0.05 (0.04 - 0.06)*	*0.01 (0.00 - 0.02)*
4	*0.02 (0.02 - 0.03)*	*0.05 (0.04 - 0.05)*	*0.07 (0.06 - 0.08)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.01 (0.00 - 0.02)*	*0.06 (0.05 - 0.07)*	*0.01 (0.00 - 0.02)*
5	*0.02 (0.02 - 0.03)*	*0.05 (0.04 - 0.06)*	*0.08 (0.07 - 0.09)*	0.01 (-0.00 - 0.01)	*0.03 (0.02 - 0.04)*	*0.01 (0.00 - 0.02)*	*0.07 (0.06 - 0.08)*	0.01 (-0.00 - 0.02)
6	*0.03 (0.02 - 0.04)*	*0.06 (0.05 - 0.06)*	*0.09 (0.08 - 0.10)*	0.01 (-0.00 - 0.02)	*0.03 (0.02 - 0.05)*	*0.02 (0.01 - 0.03)*	*0.08 (0.06 - 0.09)*	0.01 (-0.00 - 0.02)
7	*0.03 (0.02 - 0.04)*	*0.06 (0.05 - 0.07)*	*0.10 (0.09 - 0.11)*	*0.01 (0.00 - 0.02)*	*0.04 (0.03 - 0.05)*	*0.02 (0.01 - 0.04)*	*0.07 (0.06 - 0.08)*	*0.01 (0.00 - 0.02)*
8	*0.03 (0.02 - 0.04)*	*0.06 (0.05 - 0.07)*	*0.10 (0.09 - 0.11)*	*0.02 (0.01 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.03)*	*0.06 (0.05 - 0.07)*	*0.01 (0.00 - 0.02)*
9	*0.04 (0.03 - 0.05)*	*0.07 (0.06 - 0.08)*	*0.12 (0.11 - 0.13)*	*0.02 (0.01 - 0.03)*	*0.04 (0.03 - 0.05)*	*0.01 (0.00 - 0.03)*	*0.04 (0.03 - 0.05)*	0.01 (-0.00 - 0.02)

Wave	Household Composition	Marital Status	Highest Qualification	Housing Tenure	Household Composition	Marital Status	Highest Qualification	Housing Tenure
2	*0.03 (0.02 - 0.03)*	*0.01 (0.00 - 0.01)*	*0.02 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.01 (0.00 - 0.02)*
3	*0.04 (0.03 - 0.05)*	*0.01 (0.01 - 0.02)*	*0.05 (0.04 - 0.05)*	*0.05 (0.04 - 0.06)*	*0.02 (0.01 - 0.03)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.01 (0.00 - 0.02)*
4	*0.04 (0.03 - 0.05)*	*0.01 (0.01 - 0.02)*	*0.06 (0.05 - 0.07)*	*0.06 (0.05 - 0.07)*	*0.01 (0.01 - 0.02)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.03)*	*0.01 (0.00 - 0.02)*
5	*0.04 (0.03 - 0.04)*	*0.02 (0.01 - 0.02)*	*0.07 (0.06 - 0.08)*	*0.07 (0.06 - 0.08)*	*0.03 (0.02 - 0.04)*	*0.01 (0.00 - 0.03)*	*0.04 (0.03 - 0.05)*	*0.02 (0.01 - 0.03)*
6	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.03)*	*0.09 (0.08 - 0.10)*	*0.08 (0.07 - 0.09)*	*0.05 (0.04 - 0.06)*	0.01 (-0.00 - 0.02)	*0.06 (0.04 - 0.07)*	*0.02 (0.01 - 0.04)*
7	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.03)*	*0.10 (0.09 - 0.11)*	*0.08 (0.07 - 0.09)*	*0.05 (0.03 - 0.06)*	*0.02 (0.01 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*
8	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.11 (0.10 - 0.12)*	*0.09 (0.08 - 0.10)*	*0.03 (0.02 - 0.04)*	0.01 (-0.00 - 0.02)	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.04)*
9	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.04)*	*0.11 (0.10 - 0.12)*	*0.10 (0.09 - 0.11)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.04)*	*0.04 (0.02 - 0.05)*	*0.02 (0.01 - 0.03)*

Table A5: Covariate category CV_us for cross-sectional main survey and COVID-19 Study datasets. 95% CIs in brackets. Italics denote significance.

	MAIN				COVID			
Wave	Sex: Male	Sex: Female	Ethnicity: Non-minority	Ethnicity: Minority	Sex: Male	Sex: Female	Ethnicity: Non-minority	Ethnicity: Minority
2	*-0.01 (-0.02 - -0.01)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*-0.05 (-0.05 - -0.04)*	-0.01 (-0.03 - 0.00)	0.01 (-0.00 - 0.03)	*0.01 (0.00 - 0.02)*	*-0.04 (-0.06 - -0.01)*
3	*-0.02 (-0.02 - -0.01)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.02)*	*-0.06 (-0.07 - -0.05)*	*-0.02 (-0.04 - -0.00)*	*0.02 (0.00 - 0.03)*	*0.01 (0.00 - 0.02)*	*-0.03 (-0.06 - -0.01)*
4	*-0.02 (-0.02 - -0.01)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.02)*	*-0.06 (-0.07 - -0.06)*	-0.01 (-0.02 - 0.01)	0.01 (-0.01 - 0.02)	*0.01 (0.00 - 0.02)*	*-0.04 (-0.06 - -0.01)*
5	*-0.02 (-0.02 - -0.01)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.02)*	*-0.07 (-0.08 - -0.06)*	*-0.02 (-0.03 - -0.00)*	*0.02 (0.00 - 0.03)*	*0.01 (0.00 - 0.02)*	*-0.04 (-0.06 - -0.01)*
6	*-0.02 (-0.02 - -0.01)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.03)*	*-0.07 (-0.08 - -0.07)*	*-0.02 (-0.04 - -0.00)*	*0.02 (0.00 - 0.04)*	*0.01 (0.01 - 0.02)*	*-0.05 (-0.08 - -0.03)*
7	*-0.02 (-0.02 - -0.01)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.03)*	*-0.08 (-0.08 - -0.07)*	*-0.03 (-0.04 - -0.01)*	*0.02 (0.01 - 0.04)*	*0.02 (0.01 - 0.02)*	*-0.05 (-0.08 - -0.03)*
8	*-0.02 (-0.02 - -0.01)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.03)*	*-0.08 (-0.08 - -0.07)*	*-0.02 (-0.04 - -0.01)*	*0.02 (0.01 - 0.04)*	*0.01 (0.01 - 0.02)*	*-0.05 (-0.07 - -0.02)*
9	*-0.02 (-0.02 - -0.01)*	*0.02 (0.01 - 0.02)*	*0.03 (0.03 - 0.03)*	*-0.09 (-0.09 - -0.08)*	*-0.03 (-0.04 - -0.01)*	*0.02 (0.01 - 0.04)*	*0.01 (0.00 - 0.02)*	*-0.03 (-0.06 - -0.01)*
Wave	Age: 16-19	Age: 20-24	Age: 25-34	Age: 35-44	Age: 16-19	Age: 20-24	Age: 25-34	Age: 35-44
2	*-0.03 (-0.04 - -0.02)*	*-0.06 (-0.07 - -0.05)*	*-0.03 (-0.03 - -0.02)*	0.01 (-0.00 - 0.01)	*-0.05 (-0.07 - -0.03)*	*-0.04 (-0.07 - -0.02)*	-0.02 (-0.04 - 0.00)	-0.00 (-0.02 - 0.01)
3	*-0.05 (-0.06 - -0.04)*	*-0.07 (-0.08 - -0.07)*	*-0.03 (-0.04 - -0.02)*	*0.01 (0.00 - 0.02)*	*-0.06 (-0.08 - -0.04)*	*-0.05 (-0.07 - -0.02)*	*-0.03 (-0.05 - -0.01)*	-0.01 (-0.03 - 0.01)
4	*-0.06 (-0.07 - -0.05)*	*-0.08 (-0.09 - -0.07)*	*-0.03 (-0.04 - -0.02)*	*0.02 (0.01 - 0.03)*	*-0.07 (-0.09 - -0.06)*	*-0.06 (-0.08 - -0.03)*	*-0.04 (-0.06 - -0.02)*	-0.01 (-0.03 - 0.01)
5	*-0.07 (-0.08 - -0.06)*	*-0.09 (-0.10 - -0.08)*	*-0.03 (-0.04 - -0.02)*	*0.03 (0.02 - 0.04)*	*-0.08 (-0.09 - -0.06)*	*-0.07 (-0.09 - -0.04)*	*-0.04 (-0.06 - -0.02)*	*-0.02 (-0.04 - -0.01)*
6	*-0.08 (-0.09 - -0.07)*	*-0.09 (-0.10 - -0.08)*	*-0.04 (-0.04 - -0.03)*	*0.03 (0.02 - 0.04)*	*-0.09 (-0.10 - -0.07)*	*-0.07 (-0.09 - -0.05)*	*-0.06 (-0.08 - -0.04)*	*-0.03 (-0.05 - -0.01)*
7	*-0.08 (-0.09 - -0.07)*	*-0.09 (-0.09 - -0.08)*	*-0.02 (-0.03 - -0.02)*	*0.03 (0.02 - 0.04)*	*-0.09 (-0.10 - -0.07)*	*-0.06 (-0.08 - -0.04)*	*-0.06 (-0.08 - -0.05)*	*-0.04 (-0.06 - -0.02)*
8	*-0.08 (-0.09 - -0.07)*	*-0.09 (-0.09 - -0.08)*	*-0.02 (-0.03 - -0.02)*	*0.04 (0.03 - 0.05)*	*-0.06 (-0.08 - -0.04)*	*-0.05 (-0.07 - -0.03)*	*-0.04 (-0.06 - -0.02)*	*-0.03 (-0.05 - -0.01)*
9	*-0.09 (-0.09 - -0.08)*	*-0.08 (-0.09 - -0.07)*	*-0.03 (-0.03 - -0.02)*	*0.04 (0.03 - 0.05)*	*-0.06 (-0.08 - -0.04)*	*-0.05 (-0.07 - -0.02)*	-0.02 (-0.04 - 0.00)	-0.02 (-0.03 - 0.00*)*
Wave	Age: 45-54	Age: 55-64	Age: 65+		Age: 45-54	Age: 55-64	Age: 65+	
2	*0.02 (0.02 - 0.03)*	*0.04 (0.03 - 0.05)*	*0.02 (0.01 - 0.03)*		0.01 (-0.01 - 0.03)	*0.04 (0.02 - 0.06)*	0.02 (-0.01 - 0.04)	
3	*0.04 (0.03 - 0.04)*	*0.05 (0.04 - 0.06)*	*0.01 (0.00 - 0.02)*		0.00 (-0.02 - 0.02)	*0.04 (0.02 - 0.07)*	*0.05 (0.02 - 0.08)*	
4	*0.05 (0.04 - 0.06)*	*0.06 (0.05 - 0.07)*	-0.01 (-0.01 - 0.00)		0.00 (-0.02 - 0.02)	*0.06 (0.04 - 0.08)*	*0.05 (0.03 - 0.08)*	
5	*0.05 (0.04 - 0.06)*	*0.07 (0.06 - 0.08)*	*-0.02 (-0.03 - -0.01)*		0.00 (-0.02 - 0.02)	*0.07 (0.05 - 0.09)*	*0.06 (0.03 - 0.09)*	
6	*0.06 (0.05 - 0.07)*	*0.09 (0.08 - 0.10)*	*-0.03 (-0.04 - -0.02)*		0.02 (-0.00 - 0.04)	*0.08 (0.06 - 0.10)*	*0.06 (0.04 - 0.09)*	
7	*0.07 (0.06 - 0.08)*	*0.09 (0.08 - 0.10)*	*-0.05 (-0.06 - -0.05)*		0.01 (-0.01 - 0.03)	*0.07 (0.05 - 0.10)*	*0.08 (0.05 - 0.11)*	
8	*0.08 (0.07 - 0.09)*	*0.11 (0.10 - 0.12)*	*-0.08 (-0.08 - -0.07)*		0.01 (-0.01 - 0.03)	*0.07 (0.05 - 0.09)*	*0.04 (0.02 - 0.06)*	
9	*0.09 (0.08 - 0.10)*	*0.12 (0.11 - 0.13)*	*-0.10 (-0.10 - -0.09)*		0.01 (-0.01 - 0.03)	*0.05 (0.03 - 0.07)*	*0.03 (0.00 - 0.05)*	

Wave	Emp Stat: Emp, In Educ or Training	Emp Stat: Unemployed	Emp Stat: Retired	Emp Stat: Other	Emp Stat: Emp, In Educ or Training	Emp Stat: Unemployed	Emp Stat: Retired	Emp Stat: Other
2	*-0.01 (-0.01 - -0.00)*	*-0.03 (-0.03 - -0.02)*	*0.03 (0.02 - 0.04)*	-0.00 (-0.01 - 0.01)	-0.00 (-0.02 - 0.01)	-0.02 (-0.05 - 0.01)	*0.02 (0.00 - 0.05)*	-0.02 (-0.05 - 0.01)
3	-0.00 (-0.01 - 0.00)	*-0.03 (-0.04 - -0.02)*	*0.03 (0.02 - 0.03)*	-0.01 (-0.01 - 0.00)	*-0.02 (-0.04 - -0.01)*	-0.03 (-0.06 - 0.00)	*0.05 (0.03 - 0.08)*	-0.01 (-0.04 - 0.02)
4	*0.01 (0.00 - 0.01)*	*-0.04 (-0.05 - -0.03)*	*0.01 (0.00 - 0.02)*	*-0.01 (-0.02 - -0.00)*	*-0.02 (-0.04 - -0.01)*	-0.03 (-0.06 - 0.00)	*0.06 (0.04 - 0.08)*	-0.01 (-0.04 - 0.02)
5	*0.02 (0.01 - 0.02)*	*-0.04 (-0.05 - -0.03)*	0.00 (-0.01 - 0.01)	*-0.01 (-0.02 - -0.00)*	*-0.03 (-0.04 - -0.01)*	-0.02 (-0.05 - 0.01)	*0.06 (0.04 - 0.09)*	-0.01 (-0.04 - 0.02)
6	*0.02 (0.02 - 0.03)*	*-0.05 (-0.05 - -0.04)*	-0.00 (-0.01 - 0.00)	*-0.01 (-0.02 - -0.01)*	*-0.03 (-0.05 - -0.02)*	-0.03 (-0.06 - 0.00)	*0.07 (0.04 - 0.09)*	-0.01 (-0.04 - 0.02)
7	*0.04 (0.03 - 0.04)*	*-0.05 (-0.05 - -0.04)*	*-0.03 (-0.03 - -0.02)*	*-0.02 (-0.03 - -0.01)*	*-0.04 (-0.06 - -0.03)*	*-0.03 (-0.06 - -0.00)*	*0.09 (0.07 - 0.12)*	-0.01 (-0.04 - 0.02)
8	*0.05 (0.04 - 0.05)*	*-0.05 (-0.05 - -0.04)*	*-0.05 (-0.05 - -0.04)*	*-0.02 (-0.03 - -0.01)*	*-0.02 (-0.03 - -0.00)*	*-0.03 (-0.06 - -0.00)*	*0.05 (0.03 - 0.08)*	-0.02 (-0.05 - 0.01)
9	*0.06 (0.06 - 0.07)*	*-0.05 (-0.06 - -0.04)*	*-0.06 (-0.07 - -0.05)*	*-0.03 (-0.03 - -0.02)*	-0.01 (-0.03 - 0.00)	-0.02 (-0.05 - 0.01)	*0.04 (0.02 - 0.06)*	-0.02 (-0.05 - 0.01)

