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Social restrictions, leisure and well-being☆

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ABSTRACT

A wide-ranging public debate surrounds how pandemic lockdown measures differentially impacted individuals and which precise mechanisms – whether financial-, health-, or policy-driven – predominate in determining these effects. Using a nationally representative 24-h diary survey covering the first two years of the pandemic, we explore potential mechanisms underlying changes in well-being. We exploit the variation in the stringency of the social restrictions implemented by the UK government during this period and use an event-study methodology to net out the impact of social restrictions from other pandemic effects. We find that well-being dropped by 47 % (for men) and 71 % (for women) of a standard deviation during the strictest lockdown and that it took longer to revert to pre-pandemic levels than previously estimated. This finding holds after we account for financial conditions and changes in local infection and death rates, suggesting that the time use–related changes driven by social restrictions dominate financial and health shocks in driving the overall well-being effects during the pandemic. Our detailed data on time allocation and individual preferences over the activities undertaken throughout the day suggest that the drop in well-being was primarily associated to a drastic reduction in time spent in leisure with non–household members or outside the home, a category with greater weight in the well-being of women.

1. Introduction

Many countries around the world have enacted stringent measures to contain the spread of the COVID-19 virus and to limit the number of fatalities. These restrictions have been at the centre of the political debate since the outbreak of the pandemic due to concerns about their potential negative externalities for the economy and individuals. While it is undeniable that these measures saved lives (Flaxman et al., 2020; Dehning et al., 2020), there is also evidence of both direct economic costs, such as increased unemployment rates and income losses (Witteveena and Velthorst, 2020), and indirect non-economic costs, as the worsening of mental health and well-being in general (e.g., Siflinger et al., 2021; Serrano-Alarcon et al., 2022). Three years later, it is still an unsolved question how democratic states should account for the well-being impacts of restrictive policies under public health emergencies, and how those impacts should be weighted versus the lives saved. Therefore, an empirical understanding of the long-term effect on individuals' well-being and the mechanisms behind this macro shock is necessary to advance the policy discussion and for the design of effective and comprehensive policy responses. Little has been known about these mechanisms until now as their study requires comprehensive data on individual characteristics, preferences and behaviour – which could not yet be found all in one place. This paper uses real-time survey data to explore the medium- and long-term impact of social restrictions on individual well-being in the United Kingdom and the role of two mechanisms within it, namely, time allocation and individual preferences. The survey data were collected before the pandemic (April and October 2016) and during key moments characterised by the implementation of policies with different degrees of stringency: the first lockdown (May 2020), the easing of the social restriction measures in summer 2020, the second and third lockdowns (November 2020 and January 2021) and, finally, in September 2021, when most restrictions were lifted. Each of these six cross-sectional surveys includes information collected through online time use diaries, known as the Click-and-Drag Diary Instrument

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(CaDDI), on how, where and with whom individuals spend their time over a 24-hour period and on respondents' subjective well-being, demographic and economic characteristics. One unique feature of these diary data is the availability of information about the instantaneous enjoyment that respondents experience while doing different activities throughout the day (capturing what is known in the literature as "experienced utility", e.g., Kahneman et al., 2004; Kahneman and Krueger, 2006; Sevilla et al., 2012). This information is crucial to understand individual preferences, which could help us explaining, together with changes in time allocation, the variation in subjective well-being throughout the pandemic.

The United Kingdom offers an ideal context to study the well-being impact of the stringency of the policy response to the COVID-19 pandemic because of the multiple and sharp changes in the intensity of the lockdown measures implemented at the local and national levels. In England[1], the first national lockdown was introduced in March 2020 when people were ordered to stay at home, schools and non-essential business were closed and social gatherings were forbidden. From July to September 2020 most restrictions were lifted, in particular social gatherings were allowed, and hospitality businesses re-opened. Two more national lockdowns followed. One, less strict, in November 2020 when non-essential businesses were closed, people could meet outside with one non-household member, but schools were kept open. The other lockdown was introduced in January 2021, with stricter restrictions, similar to those implemented in March 2020. Finally, all restrictions were lifted in June 2021.

We exploit this variation across time and in the stringency of the lockdown measures to implement an event-study methodology and explore the link between social restrictions and well-being. We compare changes in well-being during periods when strict social restrictions were in effect with periods with no (or few) limitations on social interactions, while controlling for a set of confounding factors.

Our results show that lockdowns, more than the financial and health shocks induced by the pandemic, negatively affect the well-being as measured by life satisfaction. This reduction in well-being persists even after accounting for socioeconomic characteristics (including household income, employment status and type of occupation) and the local epidemiological impact of the pandemic in terms of infection and death rates. Consistent with prior research carried out in the United Kingdom (e.g., Lindley and Rienzo, 2021; Zhou and Kan 2021; Blanchflower and Bryson 2022), this decline in well-being is the largest when the strictest lockdown restrictions are in place.

To explore the channels through which social restrictions influence well-being, we first compare trends over time in subjective well-being with variations in satisfaction with different aspects of life affected by the pandemic and social restrictions (health status, financial conditions, and quality and quantity of social interactions). Satisfaction with the quality of time spent in leisure and social activities is the only aspect that follows a pattern similar to the one observed for subjective well-being. This provides a first indication that changes in social life and leisure are a possible channel through which social restrictions affected well-being, in line with other studies showing that global lockdowns and social distancing rules led to increased feelings of loneliness (Bau et al., 2022; Chan Ho Fai et al., 2022; Etheridge and Spantig, 2022). We further confirm this hypothesis by showing that compared to paid work, unpaid work and personal care, respondents have a strong preference for spending their time in leisure activities, especially if these are done with non–household members or away from home. However, as the social restrictions were implemented during the lockdowns, respondents drastically reduced the amount of time spent on precisely this category of leisure activities. Taken together, these results support the hypothesis that social restrictions affect well-being through changes in everyday life and social interactions.

This paper contributes to the literature on the well-being impact of the COVID-19 pandemic in two ways. First, compared to other studies focusing on the onset of the pandemic (e.g., Banks and Xu, 2020; Biroli et al., 2021; Brodeur et al., 2021; Giuntella et al., 2021; Mckeown et al., 2021; Bau et al, 2022; Blanden et al., 2022; Etheridge and Spantig, 2022), our research documents changes in well-being over a much longer period of time (the first two years of the pandemic). Conclusions based on the first wave of the pandemic do not offer a complete picture of the phenomenon. Indeed, while most of those studies determine that well-being returned to pre-pandemic levels in summer 2020 we show that it took much longer for men's well-being to return to its pre-pandemic levels while women's well-being remained low. Our results are in line with those shown in Blanchflower and Bryson (2022) and Zhou and Kan (2021) who explore trends in well-being and mental health during the first two years of the pandemic and confirm that the lowest levels of distress are found during the summer in 2020 when most restrictions were removed. Another study exploring the medium-term impact of the COVID-19 pandemic is Chan et al. (2022), who show a positive relationship between the severity of the lockdown measures and the magnitude of the mental health mediated by the amount of time spent at home (proxied using movement information collected by Google from internet-connected devices with the "location history" setting turned on). Finally, Lindley and Rienzo (2021) document that women were more sensitive to the effect of the pandemic, with higher levels of anxiety and depression than men. Differently from us, they provide evidence that financial difficulties had a growing impact on all mental health outcomes, as the pandemic progressed.

Our second contribution is to explore the role played by individual preferences and changes in time allocated to different activities in explaining the drastic drop in well-being that men and women experienced during the pandemic. By analysing changes in Google trends (Brodeur et al., 2021), the composition of helpline calls (Brülhart et al., 2021) and information on movement collected by Google (Chan et al., 2022), previous studies provide indirect evidence on how the pandemic caused an increased sense of isolation and loneliness driven by lack of interaction with friends and family members from different households. Other studies explore the drastic changes in time allocation, focusing in particular on intrahousehold allocation of time to unpaid work (e.g., Biroli et al., 2021). Our paper adds to this literature by using more direct and detailed information on time allocation for a nationally representative sample of individuals collected through time use diaries and by combining this information with evidence on time use preferences, through the instantaneous enjoyment scale, and on satisfaction with different aspects of people's lives that were directly affected by the pandemic. The instantaneous enjoyment scale is used to measure how pleasant or unpleasant various activities are for the respondents (Kahneman and Krueger, 2006; Krueger, 2007). By combining this information with the trends in time allocation before and during the pandemic, we can build a more precise picture of how men and women experience their daily life in the period considered. More specifically, instantaneous enjoyment allows us to identify the preferred activities (i.e., those individuals associate a higher utility/enjoyment to) and to understand whether a drastic reduction in the time allocated to those activities can explain changes in subjective well-being. The advantage of this approach is that we use self-reported information on individuals' preferences instead of relying on external judgment to identify enjoyable activities.

Finally, our findings speak to the long-standing literature on gender differences in well-being. In line with previous research, we find that women's well-being is more negatively affected than men by disastrous events, such as the COVID-19 emergency (Adams-Prassl et al., 2020; Andrew et al., 2020; Anaya et al., 2021; Lindley and Rienzo, 2021; Le and Nguyen, 2021; Oreffice and Quintana-Domeque, 2021; Blanchflower and Bryson, 2022; Etheridge and Spantig, 2022). We contribute to this literature by using data on time use preferences to better

[1] Similar restrictions were implemented in the other UK countries. For more details see Brown and Kirk-Wade (2021).

understand the underlying reasons for gender differences in responses to shocks. In particular, we show that women have a stronger preference for spending time on leisure activities away from home or with non–household members – the very activities that containment measures limit most stringently.

The rest of the paper is organised as follows. Section 2 sets out the data, and Section 3 presents the empirical approach. The estimation results are given in Section 4. Finally, the findings are discussed, and conclusions drawn in Section 5.

2. Data, sample and key variables

This study employs nationally representative data for the United Kingdom collected before and during the COVID-19 pandemic. Because of lack of real-time representative data, social scientists have often used commercially run panels to understand the outcomes of the COVID-19 crisis, given the surveys' rapid response times (e.g., Adams-Prassl et al., 2020; Andrew et al., 2020). In our case, respondents are members of the large Dynata agency market research panel, who volunteered for the surveys and were selected based on age, gender, socioeconomic status and region quotas that were nationally representative of the 2016 population. Data were collected from six cross-sectional sample waves: April and October 2016 (to reduce single-season effects); May–June 2020 during the first UK lockdown; August 2020 during the post-lockdown summer relaxation of restrictions; November 2020 and January 2021 when the second and third national lockdowns were implemented; and, finally, in August–September 2021, when most restrictions were removed.

Our final sample includes 3,181 individuals aged 18 to 69 and 6,432 diaries, as each respondent completed diaries for 1 to 3 days. Table A1 in Appendix A reports the main socioeconomic and demographic characteristics of the individuals in our sample. Half of the respondents are female, most of them are employed (70–79 %) and married or in a partnership (60–66 %) and approximately a third live with at least one child aged 16 or younger. About half of our sample is characterised by individuals with a post-secondary qualification. Mean socio-demographic and economic characteristics by wave show that in 2016 and September 2021 respondents were older and more qualified than in the other waves. The proportion of respondents with a post-secondary qualification is higher in May, August and November 2020. Instead, the distribution of marital status, gender and household composition does not vary significantly. An additional comparison, between the 2016 CaDDI respondents and the sample of the 2016 Annual Population Survey (APS), a nationally representative sample of the UK population, shows that CaDDI respondents are more likely to have a post-secondary qualification and are slightly younger but are otherwise similar to their APS counterparts (Appendix D, Table D3). In the analysis we account for these differences by using weights, which ensure that the joint distribution of education, age and gender in our sample is the same as that of the 18- to 69-year-old individuals in the 2016 APS data.

The individual surveys are combined with online time use CaDDI diaries. These diaries include detailed information on how, where and with whom individuals spend their time throughout the 24-h day. Continuous diaries, such as CaDDI, are considered the gold standard and preferable over survey questions for measuring changes in individuals' behaviour because they reduce recall issues and are less affected by social desirability bias (Gershuny et al., 2019; Sullivan et al., 2021). In Appendix C, we compare the distribution of time spent in leisure, personal care, paid and unpaid work of CaDDI 206 with the UK Time Use Survey 2014-15, a nationally representative dataset collecting information on time allocation of the UK population. As Table C1 shows, the distributions are similar, with the main difference being that time spent in leisure is higher in our sample.

