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**COVID-19 pandemic and panel attrition in
Understanding Society**

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Non-Technical Summary

In this working paper, we delve into *Understanding Society* response to the COVID-19 pandemic, focusing on how the pandemic and consequent changes in data collection methods affected the study response rates and sample composition. The analysis hinges on two main objectives: comparing sample attrition patterns before and after the onset of COVID-19, and evaluating the effectiveness of survey weights in maintaining the integrity of the sample profile.

The COVID-19 crisis was behind the suspension of face-to-face fieldwork in March 2020, which caused a shift of *Understanding Society* to a web and telephone mixed-mode design. Our attrition analysis reveals that, despite these changes, the response rates only slightly dropped compared to the trend before the pandemic. There were some exceptions where the response rates decreased above average during the pandemic. This was the case for older panel members, especially those ages 70 and over, those with a Pakistani ethnic background, panel members residing in Northern Ireland or the North West region, those retired, widowed, without qualifications, on low personal income, living in one-adult households and living in Local Authority housing.

Yet the sample profile remained almost unchanged between wave 10, with data collection prior to the pandemic, and waves 11 and 12. This consistency was observed when using the design weights, which do not correct for non-response and attrition, and when using the cross-sectional weights. Overall, the cross-sectional weight consistently addressed representation issues over time, such as the under-representation of males or younger adults. More specifically, the weights generally mitigated the changes observed in the sample profile due to non-response, such as the over-representation of people on higher incomes, with a university degree or owning their house outright.

COVID-19 pandemic and panel attrition in *Understanding Society*

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Abstract: This report presents some indicators of the representativeness of *Understanding Society* at waves 10, 11 and 12, which cover the period immediately before COVID-19 and the two years following the pandemic outbreak. The first objective of the paper is to analyse the response rates during this period in order to identify possible pandemic effects. The second objective of the paper is to assess the performance of cross-sectional weights to reduce any deviances in the sample profile that occurred during the pandemic. The results show that response rates slightly dropped, but the sample profile remained unchanged.

Keywords: panel attrition, sample composition, non-response bias, survey weights.

JEL classification: C81, C83.

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Executive Summary

1. Examination of response rates encompassing the period just prior to the COVID-19 pandemic (wave 10) and the subsequent two waves, which were partially impacted by the suspension of in-person interviews (waves 11 and 12), indicates a marginal decline in the conditional response rate from 87.4% in wave 10 to 86.1% in wave 11, and a slight increase in wave 12 (86.5%).
2. The decline in response rates was more pronounced among certain sample subgroups: older participants, particularly those aged 70 and above; individuals of Pakistani ethnic background, residents of Northern Ireland or the North West region, retirees, widowed individuals, those without formal qualifications, panel members with lower personal incomes, individuals in single-adult households, and those residing in Local Authority housing experienced a more substantial reduction in response rates.
3. The modest decline in response rates during the pandemic did not result in significant alterations in the sample demographic composition, which includes variables like sex, age, ethnic background, regional distribution, employment and marital status, as well as household type. Three exceptions were the disproportionate representation of individuals holding university degrees, those with higher personal incomes and those who owned their property outright, resulting from differential non-response. In these instances, the (cross-sectional) analysis weight provided to users effectively mitigated the extent of over-representation.
4. The cross-sectional weight has demonstrated efficacy in preserving the balance of the sample across the basic demographic variables – sex, age, and ethnicity – over an extended period that covers waves 1 to 12. The cross-sectional weight has been consistently successful in mitigating the effect of non-response and panel attrition, and during COVID-19, no distinct trends emerged, suggesting its sustained effectiveness throughout this period.

1. Introduction

This paper offers insights into the impact of panel attrition on the sample during the COVID-19 pandemic and assesses how effectively cross-sectional weights can restore the sample composition. The ultimate goal of this report is to provide evidence to data users about the possible impact of the pandemic on the sample composition of *Understanding Society* and the importance of using weights to adjust survey estimates.

Panel attrition, the failure of some sample members to continue participating in the study after the initial wave, negatively impacts data quality. On the one hand, the reduction in the sample size poses a threat to the longitudinal analyses that require the panel members to be observed at all waves. On the other hand, differential attrition – where certain sample members are more likely to drop out than others based on their characteristics – might bias survey estimates. COVID-19 had severe implications for data collection, the most important being the suspension of face-to-face fieldwork, which for *Understanding Society* translated into a shift to a web and telephone mixed-mode sequential design. The first objective of this working paper is to compare response rates of wave 10, immediately before COVID-19, to waves 11 and 12, whose data collection partly occurred during the pandemic.

Survey weights can reduce the level of bias in survey estimates arising from non-response and attrition. Understanding Society invests considerable effort into producing weights for users that adjust for the effects of each component of non-response (each wave and each instrument) based on relationships to a wide range of covariates, consisting mainly of survey measures collected previously. In this paper, we analyse how the individual cross-sectional weights can help mitigate the bias introduced by the differential response propensities on the sample profile, focusing on waves 10, 11 and 12. The analysis compares the trend of the unweighted and weighted estimates for a set of demographic variables. Our findings show that the effectiveness of weights in adjusting survey estimates, evident in wave 10 prior to the pandemic, persists in the post-pandemic waves. The analysis also documents the evolution of the sample profile, comparing the cross-sectional unadjusted estimates and the estimates weighted by the cross-sectional weight, which corrects for non-response and attrition.

This report builds upon previous research on the representativeness of *Understanding Society* and the influence of the COVID-19 pandemic. Cabrera-Álvarez, Burton and Lynn (2021) compared response rates and sample profiles from the year preceding the pandemic and after the cessation of face-to-face fieldwork in the United Kingdom in March 2020. The results

showed a decrease in the response rate of 1.5 percentage points (p.p.) and negligible differences in the sample profile. More recently, Cabrera-Álvarez et al. (2023) examined the impact of panel attrition on the General Population Sample up to wave 11 (2019-21) in order to evaluate the effect of the COVID-19 pandemic. This paper also included an analysis of attrition in the Immigration and Ethnic Minority Boost (IEMB) sample and an assessment of the effectiveness of survey weights to restore the sample profile. This analysis found that the eldest age group (70 and over) had higher levels of attrition during the COVID-19 pandemic. This report adds novel indicators to the analysis of the impact of COVID-19 on response rates and the performance of survey weights before and after the pandemic using data from waves 10, 11 and 12.

In the subsequent section, we detail the analytical methodology employed to calculate the response rates and assess the performance of the cross-sectional weights. Following this, a comprehensive summary of the findings is provided, with the full suite of data tables included in the annexes for detailed reference.

2. Methods

The analyses presented in this paper pursue a twofold objective: 1) to describe attrition patterns before and after the start of the COVID-19 pandemic for the full sample and the subgroups defined by a set of demographic variables, and 2) to assess the performance of cross-sectional survey weights in the waves prior and after the COVID-19 pandemic to restore the sample profile. In this section, we first provide an overview of how *Understanding Society* adapted to the COVID-19 pandemic. Then, we present the methodology employed in calculating the response rates used in the attrition analysis, followed by an explanation of the approach used to evaluate the performance of the cross-sectional weights.