Wave	HH Comp: 1 adult, no children	HH Comp: 1 adult, children	HH Comp: couple, no children	HH Comp: couple, children	HH Comp: 1 adult, no children	HH Comp: 1 adult, children	HH Comp: couple, no children	HH Comp: couple, children
2	-0.00 (-0.01 - 0.01)	-0.00 (-0.01 - 0.01)	*0.03 (0.02 - 0.04)*	*0.01 (0.01 - 0.02)*	0.01 (-0.02 - 0.03)	-0.01 (-0.04 - 0.01)	*0.04 (0.02 - 0.06)*	-0.01 (-0.02 - 0.01)
3	0.00 (-0.01 - 0.01)	-0.00 (-0.01 - 0.01)	*0.04 (0.03 - 0.04)*	*0.02 (0.01 - 0.03)*	0.01 (-0.02 - 0.03)	-0.02 (-0.05 - 0.01)	*0.06 (0.04 - 0.07)*	*-0.02 (-0.04 - -0.00)*
4	-0.00 (-0.01 - 0.01)	*-0.01 (-0.02 - -0.00)*	*0.04 (0.03 - 0.05)*	*0.02 (0.02 - 0.03)*	0.02 (-0.01 - 0.04)	-0.02 (-0.05 - 0.00)	*0.06 (0.04 - 0.08)*	*-0.02 (-0.04 - -0.01)*
5	-0.01 (-0.02 - 0.00)	*-0.01 (-0.02 - -0.00)*	*0.04 (0.03 - 0.05)*	*0.03 (0.02 - 0.04)*	0.01 (-0.01 - 0.04)	*-0.03 (-0.05 - -0.00)*	*0.07 (0.05 - 0.09)*	*-0.04 (-0.06 - -0.02)*
6	*-0.01 (-0.02 - -0.00)*	*-0.02 (-0.03 - -0.01)*	*0.04 (0.04 - 0.05)*	*0.03 (0.02 - 0.03)*	0.02 (-0.01 - 0.04)	*-0.04 (-0.06 - -0.02)*	*0.09 (0.07 - 0.11)*	*-0.06 (-0.07 - -0.04)*
7	*-0.02 (-0.03 - -0.01)*	*-0.02 (-0.03 - -0.01)*	*0.05 (0.04 - 0.06)*	*0.03 (0.02 - 0.03)*	0.02 (-0.00 - 0.05)	*-0.05 (-0.07 - -0.02)*	*0.09 (0.07 - 0.11)*	*-0.07 (-0.08 - -0.05)*
8	*-0.03 (-0.04 - -0.02)*	*-0.02 (-0.03 - -0.02)*	*0.05 (0.05 - 0.06)*	*0.03 (0.02 - 0.04)*	0.00 (-0.02 - 0.03)	*-0.03 (-0.06 - -0.01)*	*0.06 (0.04 - 0.08)*	*-0.04 (-0.05 - -0.02)*
9	*-0.04 (-0.05 - -0.03)*	*-0.03 (-0.04 - -0.02)*	*0.05 (0.04 - 0.06)*	*0.04 (0.03 - 0.04)*	0.00 (-0.02 - 0.03)	*-0.03 (-0.05 - -0.00)*	*0.06 (0.04 - 0.08)*	*-0.02 (-0.04 - -0.00)*

Wave	HH Comp: 2+ adults, no children	HH Comp: 2+ adults, children			HH Comp: 2+ adults, no children	HH Comp: 2+ adults, children		
2	*-0.04 (-0.04 - -0.03)*	*-0.02 (-0.03 - -0.01)*			*-0.03 (-0.05 - -0.00)*	*-0.03 (-0.05 - -0.01)*		
3	*-0.05 (-0.06 - -0.04)*	*-0.03 (-0.04 - -0.02)*			-0.02 (-0.04 - 0.01)	*-0.04 (-0.06 - -0.02)*		
4	*-0.05 (-0.06 - -0.04)*	*-0.03 (-0.04 - -0.02)*			-0.02 (-0.04 - 0.00)	*-0.04 (-0.06 - -0.02)*		
5	*-0.05 (-0.06 - -0.04)*	*-0.03 (-0.04 - -0.02)*			-0.02 (-0.05 - 0.00)	*-0.04 (-0.06 - -0.01)*		
6	*-0.04 (-0.05 - -0.03)*	*-0.03 (-0.04 - -0.02)*			-0.02 (-0.04 - 0.01)	*-0.04 (-0.06 - -0.02)*		
7	*-0.04 (-0.05 - -0.03)*	*-0.03 (-0.04 - -0.02)*			-0.01 (-0.03 - 0.01)	*-0.04 (-0.06 - -0.02)*		
8	*-0.04 (-0.05 - -0.03)*	*-0.03 (-0.04 - -0.02)*			-0.00 (-0.02 - 0.02)	*-0.03 (-0.05 - -0.01)*		
9	*-0.04 (-0.04 - -0.03)*	*-0.03 (-0.04 - -0.02)*			-0.02 (-0.04 - 0.01)	*-0.03 (-0.05 - -0.01)*		

Wave	Mar Stat: Single	Mar Stat: Married	Mar Stat: Separated/Divorced	Mar Stat: Widowed	Mar Stat: Single	Mar Stat: Married	Mar Stat: Separated/Divorced	Mar Stat: Widowed
2	*-0.06 (-0.06 - -0.05)*	*0.04 (0.03 - 0.04)*	*0.02 (0.01 - 0.02)*	0.01 (-0.00 - 0.02)	*-0.04 (-0.06 - -0.02)*	*0.03 (0.02 - 0.05)*	0.02 (-0.01 - 0.04)	-0.02 (-0.05 - 0.01)
3	*-0.08 (-0.08 - -0.07)*	*0.05 (0.05 - 0.06)*	*0.03 (0.02 - 0.04)*	-0.00 (-0.01 - 0.01)	*-0.06 (-0.07 - -0.04)*	*0.04 (0.02 - 0.05)*	0.01 (-0.01 - 0.04)	0.00 (-0.03 - 0.04)
4	*-0.08 (-0.09 - -0.07)*	*0.06 (0.05 - 0.06)*	*0.03 (0.02 - 0.04)*	*-0.01 (-0.02 - -0.00)*	*-0.06 (-0.08 - -0.04)*	*0.04 (0.03 - 0.06)*	0.02 (-0.01 - 0.05)	-0.01 (-0.04 - 0.02)
5	*-0.09 (-0.09 - -0.08)*	*0.07 (0.06 - 0.07)*	*0.03 (0.02 - 0.04)*	*-0.02 (-0.03 - -0.01)*	*-0.07 (-0.09 - -0.05)*	*0.04 (0.03 - 0.06)*	0.02 (-0.00 - 0.05)	0.00 (-0.03 - 0.04)
6	*-0.10 (-0.10 - -0.09)*	*0.08 (0.07 - 0.08)*	*0.03 (0.02 - 0.04)*	*-0.03 (-0.04 - -0.03)*	*-0.08 (-0.10 - -0.07)*	*0.05 (0.03 - 0.07)*	*0.03 (0.00 - 0.06)*	0.01 (-0.02 - 0.04)
7	*-0.09 (-0.09 - -0.08)*	*0.08 (0.07 - 0.08)*	*0.03 (0.02 - 0.04)*	*-0.05 (-0.06 - -0.04)*	*-0.08 (-0.10 - -0.06)*	*0.05 (0.03 - 0.07)*	*0.03 (0.00 - 0.06)*	0.00 (-0.03 - 0.04)
8	*-0.09 (-0.10 - -0.08)*	*0.09 (0.08 - 0.09)*	*0.03 (0.02 - 0.04)*	*-0.06 (-0.07 - -0.06)*	*-0.06 (-0.08 - -0.04)*	*0.04 (0.02 - 0.05)*	0.02 (-0.01 - 0.05)	0.01 (-0.03 - 0.04)
9	*-0.09 (-0.10 - -0.08)*	*0.09 (0.08 - 0.10)*	*0.03 (0.02 - 0.04)*	*-0.07 (-0.08 - -0.07)*	*-0.06 (-0.08 - -0.05)*	*0.05 (0.03 - 0.06)*	0.02 (-0.01 - 0.04)	-0.01 (-0.04 - 0.02)

Wave	High Qual: Degree	High Qual: A-Level	High Qual: GCSE	High Qual: Other	High Qual: Degree	High Qual: A-Level	High Qual: GCSE	High Qual: Other
2	*0.01 (0.01 - 0.02)*	*-0.01 (-0.02 - -0.00)*	-0.00 (-0.01 - 0.01)	0.00 (-0.01 - 0.01)	*0.02 (0.01 - 0.04)*	-0.00 (-0.02 - 0.02)	0.00 (-0.02 - 0.02)	-0.02 (-0.05 - 0.01)
3	*0.04 (0.03 - 0.04)*	*-0.01 (-0.02 - -0.00)*	*-0.01 (-0.02 - -0.00)*	0.00 (-0.01 - 0.01)	*0.02 (0.00 - 0.04)*	-0.01 (-0.03 - 0.01)	-0.02 (-0.04 - 0.01)	0.01 (-0.02 - 0.04)
4	*0.05 (0.05 - 0.06)*	-0.01 (-0.01 - 0.00)	*-0.01 (-0.02 - -0.01)*	-0.00 (-0.01 - 0.01)	0.01 (-0.00 - 0.03)	-0.01 (-0.03 - 0.01)	-0.01 (-0.03 - 0.01)	0.00 (-0.03 - 0.03)
5	*0.06 (0.06 - 0.07)*	*-0.01 (-0.02 - -0.00)*	*-0.01 (-0.02 - -0.00)*	-0.00 (-0.01 - 0.01)	*0.03 (0.01 - 0.05)*	-0.01 (-0.03 - 0.01)	*-0.03 (-0.05 - -0.01)*	0.00 (-0.03 - 0.03)
6	*0.08 (0.07 - 0.09)*	*-0.01 (-0.02 - -0.00)*	*-0.02 (-0.03 - -0.01)*	-0.01 (-0.02 - 0.00)	*0.03 (0.01 - 0.04)*	-0.01 (-0.03 - 0.01)	-0.00 (-0.02 - 0.02)	-0.01 (-0.04 - 0.02)
7	*0.09 (0.09 - 0.10)*	*-0.01 (-0.02 - -0.00)*	*-0.01 (-0.02 - -0.01)*	*-0.02 (-0.03 - -0.01)*	*0.02 (0.00 - 0.04)*	-0.01 (-0.03 - 0.01)	-0.01 (-0.03 - 0.01)	-0.00 (-0.03 - 0.03)
8	*0.11 (0.10 - 0.11)*	-0.01 (-0.02 - 0.00)	*-0.01 (-0.02 - -0.01)*	*-0.02 (-0.03 - -0.01)*	*0.03 (0.01 - 0.04)*	-0.01 (-0.03 - 0.01)	-0.02 (-0.04 - 0.00)	-0.01 (-0.04 - 0.02)
9	*0.11 (0.11 - 0.12)*	-0.00 (-0.01 - 0.01)	*-0.02 (-0.03 - -0.01)*	*-0.02 (-0.03 - -0.01)*	*0.03 (0.01 - 0.05)*	-0.01 (-0.03 - 0.01)	-0.02 (-0.04 - 0.00)	-0.02 (-0.05 - 0.01)

Wave	High Qual: None	Tenure: Owned	Tenure: Rented	Tenure: Other	High Qual: None	Tenure: Owned	Tenure: Rented	Tenure: Other
2	*-0.01 (-0.02 - -0.00)*	*0.03 (0.03 - 0.04)*	*-0.05 (-0.06 - -0.05)*	-0.00 (-0.01 - 0.01)	-0.03 (-0.06 - 0.01)	*0.02 (0.01 - 0.04)*	*-0.03 (-0.06 - -0.01)*	-0.00 (-0.02 - 0.01)
3	*-0.03 (-0.04 - -0.02)*	*0.05 (0.05 - 0.05)*	*-0.08 (-0.08 - -0.07)*	*-0.01 (-0.02 - -0.00)*	-0.01 (-0.04 - 0.03)	*0.02 (0.01 - 0.04)*	*-0.04 (-0.06 - -0.01)*	-0.00 (-0.02 - 0.01)
4	*-0.05 (-0.06 - -0.04)*	*0.06 (0.06 - 0.07)*	*-0.10 (-0.10 - -0.09)*	-0.01 (-0.02 - 0.00)	-0.00 (-0.04 - 0.03)	*0.02 (0.01 - 0.04)*	*-0.04 (-0.06 - -0.01)*	0.01 (-0.01 - 0.02)
5	*-0.06 (-0.07 - -0.06)*	*0.07 (0.07 - 0.07)*	*-0.10 (-0.11 - -0.10)*	*-0.01 (-0.02 - -0.00)*	-0.01 (-0.05 - 0.02)	*0.03 (0.02 - 0.04)*	*-0.05 (-0.07 - -0.02)*	0.01 (-0.01 - 0.03)
6	*-0.07 (-0.08 - -0.07)*	*0.08 (0.08 - 0.08)*	*-0.12 (-0.13 - -0.11)*	*-0.01 (-0.02 - -0.00)*	-0.03 (-0.07 - 0.00)	*0.04 (0.02 - 0.05)*	*-0.06 (-0.08 - -0.04)*	0.01 (-0.01 - 0.03)
7	*-0.09 (-0.10 - -0.09)*	*0.08 (0.08 - 0.09)*	*-0.13 (-0.13 - -0.12)*	*-0.01 (-0.02 - -0.00)*	0.00 (-0.04 - 0.04)	*0.04 (0.03 - 0.06)*	*-0.06 (-0.09 - -0.04)*	0.01 (-0.01 - 0.03)
8	*-0.11 (-0.11 - -0.10)*	*0.09 (0.09 - 0.09)*	*-0.13 (-0.14 - -0.13)*	*-0.02 (-0.03 - -0.01)*	-0.01 (-0.04 - 0.03)	*0.04 (0.02 - 0.05)*	*-0.06 (-0.08 - -0.04)*	0.00 (-0.01 - 0.02)
9	*-0.12 (-0.13 - -0.11)*	*0.10 (0.10 - 0.10)*	*-0.15 (-0.16 - -0.14)*	*-0.01 (-0.02 - -0.01)*	-0.01 (-0.04 - 0.03)	*0.03 (0.02 - 0.05)*	*-0.05 (-0.07 - -0.03)*	0.00 (-0.01 - 0.02)

Table A6: Covariate category CV_cs for cross-sectional main survey and COVID-19 Study datasets. 95% CIs in brackets. Italics denote significance.