2.1. Subjective well-being

We measure subjective well-being using individuals' answers to the following question: "How dissatisfied or satisfied would you say you are with your life overall?" Respondents rate their life satisfaction on the following seven-point scale: (1) "Completely dissatisfied", (2) "Mostly dissatisfied", (3) "Somewhat dissatisfied", (4) "Neither satisfied or dissatisfied", (5) "Somewhat satisfied", (6) "Mostly satisfied" and (7) "Completely satisfied".

This measure of subjective well-being is often adopted by economists as an appropriate measure of welfare (e.g., Kahneman, Diener and Schwarz, 1999; Blanchflower and Oswald, 2004; Krueger and Schkade, 2008; Diener et al., 2018). It is used to assess the impact of different economic phenomena, and policymakers increasingly use subjective well-being measures to monitor social progress (e.g., Luechinger and Raschky, 2009; Ludwig et al., 2012; Danzer and Danzer, 2016; Perez--Truglia, 2020).

To explore the impact of the policy response to the COVID-19 pandemic on different aspects of life, we also use information on the level of satisfaction associated with specific domains, such as own health, household income, amount of leisure time and quality of social life and leisure. Each of these aspects is measured by means of similar questions to the one employed to measure satisfaction with life overall, with responses on the same seven-point scale (Panel A in Table A2 reports descriptive statistics for all measures of satisfaction by wave).

2.2. Time allocation and instantaneous enjoyment

We follow the same approach as Aguiar and Hurst (2007) and use information from diaries on time allocation to construct a measure of time (in minutes) spent in four sets of activities: leisure, paid and unpaid work and personal care.[2]

We then focus on studying patterns in leisure by distinguishing between time spent in leisure activities at home and away from home. We also define time spent in leisure activities by copresence (alone or with other family members and with non–household members), as previous studies have found that women tend to experience higher levels of enjoyment when they engage in activities with other people (Hamermesh, 2020), and by location (at home, outside the home). As expected, time spent alone or with family members in leisure activities increased substantially during the pandemic (from 368 min per day in 2016 to 448 in May 2020 during the first national lockdown). In contrast, the time spent in leisure activities with non–household members (e.g., friends and co-workers) decreased drastically (82 % reduction) from almost an hour a day to less than 10 min during the January 2021 lockdown. Similar trends are observed when leisure time is split by location (Panel B in Table A2).

A unique advantage of our data over other well-being data collected during the COVID-19 pandemic consists in the fact that individuals were also asked to report their feelings experienced during the time spent on each activity. While completing their time use diary, respondents reported the instantaneous enjoyment (or utility) experienced for every ten-minute slot over the 24 h of the day on a 7-point scale from "Didn't enjoy at all" to "Enjoyed very much". Using these details, we can define the associated enjoyment for each episode as the average utility over the total time of the episode. Panel C of Table A2 shows the average instantaneous enjoyment over all episodes for the six waves of the survey.

2.3. Control variables

The survey administered to all respondents collects information on

[2] Appendix B reports the complete list of activities included in our definition of leisure.

Table 1
Changes in subjective well-being.

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	4.981***	5.102***	5.064***	4.698***	5.080***	4.711***
	(0.076)	(0.102)	(0.123)	(0.144)	(0.126)	(0.146)
Women	0.254**	0.260**	0.261**	0.278***	0.261**	0.278***
	(0.105)	(0.102)	(0.102)	(0.099)	(0.102)	(0.099)
			Panel A: Men			
May 2020	-0.360***	-0.372***	-0.344***	-0.380***	-0.369***	-0.404***
	(0.123)	(0.119)	(0.119)	(0.117)	(0.124)	(0.121)
Aug 2020	-0.140	-0.182	-0.164	-0.184	-0.162	-0.184
	(0.121)	(0.117)	(0.118)	(0.116)	(0.118)	(0.116)
Nov 2020	-0.423***	-0.425***	-0.398***	-0.415***	-0.415***	-0.457***
	(0.109)	(0.106)	(0.107)	(0.104)	(0.131)	(0.127)
Jan 2021	-0.539***	-0.525***	-0.506***	-0.535***	-0.585***	-0.649***
	(0.113)	(0.111)	(0.111)	(0.108)	(0.201)	(0.197)
Sep 2021	0.004	0.001	0.031	-0.026	0.091	-0.024
	(0.114)	(0.110)	(0.111)	(0.107)	(0.174)	(0.168)
			Panel B: Women			
May 2020	-0.724***	-0.685***	-0.675***	-0.640***	-0.699***	-0.663***
	(0.116)	(0.114)	(0.114)	(0.112)	(0.119)	(0.117)
Aug 2020	-0.482***	-0.490***	-0.504***	-0.487***	-0.503***	-0.488***
	(0.113)	(0.111)	(0.112)	(0.111)	(0.112)	(0.111)
Nov 2020	-0.636***	-0.661***	-0.638***	-0.618***	-0.659***	-0.664***
	(0.105)	(0.104)	(0.103)	(0.102)	(0.128)	(0.127)
Jan 2021	-0.938***	-0.927***	-0.902***	-0.869***	-0.981***	-0.982***
	(0.109)	(0.107)	(0.108)	(0.107)	(0.196)	(0.193)
Sep 2021	-0.450***	-0.452***	-0.429***	-0.392***	-0.368**	-0.390**
	(0.114)	(0.111)	(0.110)	(0.108)	(0.172)	(0.168)
N. Individuals	3,181	3,181	3,181	3,181	3,181	3,181
R-squared	0.037	0.081	0.090	0.121	0.090	0.121
Controls						
Socio-demographic characteristics	No	Yes	Yes	Yes	Yes	Yes
Regional dummies	No	No	Yes	Yes	Yes	Yes
Economic characteristics	No	No	No	Yes	No	Yes
COVID-19 cases/deaths	No	No	No	No	Yes	Yes

Notes: Data come from the 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. Observations are working-age (18–69 years old) individuals interviewed in the six waves of the CaDDI surveys. The dependent variable is the raw measure of overall life satisfaction (subjective well-being), measured on a seven-point scale from "completely dissatisfied" to "completely satisfied". The table reports OLS estimates of changes in well-being during the COVID-19 pandemic (with respect to well-being in the pre-pandemic period, i.e., May and October 2016) while controlling for different sets of covariates. Sociodemographic characteristics include age, marital status, an indicator for whether there is a child aged 16 or under in the household, employment status and highest qualification. Regional dummies are indicators for the following 12 regions: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East London, South East, South West, Wales, Scotland, and Northern Ireland. Economic variables include household income and indicators for whether the occupation is high, medium or low-skilled. COVID-19 cases and deaths by region per 100k habitants were obtained from https://coronavirus.data.gov.uk/details/download and are measured as moving averages over three days centred on the day of the interview. Standard errors are clustered at region level. Panel A reports coefficients for men (α_k^M, where k=1,..,5), while Panel B reports the coefficients for women ($\alpha_k^M + \alpha_k^W$) from Eq. (1). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. ***.

sociodemographic and economic characteristics, such as age, marital status, number of children aged 16 or under, labour market status (in employment, unemployed or inactive, student, retired), highest qualification achieved, region of residence (North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East London, South East, South West, Wales, Scotland, Northern Ireland), household income (less than £20,000; £20,000–£30,000; £30,000–£60,000; £60,000–£90,000 and above £90,000) and Standard Occupational Classification (SOC) codes that we map to indicators for high- (SOC major groups 1, 2 and 3), medium- (SOC major groups 4, 5, 6 and 7) and low-skilled occupations (SOC major groups 8 and 9). Finally, rolling three-day averages of infection and death rates per 100,000 inhabitants at regional level, collected from the UK Coronavirus Dashboard, were used as proxy for the epidemiological risk levels of the area where the respondents live.

3. Empirical strategy

To understand the impact of the policy response to the COVID-19 outbreak on subjective well-being, we rely on an event-study specification where we compare changes in life satisfaction between 2016 (our baseline) and different stages of the pandemic when social restrictions with different stringency were introduced in the United Kingdom. Empirically, our event-study methodology is based on the following specification:

$$Sat_i = \alpha_0 + \delta W_i + \alpha_1^M May20_i + \alpha_2^M Aug20_i + \alpha_3^M Nov20_i + \alpha_4^M Jan21_i + \alpha_5^M Sep21_i + \; + \alpha_1^W May20_i{*}W_i + \alpha_2^W Aug20_i{*}W_i + \alpha_3^W Nov20_i{*}W_i + \alpha_4^W Jan21_i{*}W_i + \; + \alpha_5^W Sep21_i{*}W_i + X_i\gamma + \; \varepsilon_i \quad (1)$$

where Sat_i represents the self-reported measure of life satisfaction of individual i and $May20_i$, $Aug20_i$, $Nov20_i$ and $Jan21_i$ are binary indicators for each period of the pandemic covered by our data. X_i includes economic and sociodemographic characteristics, indicators for region of residence and three-day moving averages of local infection and death rates as described in Section 2. W_i is a dummy taking value 1 if the respondent is a woman and 0 otherwise. Finally, ε_i is an idiosyncratic error term.

Our coefficients of interest are α_k^g (where $k = 1, ..5$ and $g = M, W$) as they identify changes in subjective well-being induced by the policy measures introduced as a response to the pandemic.[3] Given the evidence

[3] This interpretation holds under the assumption that there are no other factors (in addition to those we control for) which correlate with individuals' well-being and that are time-specific.

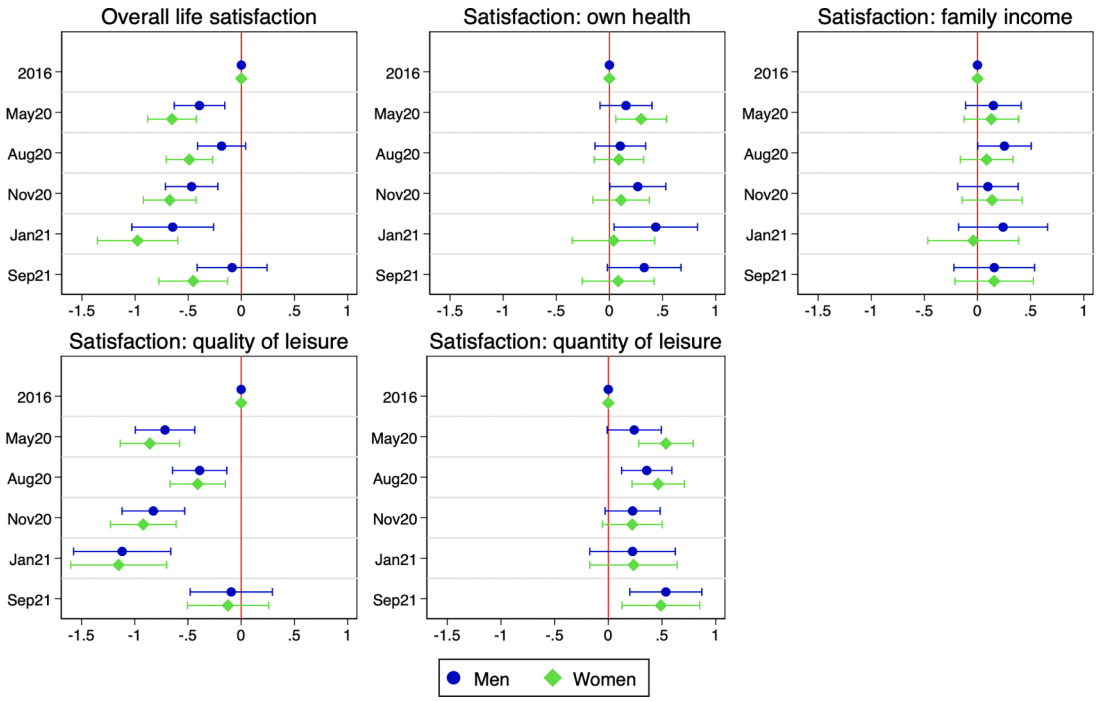

Fig. 1. Changes in satisfaction with different aspects of life.
Notes: Data come from the 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. Observations are working-age (18–69 years old) individuals interviewed in the six waves of the CaDDI surveys. Key variables measure satisfaction in five domains: overall life satisfaction (subjective well-being), with own health, with family income, with quality of leisure and with quantity of leisure. These are measured on a seven-point scale from "completely dissatisfied" to "completely satisfied." The figure reports OLS estimates of changes in satisfaction during the COVID-19 pandemic (with respect to satisfaction in the pre-pandemic period, i.e., May and October 2016) while controlling for the same set of covariates as in column 6 of Table 1. These estimates correspond to α_k^M (where k=1,..,5) for men, and ($\alpha_k^M + \alpha_k^W$) for women from Eq. (1).

from the previous literature showing that men and women have different preferences, risk attitudes and levels of subjective well-being, we allow these coefficients to differ by gender (i.e., α_k^W can differ from *zero*).