Understanding Society during the COVID-19 pandemic

In March 2020, the spread of COVID-19 caused the decree of a general lockdown and the suspension of all face-to-face fieldwork in the United Kingdom. At that point, ten monthly samples corresponding to waves 10, 11 and 12 were in the field, as shown in Figure 1. In total, 1.4% of wave 10 individual interviews took place after the suspension of face-to-face fieldwork due to the pandemic, while this percentage was 34.8% in wave 11 and 89.0% in wave 12.

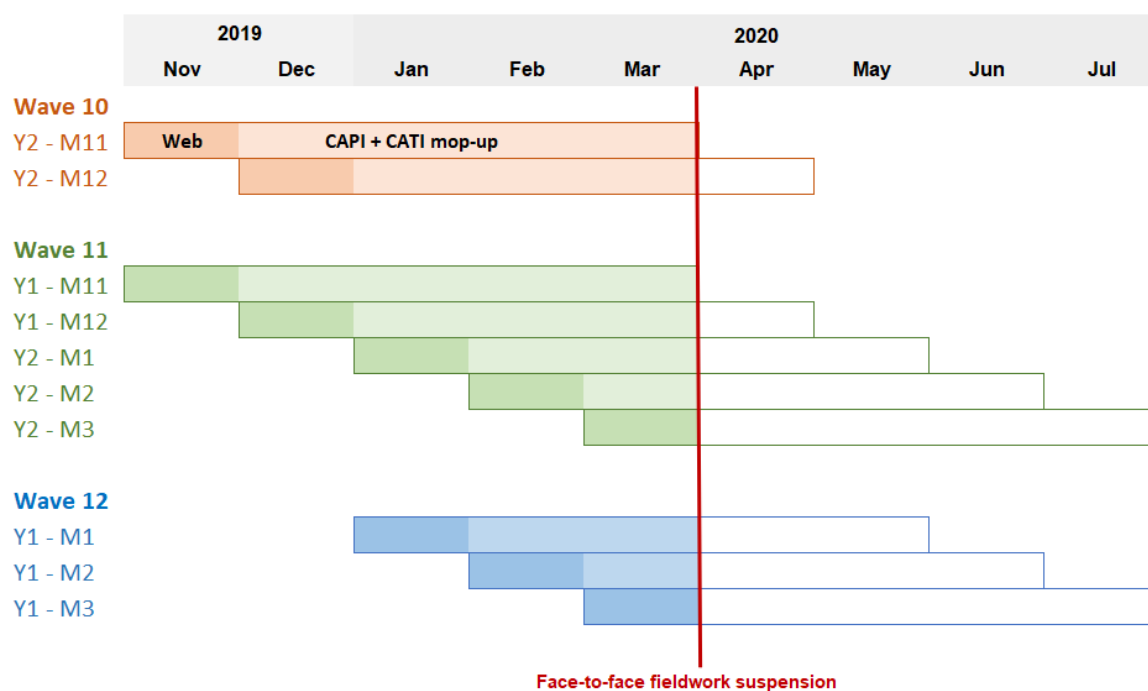


Figure 1. Diagram of Understanding Society monthly sample status when face-to-face fieldwork was suspended

When face-to-face interviews were no longer viable, *Understanding Society* shifted to a web and CATI sequential mixed-mode design. This adaptation drew on years of experience accumulated in managing mixed-mode surveys. *Understanding Society* started as a mainly face-to-face survey, with a few outstanding cases being mopped up on the telephone. Since wave 7, an increasing number of households were transferred to a web and CAPI sequential mixed-mode design, which paved the way for a smoother mode transition when the pandemic hit. At that point, three fieldwork protocols co-existed in *Understanding Society*. The web-first protocol, covering 70% of the households, combined web and CAPI sequentially. The CAPI-first protocol included 10% of households being predicted a low propensity of completing the survey online, and was issued to CAPI in the first place. Finally, a 20% random sample of households was issued to CAPI-only, being consistent with the mode design employed in waves 1 to 6. This mode transition could have affected response propensities, especially of subgroups more reluctant to complete the survey online. For a more detailed explanation of how *Understanding Society* adapted to the COVID-19 pandemic, see Burton et al. (2020).

Attrition analysis

The main objective of the attrition analysis is to provide some new indicators of whether the pandemic and the shift to a web and telephone mixed-mode design affected the attrition of the sample. To address this objective, we compare the wave 10 response rate, whose fieldwork took place almost entirely before COVID-19, with waves 11 and 12, whose data collection occurred partially during the pandemic. The following paragraphs describe the methodological decisions underpinning the wave response rate calculations.

The response rate calculation is a fraction with two components that need to be defined: the denominator, which corresponds to the number of eligible sample members, and the numerator, which is the number of panel members responding to the survey in a given wave. Regarding the numerator, we define respondents as panel members completing the adult questionnaire and those for whom a proxy response is obtained from another household member.

Regarding the base for the calculation, the denominator of the rate, we consider all adults responding to the previous wave individual interview (including proxies) and eligible for an interview in the current wave, who were original sample members, i.e. they were selected in one of the original samples of *Understanding Society* or were born to a mother initially selected. The main implication of this decision is that the response rates for each wave have slightly different bases as we are calculating the response rate conditional on the response to the previous wave. A complication arises when, between waves, panel members cease to be eligible for the survey, i.e. if they relocate abroad or die. In some instances, these changes in eligibility are detected by the interviewers or reported by other household members. However, in other cases, the death (or the change of residence abroad) will remain undetected and be misclassified as a non-respondent, resulting in an underestimation of the response rate. In this analysis, to partly address this issue, we used data from death registrations (Kaminska, 2021).

The analysis provides the response rate for the respondents to the previous wave as well as some sample subgroups delineated by a selection of demographic variables. To ensure consistency in comparisons across different waves, wave 9 measures of these demographic characteristics are used in the analysis with two exceptions. First, we adjusted the variable age to capture the age increase from one wave to the following. Since we use a grouped version of the variable age, this adjustment only affects those who transitioned from one age group to the following one in subsequent waves. Second, in some instances, the cases included in the calculations of the different response rates had not responded to wave 9. To incorporate these

cases in the subgroup analysis, we imputed their demographic information from the earliest available data, either from wave 10 or 11

It is important to note that the response rates presented are estimates based on the sample and, therefore, subject to sampling error. Consequently, minor discrepancies between two response rates may not be meaningful.

Cross-sectional weights to adjust the sample profile

In this working paper, we provide key indicators that assess the efficacy of cross-sectional weights in reinstating the sample profile. This has been achieved through two distinct analyses: first, an evaluation of the impact of (cross-sectional) weights on demographic characteristic estimates in waves 10, 11, and 12, and second, a comparison of adjusted and unadjusted trends in the estimates for sample subgroups defined by sex, age, and ethnic background through waves 1 to 12.

