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DOES WORKER WELL-BEING ADAPT TO A PANDEMIC? AN EVENT STUDY BASED ON HIGH-FREQUENCY PANEL DATA

BY JULIA SCHMIDTKE*

Institute for Employment Research (IAB)

CLEMENS HETSCHKO

University of Leeds
Freie Universität Berlin
CESifo

RONNIE SCHÖB

Freie Universität Berlin

GESINE STEPHAN

Institute for Employment Research (IAB)
Friedrich-Alexander Universität Erlangen-Nuremberg

MICHAEL EID

Freie Universität Berlin

AND

MARIO LAWES

Freie Universität Berlin

We estimate the dynamic impact of two waves of the COVID-19 pandemic on an exceptionally broad range of indicators of worker well-being. Our analyses are based on high-frequency panel data from an app-based survey of German workers and employ an event-study design with individual-specific fixed effects. We find that workers' mental health decreased substantially during the first wave of the pandemic. To a smaller extent, this is also true for life satisfaction and momentary happiness. Most well-being indicators converged to prepandemic levels when infection rates declined. During the second wave of the pandemic, overall worker well-being decreased less than that during the first wave. Life satisfaction does not seem to have changed at all. We conclude that worker well-being adapts to the pandemic. Moreover, subgroup analyses indicate that, in terms of well-being, workers who took part in a job retention scheme fared less well during the pandemic than other employees.

JEL Codes: J20, J28, I18, I31

Keywords: adaptation, COVID-19 pandemic, job retention scheme, mental health, well-being

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*Correspondence to: Julia Schmidtke, Institute for Employment Research (IAB), Regensburger Strasse 104, 90478, Nuremberg, Germany (julia.schmidtke@iab.de).

1. INTRODUCTION

COVID-19 has changed life drastically. Since its outbreak in China at the end of 2019, the virus has rapidly spread across the globe. The pandemic forced governments to introduce unprecedented restrictions to people's lives. As a result, the effects of the pandemic on individual mental health and quality of life have been of great concern right from the beginning of the outbreak (e.g. Banks et al., 2021; Brodeur et al., 2021; Clark & Lepinteur, 2021; Layard et al., 2020). To assess the impact of the COVID-19 shock on worker well-being, it is paramount to establish whether any initial effects disappear soon and fail to reappear during subsequent waves of infections. We therefore study how quickly worker well-being returns to normal levels after the first wave of the COVID-19 pandemic and compare its impact to that of the second wave.

Subjective well-being has been shown to adapt to various negative events, such as widowhood, divorce, or disability (e.g. Clark et al., 2008; Luhmann et al., 2012). Whether as a result of active coping or natural habituation, people tend to return to a set-point level of well-being (e.g. Diener et al., 2006; Frijters et al., 2011; Lucas, 2007). Between the first two waves of the COVID-19 pandemic, the health threat declined and restrictions were partly lifted. Therefore, *observed* adaptation might simply reflect the partial return to normal life. However, life did not completely return to normal.[1] The principal risk of a COVID-19 infection and reimposed restrictions remained. Complete adaptation may therefore also reflect the habitual convergence of well-being to its set point.

Having said that, people do not adapt to all life events. Notable exceptions include unemployment and poverty, which yield long-lasting changes in well-being (e.g., Clark et al., 2008; Clark et al., 2016). Workers also do not fully recover when they overcome joblessness (Clark et al., 2001; Hetschko et al., 2019; Knabe & Rätzel, 2011; Luhmann & Eid, 2009). If the pandemic were a life event of that kind, even with a complete return to normal life, well-being would not fully recover for an extended period of time. This implies that subsequent waves of COVID-19 might have been even more harmful than the first wave. Whether workers adapt to waves of a pandemic ultimately remains an empirical question.