	MAIN				COVID			
Wave	Sex: Male	Sex: Female	Ethnicity: No	Ethnicity: Yes	Sex: Male	Sex: Female	Ethnicity: No	Ethnicity: Yes
2	*0.01 (0.01 - 0.01)*	*0.01 (0.01 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.03 (0.02 - 0.03)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.02)*
3	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.02)*	*0.04 (0.03 - 0.04)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*
4	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.02)*	*0.04 (0.04 - 0.05)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*
5	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.02)*	*0.05 (0.04 - 0.05)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*
6	*0.02 (0.01 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.05 (0.04 - 0.06)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.01 (0.00 - 0.01)*	*0.02 (0.01 - 0.03)*
7	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.05 (0.04 - 0.06)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.03)*
8	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.05 (0.05 - 0.06)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.03)*
9	*0.03 (0.02 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.03 (0.03 - 0.03)*	*0.06 (0.06 - 0.07)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*
Wave	Age: 16-19	Age: 20-24	Age: 25-34	Age: 35-44	Age: 16-19	Age: 20-24	Age: 25-34	Age: 35-44
2	*0.01 (0.00 - 0.01)*	*0.02 (0.02 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*
3	*0.01 (0.01 - 0.02)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.02)*
4	*0.02 (0.01 - 0.02)*	*0.03 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*
5	*0.02 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.03 (0.03 - 0.04)*	*0.03 (0.02 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*
6	*0.02 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.04 (0.03 - 0.04)*	*0.03 (0.03 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.03 (0.02 - 0.03)*
7	*0.03 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.04 (0.03 - 0.04)*	*0.03 (0.03 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.02 (0.02 - 0.03)*
8	*0.02 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.04 (0.03 - 0.04)*	*0.03 (0.03 - 0.03)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.02)*
9	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.04 (0.03 - 0.04)*	*0.03 (0.03 - 0.04)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*
Wave	Age: 45-54	Age: 55-64	Age: 65+		Age: 45-54	Age: 55-64	Age: 65+	
2	*0.02 (0.02 - 0.02)*	*0.02 (0.02 - 0.02)*	*0.01 (0.00 - 0.01)*		*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.03)*	*0.00 (0.00 - 0.01)*	
3	*0.03 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.01 (0.01 - 0.01)*		*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.01 (0.00 - 0.01)*	
4	*0.03 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.02 (0.01 - 0.02)*		*0.03 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.01 (0.01 - 0.01)*	
5	*0.03 (0.03 - 0.03)*	*0.04 (0.03 - 0.05)*	*0.02 (0.02 - 0.03)*		*0.03 (0.03 - 0.04)*	*0.04 (0.03 - 0.05)*	*0.01 (0.01 - 0.02)*	
6	*0.03 (0.03 - 0.04)*	*0.05 (0.04 - 0.06)*	*0.03 (0.02 - 0.03)*		*0.03 (0.03 - 0.04)*	*0.04 (0.03 - 0.04)*	*0.01 (0.01 - 0.02)*	
7	*0.04 (0.03 - 0.04)*	*0.05 (0.05 - 0.06)*	*0.03 (0.03 - 0.04)*		*0.03 (0.03 - 0.04)*	*0.03 (0.03 - 0.04)*	*0.01 (0.00 - 0.01)*	
8	*0.04 (0.03 - 0.04)*	*0.06 (0.06 - 0.07)*	*0.04 (0.03 - 0.05)*		*0.02 (0.02 - 0.03)*	*0.04 (0.03 - 0.04)*	*0.01 (0.01 - 0.01)*	
9	*0.04 (0.03 - 0.05)*	*0.07 (0.06 - 0.08)*	*0.05 (0.04 - 0.06)*		*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.01 (0.00 - 0.01)*	

Wave	Emp Stat: Emp, In Educ or Training	Emp Stat: Unemployed	Emp Stat: Retired	Emp Stat: Other	Emp Stat: Emp, In Educ or Training	Emp Stat: Unemployed	Emp Stat: Retired	Emp Stat: Other
2	*0.00 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	*0.00 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.01)*
3	0.00 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	0.00 (-0.01 - 0.01)
4	*0.00 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.01)*	0.01 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	0.01 (-0.00 - 0.01)
5	0.00 (-0.00 - 0.01)	0.00 (-0.01 - 0.01)	0.00 (-0.01 - 0.01)	0.00 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	0.00 (-0.04 - 0.04)	0.01 (-0.00 - 0.01)	0.00 (-0.01 - 0.01)
6	0.00 (-0.00 - 0.01)	0.01 (-0.00 - 0.01)	0.00 (-0.01 - 0.01)	0.00 (-0.01 - 0.01)	0.01 (-0.00 - 0.01)	0.00 (-0.03 - 0.03)	0.01 (-0.00 - 0.01)	0.01 (-0.00 - 0.01)
7	*0.01 (0.00 - 0.01)*	0.01 (-0.00 - 0.02)	0.01 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.02)*	0.00 (-0.01 - 0.02)	*0.01 (0.00 - 0.01)*	0.01 (-0.00 - 0.01)
8	*0.01 (0.01 - 0.02)*	0.01 (-0.00 - 0.01)	*0.01 (0.00 - 0.02)*	0.01 (-0.00 - 0.01)	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.01)*	0.01 (-0.00 - 0.01)
9	*0.02 (0.01 - 0.02)*	0.01 (-0.00 - 0.02)	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.02)*	0.01 (-0.00 - 0.01)	0.00 (-0.01 - 0.01)	0.01 (-0.00 - 0.01)	0.01 (-0.00 - 0.02)
Wave	HH Comp: 1 adult, no children	HH Comp: 1 adult, children	HH Comp: couple, no children	HH Comp: couple, children	HH Comp: 1 adult, no children	HH Comp: 1 adult, children	HH Comp: couple, no children	HH Comp: couple, children
2	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	*0.02 (0.01 - 0.02)*	*0.00 (0.00 - 0.01)*
3	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.01)*	*0.02 (0.02 - 0.02)*	0.00 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	*0.01 (0.01 - 0.02)*	*0.00 (0.00 - 0.01)*
4	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.02)*	0.01 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.02)*	0.00 (-0.00 - 0.01)
5	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.02)*	0.00 (-0.00 - 0.01)	0.01 (-0.00 - 0.01)	*0.02 (0.02 - 0.03)*	*0.01 (0.00 - 0.02)*
6	*0.01 (0.00 - 0.01)*	0.01 (-0.00 - 0.01)	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.02 (0.01 - 0.03)*	*0.04 (0.03 - 0.05)*	*0.02 (0.02 - 0.03)*
7	*0.01 (0.00 - 0.01)*	0.01 (-0.00 - 0.01)	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.03)*
8	*0.01 (0.00 - 0.02)*	0.00 (-0.00 - 0.01)	*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*
9	*0.01 (0.00 - 0.02)*	0.00 (-0.01 - 0.01)	*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.01 (0.01 - 0.02)*
Wave	HH Comp: 2+ adults, no children	HH Comp: 2+ adults, children			HH Comp: 2+ adults, no children	HH Comp: 2+ adults, children		
2	*0.02 (0.02 - 0.02)*	*0.01 (0.01 - 0.01)*			*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*		
3	*0.03 (0.02 - 0.03)*	*0.01 (0.01 - 0.01)*			*0.01 (0.00 - 0.01)*	0.01 (-0.00 - 0.01)		
4	*0.03 (0.03 - 0.04)*	*0.01 (0.01 - 0.01)*			*0.01 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)		
5	*0.03 (0.02 - 0.03)*	*0.01 (0.00 - 0.01)*			*0.01 (0.01 - 0.02)*	0.01 (-0.00 - 0.01)		
6	*0.02 (0.02 - 0.03)*	*0.01 (0.00 - 0.01)*			*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*		
7	*0.03 (0.02 - 0.03)*	*0.01 (0.00 - 0.01)*			*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.01)*		
8	*0.03 (0.02 - 0.03)*	0.01 (-0.00 - 0.01)			*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*		
9	*0.03 (0.02 - 0.03)*	0.01 (-0.00 - 0.02)			*0.01 (0.00 - 0.02)*	0.01 (-0.00 - 0.01)		

Wave	Mar Stat: Single	Mar Stat: Married	Mar Stat: Separated/Divorced	Mar Stat: Widowed	Mar Stat: Single	Mar Stat: Married	Mar Stat: Separated/Divorced	Mar Stat: Widowed
2	*0.00 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.02)*
3	*0.01 (0.00 - 0.01)*	*0.00 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.00 (0.00 - 0.01)*	*0.00 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*
4	*0.01 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.03)*
5	*0.01 (0.00 - 0.01)*	*0.00 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.01)*	0.01 (-0.00 - 0.01)	*0.00 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*
6	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	0.00 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.02)*	0.01 (-0.00 - 0.01)
7	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*
8	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	0.00 (-0.01 - 0.01)	0.00 (-0.00 - 0.01)	0.01 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)
9	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*
Wave	High Qual: Degree	High Qual: A-Level	High Qual: GCSE	High Qual: Other	High Qual: Degree	High Qual: A-Level	High Qual: GCSE	High Qual: Other
2	*0.01 (0.01 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.03)*
3	*0.03 (0.02 - 0.03)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.01 (0.01 - 0.02)*	0.01 (-0.00 - 0.01)
4	*0.04 (0.03 - 0.04)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*
5	*0.04 (0.04 - 0.05)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.02)*
6	*0.06 (0.05 - 0.06)*	*0.02 (0.02 - 0.02)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.01 (0.01 - 0.02)*	*0.03 (0.02 - 0.04)*
7	*0.06 (0.06 - 0.07)*	*0.02 (0.02 - 0.02)*	*0.02 (0.02 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.03)*
8	*0.07 (0.06 - 0.08)*	*0.02 (0.02 - 0.02)*	*0.03 (0.02 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*
9	*0.07 (0.06 - 0.08)*	*0.02 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.03 (0.02 - 0.04)*
Wave	High Qual: None	Tenure: Owned	Tenure: Rented	Tenure: Other	High Qual: None	Tenure: Owned	Tenure: Rented	Tenure: Other
2	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.02)*	*0.02 (0.02 - 0.03)*	0.00 (-0.00 - 0.01)	*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	0.00 (-0.01 - 0.01)
3	*0.03 (0.03 - 0.04)*	*0.03 (0.03 - 0.03)*	*0.04 (0.03 - 0.04)*	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	0.00 (-0.01 - 0.01)
4	*0.04 (0.04 - 0.05)*	*0.04 (0.03 - 0.04)*	*0.05 (0.04 - 0.05)*	0.01 (-0.00 - 0.01)	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	0.00 (-0.01 - 0.01)
5	*0.05 (0.04 - 0.06)*	*0.04 (0.04 - 0.04)*	*0.05 (0.05 - 0.06)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.01 (0.00 - 0.02)*	*0.01 (0.01 - 0.02)*	0.00 (-0.01 - 0.01)
6	*0.06 (0.05 - 0.06)*	*0.04 (0.04 - 0.05)*	*0.06 (0.05 - 0.07)*	0.01 (-0.00 - 0.02)	*0.04 (0.03 - 0.05)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	0.01 (-0.00 - 0.02)
7	*0.06 (0.05 - 0.07)*	*0.05 (0.04 - 0.05)*	*0.07 (0.06 - 0.07)*	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	0.00 (-0.01 - 0.02)
8	*0.07 (0.06 - 0.08)*	*0.05 (0.05 - 0.06)*	*0.07 (0.06 - 0.08)*	*0.02 (0.01 - 0.03)*	*0.01 (0.00 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	0.00 (-0.03 - 0.03)
9	*0.07 (0.06 - 0.08)*	*0.06 (0.05 - 0.06)*	*0.08 (0.07 - 0.09)*	*0.01 (0.00 - 0.02)*	0.01 (-0.00 - 0.01)	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	0.00 (-0.07 - 0.07)

Table A7: Response Rates (RRs) for the longitudinal UKHLS main survey and COVID-19 Study datasets.

Wave	MAIN	COVID
3	0.61	0.71
4	0.53	0.65
5	0.48	0.60
6	0.41	0.54
7	0.37	0.50
8	0.34	0.48
9	0.30	0.44

Table A8: Covariate CV_us for the longitudinal UKHLS main survey and COVID-19 Study datasets. 95% CIs in brackets. Italics indicate significance.

	MAIN				COVID			
Wave	Sex	Ethnicity	Age	Employment Status	Sex	Ethnicity	Age	Employment Status
3	*0.03 (0.02 - 0.04)*	*0.08 (0.07 - 0.09)*	*0.14 (0.13 - 0.14)*	*0.06 (0.05 - 0.06)*	*0.03 (0.02 - 0.04)*	*0.05 (0.04 - 0.06)*	*0.11 (0.10 - 0.13)*	*0.08 (0.07 - 0.09)*
4	*0.04 (0.03 - 0.04)*	*0.09 (0.08 - 0.10)*	*0.17 (0.16 - 0.18)*	*0.06 (0.05 - 0.07)*	*0.02 (0.01 - 0.03)*	*0.07 (0.06 - 0.08)*	*0.15 (0.14 - 0.16)*	*0.10 (0.08 - 0.11)*
5	*0.04 (0.03 - 0.05)*	*0.11 (0.10 - 0.11)*	*0.20 (0.19 - 0.21)*	*0.06 (0.05 - 0.07)*	*0.03 (0.01 - 0.04)*	*0.08 (0.06 - 0.09)*	*0.18 (0.17 - 0.19)*	*0.11 (0.10 - 0.12)*
6	*0.04 (0.03 - 0.05)*	*0.11 (0.10 - 0.12)*	*0.23 (0.22 - 0.24)*	*0.07 (0.06 - 0.08)*	*0.03 (0.01 - 0.04)*	*0.09 (0.07 - 0.10)*	*0.22 (0.20 - 0.23)*	*0.14 (0.12 - 0.15)*
7	*0.04 (0.03 - 0.05)*	*0.12 (0.11 - 0.13)*	*0.25 (0.24 - 0.26)*	*0.07 (0.06 - 0.08)*	*0.03 (0.01 - 0.04)*	*0.09 (0.08 - 0.11)*	*0.24 (0.22 - 0.26)*	*0.16 (0.15 - 0.18)*
8	*0.04 (0.03 - 0.05)*	*0.13 (0.11 - 0.14)*	*0.27 (0.26 - 0.28)*	*0.07 (0.06 - 0.09)*	*0.03 (0.01 - 0.04)*	*0.10 (0.08 - 0.12)*	*0.24 (0.22 - 0.26)*	*0.16 (0.14 - 0.18)*
9	*0.04 (0.03 - 0.06)*	*0.13 (0.12 - 0.15)*	*0.29 (0.28 - 0.31)*	*0.08 (0.07 - 0.10)*	*0.04 (0.02 - 0.05)*	*0.10 (0.09 - 0.12)*	*0.24 (0.22 - 0.26)*	*0.16 (0.14 - 0.18)*

Wave	Household Composition	Marital Status	Highest Qualification	Housing Tenure	Household Composition	Marital Status	Highest Qualification	Housing Tenure
3	*0.08 (0.07 - 0.09)*	*0.11 (0.11 - 0.12)*	*0.05 (0.04 - 0.06)*	*0.10 (0.09 - 0.11)*	*0.10 (0.09 - 0.11)*	*0.07 (0.06 - 0.08)*	*0.04 (0.03 - 0.06)*	*0.05 (0.04 - 0.06)*
4	*0.10 (0.09 - 0.11)*	*0.14 (0.13 - 0.14)*	*0.08 (0.07 - 0.09)*	*0.13 (0.12 - 0.13)*	*0.13 (0.12 - 0.14)*	*0.09 (0.07 - 0.10)*	*0.05 (0.04 - 0.06)*	*0.07 (0.05 - 0.08)*
5	*0.11 (0.10 - 0.12)*	*0.15 (0.14 - 0.16)*	*0.10 (0.09 - 0.11)*	*0.14 (0.13 - 0.15)*	*0.16 (0.14 - 0.17)*	*0.10 (0.09 - 0.11)*	*0.06 (0.05 - 0.07)*	*0.08 (0.07 - 0.10)*
6	*0.12 (0.11 - 0.14)*	*0.17 (0.16 - 0.18)*	*0.13 (0.12 - 0.14)*	*0.16 (0.15 - 0.17)*	*0.19 (0.17 - 0.20)*	*0.12 (0.10 - 0.13)*	*0.06 (0.04 - 0.07)*	*0.10 (0.08 - 0.11)*
7	*0.13 (0.12 - 0.15)*	*0.18 (0.17 - 0.19)*	*0.15 (0.14 - 0.16)*	*0.18 (0.17 - 0.19)*	*0.21 (0.19 - 0.23)*	*0.13 (0.12 - 0.15)*	*0.07 (0.06 - 0.09)*	*0.11 (0.10 - 0.13)*
8	*0.14 (0.13 - 0.16)*	*0.20 (0.19 - 0.21)*	*0.17 (0.16 - 0.18)*	*0.19 (0.18 - 0.20)*	*0.21 (0.20 - 0.23)*	*0.13 (0.12 - 0.15)*	*0.07 (0.06 - 0.09)*	*0.13 (0.11 - 0.14)*
9	*0.15 (0.14 - 0.17)*	*0.21 (0.20 - 0.22)*	*0.18 (0.17 - 0.20)*	*0.21 (0.20 - 0.23)*	*0.21 (0.20 - 0.23)*	*0.14 (0.12 - 0.15)*	*0.08 (0.07 - 0.10)*	*0.14 (0.12 - 0.15)*

Table A9: Covariate CV_cs for the longitudinal UKHLS main survey and COVID-19 Study datasets. 95% CIs in brackets. Italics indicate significance.