In the first part of the analysis, we computed the distribution of various demographic variables utilising two approaches. The first approach ("Unadjusted¹") uses the design weight, which accounts for unequal probabilities of being selected in any of the samples that form *Understanding Society* but does not adjust non-response or attrition. This weight covers all the samples that were part of *Understanding Society* in the period under study and allows us to evaluate the impact of non-response and attrition in the analysis samples of waves 10, 11 and 12. The second approach employs the cross-sectional weight ("Adjusted²"), in which the design weight has been adjusted to account for each subsequent stage of non-response and attrition. The purpose of comparing the unadjusted and adjusted estimates across waves 10 to 12 is to evaluate the extent to which COVID-19 influenced the sample composition and the ability of the cross-sectional weight to adjust for any effects.

¹ The unadjusted estimates use the selection weight (psnenui_xd) which corrects for the unequal selection probabilities of the individuals included in the samples that formed Understanding Society between waves 6 (2014-16) and 13 (2021-23) (i.e., General Population Sample, Ethnic Minority Boost, Immigration and Ethnic Minority Boost, and the British Household Panel Survey samples). We used a weight-shared method within the household to reduce the number of panel members without a selection weight (Lavallée, 2007).

² We used the cross-sectional weight included in the released datasets (i.e., j_indpxui_xw, k_indpxui_xw and l_indpxui_xw). This weight is derived from the longitudinal weight and adjusts the cross-sectional sample of adults living in the United Kingdom for non-response and attrition. This weight covers sample members that were initially recruited in the study or born to mothers that were part of the initial sample as well as new sample members that joined the households at later waves.

In the second part, we broaden the scope of our initial analysis to encompass data from waves 1 (2009-11) through 12 (2020-22), focusing on three demographic variables: sex, age and ethnic background. This extended analysis puts the potential effects of the COVID-19 pandemic and the efficacy of cross-sectional weights into a broader context. We present this analysis graphically, comparing two sets of estimates – "Unadjusted³" and "Adjusted" – for each sample subgroup.

Several key considerations must be kept in mind while interpreting the findings of this analysis. First, due to the longitudinal nature of *Understanding Society*, the analysis does not encompass immigrants who settled in the country post-2014, after the recruitment of the IEMB sample in wave 6. Second, since the survey estimates are not compared to population figures or benchmark estimates, observed differences between unadjusted and adjusted estimates may not necessarily reflect a genuine reduction in bias. Third, population characteristics are subject to change over time, so some discrepancies in the estimates from one wave to another are anticipated, even after adjusting for non-response. Fourth, we present these survey estimates alongside their 95% confidence intervals, providing a statistical context for readers to consider the inherent uncertainty in the results.

³ The design weight used in this analysis varies across waves. For wave 1 we used the selection weight that covers the General Population Sample and the Ethnic Minority Boost sample (psnenu_xd). For waves 2 to 5 we used the selection weight that incorporates the British Household Panel Survey samples (psnenub_xd). From wave 6 onwards, we used the selection weight (psnenui_xd) that corrects for the unequal selection probabilities of all the samples that form *Understanding Society*. The wave 6 selection weight is under development and it is not yet part of the weights released through the UK Data Archive. We used a weightshared method within the household to reduce the number of panel members without a selection weight (Lavallée, 2007).

3. Results

In this section, we first present the evolution of attrition right before and during the COVID-19 crisis. Then, we assess to what extent the changes in response rates during the pandemic changed the sample composition and whether the cross-sectional weights can mitigate these deviances.

Panel Attrition during the COVID-19 pandemic

Table 1 showcases the conditional response rates for waves 10, 11 and 12, covering the entire sample of respondents from the preceding wave and various subgroups defined by sex, age, and ethnic background. In wave 10, 87.4% of the previous wave respondents completed the individual interview, either directly or through a proxy. This rate experienced a marginal dip in wave 11, dropping to 86.1%, but showed a slight increase in wave 12, reaching 86.5%.

We also observed a modest decline in response rates across both male and female respondents and in most age groups. Nevertheless, the oldest age group (70+) showed a significant decrease, with response rates falling from 91.1% in wave 10 to 88.5% and 86.3% in waves 11 and 12, respectively. This reduction could be partially attributed to undetected mortality, as this change in eligibility status is more common in this age group. Regarding the groups defined by ethnic background, Pakistani panel members exhibited a marked decrease in response rate in the period under scrutiny, declining from 77.7% in wave 10 to 73.1% in wave 11 and further to 72.0% in wave 12.

Regarding the response rates segmented by General Office Region (Table 3), the residents in two regions, North West and Northern Ireland, experienced a more pronounced decline than the average. For panel members residing in the North West, there was a decrease of 5.8 p.p. in the response rate from wave 10 to wave 12. Similarly, in Northern Ireland, the response rate saw a reduction of 5.5 p.p.

Examining the response rates by employment status (Table 4), we observe a drop in the response rate of retirees. This trend may be linked to the fact that many in this group belong to the age bracket of 70 and above, which experienced the most substantial decline in response rates. Specifically, the rate for retirees fell by 4.0 percentage points, from 92.2% in wave 10 to 88.2% in wave 12. Similarly, when analysing response rates by marital status (Table 5), we observe that widowed panel members exhibit the largest reduction in response rates during the period examined, decreasing from 89.9% in wave 10 to 84.8% in wave 12.

Panel members with lower educational qualifications (Table 6) experienced the most significant decline in response rates. Specifically, those without qualifications had a response rate of 86.3% in wave 10, which decreased by 6.6 percentage points to 79.7% in wave 12. In a similar vein, panel members with a lower level of personal income – below £1,200 per month – (Table 9) show an above-average drop in response rates, although the decrease for these groups was only around 2.0 p.p.

The response rates across different household types (Table 7) are relatively stable, with the exception of single-person households, which show a slightly higher-than-average decline in response rate – a 2.7 p.p. decrease when comparing waves 10 and 12. Moreover, panel members residing in local authority housing experienced a more pronounced reduction in response rate, dropping from 84.0% in wave 10 to 78.4% in wave 12.

Table 1. Wave Response Rate: Sex, Age and Ethnic Background

		Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
Full sample		87.4	86.1	86.5
	Base	32,254	30,794	28,688
Sex	Male	86.6	85.4	85.3
	Female	88.0	86.7	87.4
	Base	32,254	30,793	28,688
Age	16-19	79.0	77.6	77.5
	20-29	78.5	77.6	79.8
	30-39	84.8	83.7	84.2
	40-49	86.8	85.7	85.9
	50-59	90.0	88.6	89.2
	60-69	92.8	91.7	91.9
	70+	91.1	88.5	86.3
	Base	32,253	30,791	28,687
Ethnic group	White	89.5	88.0	88.3
	Black	76.5	75.1	75.9
	Indian	80.5	83.1	81.2
	Pakistani	77.7	73.1	72.0
	Bangladeshi	78.9	78.8	75.1
	Other Asian	81.4	79.6	84.0
	Mixed	80.9	78.9	84.2
	Other	77.4	80.7	78.0
	Base	32,232	30,774	28,676

Cross-sectional weights performance

Table 2 displays the demographic profile of individuals who participated in the adult interviews (aged 16 and older) during waves 10, 11, and 12. The table presents the unadjusted estimates (unadjusted panel), which accounts for the inclusion probabilities, and the adjusted estimates (adjusted panel), which uses the cross-sectional weight to correct for non-response and panel attrition. The analysis of the unadjusted sample profile by sex reveals that the composition remains consistently stable across waves 10, 11, and 12: the proportion of male respondents is 45.0% in wave 10, marginally decreasing to 44.6% in wave 11, and then to 44.1% in wave 12, amounting to a slight shift of only 0.9 percentage points. The application of the cross-sectional weight effectively counteracts the overrepresentation of female respondents, although we observe no meaningful differences when comparing wave 10 with data collected almost entirely before the pandemic and waves 11 and 12.