Our estimation exploits variation in the timing and stringency of social restrictions. Differently from other countries, the United Kingdom was affected by multiple and sudden changes in social restrictions. To disentangle the effect of the policy response from the effects of contemporaneous economic and health shocks, we include in the regression employment status, household income, type of occupation and the number of COVID-19 cases and related deaths at regional level.

We estimate Eq. (1) by OLS. While the main advantage of this approach is the immediate interpretation of the coefficients, it also presents some limitations. Inference relies on the assumption of normality of the dependent variable. Non-linear models fit better the nature of the outcome variable but require additional assumptions (Athey and Imbens, 2006; Blundell and Costa Dias, 2009). Further, our linear models rely on the assumption of cardinality and interpersonal comparability (also known as common reporting function), that is the difference in satisfaction between 4 and 5 for any individual is the same as between and 1 and 2 for any other individual (Bond and Lang, 2019; Bloem, 2022; Kaiser and Oswald, 2022; Oparina and Srisuma, 2022). In the analysis, we relax the cardinality assumption using an ordered probit model and we test the external validity of our findings by estimating discrete choice models, as suggested by Bond and Lang (2019).

4. Results

4.1. Subjective well-being and the stringency of the containment measures

Table 1 reports the changes in subjective well-being when containment measures with different stringency levels were in place. Columns 1 shows that subjective well-being decreased substantially during the pandemic and, in contrast to what other studies find, this reduction persisted one year after the onset of the pandemic. Accounting for demographic characteristics, such as age, household composition, and education (Columns 2), and the region of residence (Column 3) does not affect these estimates.

These results may be confounded by other factors, such as the financial and health shocks caused by the pandemic. However, when we control for household income, economic status of the respondent and the COVID-19 regional infection and death rates - these last two variables as proxies for the health risks of the virus - we find that the key coefficients do not change significantly (Columns 4 and 5). Similarly, when we include all controls the estimates of the negative changes in well-being are not affected (Column 6).

The negative change in subjective well-being is not monotone over time; instead, it appears to be proportional to the intensity of the lock-down measures and social restrictions implemented. In the first lock-down (May 2020), men's level of life satisfaction declined by 29 % of a standard deviation, while for women, the drop was 48 % of a standard deviation. However, life satisfaction increased once social restrictions were lifted (August 2020). When new containment measures were introduced in November 2020 and then even stricter ones in January 2021, average life satisfaction dropped again, with the negative change being larger in January 2021 (47 % and 71 % of a standard deviation for men and women, respectively), suggesting that people did not adjust to the "new normal".

We also observe important gender differences in the impact of the social restrictions. Women experienced a greater drop in subjective well-being than men, in line with previous studies finding that women's psychological well-being is more likely to be affected by macroeconomic

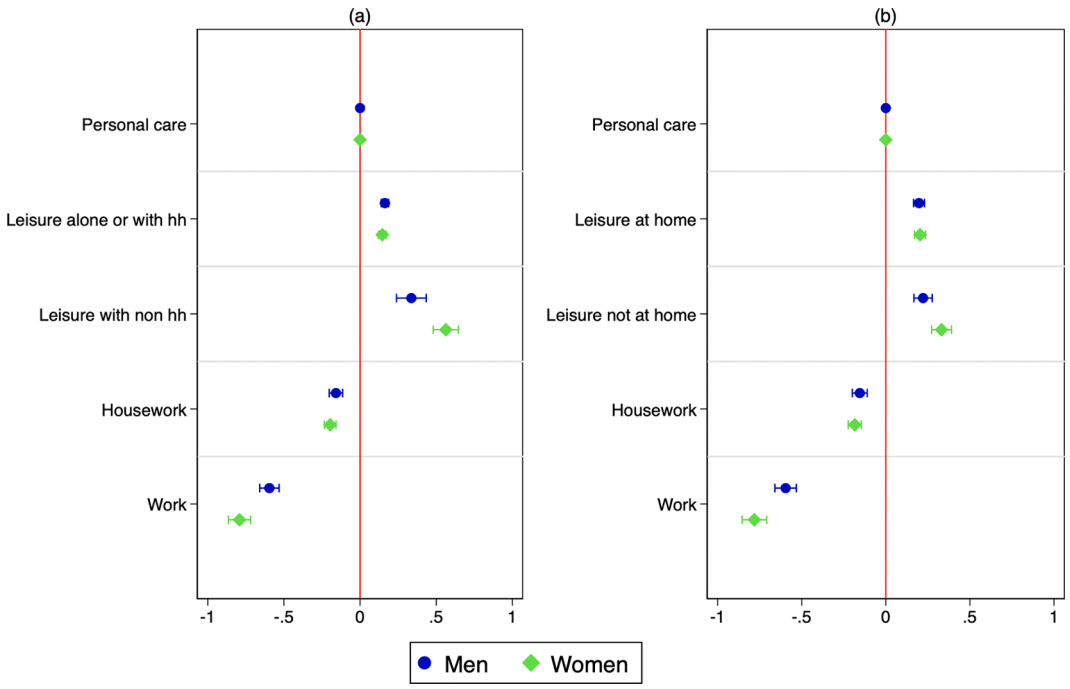

Fig. 2. Instantaneous enjoyment by type of activities.
Notes: Data come from 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. Observations are episodes of activities reported in diaries by individuals aged 18–69 years old and interviewed in the six waves of the CaDDI surveys. The dependent variable is defined as the instantaneous enjoyment reported by respondents for each of these episodes in their diary. Appendix B lists the activities included in the definition of leisure, personal care, housework and work time. Figures (a) and (b) report the results when leisure is classified by copresence and by location, respectively. The results are obtained from OLS analysis with controls for age, marital status, indicator for whether there is a child aged 16 or less in the household, employment status, highest qualification, regional dummies, household income, indicators for whether the occupation is high, medium or low skilled, regional dummies, COVID-19 cases and deaths by region per 100k habitants, total number of minutes spent in leisure during the day and day of the week.

shocks (Adams-Prassl et al., 2020; Alon et al., 2020; Andrew et al., 2020; Oreffice and Quintana-Domeque, 2021). For women, it also took longer to recover. Indeed, in September 2021, when men's well-being returned to pre-pandemic levels, women's life satisfaction remained 28 % of a standard deviation lower than its pre-pandemic level.[4]

These findings are robust to sample reweighting (Table A3) and consistent with the estimated marginal effects from an ordered probit model that relax the assumption of cardinality (Table A4).

There are two issues affecting our estimates that we are unable to account for due to data limitations. First, the presence of a negative trend in well-being that precedes the onset of the pandemic may lead to an overestimation of the social restrictions effect. Second, seasonal differences in well-being which coincide with the time of year the survey was undertaken may cofound our estimates. The structure of the CaDDI data, that only includes one pre-pandemic wave (2016) and five additional waves collected at different times of the year, does not allow us to account for a decreasing pre-trend nor to disentangle the effect of seasonality. For this reason, we confirm the external validity of our results using the APS, a nationally representative annual survey that includes around 150,000 respondents, with a distribution of life satisfaction which closely follows the one obtained using CaDDI data (Table D1). The full analysis is reported in Appendix D. We first document the presence of a negative time trend in life satisfaction that started in late 2018 (Fig. D1). Then we estimate a counterfactual level of life satisfaction, which would have prevailed in the absence of the pandemic. Banks and Xu (2020) define the effect of the pandemic as the difference between individuals' mental health (in our case, life satisfaction) during the pandemic and a prediction of their likely level of mental health over the same period had the pandemic not happened. Results show that even after controlling for the time trend, the drop in well-being during the pandemic does not dissipate and, in line with our results, the drop is greater during the strictest lockdown of January 2021. Similarly, we use APS data to show that controlling for seasonality has a small effect on the estimates of the changes in well-being (Fig. D3).

Taken together, our results suggest that the decline in well-being was caused by policy restrictions more than by the economic and health crisis generated by the pandemic. This hypothesis is supported by the results in Fig. 1, where we show how, among different aspects of people's life that changed during the pandemic (own health, household income, quality and quantity of social life and leisure time), only satisfaction with the quality of social life and leisure time follows a trend similar to the one that we observe for subjective well-being.[5] The most noticeable drop in the quality of leisure is observable for January 2021, i.e., during the most stringent lockdown, when meetings with friends and family members from different households were banned and all public gatherings and social events cancelled. In September 2021, instead, when most restrictions were lifted, the levels of satisfaction with the quality of social life returned to their pre-pandemic levels. Further

[4] Fig. A1 (Appendix A) shows the results when we allow the effect of the stringency of the social restrictions to vary across different groups. We find no significant differences in trends; however, in line with previous studies (Biroli et al., 2021, Blanden et al., 2022), we find that the drop was larger for parents than for adults with no children (and the difference is statistically significant).

[5] These results are also in line with studies showing that individuals who have more extraverted and open personality traits reported a greater mental health deterioration during the COVID-19 pandemic (Proto and Zhang, 2021).

Table 2
Changes in leisure time.

	(1) Alone or with household members	(2) With non-household members	(3) At home	(4) Away from home
Constant	419.246***	37.864***	311.081***	64.387***
	(18.174)	(8.294)	(17.204)	(10.137)
Women	-42.968***	11.938*	-29.750**	2.675
	(12.810)	(7.192)	(12.341)	(8.930)
		Panel A: Men		
May 2020	67.606***	-31.046***	76.073***	-37.239***
	(13.662)	(6.045)	(13.233)	(7.550)
Aug 2020	42.292***	-15.452**	47.972***	-15.903*
	(14.202)	(6.917)	(13.876)	(8.551)
Nov 2020	80.992***	-27.832***	92.523***	-34.388***
	(15.267)	(6.556)	(15.156)	(7.928)
Jan 2021	116.603***	-29.898***	118.422***	-25.419**
	(21.916)	(7.873)	(22.532)	(10.351)
Sep 2021	33.165*	-2.144	26.517	-0.371
	(18.445)	(8.279)	(18.387)	(11.086)
		Panel B: Women		
May 2020	98.90***	-40.83***	100.8***	-32.34***
	13.56	(5.947)	(13.16)	(7.676)
Aug 2020	42.70***	-16.62**	40.17***	-4.910
	12.82	(6.806)	(12.41)	(8.309)
Nov 2020	95.07***	-31.17***	95.38***	-28.74***
	14.73	(6.467)	(14.64)	(7.916)
Jan 2021	106.8***	-34.61***	105.3***	-28.32***
	21.32	(7.947)	(21.35)	(9.856)
Sep 2021	41.46**	-15.03*	14.12	3.189
	18.81	(8.433)	(18.50)	(10.83)
N. Diaries	6,432	6,432	6,432	6,432
N. Individuals	3,181	3,181	3,181	3,181
R-squared	0.125	0.046	0.118	0.049

Notes: Data come from the 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. Observations are working-age (18–69 years old) individuals interviewed in the six waves of the CaDDI surveys. The dependent variables measure min spent in a day in leisure activities by copresence (alone or with household members and with non–household members) and location (at home and away from home). Appendix B lists the activities included in the definition of leisure. The table reports OLS estimates of changes in time allocation during the COVID-19 pandemic (with respect to the pre-pandemic period, i.e., May and October 2016) with controls for the same set of covariates as in column 6 of Table 1 and an indicator for the day of the week in which the diary is completed. Panel A reports coefficients for men (α_k^M, where k=1,..,5), while Panel B reports the coefficients for women ($\alpha_k^M + \alpha_k^W$) from Eq. (1). Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. ***.

evidence supporting this hypothesis is presented in Table A6 where we show that satisfaction with the quality of leisure has one of the highest associations with life satisfaction and controlling for it in the main regression reduces the coefficients associated to the period dummies to zero for men and decreases the magnitude of the drop in well-being for women.

4.2. *Exploring the mechanisms: social isolation and loneliness*

We exploit the availability of information on individuals' time allocation combined with the level of enjoyment associated with each activity, to show that changes in time spent in preferred activities are associated to the changes that we observe in well-being.