	MAIN				COVID			
Wave	Sex	Ethnicity	Age	Employment Status	Sex	Ethnicity	Age	Employment Status
3	*0.02 (0.02 - 0.03)*	*0.05 (0.04 - 0.06)*	*0.07 (0.06 - 0.07)*	*0.01 (0.00 - 0.02)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.03)*	*0.06 (0.05 - 0.07)*	*0.03 (0.01 - 0.04)*
4	*0.03 (0.02 - 0.04)*	*0.06 (0.05 - 0.07)*	*0.08 (0.07 - 0.09)*	*0.01 (0.00 - 0.02)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.08 (0.07 - 0.09)*	*0.02 (0.01 - 0.03)*
5	*0.03 (0.02 - 0.04)*	*0.07 (0.06 - 0.08)*	*0.10 (0.09 - 0.11)*	*0.01 (0.00 - 0.02)*	*0.03 (0.02 - 0.05)*	*0.03 (0.02 - 0.05)*	*0.09 (0.08 - 0.10)*	*0.02 (0.01 - 0.03)*
6	*0.04 (0.03 - 0.05)*	*0.08 (0.07 - 0.09)*	*0.12 (0.11 - 0.13)*	0.01 (-0.00 - 0.02)	*0.04 (0.02 - 0.05)*	*0.04 (0.02 - 0.05)*	*0.10 (0.09 - 0.12)*	*0.02 (0.01 - 0.04)*
7	*0.04 (0.03 - 0.05)*	*0.09 (0.07 - 0.10)*	*0.13 (0.12 - 0.14)*	*0.01 (0.00 - 0.02)*	*0.04 (0.02 - 0.06)*	*0.04 (0.02 - 0.05)*	*0.11 (0.09 - 0.13)*	*0.03 (0.01 - 0.04)*
8	*0.05 (0.03 - 0.06)*	*0.09 (0.08 - 0.10)*	*0.14 (0.13 - 0.15)*	0.01 (-0.00 - 0.02**)**	*0.04 (0.02 - 0.06)*	*0.04 (0.03 - 0.06)*	*0.11 (0.09 - 0.12)*	*0.03 (0.01 - 0.05)*
9	*0.05 (0.04 - 0.07)*	*0.10 (0.08 - 0.11)*	*0.16 (0.14 - 0.17)*	*0.02 (0.00 - 0.03)*	*0.05 (0.03 - 0.07)*	*0.05 (0.03 - 0.07)*	*0.11 (0.09 - 0.13)*	*0.03 (0.01 - 0.05)*

Wave	Household Composition	Marital Status	Highest Qualification	Housing Tenure	Household Composition	Marital Status	Highest Qualification	Housing Tenure
3	*0.04 (0.04 - 0.05)*	*0.02 (0.01 - 0.02)*	*0.05 (0.04 - 0.06)*	*0.05 (0.04 - 0.06)*	*0.04 (0.03 - 0.05)*	*0.03 (0.02 - 0.04)*	*0.04 (0.03 - 0.05)*	*0.01 (0.00 - 0.02)*
4	*0.05 (0.04 - 0.06)*	*0.02 (0.01 - 0.03)*	*0.07 (0.06 - 0.08)*	*0.06 (0.06 - 0.07)*	*0.05 (0.04 - 0.06)*	*0.03 (0.02 - 0.05)*	*0.05 (0.03 - 0.06)*	*0.02 (0.01 - 0.03)*
5	*0.05 (0.04 - 0.06)*	*0.02 (0.01 - 0.03)*	*0.09 (0.08 - 0.09)*	*0.07 (0.06 - 0.08)*	*0.07 (0.05 - 0.08)*	*0.03 (0.02 - 0.04)*	*0.06 (0.05 - 0.08)*	*0.03 (0.02 - 0.04)*
6	*0.05 (0.04 - 0.06)*	*0.03 (0.02 - 0.04)*	*0.11 (0.10 - 0.12)*	*0.08 (0.07 - 0.09)*	*0.08 (0.06 - 0.09)*	*0.04 (0.02 - 0.05)*	*0.07 (0.05 - 0.08)*	*0.03 (0.02 - 0.05)*
7	*0.06 (0.04 - 0.07)*	*0.03 (0.02 - 0.04)*	*0.13 (0.12 - 0.14)*	*0.09 (0.08 - 0.10)*	*0.08 (0.07 - 0.10)*	*0.03 (0.02 - 0.05)*	*0.08 (0.06 - 0.09)*	*0.04 (0.02 - 0.06)*
8	*0.06 (0.05 - 0.08)*	*0.04 (0.02 - 0.05)*	*0.14 (0.13 - 0.15)*	*0.10 (0.08 - 0.11)*	*0.09 (0.07 - 0.11)*	*0.03 (0.01 - 0.04)*	*0.07 (0.06 - 0.09)*	*0.05 (0.03 - 0.07)*
9	*0.07 (0.05 - 0.08)*	*0.04 (0.03 - 0.05)*	*0.15 (0.13 - 0.16)*	*0.11 (0.10 - 0.12)*	*0.09 (0.07 - 0.11)*	*0.03 (0.01 - 0.05)*	*0.08 (0.06 - 0.09)*	*0.06 (0.04 - 0.08)*

Table A3: Covariate category CV_us for longitudinal UKHLS main survey and COVID-19 Study datasets. 95% CIs in brackets. Italics indicate significance.

	MAIN				COVID			
Wave	Sex: Male	Sex: Female	Ethnicity: No	Ethnicity: Yes	Sex: Male	Sex: Female	Ethnicity: No	Ethnicity: Yes
3	*-0.02 (-0.03 - -0.02)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*-0.07 (-0.08 - -0.07)*	*-0.02 (-0.03 - -0.00)*	*0.02 (0.00 - 0.03)*	*0.01 (0.01 - 0.02)*	*-0.05 (-0.07 - -0.02)*
4	*-0.03 (-0.03 - -0.02)*	*0.02 (0.02 - 0.03)*	*0.03 (0.03 - 0.03)*	*-0.09 (-0.09 - -0.08)*	-0.01 (-0.03 - 0.00)	0.01 (-0.00 - 0.03)	*0.02 (0.01 - 0.02)*	*-0.06 (-0.08 - -0.04)*
5	*-0.03 (-0.03 - -0.02)*	*0.03 (0.02 - 0.03)*	*0.03 (0.03 - 0.03)*	*-0.10 (-0.11 - -0.10)*	*-0.02 (-0.03 - -0.00)*	*0.02 (0.00 - 0.03)*	*0.02 (0.02 - 0.03)*	*-0.07 (-0.10 - -0.05)*
6	*-0.03 (-0.03 - -0.02)*	*0.03 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*-0.11 (-0.11 - -0.10)*	-0.02 (-0.03 - 0.00)	0.02 (-0.00 - 0.03)	*0.02 (0.02 - 0.03)*	*-0.08 (-0.10 - -0.06)*
7	*-0.03 (-0.03 - -0.02)*	*0.03 (0.02 - 0.03)*	*0.04 (0.04 - 0.04)*	*-0.12 (-0.12 - -0.11)*	*-0.02 (-0.03 - -0.00)*	*0.02 (0.00 - 0.03)*	*0.03 (0.02 - 0.03)*	*-0.09 (-0.11 - -0.07)*
8	*-0.03 (-0.03 - -0.02)*	*0.03 (0.02 - 0.03)*	*0.04 (0.04 - 0.04)*	*-0.12 (-0.12 - -0.11)*	*-0.02 (-0.03 - -0.00)*	*0.02 (0.00 - 0.03)*	*0.03 (0.02 - 0.03)*	*-0.10 (-0.12 - -0.08)*
9	*-0.03 (-0.04 - -0.02)*	*0.03 (0.02 - 0.04)*	*0.04 (0.04 - 0.04)*	*-0.13 (-0.13 - -0.12)*	*-0.02 (-0.04 - -0.01)*	*0.02 (0.01 - 0.04)*	*0.03 (0.02 - 0.03)*	*-0.10 (-0.12 - -0.08)*
Wave	Age: 16-19	Age: 20-24	Age: 25-34	Age: 35-44	Age: 16-19	Age: 20-24	Age: 25-34	Age: 35-44
3	*-0.07 (-0.07 - -0.06)*	*-0.09 (-0.09 - -0.08)*	*-0.03 (-0.04 - -0.03)*	*0.01 (0.00 - 0.02)*	*-0.06 (-0.08 - -0.04)*	*-0.05 (-0.08 - -0.03)*	*-0.03 (-0.05 - -0.01)*	-0.01 (-0.03 - 0.01)
4	*-0.09 (-0.09 - -0.08)*	*-0.10 (-0.11 - -0.09)*	*-0.04 (-0.05 - -0.03)*	*0.02 (0.01 - 0.03)*	*-0.08 (-0.10 - -0.07)*	*-0.06 (-0.09 - -0.04)*	*-0.05 (-0.07 - -0.03)*	*-0.02 (-0.04 - -0.00)*
5	*-0.10 (-0.11 - -0.10)*	*-0.11 (-0.12 - -0.11)*	*-0.05 (-0.05 - -0.04)*	*0.03 (0.02 - 0.04)*	*-0.10 (-0.11 - -0.08)*	*-0.08 (-0.10 - -0.06)*	*-0.05 (-0.07 - -0.03)*	*-0.03 (-0.05 - -0.01)*
6	*-0.12 (-0.13 - -0.12)*	*-0.12 (-0.13 - -0.11)*	*-0.05 (-0.06 - -0.05)*	*0.03 (0.02 - 0.04)*	*-0.11 (-0.12 - -0.09)*	*-0.10 (-0.12 - -0.08)*	*-0.07 (-0.09 - -0.05)*	*-0.04 (-0.06 - -0.02)*
7	*-0.14 (-0.14 - -0.13)*	*-0.13 (-0.13 - -0.12)*	*-0.05 (-0.06 - -0.05)*	*0.03 (0.02 - 0.04)*	*-0.11 (-0.13 - -0.10)*	*-0.10 (-0.12 - -0.09)*	*-0.08 (-0.10 - -0.06)*	*-0.05 (-0.07 - -0.03)*
8	*-0.14 (-0.15 - -0.14)*	*-0.13 (-0.14 - -0.12)*	*-0.05 (-0.06 - -0.04)*	*0.03 (0.02 - 0.04)*	*-0.11 (-0.13 - -0.10)*	*-0.10 (-0.12 - -0.09)*	*-0.08 (-0.10 - -0.06)*	*-0.06 (-0.07 - -0.04)*
9	*-0.16 (-0.16 - -0.15)*	*-0.13 (-0.14 - -0.12)*	*-0.06 (-0.06 - -0.05)*	*0.03 (0.02 - 0.04)*	*-0.12 (-0.13 - -0.11)*	*-0.11 (-0.13 - -0.10)*	*-0.07 (-0.09 - -0.06)*	*-0.05 (-0.06 - -0.03)*
Wave	Age: 45-54	Age: 55-64	Age: 65+		Age: 45-54	Age: 55-64	Age: 65+	
3	*0.04 (0.03 - 0.05)*	*0.06 (0.05 - 0.07)*	*0.03 (0.02 - 0.03)*		0.01 (-0.01 - 0.03)	*0.05 (0.03 - 0.07)*	*0.04 (0.02 - 0.07)*	
4	*0.05 (0.04 - 0.06)*	*0.08 (0.07 - 0.09)*	*0.02 (0.01 - 0.03)*		0.01 (-0.01 - 0.03)	*0.06 (0.04 - 0.09)*	*0.06 (0.03 - 0.08)*	
5	*0.06 (0.05 - 0.07)*	*0.10 (0.09 - 0.11)*	*0.01 (0.00 - 0.02)*		0.01 (-0.01 - 0.03)	*0.08 (0.06 - 0.11)*	*0.07 (0.05 - 0.10)*	
6	*0.07 (0.06 - 0.08)*	*0.12 (0.10 - 0.13)*	0.00 (-0.00 - 0.01)		0.01 (-0.01 - 0.03)	*0.10 (0.08 - 0.12)*	*0.09 (0.07 - 0.12)*	
7	*0.08 (0.07 - 0.09)*	*0.13 (0.12 - 0.14)*	*-0.01 (-0.02 - -0.00)*		0.01 (-0.01 - 0.03)	*0.11 (0.08 - 0.13)*	*0.11 (0.08 - 0.13)*	
8	*0.09 (0.08 - 0.10)*	*0.15 (0.14 - 0.16)*	*-0.03 (-0.04 - -0.02)*		0.02 (-0.00 - 0.04)	*0.11 (0.09 - 0.14)*	*0.10 (0.08 - 0.13)*	
9	*0.10 (0.09 - 0.11)*	*0.17 (0.16 - 0.19)*	*-0.04 (-0.05 - -0.04)*		*0.02 (0.00 - 0.04)*	*0.11 (0.09 - 0.14)*	*0.09 (0.07 - 0.12)*	