The analysis reveals a consistent trend in terms of age distribution: the demographic makeup of the waves impacted by the pandemic closely mirrors that of the pre-COVID-19 era, as seen in wave 10. This pattern holds even for the oldest cohort, those aged 70 and above, who, as previously noted, faced a more significant decline in response rates compared to other age groups. Despite this, the percentage associated with this group slightly increased in waves 11 and 12, in both the unadjusted and the adjusted estimates. This apparent contradiction can be explained by the comparatively higher response rates of the oldest age group despite the observed downturn in waves 11 and 12. The distribution of ethnic background has not changed meaningfully between waves 10 and 12.

Annex B extends this analysis to additional variables. There are several instances where the cross-sectional weights effectively adjusted the sample composition. The weights were effective in mitigating the overrepresentation of individuals with a university degree, those who own their property outright, and those earning a monthly gross income above £2,600. The proportion of panel members with a university degree (Table 13) surged by 2.6 percentage points from wave 10 to 12 in the unadjusted data. However, this increase was more limited, at 1.8 percentage points, when the cross-sectional weight was applied. The percentage of those owning their property outright (Table 15) increased by 3.8 percentage points between waves 10 and 12, however this rise slightly decreased to 3.2 points when the non-response weight was applied. Similarly, panel members with personal incomes of £2,600 or more (Table 16) accounted for 22.3% in wave 10 and 24.4% in wave 12, a growth of 2.1 percentage points. Yet,

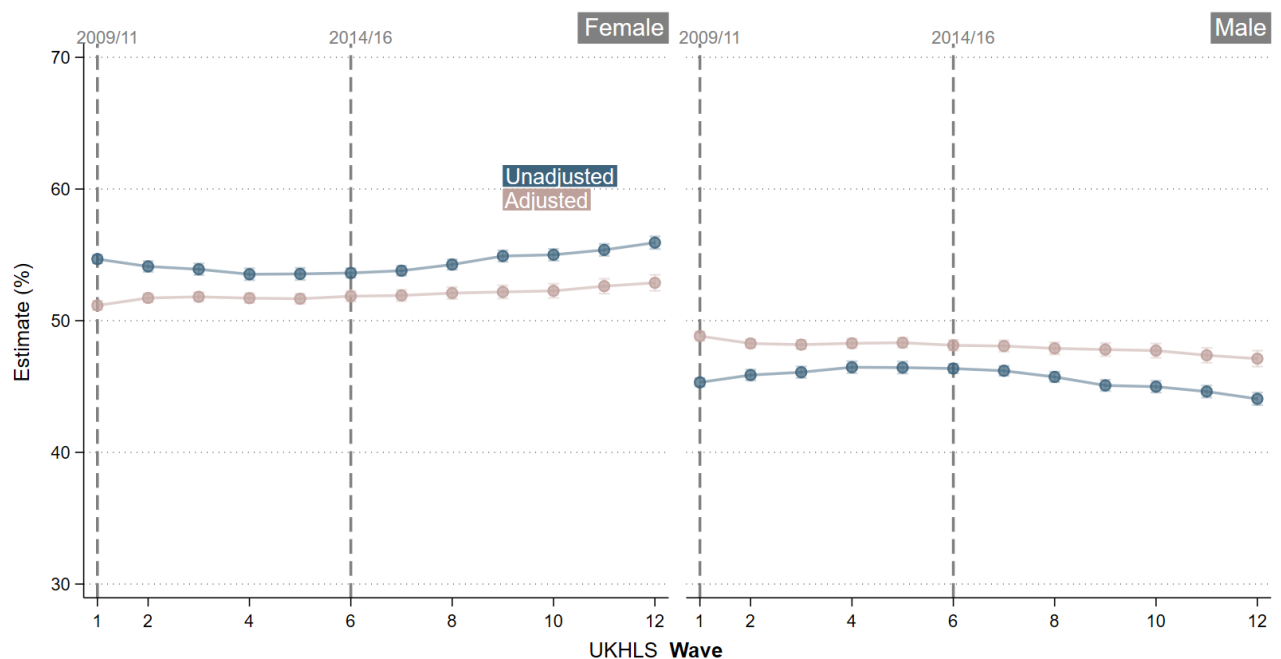
this rise was moderated to just 1.3 percentage points with the application of cross-sectional weight. For the other characteristics examined, no significant variations were observed in their distribution pre- and post-pandemic, suggesting that the potential impact of the pandemic and changes in data collection methods may have been minimal.

Table 2. Cross-Sectional Estimates and Standard Errors Unadjusted and Adjusted: Sex, Age, and Ethnic Background

		Unadjusted			Adjusted		
		Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
Sex	Male	45.0	44.6	44.1	47.7	47.4	47.1
		(0.23)	(0.24)	(0.25)	(0.28)	(0.29)	(0.32)
	Female	55.0	55.4	55.9	52.3	52.6	52.9
		(0.23)	(0.24)	(0.25)	(0.28)	(0.29)	(0.32)
	Base (Unweighted)	31,062	28,932	26,418	31,062	28,932	26,418
Age	16-19	5.4	5.0	4.7	6.2	5.8	5.5
		(0.15)	(0.15)	(0.15)	(0.20)	(0.21)	(0.19)
	20-29	9.7	10.2	10.3	13.7	13.5	13.6
		(0.21)	(0.23)	(0.23)	(0.32)	(0.32)	(0.34)
	30-39	9.3	8.5	7.8	13.2	12.6	12.1
		(0.21)	(0.20)	(0.20)	(0.30)	(0.30)	(0.32)
	40-49	14.9	14.2	13.5	14.8	14.3	13.9
		(0.27)	(0.27)	(0.27)	(0.28)	(0.28)	(0.31)
	50-59	19.6	19.8	19.9	18.2	18.4	18.2
		(0.28)	(0.29)	(0.31)	(0.27)	(0.29)	(0.30)
	60-69	18.2	18.7	19.7	15.2	15.9	16.6
		(0.30)	(0.31)	(0.33)	(0.27)	(0.28)	(0.30)
	70+	22.9	23.6	24.2	18.9	19.6	20.2
		(0.37)	(0.39)	(0.41)	(0.34)	(0.35)	(0.37)
	Base (Unweighted)	31,061	28,932	26,416	31,061	28,932	26,416
Ethnic group	White	93.2	93.3	93.5	90.8	90.5	89.8
		(0.21)	(0.22)	(0.23)	(0.27)	(0.29)	(0.34)
	Black	1.2	1.2	1.1	1.9	2.1	2.3
		(0.08)	(0.08)	(0.07)	(0.11)	(0.13)	(0.15)
	Indian	1.7	1.7	1.7	1.9	2.1	2.1
		(0.12)	(0.12)	(0.13)	(0.13)	(0.14)	(0.15)
	Pakistani	1.1	1.1	1.0	1.4	1.4	1.6
		(0.09)	(0.09)	(0.10)	(0.11)	(0.12)	(0.16)
	Bangladeshi	0.4	0.4	0.4	0.7	0.7	0.8
		(0.05)	(0.05)	(0.05)	(0.07)	(0.07)	(0.08)
	Other Asian	0.8	0.7	0.7	1.0	1.0	1.0
		(0.08)	(0.09)	(0.09)	(0.12)	(0.12)	(0.16)
	Mixed	1.0	1.1	1.2	1.4	1.5	1.6
		(0.07)	(0.07)	(0.08)	(0.09)	(0.11)	(0.11)
	Other	0.6	0.6	0.5	0.8	0.8	0.7
		(0.05)	(0.06)	(0.05)	(0.09)	(0.11)	(0.08)
	Base (Unweighted)	30,977	28,877	26,399	30,977	28,877	26,399