We rank individuals' preferences on time allocation by estimating the mean instantaneous enjoyment for each activity (personal care, leisure with non–family members and family members, unpaid and paid work) with a regression analysis at episode level, while controlling for the episode length, day of the week, individual characteristics, regional dummies and COVID-19 infection and death rates. The baseline category is personal care, as it includes a set of activities that are undertaken by the whole sample. Fig. 2 shows that respondents enjoy leisure activities the most, especially those with non–household members. The least preferred activities are paid and unpaid work. We also find evidence of gender differences, as women assign a higher level of enjoyment to leisure time with non-family members and outside of the home than men. This ranking of preferences across different categories of activities is stable during the pandemic (Fig. A2 in Appendix A).[6]

An investigation of changes in leisure time by copresence and location during the pandemic (Table 2) finds that time in leisure alone or with household members increased for everyone throughout the pandemic, with the greatest surges observable for May 2020 (over an hour for men and one hour and forty minutes for women), November 2020 (80 min for men and 95 min for women) and January 2021 (116 min for men and 107 min for women). A similar pattern is observed for leisure time at home.

On the contrary, time spent with non–household members in leisure activities follows an inverse trend, with individuals spending less time with non–household members in periods when stricter social restrictions were in place: the reduction in leisure with others was 31 and 41 min, respectively, for men and women in May 2020, 28 and 31 min in November 2020, and 30 and 35 min in January 2021.

[6] Given the structure of the time diaries, information on the instantaneous enjoyment associated to each activity is collected only if the respondent spends some time in these activities. The national lockdowns restricted individuals' freedom, therefore fewer individuals reported spending time (and the associated instantaneous enjoyment) in leisure activities with non-household members or outside the house in those periods, making their instantaneous enjoyment less representative of the full sample. Additionally, the composition of leisure activities also changed in response to the constraints imposed (see also Fig. 3 top and bottom panel).

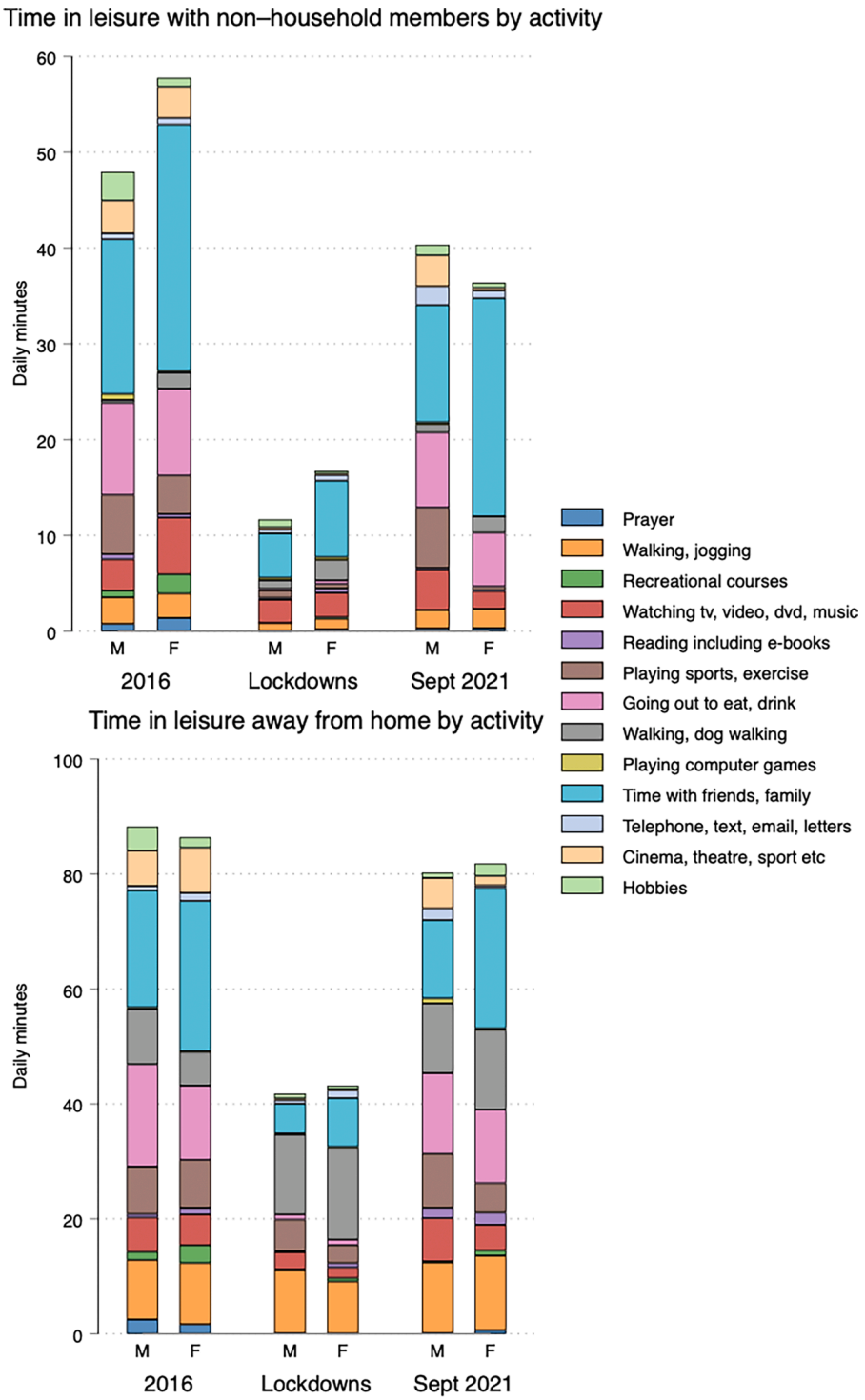

Fig. 3. Time in Leisure with non–household members and away from home by activity.
Notes: Data comes from the 2016, May 2020, November 2020, January 2021 (labelled as "lockdowns") and September 2021 CaDDI time diary surveys. Each element of the stacked bars represents the mean daily minutes spent in each type of leisure activity with non–household members and away from home.

In September 2021, when all social restrictions were removed, men's leisure time with non–household members and away from home returned to its pre-pandemic levels. Similarly, their life satisfaction returned to pre-pandemic levels (Table 1). For women, instead, while the amount of time spent with non–household members increased with respect to the level in the lockdown periods, it was still lower than the pre-pandemic level, as was their life satisfaction.

To present a more comprehensive picture of how social restrictions changed individuals' time allocation we report changes in the composition of leisure time with non–family members (Fig. 3 top panel) and away from home (Fig. 3, bottom panel) for 2016, the lockdown waves and September 2021. This visual representation of time use shows that during the lockdowns and compared to 2016, both men and women spent considerably less time in all leisure activities with non–household members, with those involving locations other than home (e.g., going out to drink or eat or to the cinema or theatre) reduced almost to zero. As

Table 3
Changes in time allocation by activities.

	(1) Personal Care	(2) Unpaid work	(3) Paid work
Constant	767.914***	52.400***	144.015***
	(15.791)	(12.639)	(16.854)
Women	13.023	78.949***	-54.587***
	(11.181)	(9.999)	(12.829)
		Panel A: Men	
May 2020	3.251	32.787***	-81.315***
	(12.645)	(10.159)	(13.698)
Aug 2020	-0.024	7.045	-28.153**
	(13.071)	(9.483)	(13.956)
Nov 2020	-20.952	-4.510	-24.100
	(13.436)	(10.295)	(14.722)
Jan 2021	-22.468	1.018	-57.817***
	(19.944)	(16.049)	(21.106)
Sep 2021	-40.909**	12.405	4.485
	(17.845)	(13.589)	(18.037)
		Panel B: Women	
May 2020	-4.447	-5.107	-60.06***
	(11.324)	(11.102)	(13)
Aug 2020	-20.37***	0.285	-9.981
	(10.671)	(10.974)	(12.752)
Nov 2020	-39.30***	-31.37***	9.155
	(12.752)	(11.921)	(14.361)
Jan 2021	-25.69	-24.50	-13.85
	(18.161)	(15.846)	(20.436)
Sep 2021	-12.85	-3.484	-0.906
	(17.601)	(14.283)	(18.218)
N. Diaries	6,432	6,432	6,432
N. Individuals	3,181	3,181	3,181
R-squared	0.036	0.141	0.281

Notes: Data come from the 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. Observations are working-age (18–69 years old) individuals interviewed in the six waves of the CaDDI surveys. The dependent variables measure minutes spent in a day. Appendix B lists the activities included in the definition of personal care, unpaid and paid work. The table reports OLS estimates of changes in time allocation during the COVID-19 pandemic (with respect the pre-pandemic period, i.e., May and October 2016) while controlling for the same set of covariates as in column 6 of Table 1 and an indicator for the day of the week in which the diary is completed. Robust standard errors in parentheses. Panel A reports coefficients for men (α_k^M, where k=1,..,5), while Panel B reports the coefficients for women ($\alpha_k^M + \alpha_k^W$) from Eq. (1). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. ***.

the restrictions were lifted, men allocated their time across leisure activities with non–household members more similarly to how they did in 2016 (in particular, exercising, playing sports, going to cinema and sport events). The leisure time of women with non–household members increased after the three lockdowns, but their time spent outside the home, such as at the cinema or theatre, in sporting events or recreational courses, or playing sports and exercising, was still significantly lower than in 2016.

Interestingly, when we explore patterns in time allocated to other types of activities, such as unpaid and paid work or personal care, we find that none of these activities follow trends similar to the one we observe for life satisfaction (Table 3). More specifically, time in unpaid work increased for men only during the first lockdown while it never increased for women. [7] Men reduced the time they spent in paid work during the pandemic, especially during the two strictest lockdowns when most shops and workplaces were temporarily closed. For women the change in working time was only temporary and returned to pre-pandemic levels after the first lockdown.

In summary, in comparison to men, women take more enjoyment in spending time in leisure activities both with non-household members and outside their home. If this is the case, one would expect the same reduction in time allocated to these activities to lead to a larger drop in well-being for women. [8]

5. Discussion and conclusion

In this paper we explore possible mechanisms behind the substantial decrease in well-being observed during different phases of the COVID-19 crisis in the United Kingdom. We focus, in particular, on individual preferences over time allocation and the behavioural changes determined by social restrictions with different degrees of stringency that were implemented over the pandemic.

Combining self-reported information on satisfaction with different domains of life and on the time allocation and instantaneous enjoyment associated with different activities, we show that the change in social interactions and the increase in loneliness induced by the pandemic social restrictions in the UK are associated to a significant drop in individuals' well-being.

Women experienced larger reduction in life satisfaction than men throughout the pandemic and these gender differences seem to be linked to different levels of enjoyment associated to leisure activities, with women enjoying leisure time spent with non–household members to a greater extent than men. This implies that *the same* absolute or relative changes in time use can have differential well-being impacts when weighted by preferences or when the time allocation is considered with respect to different ex ante compositions.

Not only the intensity of the impact of these restrictions, but also the persistence of the shock differs by gender. Indeed, in September 2021, when all restrictions were removed, women's well-being was still 28 % of a standard deviation lower than its pre-pandemic level, while that of men had rebounded to its pre-pandemic level. This evidence, combined with the fact that the amount of time women spent in leisure activities with non-family members was lower than the pre-pandemic levels, seems to suggest that women adopted preventive behaviours that resulted in loneliness (and low levels of well-being) even when no mandatory restrictions were in place, as a consequence of their risk attitudes (Etheridge and Spantig 2022). Indeed, there is a large body of literature documenting gender differences in risk perceptions and preferences, also in the context of the COVID-19 pandemic (e.g., Capraro, 2020; Fan et al., 2020; Nino et al., 2021; Dryhurst et al., 2020; Galasso et al., 2020; Bundorf et al., 2023). Decker and Schmitz (2016) show that women are not only less risk willing in general, but their risk attitudes are also more strongly affected by the experience of a health shock, which persists for at least four years after the shock. These findings, along with evidence from previous studies documenting a direct link between women's risk aversion and more conservative choices (Jianakoplos and Bernasek, 1998; Barber and Odean, 2001; Croson and Gneezy, 2009) can explain why women would continue to engage in precautionary health behaviours (including less interactions with non-household members), even after the relaxation of all the social restrictions, ultimately damaging their well-being.

Admittedly, our findings may partly reflect a sequence effect, such that earlier lockdowns exacerbate the effect of subsequent lockdowns, or an anchoring effect, where the severity of later lockdowns is assessed relative to the previous one. Indeed, in January 2021 both men and women experienced the largest drop in well-being: this can be due to the severity of the social restrictions per-se (in January 2021 they were the strictest ever to date), but it might also be a consequence of the repeated

[7] If we focus on intra-household allocation of time, we find that women did not increase their time in housework in May and August 2020 and they reduced it during the November and January lockdowns possibly as a consequence of the restrictions imposed to mobility (Fig. A3).