Wave	Emp Stat: Emp, In Educ or Training	Emp Stat: Unemployed	Emp Stat: Retired	Emp Stat: Other	Emp Stat: Emp, In Educ or Training	Emp Stat: Unemployed	Emp Stat: Retired	Emp Stat: Other
3	*-0.01 (-0.02 - -0.01)*	*-0.04 (-0.05 - -0.03)*	*0.04 (0.03 - 0.05)*	-0.00 (-0.01 - 0.01)	-0.01 (-0.03 - 0.00)	*-0.03 (-0.06 - -0.01)*	*0.05 (0.03 - 0.07)*	-0.02 (-0.05 - 0.01)
4	*-0.01 (-0.01 - -0.00)*	*-0.05 (-0.05 - -0.04)*	*0.04 (0.03 - 0.05)*	*-0.01 (-0.02 - -0.00)*	*-0.02 (-0.04 - -0.01)*	*-0.04 (-0.06 - -0.01)*	*0.07 (0.05 - 0.09)*	-0.02 (-0.05 - 0.01)
5	-0.00 (-0.01 - 0.00)	*-0.05 (-0.06 - -0.04)*	*0.04 (0.03 - 0.05)*	*-0.01 (-0.02 - -0.01)*	*-0.03 (-0.05 - -0.02)*	*-0.03 (-0.06 - -0.01)*	*0.08 (0.06 - 0.11)*	-0.02 (-0.05 - 0.00)
6	0.00 (-0.00 - 0.01)	*-0.06 (-0.06 - -0.05)*	*0.04 (0.03 - 0.04)*	*-0.02 (-0.03 - -0.01)*	*-0.05 (-0.06 - -0.03)*	*-0.03 (-0.06 - -0.00)*	*0.11 (0.08 - 0.13)*	-0.02 (-0.05 - 0.01)
7	*0.01 (0.01 - 0.02)*	*-0.06 (-0.07 - -0.05)*	*0.03 (0.02 - 0.04)*	*-0.02 (-0.03 - -0.02)*	*-0.06 (-0.07 - -0.04)*	-0.03 (-0.06 - 0.00)	*0.13 (0.10 - 0.15)*	*-0.03 (-0.06 - -0.00)*
8	*0.02 (0.02 - 0.03)*	*-0.06 (-0.07 - -0.06)*	*0.01 (0.01 - 0.02)*	*-0.03 (-0.03 - -0.02)*	*-0.05 (-0.07 - -0.04)*	*-0.03 (-0.06 - -0.00)*	*0.13 (0.10 - 0.15)*	*-0.04 (-0.06 - -0.01)*
9	*0.03 (0.03 - 0.04)*	*-0.07 (-0.08 - -0.06)*	0.00 (-0.00 - 0.01)	*-0.03 (-0.04 - -0.02)*	*-0.05 (-0.06 - -0.04)*	-0.03 (-0.05 - 0.00)	*0.12 (0.10 - 0.15)*	*-0.04 (-0.07 - -0.02)*
Wave	HH Comp: 1 adult, no children	HH Comp: 1 adult, children	HH Comp: couple, no children	HH Comp: couple, children	HH Comp: 1 adult, no children	HH Comp: 1 adult, children	HH Comp: couple, no children	HH Comp: couple, children
3	0.01 (-0.00 - 0.02)	-0.00 (-0.01 - 0.01)	*0.04 (0.04 - 0.05)*	*0.02 (0.01 - 0.03)*	0.01 (-0.02 - 0.03)	-0.02 (-0.05 - 0.00)	*0.07 (0.05 - 0.09)*	-0.02 (-0.04 - 0.00)
4	*0.01 (0.00 - 0.02)*	*-0.01 (-0.02 - -0.00)*	*0.06 (0.05 - 0.06)*	*0.02 (0.01 - 0.03)*	0.01 (-0.01 - 0.04)	*-0.03 (-0.05 - -0.01)*	*0.09 (0.07 - 0.10)*	*-0.03 (-0.05 - -0.01)*
5	*0.01 (0.01 - 0.02)*	*-0.01 (-0.02 - -0.01)*	*0.07 (0.06 - 0.07)*	*0.02 (0.01 - 0.03)*	0.02 (-0.01 - 0.04)	*-0.04 (-0.06 - -0.02)*	*0.11 (0.09 - 0.13)*	*-0.05 (-0.07 - -0.03)*
6	*0.02 (0.01 - 0.03)*	*-0.03 (-0.03 - -0.02)*	*0.07 (0.07 - 0.08)*	*0.02 (0.01 - 0.03)*	0.02 (-0.01 - 0.05)	*-0.06 (-0.08 - -0.04)*	*0.13 (0.11 - 0.15)*	*-0.07 (-0.09 - -0.06)*
7	*0.02 (0.01 - 0.03)*	*-0.03 (-0.04 - -0.02)*	*0.08 (0.08 - 0.09)*	*0.01 (0.00 - 0.02)*	*0.03 (0.01 - 0.06)*	*-0.06 (-0.08 - -0.05)*	*0.15 (0.13 - 0.17)*	*-0.09 (-0.11 - -0.07)*
8	*0.01 (0.00 - 0.02)*	*-0.04 (-0.04 - -0.03)*	*0.10 (0.09 - 0.10)*	*0.01 (0.00 - 0.02)*	*0.03 (0.00 - 0.05)*	*-0.07 (-0.09 - -0.05)*	*0.15 (0.13 - 0.17)*	*-0.10 (-0.11 - -0.08)*
9	0.01 (-0.00 - 0.02)	*-0.04 (-0.05 - -0.04)*	*0.10 (0.09 - 0.11)*	0.01 (-0.00 - 0.01)	*0.03 (0.00 - 0.05)*	*-0.07 (-0.08 - -0.05)*	*0.15 (0.13 - 0.16)*	*-0.09 (-0.10 - -0.07)*
Wave	HH Comp: 2+ adults, no children	HH Comp: 2+ adults, children			HH Comp: 2+ adults, no children	HH Comp: 2+ adults, children		
3	*-0.05 (-0.06 - -0.05)*	*-0.04 (-0.05 - -0.03)*			*-0.03 (-0.05 - -0.01)*	*-0.04 (-0.06 - -0.02)*		
4	*-0.06 (-0.07 - -0.06)*	*-0.05 (-0.06 - -0.04)*			*-0.03 (-0.05 - -0.01)*	*-0.06 (-0.08 - -0.04)*		
5	*-0.07 (-0.07 - -0.06)*	*-0.06 (-0.07 - -0.05)*			*-0.04 (-0.06 - -0.01)*	*-0.06 (-0.08 - -0.04)*		
6	*-0.07 (-0.07 - -0.06)*	*-0.07 (-0.08 - -0.06)*			*-0.03 (-0.06 - -0.01)*	*-0.06 (-0.08 - -0.04)*		
7	*-0.06 (-0.07 - -0.06)*	*-0.07 (-0.08 - -0.07)*			*-0.04 (-0.06 - -0.02)*	*-0.06 (-0.08 - -0.04)*		
8	*-0.06 (-0.07 - -0.06)*	*-0.08 (-0.09 - -0.07)*			*-0.03 (-0.06 - -0.01)*	*-0.06 (-0.08 - -0.04)*		
9	*-0.06 (-0.07 - -0.05)*	*-0.08 (-0.09 - -0.08)*			*-0.04 (-0.06 - -0.02)*	*-0.06 (-0.08 - -0.04)*		

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Wave	Mar Stat: Single	Mar Stat: Married	Mar Stat: Separated/Divorced	Mar Stat: Widowed	Mar Stat: Single	Mar Stat: Married	Mar Stat: Separated/Divorced	Mar Stat: Widowed
3	*-0.09 (-0.10 - -0.09)*	*0.06 (0.05 - 0.06)*	*0.03 (0.02 - 0.04)*	0.01 (-0.00 - 0.02)	*-0.05 (-0.07 - -0.04)*	*0.04 (0.03 - 0.06)*	0.01 (-0.01 - 0.04)	-0.02 (-0.05 - 0.01)
4	*-0.11 (-0.12 - -0.10)*	*0.07 (0.07 - 0.08)*	*0.04 (0.03 - 0.05)*	0.00 (-0.01 - 0.01)	*-0.07 (-0.09 - -0.05)*	*0.05 (0.04 - 0.07)*	0.02 (-0.01 - 0.04)	-0.02 (-0.05 - 0.01)
5	*-0.12 (-0.13 - -0.12)*	*0.08 (0.07 - 0.09)*	*0.05 (0.04 - 0.05)*	-0.00 (-0.01 - 0.00)	*-0.09 (-0.10 - -0.07)*	*0.06 (0.04 - 0.07)*	0.03 (-0.00 - 0.05)	-0.01 (-0.04 - 0.02)
6	*-0.14 (-0.14 - -0.13)*	*0.09 (0.09 - 0.10)*	*0.05 (0.04 - 0.06)*	*-0.01 (-0.02 - -0.01)*	*-0.10 (-0.12 - -0.08)*	*0.07 (0.05 - 0.08)*	*0.03 (0.00 - 0.05)*	-0.00 (-0.03 - 0.03)
7	*-0.14 (-0.15 - -0.14)*	*0.10 (0.09 - 0.11)*	*0.05 (0.05 - 0.06)*	*-0.02 (-0.03 - -0.02)*	*-0.11 (-0.13 - -0.09)*	*0.08 (0.06 - 0.09)*	0.03 (-0.00 - 0.05)	0.00 (-0.03 - 0.03)
8	*-0.15 (-0.16 - -0.14)*	*0.11 (0.11 - 0.12)*	*0.06 (0.05 - 0.07)*	*-0.04 (-0.05 - -0.03)*	*-0.11 (-0.13 - -0.10)*	*0.08 (0.06 - 0.09)*	0.02 (-0.00 - 0.05)	0.01 (-0.03 - 0.04)
9	*-0.16 (-0.16 - -0.15)*	*0.12 (0.12 - 0.13)*	*0.06 (0.05 - 0.07)*	*-0.05 (-0.06 - -0.04)*	*-0.12 (-0.13 - -0.10)*	*0.08 (0.06 - 0.09)*	0.02 (-0.00 - 0.05)	0.00 (-0.03 - 0.03)
Wave	High Qual: Degree	High Qual: A-Level	High Qual: GCSE	High Qual: Other	High Qual: Degree	High Qual: A-Level	High Qual: GCSE	High Qual: Other
3	*0.04 (0.03 - 0.04)*	*-0.02 (-0.02 - -0.01)*	*-0.01 (-0.02 - -0.00)*	0.00 (-0.00 - 0.01)	*0.03 (0.01 - 0.04)*	-0.00 (-0.02 - 0.02)	-0.01 (-0.03 - 0.02)	-0.02 (-0.05 - 0.01)
4	*0.06 (0.05 - 0.07)*	*-0.02 (-0.03 - -0.01)*	*-0.02 (-0.02 - -0.01)*	0.00 (-0.00 - 0.01)	*0.03 (0.01 - 0.05)*	-0.01 (-0.03 - 0.01)	-0.01 (-0.03 - 0.01)	-0.02 (-0.05 - 0.01)
5	*0.07 (0.06 - 0.08)*	*-0.02 (-0.03 - -0.01)*	*-0.02 (-0.03 - -0.01)*	0.00 (-0.01 - 0.01)	*0.04 (0.02 - 0.06)*	-0.01 (-0.03 - 0.01)	-0.01 (-0.04 - 0.01)	*-0.03 (-0.06 - -0.00)*
6	*0.10 (0.09 - 0.10)*	*-0.03 (-0.04 - -0.02)*	*-0.03 (-0.03 - -0.02)*	-0.00 (-0.01 - 0.01)	*0.04 (0.02 - 0.06)*	-0.02 (-0.04 - 0.00)	-0.01 (-0.03 - 0.01)	*-0.03 (-0.06 - -0.00)*
7	*0.11 (0.11 - 0.12)*	*-0.03 (-0.04 - -0.02)*	*-0.03 (-0.03 - -0.02)*	*-0.01 (-0.02 - -0.00)*	*0.04 (0.03 - 0.06)*	-0.02 (-0.04 - 0.00)	-0.01 (-0.03 - 0.01)	*-0.04 (-0.06 - -0.01)*
8	*0.13 (0.12 - 0.14)*	*-0.03 (-0.04 - -0.02)*	*-0.03 (-0.04 - -0.02)*	*-0.01 (-0.02 - -0.00)*	*0.05 (0.03 - 0.06)*	*-0.02 (-0.04 - -0.00)*	-0.01 (-0.03 - 0.01)	*-0.03 (-0.06 - -0.01)*
9	*0.14 (0.13 - 0.15)*	*-0.03 (-0.04 - -0.02)*	*-0.03 (-0.04 - -0.02)*	*-0.02 (-0.03 - -0.01)*	*0.06 (0.04 - 0.07)*	*-0.03 (-0.05 - -0.01)*	-0.01 (-0.03 - 0.01)	*-0.03 (-0.06 - -0.01)*
Wave	High Qual: None	Tenure: Owned	Tenure: Rented	Tenure: Other	High Qual: None	Tenure: Owned	Tenure: Rented	Tenure: Other
3	*-0.03 (-0.03 - -0.02)*	*0.05 (0.05 - 0.06)*	*-0.08 (-0.09 - -0.07)*	*-0.01 (-0.02 - -0.00)*	-0.02 (-0.06 - 0.01)	*0.03 (0.01 - 0.04)*	*-0.04 (-0.06 - -0.02)*	-0.00 (-0.02 - 0.01)
4	*-0.05 (-0.05 - -0.04)*	*0.07 (0.06 - 0.07)*	*-0.10 (-0.11 - -0.10)*	-0.01 (-0.01 - 0.00)	-0.03 (-0.06 - 0.01)	*0.04 (0.02 - 0.05)*	*-0.06 (-0.08 - -0.03)*	-0.00 (-0.02 - 0.01)
5	*-0.06 (-0.06 - -0.05)*	*0.08 (0.07 - 0.08)*	*-0.12 (-0.12 - -0.11)*	*-0.01 (-0.02 - -0.00)*	-0.02 (-0.06 - 0.01)	*0.05 (0.03 - 0.06)*	*-0.07 (-0.09 - -0.05)*	0.00 (-0.02 - 0.02)
6	*-0.07 (-0.08 - -0.07)*	*0.09 (0.08 - 0.09)*	*-0.13 (-0.14 - -0.13)*	*-0.01 (-0.02 - -0.00)*	-0.02 (-0.06 - 0.01)	*0.05 (0.04 - 0.07)*	*-0.08 (-0.11 - -0.06)*	0.00 (-0.02 - 0.02)
7	*-0.09 (-0.09 - -0.08)*	*0.10 (0.09 - 0.10)*	*-0.15 (-0.15 - -0.14)*	*-0.02 (-0.02 - -0.01)*	-0.02 (-0.05 - 0.02)	*0.06 (0.05 - 0.08)*	*-0.10 (-0.12 - -0.08)*	0.00 (-0.02 - 0.02)
8	*-0.10 (-0.11 - -0.09)*	*0.11 (0.10 - 0.11)*	*-0.16 (-0.16 - -0.15)*	*-0.02 (-0.03 - -0.01)*	-0.02 (-0.06 - 0.01)	*0.07 (0.06 - 0.08)*	*-0.11 (-0.13 - -0.09)*	0.00 (-0.02 - 0.02)
9	*-0.11 (-0.12 - -0.11)*	*0.12 (0.11 - 0.12)*	*-0.18 (-0.18 - -0.17)*	*-0.02 (-0.02 - -0.01)*	*-0.04 (-0.07 - -0.01)*	*0.08 (0.07 - 0.09)*	*-0.12 (-0.14 - -0.10)*	-0.01 (-0.02 - 0.01)

Table A14: Covariate category CV_cs for the longitudinal UKHLS main survey and COVID-19 Study datasets. 95% CIs in brackets. Italics indicate significance.