In the second part of the analysis, we broadened the scope to include a comparative review of both unadjusted and adjusted sample profiles across waves 1 through 12 for the sex, age and ethnic background variables. This analysis aims to enhance the detection of changes in trends during the COVID-19 pandemic and the changes introduced in the mode strategy. Note that some fluctuations observed in the graphs over time likely reflect genuine shifts in the population composition (notably, an ageing population).

Figure 2 shows the unadjusted and adjusted percentage of females and males over time. The first insight from this plot is the negligible effect of the pandemic, as the trend up to wave 10 appears to have persisted through waves 11 and 12. Second, there is a slight decline in the percentage of men in the unadjusted data, particularly evident from wave 6 onwards, which indicates the lower participation propensity of this group compared to females. Third, the application of the cross-sectional weight, which compensates for attrition, presents a more consistent scenario where the rise in the female proportion progresses more gradually.



Notes. (1) Base for the analysis are respondents to each wave interview. (2) The error bars represent the 95% confidence interval.

Figure 2. Sample profile (unadjusted and adjusted) by sex over waves 1 to 12. Point estimates and 95% confidence intervals.

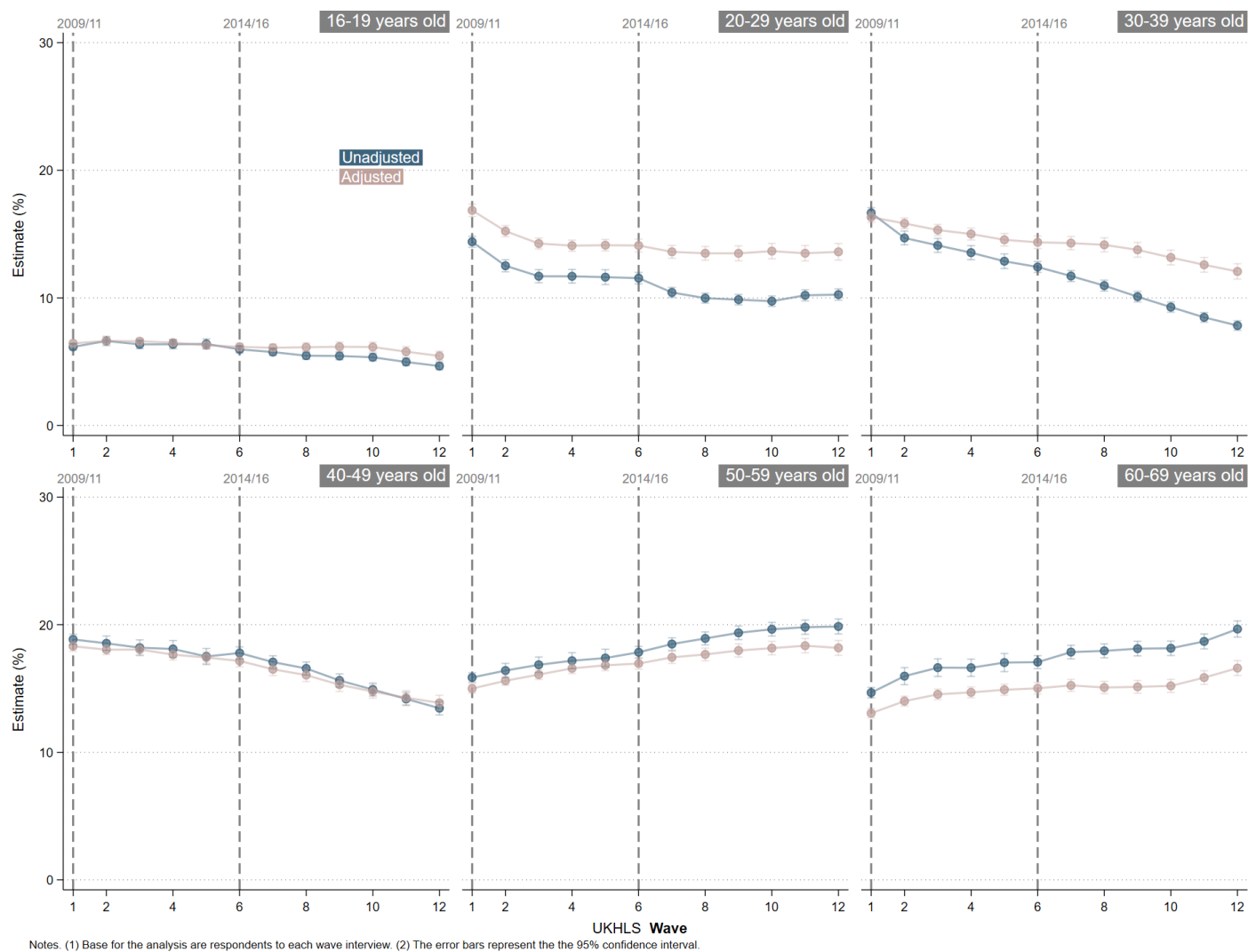


Figure 3a. Sample profile (unadjusted and adjusted) by age group over waves 1 to 12. Point estimates and 95% confidence intervals.