[8] This result is in line with Etheridge and Spantig (2022) who find that social factors matter the most in explaining the gender gap in well-being.

introduction of these restrictions in a short period of time (this was their third lockdown in less than 12 months). If this is the case, the drop in well-being in January 2021 would capture the cumulative effect of the events occurred up to that point and we should consider our estimates as upper bound of the effect that would have occurred in case of a random shock.

Overall, the UK lockdowns appear to have affected well-being more through the direct loss of social interactions than through their effect on the labour market and health distress. While the COVID-19 pandemic has been characterised by unusual circumstances and an unprecedented policy response, the implications of this study can be generalised to situations when policy needs to weight many competing objectives. This implies that future interventions put in place to counteract the total effect of macro-shocks should consider additional dimensions such as the possible negative shifts in individual well-being and mental health.

CRediT authorship contribution statement

Francesca Foliano: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Valentina Tonei:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing. **Almudena Sevilla:** Conceptualization, Funding acquisition.

Data availability

The anonymized 6-wave data are available from the core collection of the UK Data Archive, Study no. 8741 (https://doi.org/10.5255/UKDA-SN-8741-1).

Appendix A

Table A5

Table A1
Summary statistics of covariates.

	2016	May 2020	Aug 2020	Nov 2020	Jan 2021	Sep 2021
Female	0.493	0.494	0.519	0.507	0.523	0.463
Age						
Less than 30 years	0.220	0.233	0.170	0.141	0.236	0.135
30 to 40 years	0.206	0.233	0.279	0.291	0.227	0.185
40 to 50 years	0.173	0.226	0.221	0.228	0.207	0.193
50 to 69 years	0.401	0.309	0.330	0.340	0.329	0.488
Employed						
High skill occupation	0.303	0.411	0.430	0.403	0.383	0.336
Mid-skill occupation	0.282	0.264	0.247	0.280	0.229	0.247
Low-skill occupation	0.088	0.059	0.077	0.065	0.047	0.037
Occupation missing	0.026	0.018	0.040	0.011	0.044	0.023
Student	0.054	0.060	0.040	0.023	0.052	0.025
Retired	0.147	0.072	0.051	0.093	0.089	0.180
Unemployed or inactive	0.100	0.111	0.116	0.125	0.157	0.151
Higher Education	0.457	0.545	0.579	0.577	0.515	0.508
Single/divorced/widowed	0.354	0.395	0.340	0.350	0.388	0.367
At least 1 child <=16 y.o.	0.321	0.368	0.426	0.348	0.351	0.334
Income						
<=£20k	0.223	0.167	0.147	0.154	0.176	0.199
£20k-30k	0.230	0.194	0.160	0.193	0.186	0.176
£30k-60k	0.165	0.167	0.137	0.156	0.166	0.158
£60k-90k	0.188	0.196	0.242	0.228	0.222	0.195
>=£90k	0.194	0.275	0.314	0.268	0.251	0.272
Missing	0.000	0.045	0.049	0.033	0.051	0.033
Regions						
London	0.073	0.097	0.084	0.172	0.145	0.137
Yorkshire & Humberside	0.083	0.090	0.074	0.088	0.079	0.064
East Midlands	0.085	0.106	0.093	0.055	0.070	0.068
East Anglia	0.095	0.079	0.088	0.088	0.087	0.081
South East	0.117	0.113	0.086	0.148	0.132	0.137
South West	0.077	0.083	0.093	0.081	0.084	0.099
West Midlands	0.140	0.090	0.151	0.085	0.082	0.079
North West	0.095	0.090	0.100	0.089	0.115	0.129
Scotland	0.016	0.020	0.012	0.092	0.075	0.085
Wales	0.054	0.045	0.037	0.049	0.053	0.044
Northern Ireland	0.049	0.041	0.053	0.015	0.025	0.023
North East	0.116	0.144	0.128	0.037	0.052	0.054
N. Individuals	613	443	430	615	598	482

Notes: Data come from 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. COVID cases and deaths by region per 100k habitants were obtained from: https://coronavirus.data.gov.uk/details/download and they are measured as moving averages over three days centred in the first day of the interview. Numbers represent proportions of the sample.

Table A2
Summary statistics of the dependent variables.

	2016	May 2020	Aug 2020	Nov 2020	Jan 2021	Sep 2021
			Panel A: Satisfaction with			
Life Overall	5.106	4.567	4.795	4.579	4.366	4.892
	(1.301)	(1.399)	(1.326)	(1.349)	(1.425)	(1.350)
Health	4.713	4.926	4.872	4.872	4.803	4.969
	(1.473)	(1.303)	(1.283)	(1.328)	(1.337)	(1.359)
Income	4.488	4.571	4.705	4.633	4.472	4.824
	(1.555)	(1.533)	(1.475)	(1.466)	(1.559)	(1.553)
Quantity of leisure	4.760	5.000	5.077	4.876	4.771	5.398
	(1.520)	(1.400)	(1.319)	(1.358)	(1.474)	(1.302)
Quality of leisure	4.693	3.865	4.312	3.865	3.602	4.680
	(1.494)	(1.631)	(1.452)	(1.569)	(1.620)	(1.465)
N. Individuals	613	443	430	615	598	482
			Panel B: Leisure Time			
Alone or w household member	367.9	447.7	404.9	426.7	433.4	394.2
	(230.1)	(287.5)	(297.6)	(286.2)	(277.0)	(270.2)
With non-household member	51.33	14.39	34.42	16.41	9.047	35.89
	(111.6)	(65.63)	(102.3)	(72.59)	(53.06)	(94.41)
At home	282.5	348.4	302.3	345.4	354.9	296.9
	(194.2)	(214.5)	(228.7)	(225.7)	(226.7)	(220.4)
Away from home	84.81	45.01	71.49	41.76	33.73	75.34
	(136.2)	(91.09)	(125.8)	(81.98)	(76.22)	(131.6)
N. Diaries	935	983	987	1277	1154	1096
N. Individuals	613	443	430	615	598	482
			Panel C: Instantaneous Enjoyment in Leisure Activities			
Enjoyment	5.258	5.368	5.320	5.295	5.228	5.414
	(1.439)	(1.344)	(1.393)	(1.338)	(1.396)	(1.442)
N. Episodes	3,527	3,697	3,561	4,622	3,966	3,848
N. Diaries	908	927	906	1,212	1,073	1,020
N. Individuals	602	438	419	599	575	468

Notes: Data come from 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. Panels A and B include CaDDI respondents aged 18-69, while in Panel C the sample is restricted to those individuals who reports at least one episode of leisure activities in their time diaries. Values represent average satisfaction (Panel A), time spent in leisure activities (Panel B), as defined in Appendix B and instantaneous enjoyment (Panel C). Standard deviations are reported in parentheses.

Table A3
Changes in overall satisfaction using weights.

	(1)	(2)	(3)	(4)	(5)	(6)
Constant	4.902***	5.047***	5.014***	4.705***	5.033***	4.721***
	(0.083)	(0.116)	(0.154)	(0.169)	(0.158)	(0.173)
Women	0.329***	0.295***	0.289***	0.294***	0.289***	0.294***
	(0.111)	(0.108)	(0.109)	(0.106)	(0.109)	(0.106)
			Panel A: Men			
May 2020	-0.349**	-0.327**	-0.294**	-0.334**	-0.327**	-0.364***
	(0.140)	(0.133)	(0.133)	(0.130)	(0.138)	(0.135)
Aug 2020	-0.110	-0.131	-0.103	-0.098	-0.101	-0.097
	(0.185)	(0.180)	(0.178)	(0.178)	(0.179)	(0.178)
Nov 2020	-0.403***	-0.391***	-0.373***	-0.380***	-0.382**	-0.419***
	(0.131)	(0.130)	(0.131)	(0.126)	(0.160)	(0.154)
Jan 2021	-0.463***	-0.428***	-0.424***	-0.455***	-0.505**	-0.579***
	(0.124)	(0.122)	(0.122)	(0.118)	(0.225)	(0.218)
Sep 2021	-0.025	0.001	0.031	-0.029	0.138	0.003
	(0.137)	(0.135)	(0.133)	(0.128)	(0.212)	(0.204)
			Panel B: Women			
May 2020	-0.727***	-0.691***	-0.677***	-0.634***	-0.708***	-0.662***
	(0.123)	(0.122)	(0.122)	(0.121)	(0.128)	(0.127)
Aug 2020	-0.566***	-0.538***	-0.540***	-0.517***	-0.538***	-0.516***
	(0.127)	(0.128)	(0.126)	(0.128)	(0.126)	(0.128)
Nov 2020	-0.768***	-0.747***	-0.731***	-0.700***	-0.743***	-0.743***
	(0.120)	(0.117)	(0.117)	(0.117)	(0.144)	(0.143)
Jan 2021	-0.987***	-0.962***	-0.934***	-0.901***	-1.015***	-1.022***
	(0.119)	(0.118)	(0.118)	(0.117)	(0.218)	(0.214)
Sept 2021	-0.474***	-0.444***	-0.432***	-0.410***	-0.326*	-0.378**
	(0.116)	(0.114)	(0.113)	(0.112)	(0.186)	(0.186)
N. Individuals	3,181	3,181	3,181	3,181	3,181	3,181
R-squared	0.037	0.076	0.089	0.117	0.090	0.117

Notes: Data come from the 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. Observations are working-age (18–69 years old) individuals interviewed in the six waves of the CaDDI surveys. The dependent variable is the raw measure of overall life satisfaction (subjective well-being), measured on a seven-point scale from "completely dissatisfied" to "completely satisfied". The table reports OLS estimates of changes in well-being during the COVID-19 pandemic (with respect to well-being in the pre-pandemic period, i.e., May and October 2016) while controlling for different sets of covariates. Socio-demographic characteristics include age, marital status, an indicator for whether there is a child aged 16 or under in the household, employment status and highest

qualification. Regional dummies are indicators for the following 12 regions: North East, North West, Yorkshire and the Humber, East Midlands, West Midlands, East London, South East, South West, Wales, Scotland, Northern Ireland. Economic variables include household income and indicators for whether the occupation is high, medium or low skilled. COVID cases and deaths by region per 100k habitants were obtained from https://coronavirus.data.gov.uk/details/download and they are measured as moving averages over three days centred in the first day of the interview. To weight the observations in this regression we use post-stratification weights. We define 16 groups from four age categories (age≤30, >30 and ≤ 40, >40 and ≤ 50, >50 and ≤ 69), two education categories (with higher education, without higher education) and genders (female and male). The weights are obtained by dividing the proportion of APS 2016 respondents in each of these groups by the proportion of the same group in the CaDDI sample. Panel A reports coefficients for men (α_k^M,where k=1,..,5), while Panel B reports the coefficients for women ($\alpha_k^M + \alpha_k^W$) from Eq. (1). Sample was re-weighted to ensure that the joint density of gender, education, and age in our samples matches that of the population aged 18–69 in the 2016 Annual Population Survey. Standard errors are clustered at region level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. ***.

Table A4
Ordered probit.