	MAIN				COVID			
Wave	Sex: Male	Sex: Female	Ethnicity: No	Ethnicity: Yes	Sex: Male	Sex: Female	Ethnicity: No	Ethnicity: Yes
3	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.03)*	*0.05 (0.04 - 0.05)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.03)*
4	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.06 (0.05 - 0.06)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.01 (0.01 - 0.02)*	*0.03 (0.02 - 0.04)*
5	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.03 (0.03 - 0.03)*	*0.07 (0.06 - 0.07)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.02)*	*0.03 (0.02 - 0.04)*
6	*0.03 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.07 (0.06 - 0.08)*	*0.02 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.02)*	*0.04 (0.02 - 0.05)*
7	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.03 (0.03 - 0.04)*	*0.08 (0.07 - 0.09)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.03)*	*0.04 (0.03 - 0.05)*
8	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.04 (0.03 - 0.04)*	*0.08 (0.07 - 0.09)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.02 (0.02 - 0.03)*	*0.04 (0.03 - 0.06)*
9	*0.04 (0.03 - 0.05)*	*0.04 (0.03 - 0.05)*	*0.04 (0.03 - 0.04)*	*0.09 (0.08 - 0.10)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.05)*	*0.02 (0.02 - 0.03)*	*0.05 (0.03 - 0.06)*

Wave	Age: 16-19	Age: 20-24	Age: 25-34	Age: 35-44	Age: 16-19	Age: 20-24	Age: 25-34	Age: 35-44
3	*0.02 (0.01 - 0.02)*	*0.03 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.02)*
4	*0.03 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.03 (0.03 - 0.04)*	*0.03 (0.03 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.02 (0.02 - 0.03)*
5	*0.03 (0.03 - 0.04)*	*0.04 (0.03 - 0.04)*	*0.04 (0.04 - 0.05)*	*0.04 (0.03 - 0.04)*	*0.03 (0.02 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.04 (0.03 - 0.05)*	*0.03 (0.02 - 0.03)*
6	*0.04 (0.03 - 0.04)*	*0.04 (0.03 - 0.05)*	*0.05 (0.05 - 0.06)*	*0.04 (0.04 - 0.05)*	*0.03 (0.02 - 0.04)*	*0.04 (0.03 - 0.05)*	*0.04 (0.04 - 0.05)*	*0.03 (0.03 - 0.04)*
7	*0.04 (0.04 - 0.05)*	*0.04 (0.04 - 0.05)*	*0.05 (0.05 - 0.06)*	*0.05 (0.04 - 0.05)*	*0.03 (0.02 - 0.04)*	*0.04 (0.03 - 0.05)*	*0.05 (0.04 - 0.06)*	*0.04 (0.03 - 0.04)*
8	*0.04 (0.04 - 0.05)*	*0.04 (0.04 - 0.05)*	*0.06 (0.05 - 0.06)*	*0.05 (0.04 - 0.05)*	*0.03 (0.02 - 0.04)*	*0.04 (0.03 - 0.05)*	*0.05 (0.04 - 0.06)*	*0.03 (0.03 - 0.04)*
9	*0.05 (0.04 - 0.05)*	*0.04 (0.04 - 0.05)*	*0.06 (0.05 - 0.07)*	*0.05 (0.04 - 0.05)*	*0.03 (0.02 - 0.04)*	*0.05 (0.03 - 0.06)*	*0.05 (0.04 - 0.06)*	*0.04 (0.03 - 0.04)*

Wave	Age: 45-54	Age: 55-64	Age: 65+	Age: 45-54	Age: 55-64	Age: 65+
3	*0.03 (0.02 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.01 (0.01 - 0.01)*	*0.02 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.01 (0.00 - 0.01)*
4	*0.03 (0.03 - 0.04)*	*0.04 (0.03 - 0.05)*	*0.02 (0.01 - 0.02)*	*0.03 (0.03 - 0.04)*	*0.03 (0.03 - 0.04)*	*0.01 (0.00 - 0.01)*
5	*0.04 (0.03 - 0.05)*	*0.05 (0.04 - 0.06)*	*0.02 (0.02 - 0.03)*	*0.04 (0.03 - 0.04)*	*0.04 (0.04 - 0.05)*	*0.01 (0.01 - 0.02)*
6	*0.05 (0.04 - 0.05)*	*0.06 (0.05 - 0.07)*	*0.03 (0.02 - 0.03)*	*0.04 (0.04 - 0.05)*	*0.05 (0.04 - 0.06)*	*0.01 (0.01 - 0.02)*
7	*0.05 (0.04 - 0.06)*	*0.07 (0.06 - 0.08)*	*0.03 (0.03 - 0.04)*	*0.05 (0.04 - 0.06)*	*0.05 (0.04 - 0.06)*	*0.01 (0.01 - 0.02)*
8	*0.05 (0.04 - 0.06)*	*0.08 (0.07 - 0.09)*	*0.04 (0.04 - 0.05)*	*0.05 (0.04 - 0.06)*	*0.05 (0.04 - 0.06)*	*0.01 (0.01 - 0.02)*
9	*0.06 (0.05 - 0.06)*	*0.10 (0.08 - 0.11)*	*0.05 (0.05 - 0.06)*	*0.05 (0.04 - 0.06)*	*0.05 (0.04 - 0.06)*	*0.01 (0.01 - 0.02)*

Wave	Emp Stat: Emp, In Educ or Training	Emp Stat: Unemployed	Emp Stat: Retired	Emp Stat: Other	Emp Stat: Emp, In Educ or Training	Emp Stat: Unemployed	Emp Stat: Retired	Emp Stat: Other
3	*0.01 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.01)*	*0.00 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	0.00 (-0.00 - 0.01)	0.01 (-0.00 - 0.01)
4	*0.01 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.01)*	0.00 (-0.00 - 0.01)	*0.01 (0.00 - 0.01)*	0.01 (-0.00 - 0.02)	0.00 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)
5	0.01 (-0.00 - 0.01)	0.00 (-0.01 - 0.01)	0.01 (-0.00 - 0.01)	0.00 (-0.00 - 0.01)	0.00 (-0.01 - 0.02)	0.00 (-0.03 - 0.03)	0.00 (-0.01 - 0.02)	0.00 (-0.01 - 0.02)
6	0.00 (-0.00 - 0.01)	0.00 (-0.01 - 0.01)	0.01 (-0.00 - 0.01)	0.01 (-0.00 - 0.01)	0.01 (-0.00 - 0.02)	0.00 (-0.01 - 0.02)	0.01 (-0.00 - 0.02)	0.00 (-0.01 - 0.02)
7	0.00 (-0.00 - 0.01)	0.01 (-0.00 - 0.02)	0.00 (-0.01 - 0.01)	0.01 (-0.00 - 0.02)	*0.01 (0.00 - 0.02)*	0.01 (-0.00 - 0.02)	*0.01 (0.00 - 0.02)*	0.00 (-0.01 - 0.02)
8	0.01 (-0.00 - 0.01)	0.01 (-0.01 - 0.02)	0.00 (-0.02 - 0.03)	0.01 (-0.00 - 0.02)	*0.01 (0.00 - 0.02)*	0.01 (-0.01 - 0.02)	*0.01 (0.00 - 0.02)*	0.00 (-0.01 - 0.02)
9	0.01 (-0.00 - 0.02)	0.01 (-0.00 - 0.02)	0.00 (-0.01 - 0.02)	0.01 (-0.00 - 0.02)	*0.02 (0.01 - 0.03)*	0.01 (-0.00 - 0.03)	*0.02 (0.00 - 0.03)*	0.01 (-0.00 - 0.02)

Wave	HH Comp: 1 adult, no children	HH Comp: 1 adult, children	HH Comp: couple, no children	HH Comp: couple, children	HH Comp: 1 adult, no children	HH Comp: 1 adult, children	HH Comp: couple, no children	HH Comp: couple, children
3	*0.01 (0.01 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.01)*	*0.02 (0.02 - 0.03)*	*0.01 (0.00 - 0.01)*	0.01 (-0.00 - 0.01)	*0.02 (0.02 - 0.03)*	*0.01 (0.00 - 0.01)*
4	*0.01 (0.01 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.01 (0.00 - 0.01)*	0.01 (-0.00 - 0.02)	*0.03 (0.02 - 0.04)*	*0.01 (0.00 - 0.01)*
5	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.04 (0.03 - 0.05)*	*0.02 (0.01 - 0.02)*
6	*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.05 (0.04 - 0.06)*	*0.03 (0.02 - 0.04)*
7	*0.02 (0.01 - 0.03)*	0.01 (-0.00 - 0.01)	*0.02 (0.01 - 0.03)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.03)*	*0.06 (0.05 - 0.07)*	*0.04 (0.03 - 0.05)*
8	*0.03 (0.02 - 0.03)*	0.01 (-0.00 - 0.01)	*0.03 (0.02 - 0.04)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.02)*	*0.03 (0.01 - 0.04)*	*0.06 (0.05 - 0.07)*	*0.05 (0.04 - 0.06)*
9	*0.03 (0.02 - 0.04)*	0.01 (-0.00 - 0.01)	*0.03 (0.02 - 0.04)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.03 (0.01 - 0.04)*	*0.06 (0.05 - 0.07)*	*0.04 (0.03 - 0.06)*

Wave	HH Comp: 2+ adults, no children	HH Comp: 2+ adults, children	HH Comp: 2+ adults, no children	HH Comp: 2+ adults, children
3	*0.03 (0.02 - 0.04)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.02)*
4	*0.04 (0.03 - 0.04)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.02)*
5	*0.04 (0.03 - 0.05)*	*0.02 (0.01 - 0.02)*	*0.02 (0.02 - 0.03)*	*0.01 (0.00 - 0.02)*
6	*0.04 (0.03 - 0.05)*	*0.02 (0.01 - 0.03)*	*0.02 (0.02 - 0.03)*	*0.01 (0.01 - 0.02)*
7	*0.04 (0.03 - 0.05)*	*0.02 (0.01 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.01 (0.01 - 0.02)*
8	*0.04 (0.03 - 0.05)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.02)*
9	*0.04 (0.03 - 0.05)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.01 (0.01 - 0.02)*

Wave	Mar Stat: Single	Mar Stat: Married	Mar Stat: Separated/Divorced	Mar Stat: Widowed	Mar Stat: Single	Mar Stat: Married	Mar Stat: Separated/Divorced	Mar Stat: Widowed
3	*0.01 (0.00 - 0.01)*	*0.00 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.00 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.03)*
4	*0.01 (0.00 - 0.02)*	*0.00 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*
5	*0.01 (0.00 - 0.02)*	*0.00 (0.00 - 0.01)*	*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.03)*
6	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.02 (0.01 - 0.03)*	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.03)*
7	*0.01 (0.01 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.02)*	*0.01 (0.00 - 0.02)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.03)*
8	*0.02 (0.01 - 0.03)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.03)*	0.01 (-0.00 - 0.02)	0.01 (-0.00 - 0.01)	*0.01 (0.00 - 0.02)*	*0.02 (0.00 - 0.03)*
9	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.03)*	0.01 (-0.00 - 0.02)	0.01 (-0.00 - 0.01)	0.01 (-0.00 - 0.02)	*0.02 (0.00 - 0.03)*

Wave	High Qual: Degree	High Qual: A-Level	High Qual: GCSE	High Qual: Other	High Qual: Degree	High Qual: A-Level	High Qual: GCSE	High Qual: Other
3	*0.03 (0.02 - 0.03)*	*0.01 (0.01 - 0.02)*	*0.01 (0.01 - 0.01)*	*0.02 (0.01 - 0.02)*	*0.01 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.01 (0.01 - 0.01)*	*0.02 (0.02 - 0.03)*
4	*0.04 (0.04 - 0.05)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.01 (0.01 - 0.02)*	*0.03 (0.02 - 0.04)*
5	*0.05 (0.05 - 0.06)*	*0.02 (0.02 - 0.02)*	*0.02 (0.02 - 0.02)*	*0.02 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.02 (0.01 - 0.02)*	*0.04 (0.03 - 0.05)*
6	*0.07 (0.06 - 0.08)*	*0.02 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.02)*	*0.05 (0.04 - 0.06)*
7	*0.08 (0.07 - 0.09)*	*0.03 (0.02 - 0.03)*	*0.03 (0.02 - 0.03)*	*0.04 (0.03 - 0.05)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.02)*	*0.06 (0.05 - 0.07)*
8	*0.09 (0.08 - 0.10)*	*0.03 (0.02 - 0.03)*	*0.03 (0.03 - 0.03)*	*0.04 (0.03 - 0.05)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.02)*	*0.05 (0.04 - 0.07)*
9	*0.10 (0.09 - 0.11)*	*0.03 (0.03 - 0.03)*	*0.03 (0.03 - 0.04)*	*0.05 (0.04 - 0.06)*	*0.04 (0.03 - 0.05)*	*0.02 (0.01 - 0.03)*	*0.02 (0.01 - 0.02)*	*0.05 (0.04 - 0.07)*

Wave	High Qual: None	Tenure: Owned	Tenure: Rented	Tenure: Other	High Qual: None	Tenure: Owned	Tenure: Rented	Tenure: Other
3	*0.04 (0.03 - 0.04)*	*0.03 (0.02 - 0.03)*	*0.04 (0.03 - 0.04)*	*0.01 (0.00 - 0.02)*	*0.02 (0.01 - 0.03)*	*0.01 (0.00 - 0.01)*	*0.01 (0.00 - 0.02)*	0.01 (-0.01 - 0.02)
4	*0.05 (0.04 - 0.06)*	*0.04 (0.03 - 0.04)*	*0.05 (0.04 - 0.06)*	0.01 (-0.00 - 0.01)	*0.02 (0.02 - 0.03)*	*0.01 (0.00 - 0.02)*	*0.01 (0.01 - 0.02)*	0.00 (-0.01 - 0.02)
5	*0.06 (0.05 - 0.06)*	*0.04 (0.03 - 0.04)*	*0.05 (0.05 - 0.06)*	*0.01 (0.00 - 0.02)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.02)*	*0.02 (0.01 - 0.03)*	0.00 (-0.02 - 0.02)
6	*0.07 (0.06 - 0.08)*	*0.04 (0.04 - 0.05)*	*0.06 (0.05 - 0.07)*	*0.01 (0.00 - 0.02)*	*0.03 (0.02 - 0.04)*	*0.02 (0.01 - 0.03)*	*0.03 (0.02 - 0.04)*	0.00 (-0.03 - 0.03)
7	*0.08 (0.07 - 0.09)*	*0.05 (0.04 - 0.05)*	*0.07 (0.06 - 0.08)*	*0.02 (0.01 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.02 (0.02 - 0.03)*	*0.03 (0.02 - 0.04)*	0.00 (-0.02 - 0.03)
8	*0.09 (0.08 - 0.10)*	*0.05 (0.05 - 0.06)*	*0.08 (0.07 - 0.08)*	*0.02 (0.01 - 0.03)*	*0.03 (0.02 - 0.04)*	*0.03 (0.02 - 0.04)*	*0.04 (0.03 - 0.05)*	0.00 (-0.02 - 0.03)
9	*0.09 (0.08 - 0.10)*	*0.06 (0.05 - 0.07)*	*0.09 (0.08 - 0.10)*	*0.02 (0.00 - 0.03)*	*0.04 (0.03 - 0.06)*	*0.04 (0.03 - 0.04)*	*0.05 (0.04 - 0.06)*	0.01 (-0.01 - 0.03)

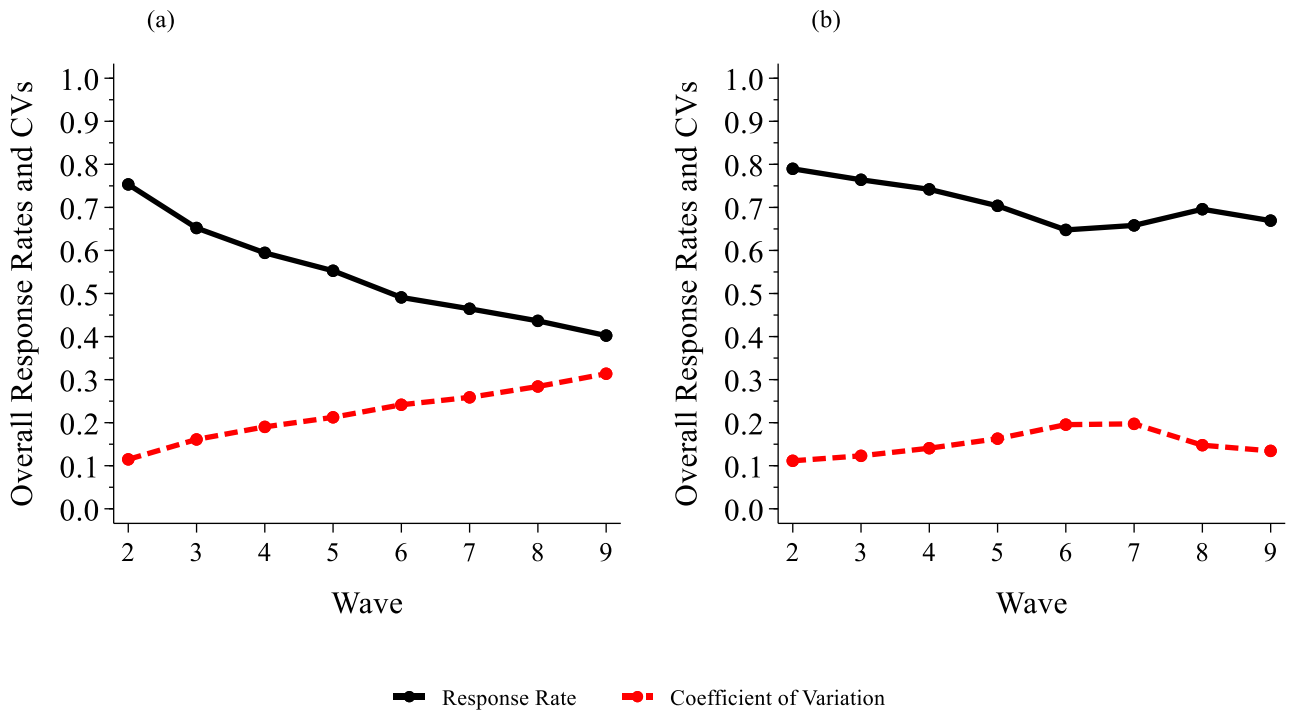

Figure A1: Response Rates and overall CVs for the a) UKHLS main survey; and b) COVID-19 Study cross-sectional datasets.