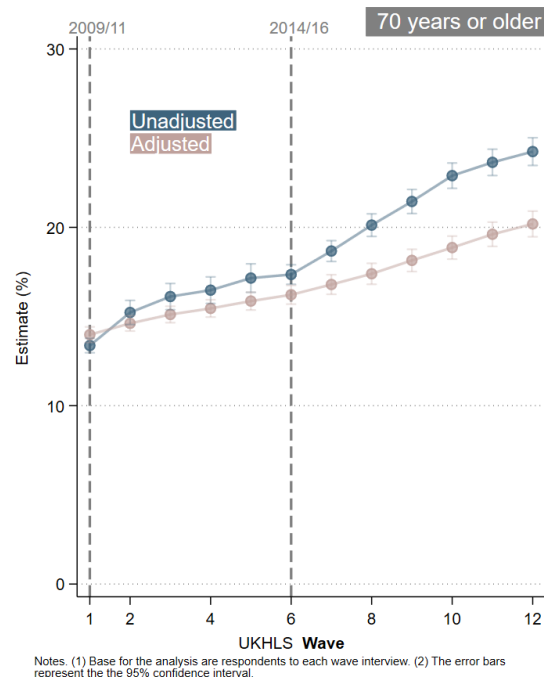


Figure 3b. Sample profile (unadjusted and adjusted) for age group 70+ over waves 1 to 12 Point estimates and 95% confidence intervals.

Figure 3a and 3b display the distribution of various age groups across different waves. These graphs show that the application of the cross-sectional weight has been instrumental in curbing the overrepresentation of older panel members (aged 50 and above) over time. Examining the trends across all age categories, there is no substantial indication that the sample composition has undergone significant alterations post-pandemic, nor is there evidence to suggest that the pandemic has altered the impact of the cross-sectional weights on the estimates.

The implementation of the cross-sectional weight has proven advantageous in counteracting the under-representation of ethnic minorities, who typically exhibit below-average response rates, as illustrated in Figure 4a and 4b. Moreover, our analysis does not reveal any discernible shifts in these trends attributable to the pandemic. The positive effect of the cross-sectional weight adjusting the under-representation of people from ethnic minorities is also observed in waves 11 and 12 during the COVID-19 pandemic.

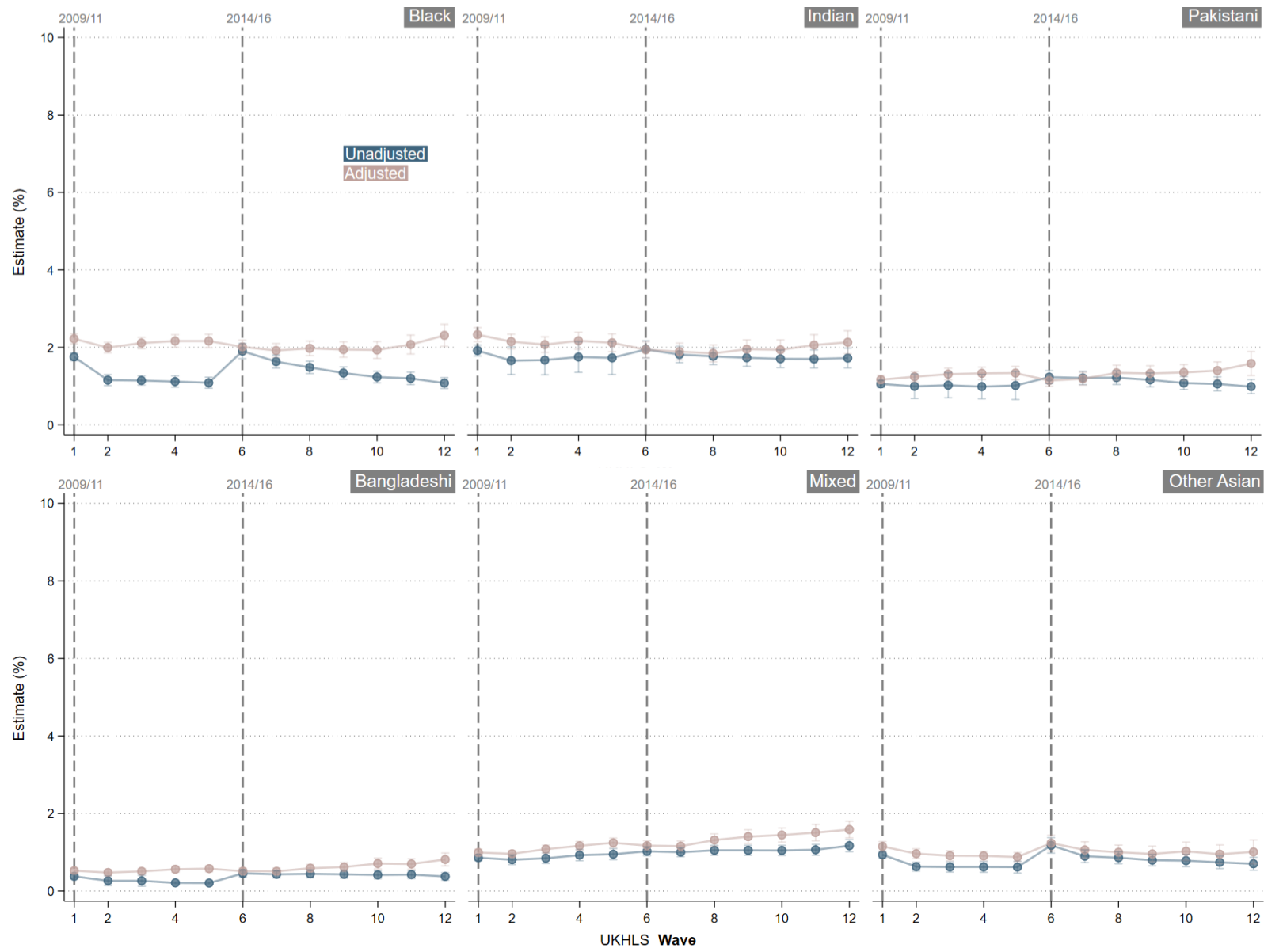


Figure 4a. Sample profile (unadjusted and adjusted) by ethnic background over waves 1 to 12. Point estimates and 95% confidence intervals.

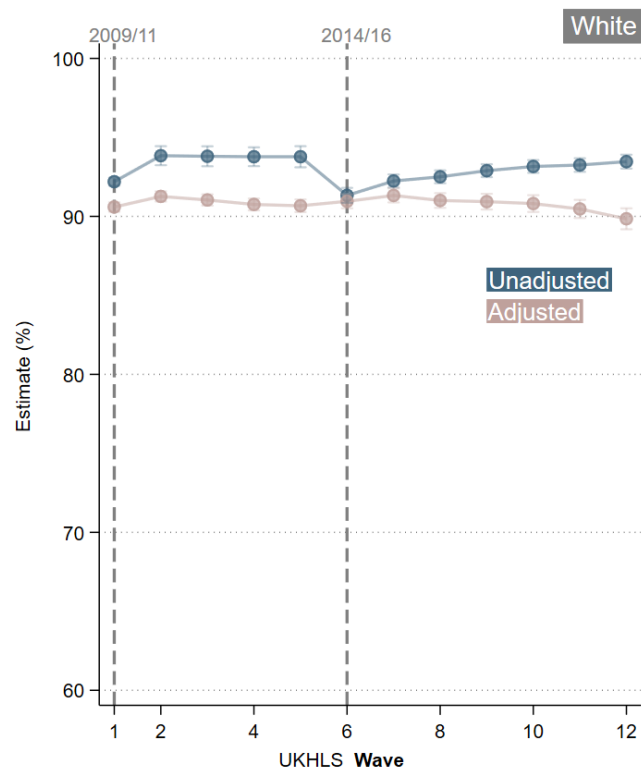


Figure 4b. Sample profile (unadjusted and adjusted) for White over waves 1 to 12. Point estimates and 95% confidence intervals.