	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
	Completely dissatisfied (1)		Mostly dissatisfied (2)		Somewhat dissatisfied (3)		Neither satisfied or dissatisfied (4)		Somewhat satisfied (5)		Mostly satisfied (6)		Completely satisfied (7)	
2016	0.012	0.006	0.035	0.022	0.095	0.069	0.132	0.107	0.315	0.295	0.344	0.398	0.068	0.103
	(0.003)	(0.002)	(0.005)	(0.004)	(0.010)	(0.008)	(0.009)	(0.009)	(0.009)	(0.011)	(0.020)	(0.018)	(0.011)	(0.014)
May 2020	0.025	0.026	0.061	0.061	0.136	0.137	0.162	0.163	0.318	0.318	0.262	0.260	0.036	0.035
	(0.005)	(0.005)	(0.009)	(0.008)	(0.012)	(0.012)	(0.009)	(0.009)	(0.009)	(0.009)	(0.022)	(0.021)	(0.007)	(0.007)
Aug 2020	0.018	0.019	0.047	0.050	0.116	0.120	0.149	0.152	0.320	0.320	0.300	0.293	0.049	0.046
	(0.004)	(0.004)	(0.007)	(0.007)	(0.012)	(0.012)	(0.010)	(0.010)	(0.008)	(0.008)	(0.023)	(0.022)	(0.009)	(0.008)
Nov 2020	0.029	0.026	0.067	0.062	0.145	0.139	0.167	0.164	0.315	0.318	0.245	0.257	0.031	0.034
	(0.005)	(0.004)	(0.007)	(0.007)	(0.010)	(0.010)	(0.008)	(0.008)	(0.009)	(0.009)	(0.016)	(0.016)	(0.005)	(0.005)
Jan 2021	0.041	0.042	0.084	0.086	0.167	0.169	0.177	0.178	0.304	0.303	0.205	0.201	0.022	0.021
	(0.010)	(0.010)	(0.013)	(0.013)	(0.015)	(0.015)	(0.009)	(0.009)	(0.013)	(0.013)	(0.025)	(0.025)	(0.006)	(0.005)
Sep 2021	0.013	0.016	0.037	0.044	0.098	0.111	0.135	0.145	0.316	0.320	0.337	0.311	0.065	0.053
	(0.004)	(0.005)	(0.008)	(0.009)	(0.014)	(0.015)	(0.012)	(0.012)	(0.010)	(0.009)	(0.028)	(0.028)	(0.014)	(0.012)
N. Individuals	3,181													

Notes: Data come from the 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. The dependent variable is the raw measure of overall life satisfaction (subjective well-being), measured on a seven-point scale from "completely dissatisfied" to "completely satisfied". Control variables include age, marital status, whether there is a child aged 16 or under in the household, employment status, occupation, highest qualification and region indicators (same as in Column 6 of Table 1). The table reports marginal effects for men and women, obtained estimating Eq. (1) using an ordered probit model. Standard errors are reported in parentheses.

Table A5
Probit model – changes in subjective well-being.

	Pr(Completely Dissatisfied)		Pr(Completely Dissatisfied or mostly dissatisfied)		Pr(Completely Dissatisfied or Mostly Dissatisfied or Somewhat Dissatisfaction)	
	(1)	(2)	(3)	(4)	(5)	(6)
	ME	s.e.	ME	s.e.	ME	s.e
				Panel A: Men		
2016	0.016	0.008	0.055	0.014	0.144	0.023
May 2020	0.027	0.012	0.102	0.023	0.230	0.031
Aug 2020	0.024	0.011	0.063	0.018	0.169	0.029
Nov 2020	0.018	0.008	0.098	0.018	0.225	0.024
Jan 2021	0.061	0.029	0.131	0.036	0.258	0.044
Sep 2021	0.017	0.012	0.059	0.024	0.153	0.032
				Panel B: Women		
2016	0.016	0.008	0.035	0.011	0.109	0.020
May 2020	0.015	0.007	0.076	0.018	0.244	0.031
Aug 2020	0.009	0.006	0.072	0.019	0.209	0.031
Nov 2020	0.023	0.008	0.073	0.015	0.227	0.024
Jan 2021	0.032	0.017	0.138	0.036	0.327	0.048
Sept 2021	0.016	0.010	0.044	0.018	0.148	0.032
N. Individuals	3,181		3,181		3,181	

Notes: Data come from the 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. The table reports marginal effects (and standard errors) for men and women from the estimation of three probit models, where the dependent variable is a dummy taking value 1 if respondents report the following levels of life satisfaction (subjective well-being): "completely dissatisfied" (Columns 1 and 2), "Completely dissatisfied" or "Mostly dissatisfied" (Columns 3 and 4), "Completely dissatisfied" or "Mostly dissatisfied" or "Somewhat dissatisfied" (Columns 5 and 6). Control variables include age, marital status, whether there is a child aged 16 or under in the household, employment status, occupation, highest qualification and region indicators.

Table A6
Subjective well-being and satisfaction with different aspects of life.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Women	0.278***	0.197**	0.246***	0.283***	0.340***	0.259***	0.086**
	(0.099)	(0.087)	(0.085)	(0.091)	(0.077)	(0.074)	(0.039)
Constant	4.711***	2.452***	3.115***	2.907***	2.521***	1.340***	1.225***
	(0.146)	(0.152)	(0.141)	(0.156)	(0.142)	(0.138)	(0.131)
				Panel A: Men			
May 2020	-0.404***	-0.474***	-0.456***	-0.494***	-0.074	-0.291***	
	(0.121)	(0.103)	(0.102)	(0.110)	(0.102)	(0.092)	
Aug 2020	-0.184	-0.235**	-0.300***	-0.328***	-0.007	-0.186**	
	(0.116)	(0.099)	(0.102)	(0.110)	(0.100)	(0.091)	
Nov 2020	-0.457***	-0.595***	-0.541***	-0.563***	-0.082	-0.369***	
	(0.127)	(0.109)	(0.106)	(0.114)	(0.106)	(0.095)	
Jan 2021	-0.649***	-0.862***	-0.792***	-0.752***	-0.135	-0.544***	
	(0.197)	(0.175)	(0.176)	(0.179)	(0.169)	(0.155)	
Sep 2021	-0.024	-0.223	-0.231	-0.292**	0.001	-0.246**	
	(0.168)	(0.144)	(0.141)	(0.146)	(0.129)	(0.117)	
				Panel B: Women			
May 2020	-0.663***	-0.805***	-0.708***	-0.872***	-0.269***	-0.565***	
	(0.117)	(0.102)	(0.106)	(0.108)	(0.101)	(0.093)	
Aug 2020	-0.488***	-0.532***	-0.529***	-0.674***	-0.302***	-0.454***	
	(0.111)	(0.101)	(0.099)	(0.103)	(0.092)	(0.088)	
Nov 2020	-0.664***	-0.724***	-0.765***	-0.768***	-0.246**	-0.520***	
	(0.127)	(0.111)	(0.108)	(0.112)	(0.106)	(0.097)	
Jan 2021	-0.982***	-0.999***	-0.998***	-1.087***	-0.452***	-0.715***	
	(0.193)	(0.171)	(0.169)	(0.175)	(0.164)	(0.148)	
Sep 2021	-0.390**	-0.467***	-0.596***	-0.640***	-0.351**	-0.541***	
	(0.168)	(0.148)	(0.147)	(0.150)	(0.137)	(0.128)	
Satisfaction with:							
health		0.492***				0.241***	0.235***
		(0.017)				(0.018)	(0.018)
household income			0.442***			0.200***	0.195***
			(0.016)			(0.017)	(0.017)
amount of leisure				0.398***		0.067***	0.050***
				(0.018)		(0.018)	(0.018)
quality of leisure					0.456***	0.258***	0.281***
					(0.014)	(0.016)	(0.016)
N. Individuals	3,181	3,181	3,181	3,181	3,181	3,181	3,181
R-squared	0.121	0.341	0.327	0.274	0.371	0.489	0.479

Notes: Data come from the 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. Observations are working-age (18–69 years old) individuals interviewed in the six waves of the CaDDI surveys. The dependent variable is the raw measure of overall life satisfaction (subjective well-being), measured on a seven-point scale from "completely dissatisfied" to "completely satisfied". The table reports OLS estimates of changes in well-being during the COVID-19 pandemic (with respect to well-being in the pre-pandemic period, i.e., May and October 2016). Columns 1-5 replicate the analysis as in Column 6 of Table 1 but add also the four measures of satisfaction with health (Column 1), income (Column 2), quantity of leisure (Column 3) and quality of leisure (Column 4). Column 5 reports the results when all measures of satisfaction are included in the regression. Panel A reports coefficients for men (α_k^M, where k=1,..,5), while Panel B reports the coefficients for women ($\alpha_k^M + \alpha_k^W$) from Eq. (1). Column 6 includes only the satisfaction measures and the same covariates as in Column 6 of Table 1, without controlling for period dummies (nor the interaction between period dummies and women indicator). Standard errors are reported in parentheses and clustered at region level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. ***.

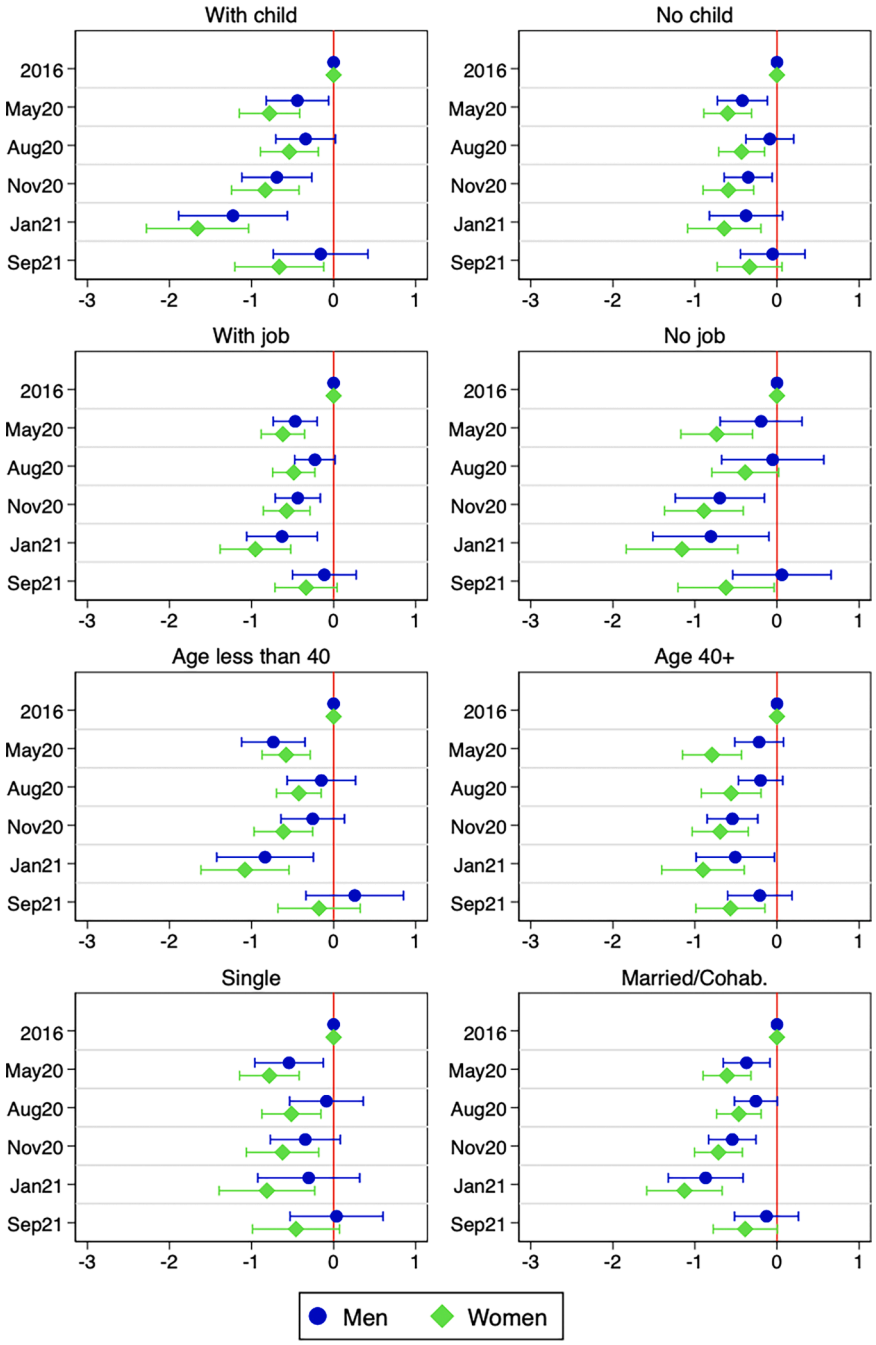

Fig. A1. Heterogeneity in changes in subjective well-being.
Notes: Data come from the 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. Observations are working-age (18–69 years old) individuals interviewed in the six waves of the CaDDI surveys. The dependent variable is the raw measure of overall life satisfaction (subjective well-being), measured on a seven-point scale from "completely dissatisfied" to "completely satisfied". The figure reports OLS estimates of changes in well-being during the COVID-19 pandemic (with respect to well-being in the pre-pandemic period, i.e., May and October 2016) while controlling for the same set of covariates as in Column 6 of Table 1. Coefficients for men *are estimates of* α_k^M, where k=1,..,5), while coefficients for women are estimates of $(\alpha_k^M + \alpha_k^W)$ from Eq. (1).