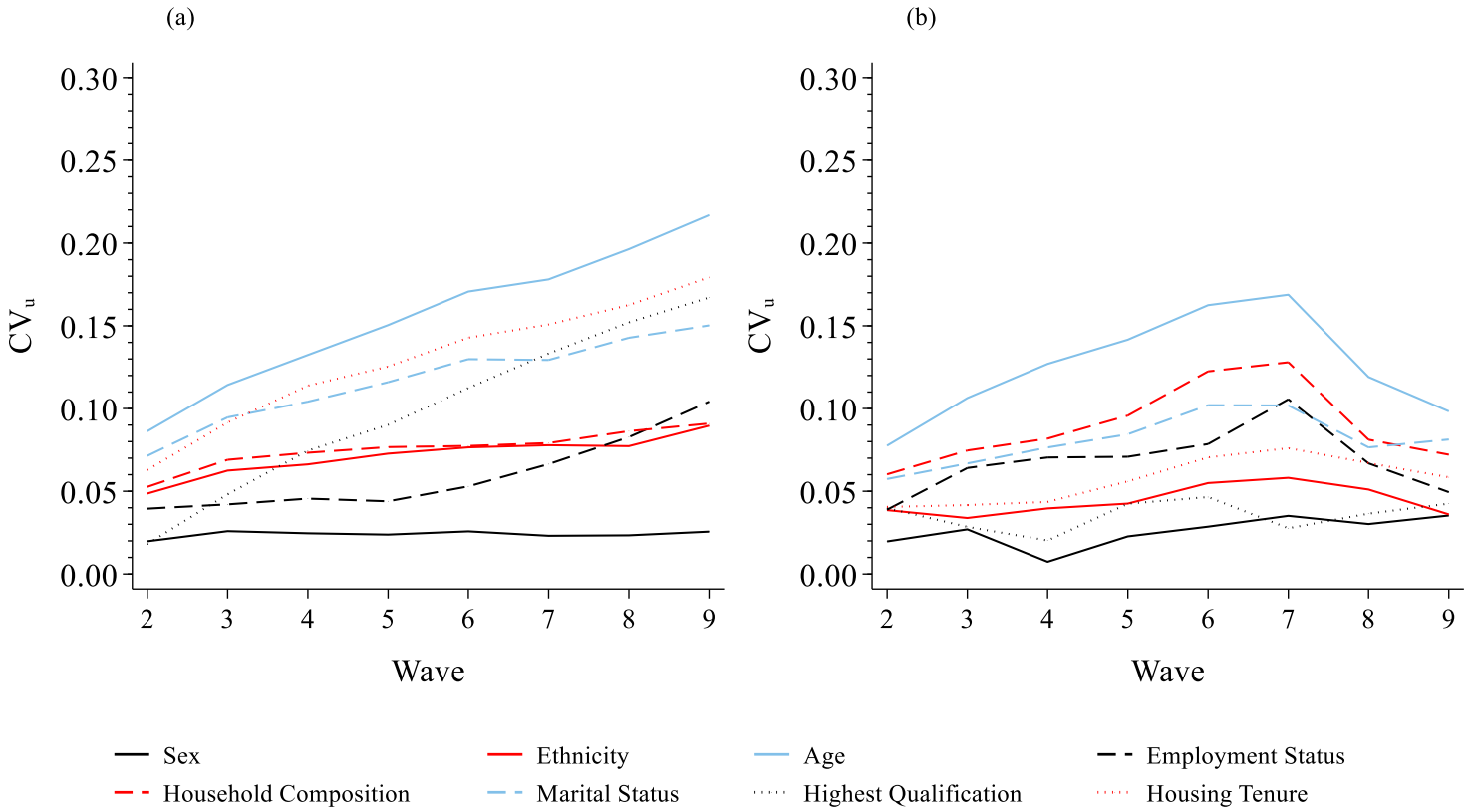

Figure A2: Covariate CV_us for the a) UKHLS main survey; and b) COVID-19 Study cross-sectional datasets.

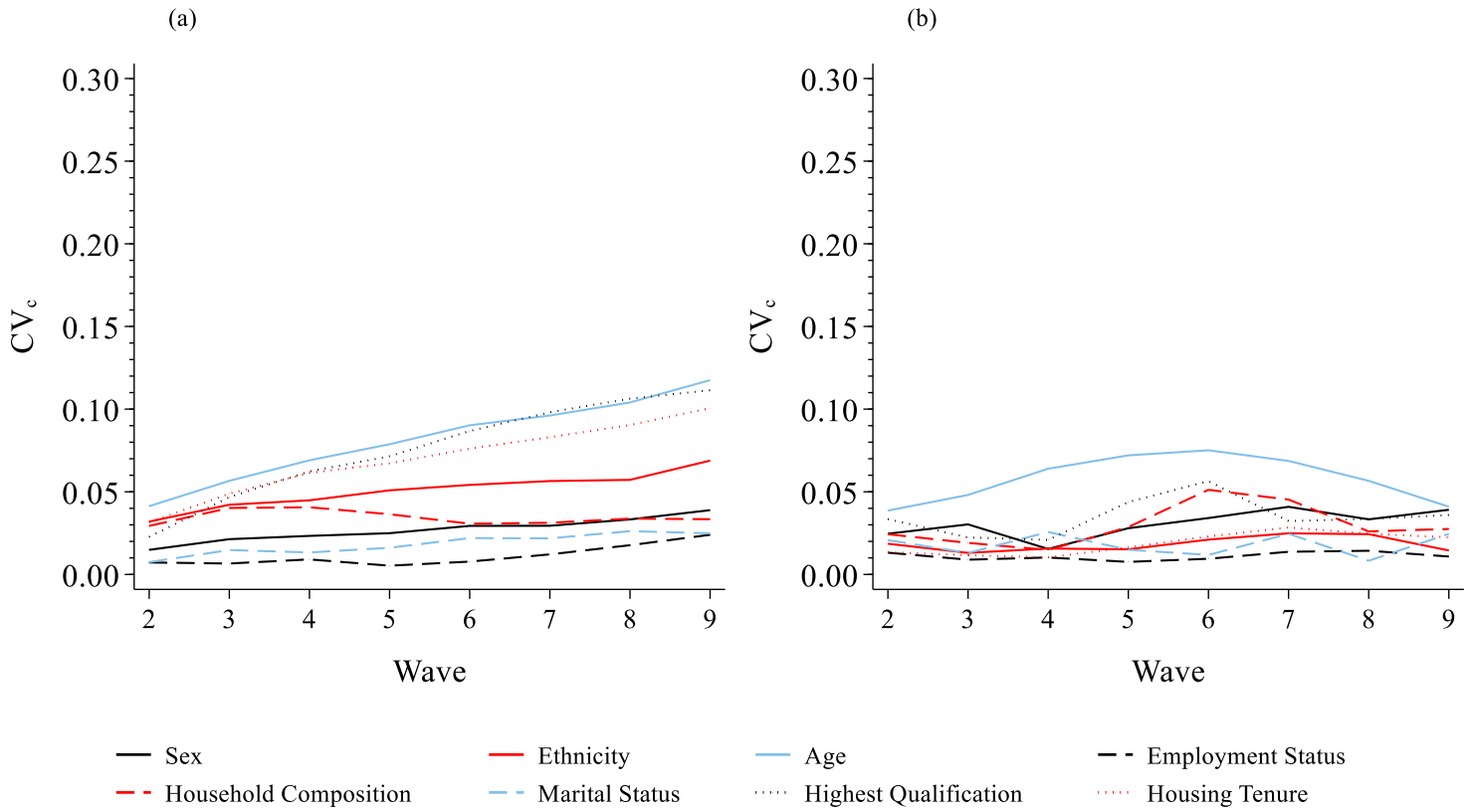

Figure A3: Covariate CV_cs for the a) UKHLS main survey; and b) COVID-19 Study cross-sectional datasets.

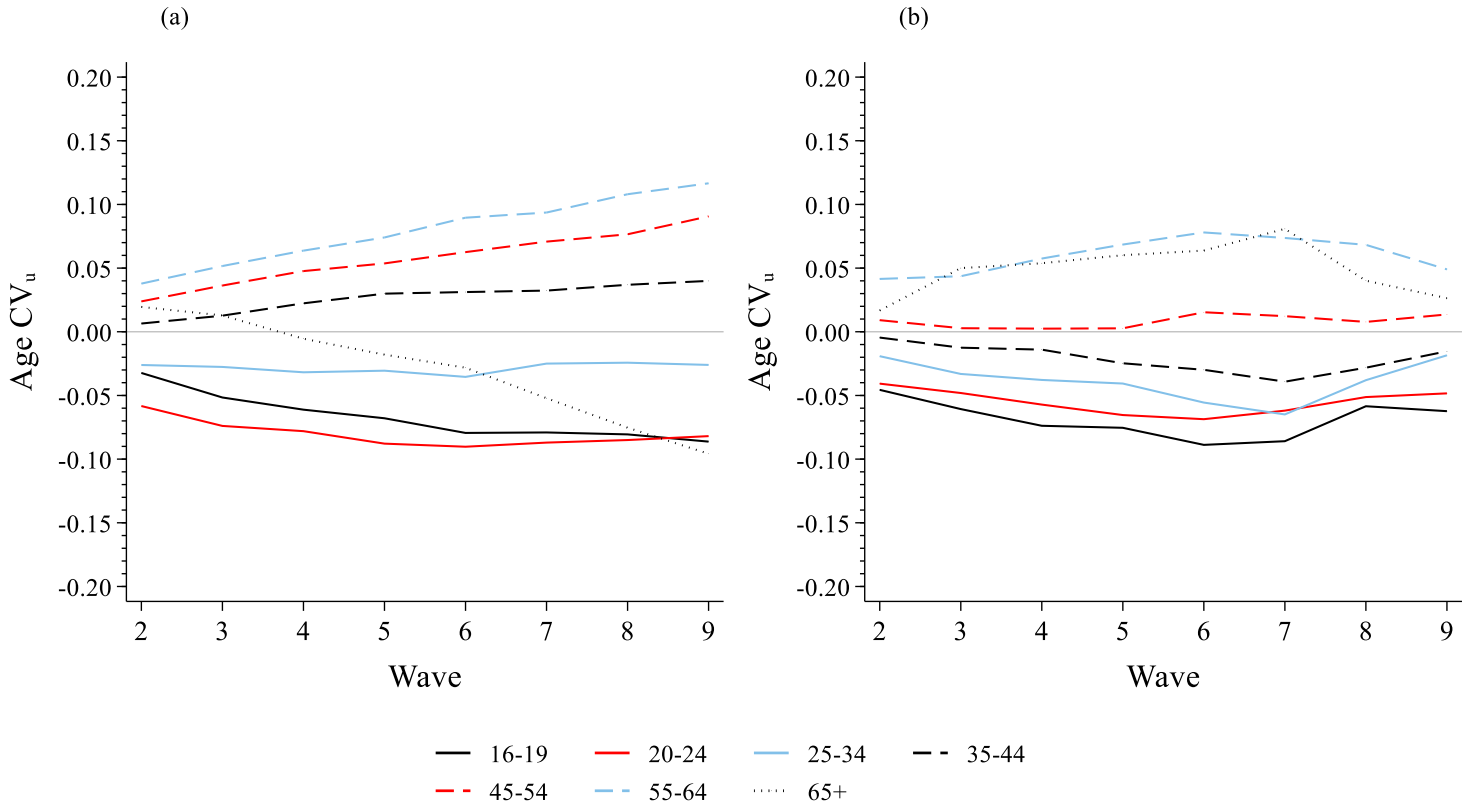

Figure A4: Age category CV_us for the a) UKHLS main survey; and b) COVID-19 Study cross-sectional datasets.

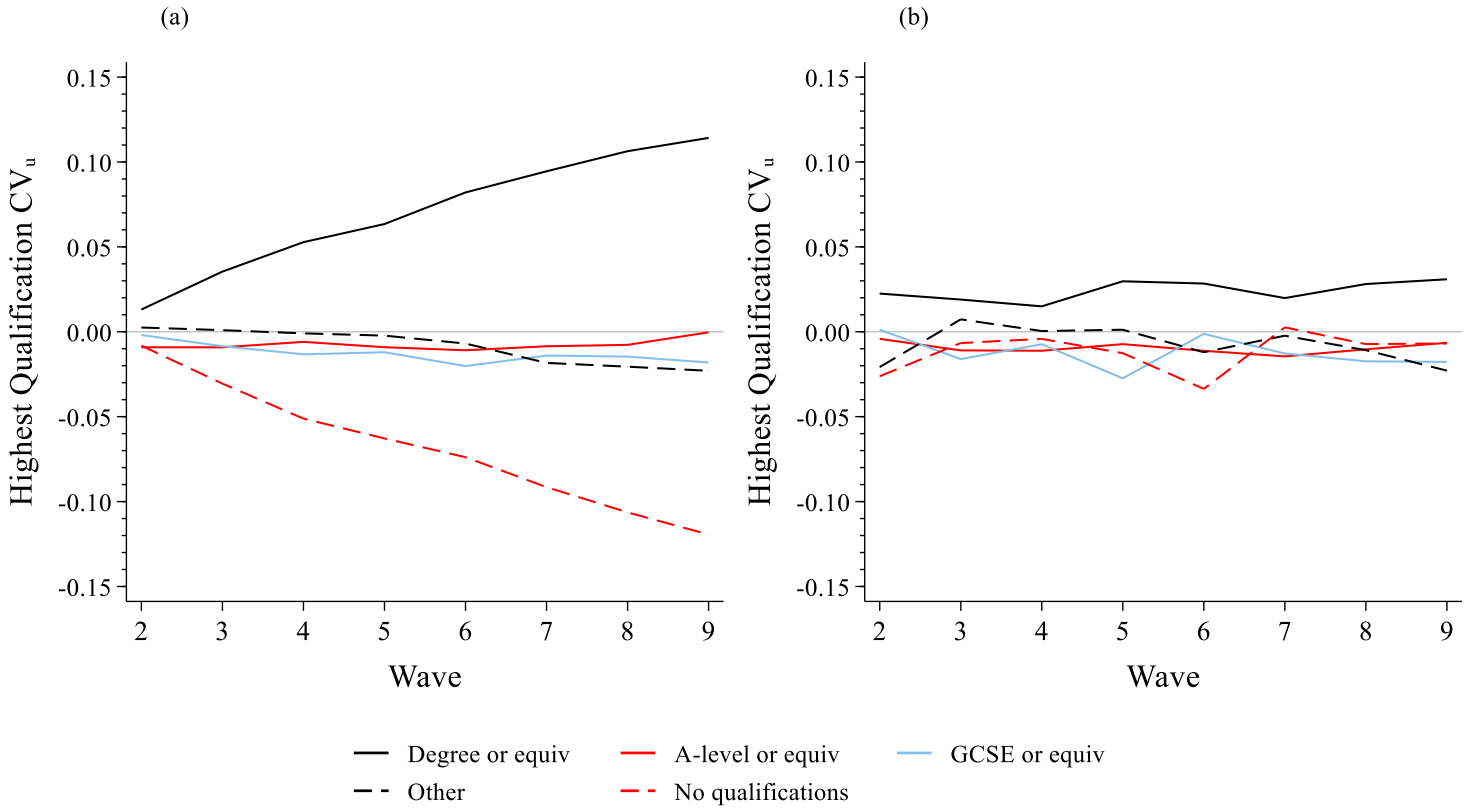

Figure A5: Highest Qualification category CV_us for the a) UKHLS main survey; and b) COVID-19 Study cross-sectional datasets.