References

- Burton, J., Lynn, P., & Benzeval, M. (2020). How Understanding Society: The UK Household Longitudinal Study adapted to the COVID-19 pandemic. *Survey Research Methods*, 14(2), 235-239 Pages. <https://doi.org/10.18148/SRM/2020.V14I2.7746>
- Cabrera-Álvarez, P., Burton, J., & Lynn, P. (2021). COVID-19 and Mode Selection Effects in Understanding Society. *Understanding Society Working Papers*, 2021(10), 1–29.
- Cabrera-Álvarez, P., James, N., & Lynn, P. (2023). Panel attrition in the General Population Sample and the Immigrant and Ethnic Minority Boost of Understanding Society. *Understanding Society Working Papers*, 2023–03, 37. <https://doi.org/10.5255/UKDA-SN-6614-15>
- Kaminska, O. (2021). *Weighting for mortality in a longitudinal study*. European Survey Research Association Conference, Online.
- Lavallée, P. (2007). *Indirect sampling*. Springer.

Annex A: Wave response rates

Notes to Annex A tables: Ineligible cases were removed from the response rates calculations and, as explained in the methods sections, further adjustments were implemented to deal with under-identified mortality. However, it is likely that some undetected ineligibility remains, which might cause an underestimation of the response rates. The undetected ineligibility is likely to increase over time, especially in the oldest age groups.

Table 3. Wave Response Rate: General Office Region (GOR)

	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
North East	87.3	88.8	89.4
North West	89.2	84.6	83.4
Yorks & Humber	87.8	82.6	84.5
East Midlands	87.7	89.1	88.1
West Midlands	85.3	83.3	85.9
East of England	90.2	87.1	88.7
Greater London	82.0	83.1	82.0
South East	87.7	88.3	90.4
South West	90.3	88.8	88.6
Wales	85.9	87.4	87.5
Scotland	89.0	86.9	88.2
Northern Ireland	89.2	87.2	83.7
Base	32,235	30,776	28,674

Table 4. Wave Response Rate: Employment Status

	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
Self-employed	86.3	85.1	86.6
Paid employment	86.7	86.8	87.7
Unemployed	82.0	76.7	81.2
Retired	92.2	90.1	88.2
Family care or home	85.2	80.3	81.9
Full-time student	79.9	78.7	78.4
Long-term sick or disabled & others	85.4	82.6	82.4
Base	32,222	30,761	28,662

Table 5. Wave Response Rate: Marital Status

	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
Single	81.1	82.8	83.0
Living as a couple	88.7	88.6	88.9
Married	89.4	89.8	89.1
Separated/Divorced	90.0	89.9	88.8
Widowed	89.9	86.8	84.8
Base	32,164	28,055	25,800

Table 6. Wave Response Rate: Highest Qualification

	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
No qualifications	86.3	81.8	79.7
Other	87.7	86.0	84.8
GCSE or equivalent	87.0	85.5	84.8
A-level or equivalent	85.5	85.1	86.1
Degree or equivalent	89.4	89.0	90.1
Base	31,629	30,240	28,265

Table 7. Wave Response Rate: Household Type

	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
An adult, no children	90.4	88.5	87.7
An adult, children	80.2	77.2	79.5
Couple, no children	92.5	91.6	90.6
Couple, children	87.2	85.1	85.5
Two or more adults, no children	84.3	83.3	85.6
Two or more adults, children	79.7	79.1	79.5
Base	32,254	30,794	28,688

Table 8. Wave Response Rate: Household Tenure

	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
Owned outright	91.3	90.2	89.3
Owned with mortgage	87.0	87.3	87.2
Local authority housing	84.0	77.9	78.4
Rented private	83.3	82.3	83.8
Other	83.9	80.2	84.1
Base	31,804	30,398	28,343

Table 9. Wave Response Rate: Personal Gross Income

	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
Less than £600	84.6	82.1	82.5
From £600 to £1,199	88.0	85.3	85.4
From £1,200 to £1,699	86.5	86.0	86.6
From £1,700 to £2,599	88.7	87.2	87.6
£2,600 or more	89.0	89.9	90.0
Base	32,254	30,794	28,688

Annex B: Unadjusted and weighted estimates

Notes to Annex B tables: The tables present the point estimates and standard error for a set of demographic variables. These estimates have been weighted using the design weight (“Unadjusted”) or the cross-sectional weight (“Adjusted”). Note that the design weight used to produce the estimates is the wave 6 longitudinal inclusion weight, which also corrects for non-response and attrition up to wave 6.

Table 10. Cross-Sectional Estimates Unadjusted and Adjusted: General Office Region (GOR)

	Unadjusted			Adjusted		
	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
North East	4.6 (0.22)	4.7 (0.25)	4.8 (0.26)	4.2 (0.22)	4.4 (0.25)	4.5 (0.27)
North West	11.2 (0.33)	10.9 (0.34)	10.6 (0.35)	11.3 (0.39)	10.9 (0.38)	10.7 (0.40)
Yorks & Humber	9.6 (0.30)	9.3 (0.30)	9.3 (0.33)	9.1 (0.32)	8.9 (0.32)	9.1 (0.35)
East Midlands	8.6 (0.30)	8.8 (0.31)	8.9 (0.34)	7.7 (0.30)	8.0 (0.31)	8.0 (0.35)
West Midlands	8.6 (0.26)	8.5 (0.28)	8.5 (0.27)	8.8 (0.30)	8.8 (0.33)	8.8 (0.35)
East of England	10.4 (0.37)	10.3 (0.37)	10.4 (0.39)	9.6 (0.36)	9.6 (0.37)	9.9 (0.40)
Greater London	7.6 (0.26)	7.8 (0.26)	7.5 (0.28)	11.1 (0.38)	11.3 (0.39)	11.0 (0.40)
South East	14.2 (0.39)	14.4 (0.41)	14.7 (0.44)	13.6 (0.40)	13.7 (0.42)	13.7 (0.45)
South West	10.2 (0.32)	10.3 (0.34)	10.5 (0.35)	8.7 (0.30)	8.7 (0.32)	8.7 (0.34)
Wales	5.2 (0.20)	5.3 (0.20)	5.2 (0.22)	4.7 (0.20)	4.7 (0.20)	4.7 (0.22)
Scotland	6.9 (0.23)	6.9 (0.23)	7.0 (0.25)	8.2 (0.30)	8.0 (0.30)	8.1 (0.32)
Northern Ireland	2.8 (0.07)	2.7 (0.07)	2.6 (0.08)	2.9 (0.09)	2.9 (0.10)	2.9 (0.12)
Base (Unweighted)	31,042	28,923	26,412	31,042	28,923	26,412