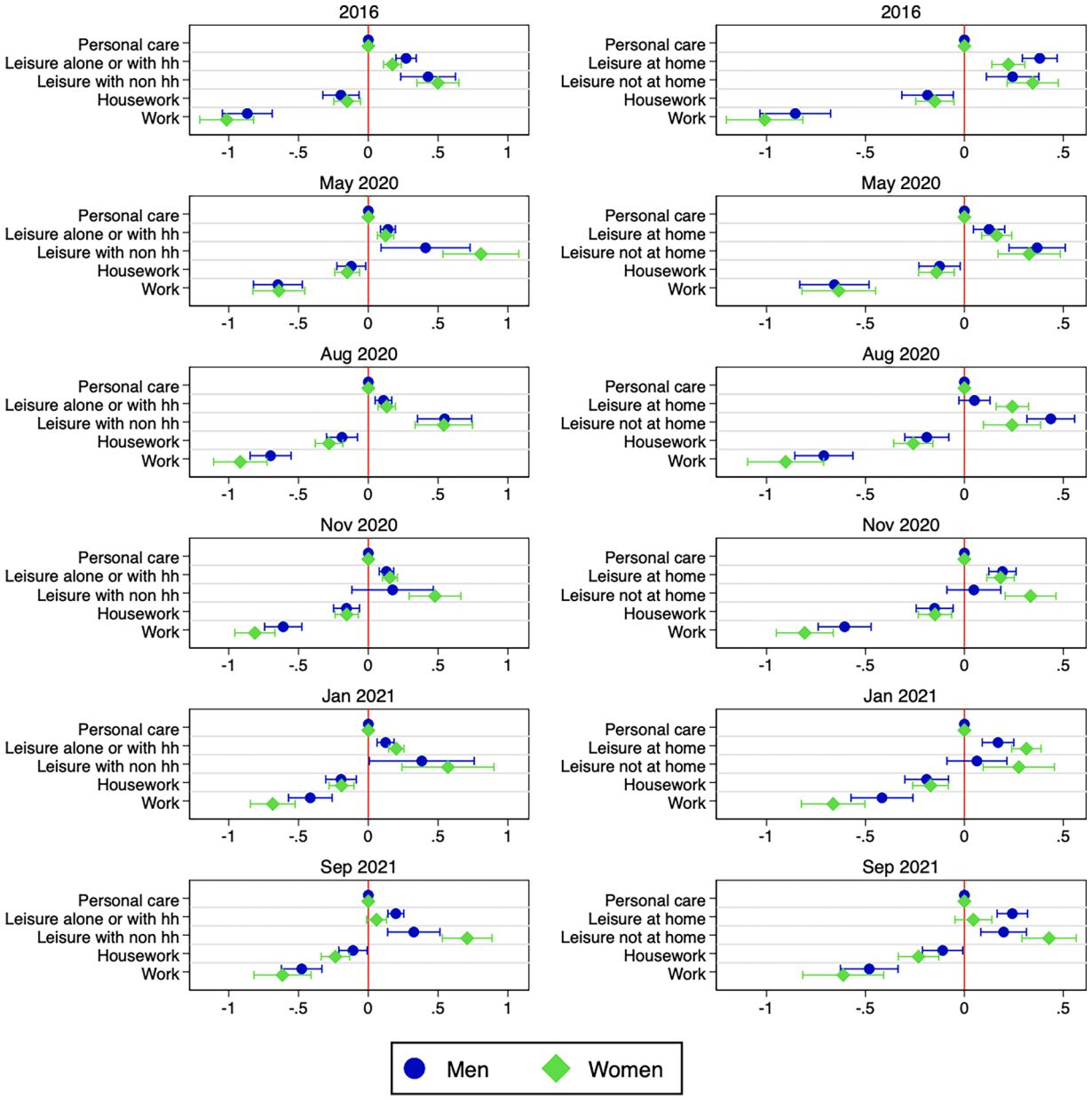

Fig. A2. Instantaneous enjoyment over time and across activities.

Notes: Data come from the 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. Observations are episodes of activities reported in diaries by individuals aged 18–69 years old and interviewed in the six waves of the CaDDI surveys. The dependent variable is defined as the raw measure of instantaneous enjoyment reported by respondents for each of these episodes in their diary. Appendix B lists the activities included in the definition of leisure, personal care, housework and work time. The left and right columns report the results when leisure is classified, respectively, by copresence and by location. The results are obtained from OLS analysis with controls for age, marital status, an indicator for whether there is a child aged 16 or under in the household, employment status, highest qualification, regional dummies, household income, indicators for whether the occupation is high, medium or low skilled, total number of minutes spent in leisure during the day and day of the week. Coefficients for men are estimates of α_k^M, where k=1,..,5, while coefficients for women are estimates of $(\alpha_k^M + \alpha_k^W)$ from Eq. (1).

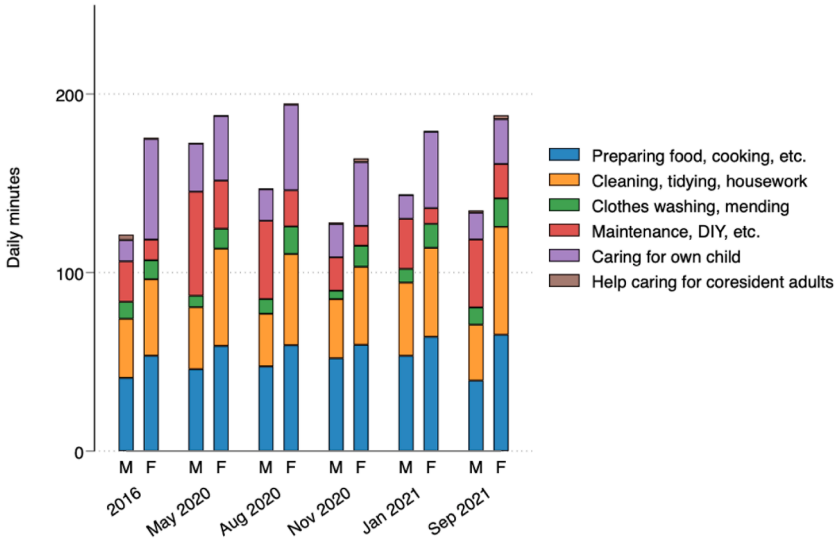

Fig. A3. Time in housework activities by gender and wave.
Notes: Data come from the 2016, May 2020, August 2020, November 2020, January 2021 and September 2021 CaDDI time diary surveys. Each element of the stacked bars represents the mean daily minutes spent in each type of housework activity. M indicates men and F indicates women.

Appendix B

Activities included in personal care, leisure, unpaid work and paid work.

Personal care	Leisure	Unpaid work	Paid work
Sleeping	Going to church, temple, synagogue, prayer	Preparing food, cooking	Paid work including at home
Resting	Walking, jogging	Cleaning, tidying housework	
Washing, dressing	Recreational courses	Clothes washing, mending	
Eating, drinking	Watching tv, video, DVD, listening to music	Maintenance, DIY, etc	
Travel by bike	Reading (including e-books)	Voluntary work for organisations	
Travel by car	Playing sports, exercise	Caring for own child	
Travel by bus, tram	Going out to eat, drink	Caring for other children	
Travel by train, tube	Walking, dog walking	Help, caring for co-resident adults	
Travel other	Playing computer games	Help, caring for non-coresidents	
Consuming services	Time with friends, family	Shopping, bank, etc (including internet)	
	Telephone, text, email, letters		
	Cinema, theatre, sport		
	Hobbies		
	Work break		

Appendix C

Table C1
UK Time Use Survey (UKTUS) and CaDDI comparison.

	CaDDI 2016	UK-TUS 2014-15
Leisure time alone/with household members	367.9	288.3
	(230.1)	(182.3)
Leisure time with non–household members	51.33	43.21
	(111.6)	(95.69)
Leisure time at home	282.5	242.3
	(194.2)	(179.8)
Leisure time not at home	84.81	89.22
	(136.2)	(128.8)
N. Diaries	935	16,510
N. Individuals	613	8,274

Notes: The table shows the weighted average number of minutes spent in leisure activities by location (home or away from home) and copresence (alone or with household members, or with non–household members) for individuals aged 18–69 in the UK Time Use survey. Similar unweighted statistics are reported for the CaDDI 2016 respondents. Standard deviations are reported in parentheses.

Appendix D: Analysis using the Annual Population Survey (APS)

Here below we report a set of additional analyses implemented using the Annual Population Survey (APS). The APS is a continuous household survey, representative of the UK population. It uses data combined from two waves of the Labour Force Survey (LFS). More importantly for our purposes, it collects information on individual's life satisfaction (subjective well-being) throughout the year. The question used to collect information on subjective well-being is the same as in the CaDDI data, however the APS uses an eleven-point scale (from 0 to 10). Below, we show that when we convert the APS scale to the CaDDI scale, the average level of well-being is similar in the two surveys

Table D1
Average subjective well-being by wave with CaDDI and APS data.

	2016 (May and Oct)	May 2020	Aug 2020	Nov 2020	Jan 2021	Sep 2021
CaDDI	5.1	4.5	4.8	4.5	4.3	4.8
	(1.3)	(1.4)	(1.3)	(1.3)	(1.4)	(1.4)
APS	7.6	7.5	7.5	7.3	7.1	7.5
	(1.7)	(1.7)	(1.7)	(1.8)	(1.8)	(1.7)
APS with CaDDI scale	4.9	4.7	4.7	4.6	4.5	4.8
	(1.1)	(1.1)	(1.1)	(1.1)	(1.1)	(1.1)
t-test	4.62	2.79	-0.54*	0.90*	3.10	-1.28*

Notes: Average values of subjective well-being (life satisfaction) in CaDDI and APS. Standard deviations are reported in parentheses. T-test refers to the t-statistic obtained to test whether the distribution of subjective well-bein in CaDDI and APS (using the CaDDI scale) is the same.

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D.1. Accounting for pre-existing trends

Using the APS, we first explore trends in subjective well-being from January/February 2012 to November/December 2021. Fig. D1 shows the existence of an inverse U-shaped trend. Indeed, men's and women's well-being increased over time until the end of 2018, when it started to decrease, indicating a pre-pandemic downward trend. In addition, similarly to what happens using the CaDDI data, we find that women's level of well-being was higher than men's in 2016, but women were also more affected than men by social restrictions, with larger reductions during stricter lockdowns.

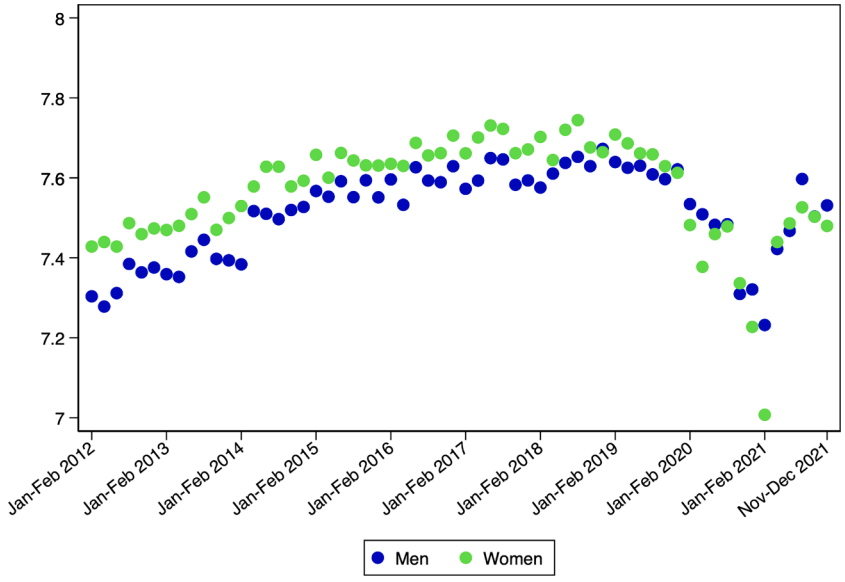

Fig. D1. Average life satisfaction by gender with APS.
Notes: The figure reports the average bi-monthly life satisfaction by gender from the APS. Observations are weighted using well-being weights provided.

To explore whether this downward trend accounts for some (or all) of the drop in well-being we observe during the COVID-19 pandemic, we follow the approach by Banks and Xu (2020). The idea is to estimate a counterfactual level of life satisfaction, which would have prevailed in the absence of the pandemic. Banks and Xu define the effect of the pandemic as the difference between individuals' mental health (in our case, life satisfaction) during the pandemic and a prediction of their likely level of mental health over the same period had the pandemic not happened. They compare this with a measure of the effect that is simply the difference between the respondents' pandemic and pre-pandemic values, to evaluate how the underlying time trends affect the estimates.