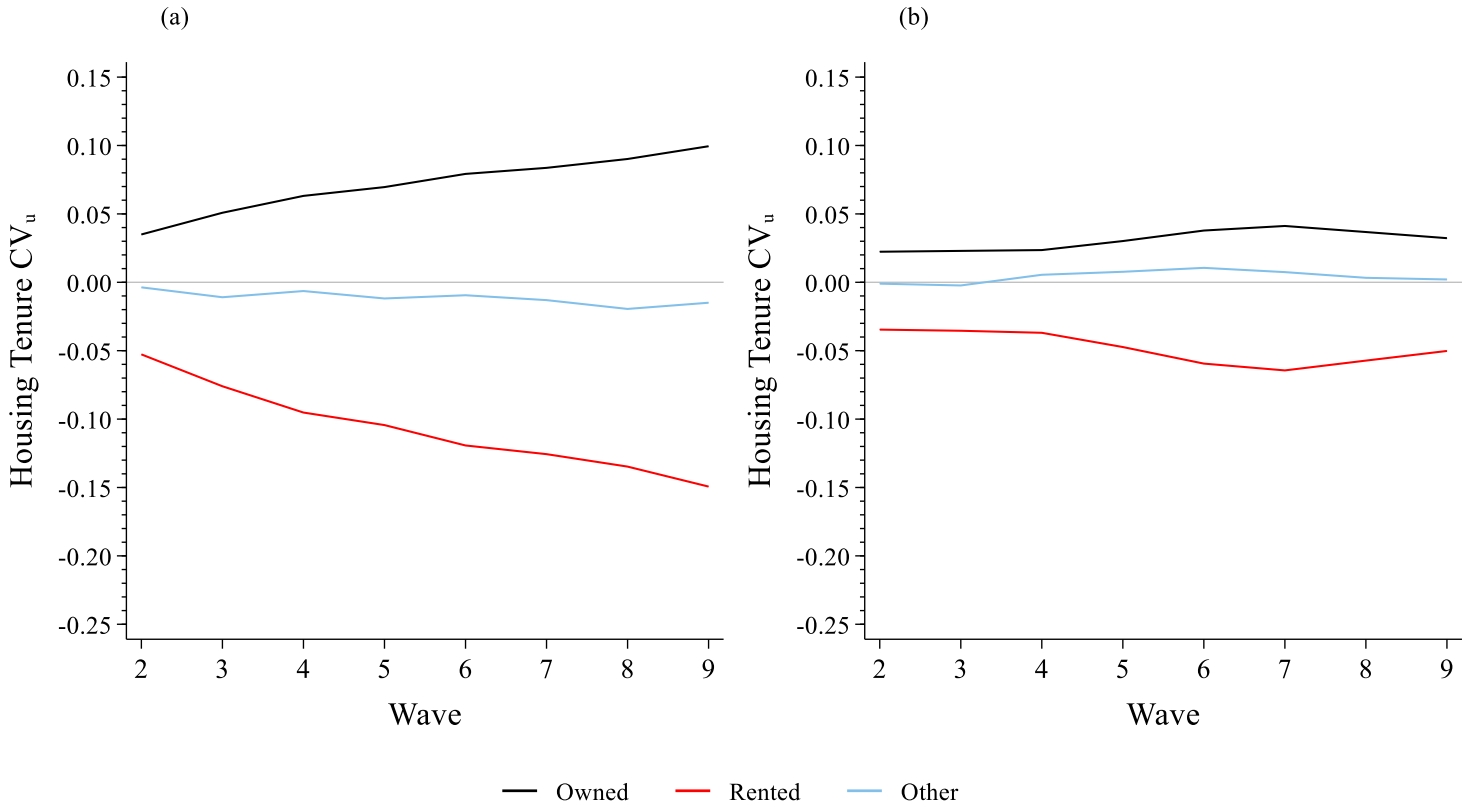

Figure A6: Housing Tenure category CV_us for the a) UKHLS main survey; and b) COVID-19 Study cross-sectional datasets.

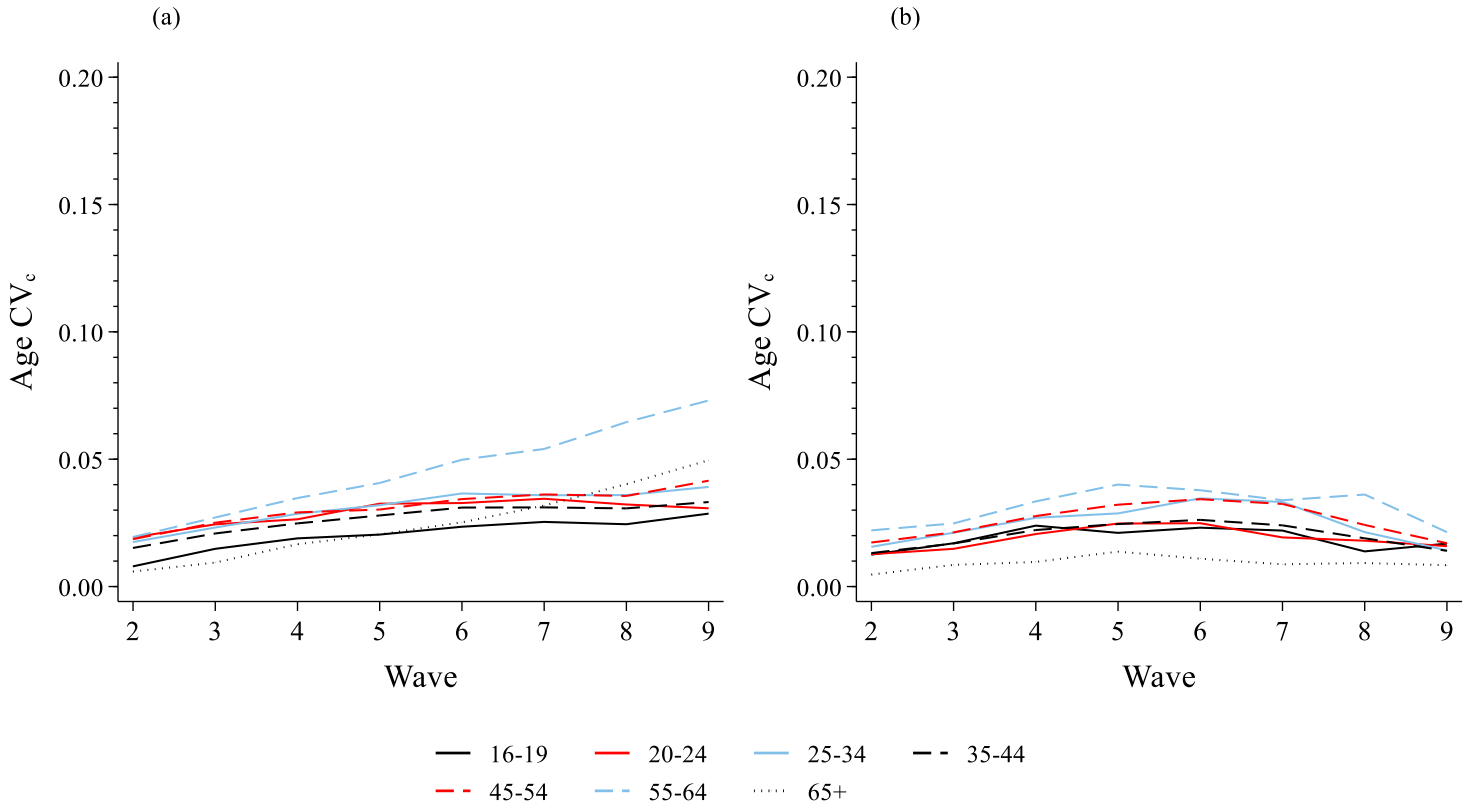

Figure A7: Age category CV_cs for the a) UKHLS main survey; and b) COVID-19 Study cross-sectional datasets.

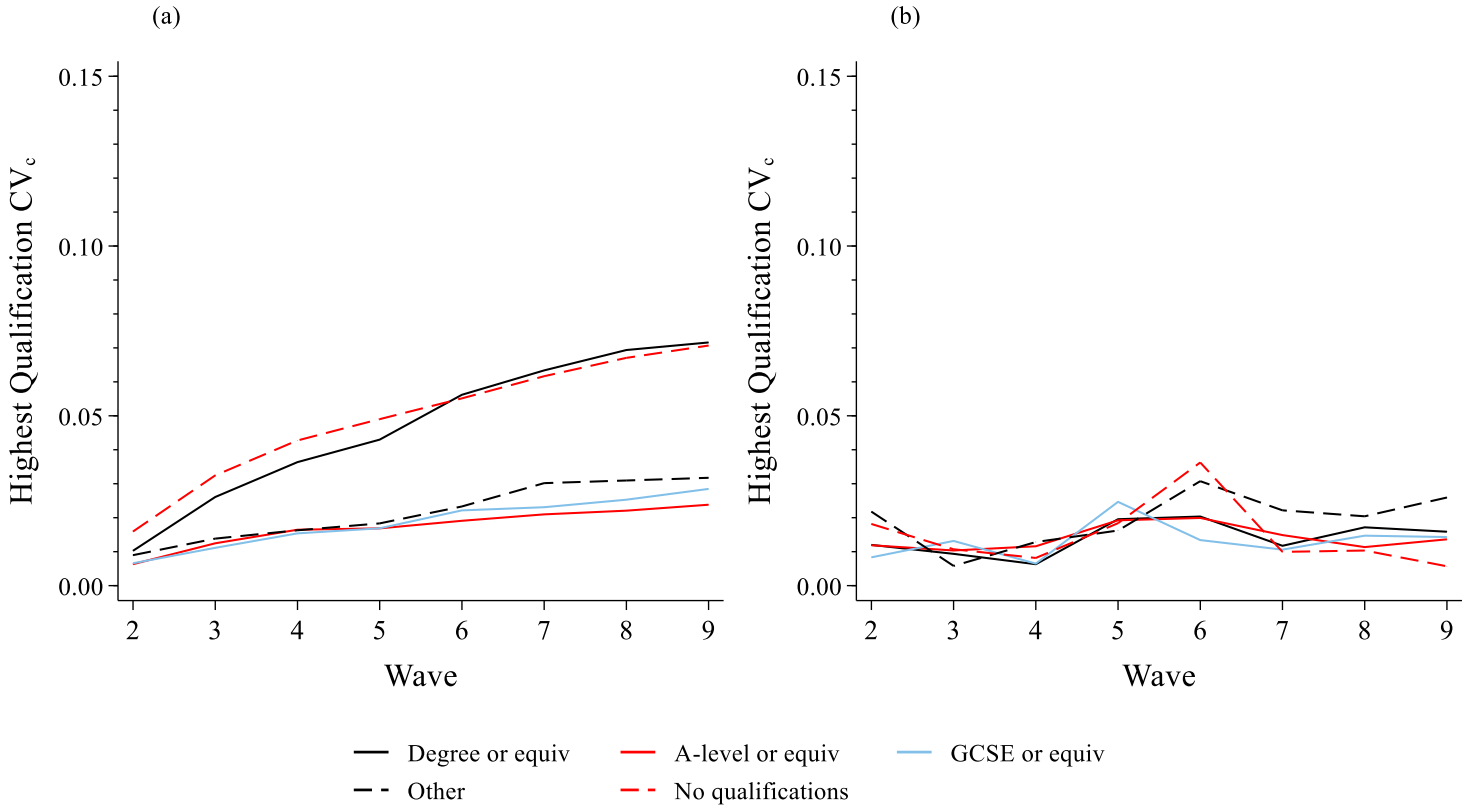

Figure A8: Highest Qualification category CV_cs for the a) UKHLS main survey; and b) COVID-19 Study cross-sectional datasets.

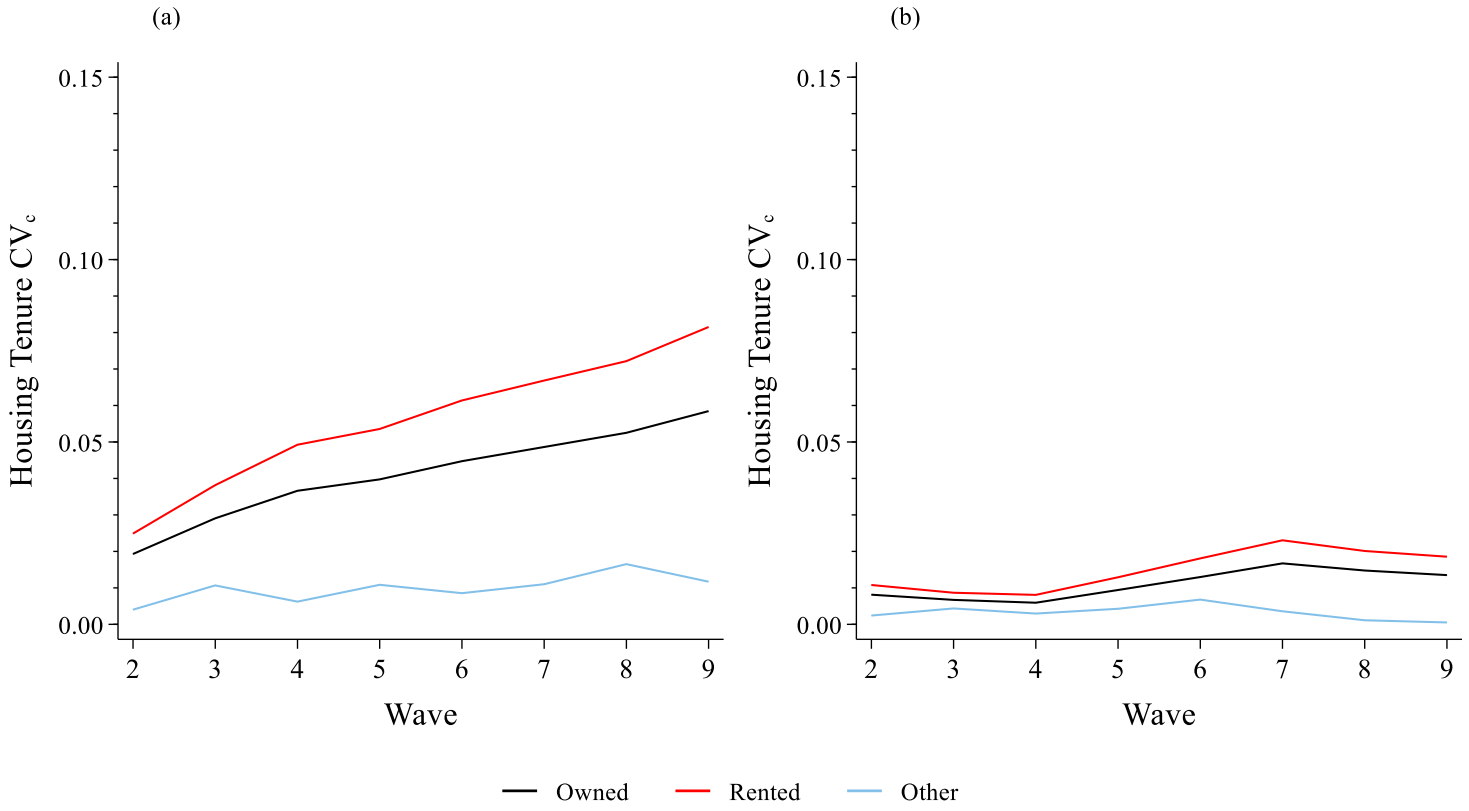

Figure A5: Housing Tenure category CV_cs for the a) UKHLS main survey; and b) COVID-19 Study cross-sectional datasets.