Table 11. Cross-Sectional Estimates Unadjusted and Adjusted: Employment Status

	Unadjusted			Adjusted		
	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
Self-employed	7.8 (0.20)	7.4 (0.19)	7.0 (0.20)	7.7 (0.21)	7.4 (0.21)	6.9 (0.21)
Paid employment	44.6 (0.40)	43.9 (0.41)	43.2 (0.42)	47.5 (0.42)	46.4 (0.44)	45.4 (0.45)
Unemployed	2.9 (0.12)	3.3 (0.13)	3.7 (0.14)	4.0 (0.19)	4.5 (0.20)	5.2 (0.22)
Retired	32.8 (0.42)	33.4 (0.43)	34.4 (0.45)	26.7 (0.39)	27.4 (0.40)	28.2 (0.43)
Family care or home	2.7 (0.10)	2.7 (0.10)	2.3 (0.10)	3.2 (0.12)	3.2 (0.13)	2.7 (0.12)
Full-time student	5.2 (0.16)	4.9 (0.16)	4.6 (0.16)	6.1 (0.20)	5.8 (0.21)	5.6 (0.22)
Long-term sick or disabled & others	4.1 (0.14)	4.4 (0.15)	4.8 (0.16)	4.8 (0.18)	5.4 (0.21)	6.0 (0.22)
Base (Unweighted)	31,026	28,876	26,363	31,026	28,876	26,363

Table 12. Cross-Sectional Estimates Unadjusted and Adjusted: Marital Status

	Unadjusted			Adjusted		
	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
Single	21.6 (0.29)	21.6 (0.30)	21.4 (0.31)	26.9 (0.38)	27.0 (0.40)	27.5 (0.42)
Living as a couple	7.6 (0.21)	7.7 (0.22)	7.7 (0.23)	9.3 (0.27)	9.3 (0.28)	9.3 (0.28)
Married	54.9 (0.38)	54.9 (0.39)	55.2 (0.40)	49.5 (0.42)	49.2 (0.43)	48.5 (0.45)
Separated/Divorced	8.7 (0.21)	8.7 (0.20)	8.8 (0.22)	7.7 (0.19)	7.9 (0.20)	8.1 (0.22)
Widowed	7.2 (0.19)	7.1 (0.19)	6.9 (0.20)	6.5 (0.18)	6.5 (0.19)	6.5 (0.20)
Base (Unweighted)	30,936	28,813	26,274	30,936	28,813	26,274

Table 13. Cross-Sectional Estimates Unadjusted and Adjusted: Highest Qualification

	Unadjusted			Adjusted		
	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
No qualifications	10.4 (0.24)	9.4 (0.23)	8.6 (0.23)	10.4 (0.25)	9.7 (0.26)	9.2 (0.27)
Other	9.4 (0.21)	9.1 (0.21)	8.7 (0.21)	9.0 (0.22)	8.9 (0.22)	8.7 (0.23)
GCSE or equivalent	20.2 (0.29)	20.0 (0.29)	20.0 (0.30)	20.6 (0.32)	20.5 (0.33)	20.2 (0.34)
A-level or equivalent	20.6 (0.28)	20.8 (0.30)	20.7 (0.31)	21.5 (0.31)	21.7 (0.33)	21.7 (0.35)
Degree or equivalent	39.4 (0.39)	40.7 (0.40)	42.0 (0.42)	38.5 (0.42)	39.2 (0.43)	40.3 (0.47)
Base (Unweighted)	30,470	28,475	26,039	30,470	28,475	26,039

Table 14. Cross-Sectional Estimates Unadjusted and Adjusted: Household Type

	Unadjusted			Adjusted		
	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
An adult, no children	19.1 (0.30)	19.4 (0.31)	19.8 (0.33)	17.3 (0.30)	17.8 (0.32)	18.4 (0.35)
An adult, children	2.3 (0.12)	2.1 (0.12)	1.9 (0.11)	3.0 (0.16)	3.0 (0.16)	2.7 (0.17)
Couple, no children	33.4 (0.45)	34.1 (0.46)	34.8 (0.47)	28.1 (0.42)	28.3 (0.44)	28.2 (0.44)
Couple, children	15.9 (0.33)	14.7 (0.33)	13.8 (0.34)	18.4 (0.38)	17.5 (0.39)	16.4 (0.40)
Two or more adults, no children	19.6 (0.43)	19.6 (0.45)	20.1 (0.45)	21.8 (0.49)	21.5 (0.50)	22.0 (0.52)
Two or more adults, children	9.8 (0.33)	10.0 (0.36)	9.6 (0.36)	11.3 (0.41)	11.9 (0.47)	12.3 (0.48)
Base (Unweighted)	31,062	28,933	26,419	31,062	28,933	26,419

Table 15. Cross-Sectional Estimates Unadjusted and Adjusted: Household Tenure Status

	Unadjusted			Adjusted		
	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
Owned outright	43.0 (0.49)	45.3 (0.50)	46.8 (0.52)	35.6 (0.49)	37.4 (0.51)	38.8 (0.55)
Owned with mortgage	34.8 (0.47)	33.6 (0.48)	33.1 (0.50)	34.0 (0.49)	32.8 (0.50)	32.1 (0.53)
Local authority housing	13.0 (0.33)	12.1 (0.33)	11.3 (0.33)	18.9 (0.50)	18.5 (0.51)	18.0 (0.53)
Rented private	8.2 (0.25)	7.7 (0.24)	7.5 (0.25)	10.1 (0.33)	9.9 (0.33)	9.6 (0.36)
Other	1.0 (0.09)	1.2 (0.11)	1.2 (0.10)	1.4 (0.14)	1.5 (0.16)	1.5 (0.15)
Base (Unweighted)	30,341	28,017	25,615	30,341	28,017	25,615

Table 16. Cross-Sectional Estimates Unadjusted and Adjusted: Personal Gross Income

	Unadjusted			Adjusted		
	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)	Wave 10 (2018-20)	Wave 11 (2019-21)	Wave 12 (2020-22)
Less than £600	17.0 (0.25)	17.7 (0.27)	16.1 (0.26)	18.5 (0.30)	19.0 (0.33)	17.6 (0.32)
From £600 to £1,199	21.5 (0.29)	20.0 (0.28)	19.7 (0.29)	20.9 (0.30)	19.7 (0.30)	19.8 (0.32)
From £1,200 to £1,699	18.4 (0.26)	17.7 (0.27)	17.7 (0.26)	18.5 (0.29)	18.0 (0.29)	17.8 (0.30)
From £1,700 to £2,599	20.8 (0.28)	21.3 (0.28)	22.1 (0.30)	20.4 (0.29)	21.0 (0.29)	21.8 (0.33)
£2,600 or more	22.3 (0.29)	23.2 (0.30)	24.4 (0.33)	21.7 (0.31)	22.3 (0.32)	23.0 (0.35)
Base (Unweighted)	31,062	28,933	26,419	31,062	28,933	26,419