Following this approach, we regress, separately by gender, individual life satisfaction on the main individual characteristics available in the APS data (age, highest qualification, economic activity, occupations, region of residence, marital or cohabiting status), a time trend, a squared and cubic time trend and month dummies for the period 2012-2019. We then predict the individual life satisfaction for 2020 and 2021, we take the means of this predictions by gender, and we compare them with the means of life satisfaction from the pandemic years. The main differences between Banks and Xu's estimation approach and ours are due to the fact that we have multiple time periods during the pandemic (instead they focus on the first lockdown in March/April 2020), and we do not observe the same individuals over time, therefore we cannot include individual fixed-effects in the regression.

Fig. D2 mimics Fig. 4 in Banks and Xu (and Fig. 3 in Lindley and Rienzo, 2021), reporting the counterfactual prediction for years 2020-2021 and the

average well-being for the same period. Table D2 reports the same values (and their differences) for those periods that mostly overlap with CaDDI interview dates to allow the reader a more direct comparison between the APS and the CaDDI results. We find that, even after controlling for a negative time trend, there is still a drop in well-being during the pandemic. Women are more negatively affected than men by social restrictions, and the largest effects are observed during the strictest lockdowns. These conclusions are in line with those attained using CaDDI data.

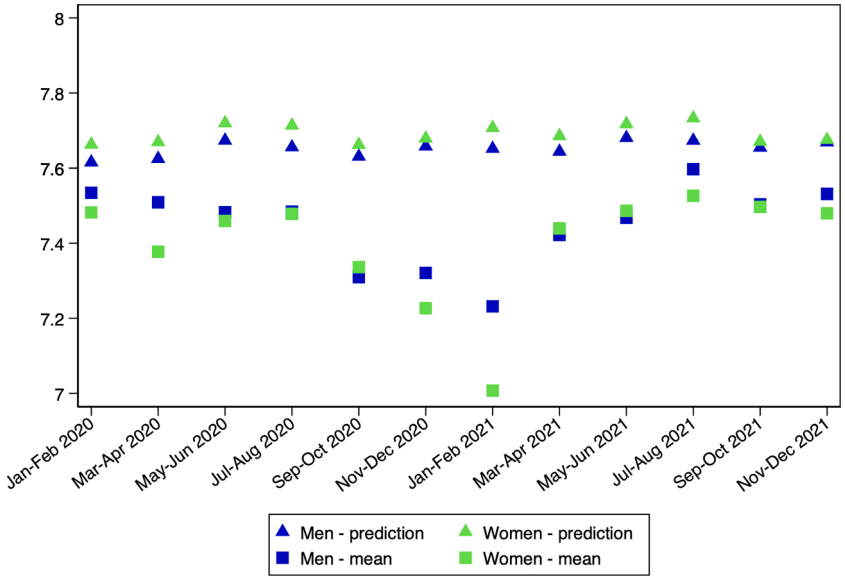

Fig. D2. Life satisfaction (mean and prediction) by gender.
Notes: The figure shows the prediction out of sample (triangle markers) and the mean (square markers) of reported life satisfaction for the years 2020 and 2021 based on APS data. Predicted life satisfaction for the years 2020 and 2021 was obtained by first regressing, separately by gender, individual life satisfaction on age, highest qualification, economic activity, occupations, region of residence, marital or cohabiting status, a time trend, a squared and cubic time trend and month dummies for the years 2012–2019 and then averaging the out-of sample individual predictions by gender and time. Predictions and means are obtained using the well-being weights provided in the APS.

Table D2
Predicted and average life satisfaction with APS by gender.

	May-Jun 2020	Jul-Aug 2020	Nov-Dec 2020	Jan-Feb 2021	Sep-Oct 2021
			Men		
Predict	7.674	7.656	7.658	7.652	7.655
Mean	7.482	7.484	7.321	7.232	7.503
Δ	-0.191	-0.172	-0.337	-0.420	-0.152
			Women		
Predict	7.720	7.714	7.679	7.707	7.671
Mean	7.459	7.478	7.227	7.008	7.497
Δ	-0.261	-0.235	-0.452	-0.700	-0.174

Notes: The table reports predicted and mean life satisfaction, and the difference between the two, for the five pandemic periods that mostly overlaps the dates of the CaDDI interviews. The calculation is based on the Annual Population Survey (APS). Predicted values for life satisfaction for the years 2020 and 2021 are obtained by first regressing individual life satisfaction on the main individual characteristics available in the APS dataset (age, highest qualification, economic activity, occupations, region of residence, marital or cohabiting status), a time trend, a squared and cubic time trend and month dummies for the period 2012–2019 and then by taking the mean, by gender, of the predicted individual life satisfaction for respondents in 2020 and 2021. Mean values for life satisfaction are obtained using well-being weights available in the survey.

D.2. Accounting for seasonality

A concern one may have when looking at our results is that we cannot completely ruled out that they reflect seasonal differences in well-being which coincide with the time of year the survey was undertaken. Indeed, previous studies have shown that there are seasonal patterns in suicide, as well as in happiness and well-being (Blanchflower and Bryson, 2022). We use the APS to show that seasonality does not affect our conclusions.

Fig. D3 shows changes in subjective well-being during the COVID-19 pandemic without and with seasonality adjustments (month dummies). Results do not change significantly when accounting for seasonality. In addition, results are perfectly in line with those that we obtain using our CaDDI data: the size of the drops in well-being seems to follow the intensity of the social restrictions in place, and women are more affected than men in all periods.

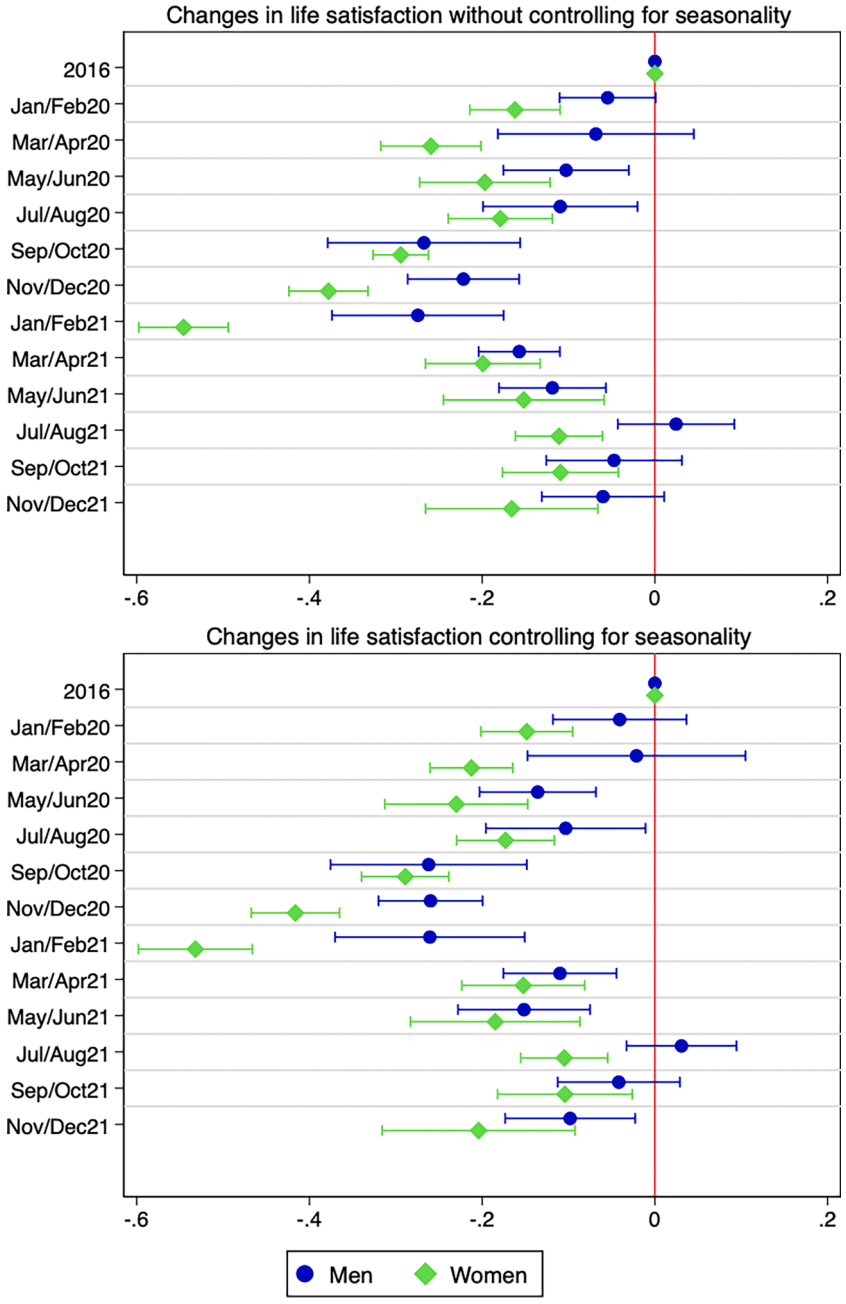

Fig. D3. Changes in life satisfaction accounting for seasonality

Notes: The figure reports coefficients from a regression analysis based on the 2016, 2020 **and** 2021 individual APS data. Observations are working-age (18–69 years old) respondents interviewed over the whole year. The dependent variable is the measure of overall life satisfaction (subjective well-being) measured on an eleven-point scale (0 being the least satisfied, 10 being the most satisfied). The OLS estimates in the top panel of the figure represent changes in well-being during the COVID-19 pandemic (with respect to well-being in 2016) while controlling for age, highest qualification achieved, economic status and occupation, marital status and region dummies. The bottom panel reports OLS estimates from a regression that further includes month dummies to control for seasonality in subjective well-being. Observations are weighted using the well-being weights provided in the APS. Standard errors are clustered at region level. Coefficients for men are estimates of α_k^M where k=1,..,5, while coefficients for women are estimates of $(\alpha_k^M + \alpha_k^W)$ from Eq. (1).

D.3. Data validation

In this section we evaluate the representativeness of our CaDDI data by comparing the main demographic characteristics of its respondents with those of individuals aged 18–69 interviewed in the 2016 APS.

CaDDI respondents are more likely to have achieved a postsecondary qualification and are slightly younger but are otherwise similar to their APS counterparts, as presented in Table D3. Throughout the analysis, we use the unweighted sample. However, as shown in Table A3 (in appendix A), our main results are robust to reweighting the sample to match the distribution of observable characteristics of the working-age population in the 2016 APS data.

Table D3
Annual population survey and CaDDI comparison.

	APS	CaDDI						
	2016	All	2016	May 2020	Aug 2020	Nov 2020	Jan 2021	Sep 2021
Higher education qual.	0.384	0.528	0.457	0.544	0.579	0.577	0.515	0.508
	(0.486)	(0.499)	(0.499)	(0.499)	(0.494)	(0.494)	(0.500)	(0.500)
Employed	0.711	0.723	0.700	0.752	0.793	0.759	0.702	0.643
	(0.453)	(0.448)	(0.459)	(0.433)	(0.406)	(0.428)	(0.458)	(0.480)
Less than 30 years	0.256	0.190	0.220	0.233	0.170	0.141	0.236	0.135
	(0.436)	(0.392)	(0.415)	(0.423)	(0.376)	(0.349)	(0.425)	(0.342)
30 to 40 years	0.196	0.237	0.206	0.233	0.279	0.291	0.227	0.185
	(0.397)	(0.425)	(0.404)	(0.423)	(0.449)	(0.455)	(0.420)	(0.388)
40 to 50 years	0.204	0.207	0.173	0.226	0.221	0.228	0.207	0.193
	(0.403)	(0.405)	(0.378)	(0.419)	(0.415)	(0.420)	(0.406)	(0.395)
50 to 69 years	0.344	0.367	0.401	0.309	0.330	0.340	0.329	0.488
	(0.475)	(0.482)	(0.491)	(0.463)	(0.471)	(0.474)	(0.470)	(0.500)
Single	0.359	0.365	0.354	0.395	0.340	0.350	0.388	0.367
	(0.480)	(0.482)	(0.479)	(0.489)	(0.474)	(0.477)	(0.488)	(0.483)

Notes: The table shows the average demographic characteristics of individuals aged 18–69 interviewed in 2016 for the Annual Population Survey and CaDDI. These means are calculated using the frequency weights provides in the APS 2016, while the unweighted averages of these demographic variables are presented for the CaDDI surveys. Standard deviations are reported in parentheses.

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