We analyze the evolution of the well-being of German workers over the years 2019 and 2020 and thus before and during the first year of the COVID-19 pandemic.[2] Our event study is based on monthly survey data, collected via an innovative smartphone app, and individual fixed-effects estimations. This enables us to follow the same subjects through both the first and second waves of the pandemic, including two lockdowns. Unlike previous studies that rely on one-time

[1] This means we broadly define adaptation as an empirical observation where people return to their initial levels of well-being after a certain life event, even though reduced exposure to the event might drive this observation. Our broad definition also covers habituation where repeated life events yield smaller effects on well-being.

[2] Our analysis is based on a preexisting sample of workers. One to two years before the start of the pandemic, our subjects were sampled for the "German Job Search Panel" as they considered themselves to be at risk of being terminated from their jobs. Until the start of the pandemic, the vast majority were still employed with the same company or reemployed after a short spell of job search. This allows us to study the well-being of an employed sample.

estimates of the impact of the first wave of COVID-19 (e.g. Altindag et al., 2022), we ask whether workers adapt to prepandemic levels of well-being after the initial outbreak and if the second wave was more or less harmful than the first wave. A further unique feature of our study and a key contribution to the literature is that we investigate a wide array of dimensions of well-being, including mental health (by means of a depression score), evaluative well-being (e.g. life and job satisfaction), and momentary happiness. This allows us to ascertain if adaptation occurs across the board of well-being dimensions.

The working population was strongly affected by lockdown measures. Multiple disruptions influenced their lives during COVID-19, including working from home and accelerated digitization. Parents had to cope with increased care responsibilities as schools and kindergartens closed. The economic impact put workers' careers and thereby future incomes at stake (e.g. Botha et al., 2021; Immel et al., 2022). Most studies expect women to suffer more than men from these impacts, as they bear the brunt of both labor market shocks and caring responsibilities (Alon et al., 2021; Hupkau & Petrongolo, 2020). We complement studies analyzing the impacts of the pandemic on specific groups, such as parents/mothers, children, or university students (e.g. Baron et al., 2020; Giuntella et al., 2021; Huebener et al., 2021; Takaku & Yokoyama, 2021) by examining the differential evolution of the well-being of workers who take part in the *Kurzarbeit* ("short-time work") scheme during the pandemic. This job retention scheme was employed by the German government during COVID-19, similar to the US short-time work compensation program or the UK's furlough scheme (for an overview, see OECD, 2020).

Our analyses show declines in workers' mental health during both the first and the second waves of the pandemic. Mental health returned to prepandemic levels within the short time period between these waves. During the second wave of COVID-19, although more significant in terms of infections, mental health decreased less than during the first wave. Life satisfaction also declined, but the change was small and limited to a few weeks around the start of the first lockdown. Contrary to life satisfaction, but similar to mental health, momentary happiness responded negatively to both waves (at the time of the first lockdown it was significant only at the 10 percent level). A somewhat different picture emerges when it comes to job satisfaction. It reduced compared to prepandemic months during and in between the first and second pandemic waves, without any sign of adaptation.

Stronger than average negative changes in mental health, life satisfaction and job satisfaction are found during the pandemic for workers who had to reduce working hours as part of *Kurzarbeit*. Short-time work might signal employees that their job security is at stake, given that employers use the scheme to cushion their losses in times of crisis, without having to lay off workers immediately. As the subsidy is temporary, there is a risk that it only delays job losses. Apart from that, workers have responded remarkably similarly to the COVID-19 pandemic across other distinctions of subgroups.

We proceed as follows. In Section 2, we review the parallel literature on the well-being impact of the COVID-19 pandemic. Section 3 describes the data. In Section 4, we introduce the event-study design and empirical model. The results are presented in Section 5. Section 6 concludes.

2. LITERATURE

The few existing studies on the well-being effects of past epidemics point to negative effects on various indicators of well-being and quality of life (e.g. Bults et al., 2011; Lau et al., 2008; Thompson et al., 2017). In the course of the COVID-19 pandemic, this literature has grown rapidly.[3] Most surveys on the well-being impact of COVID-19 started during the first wave of the pandemic, often with lockdown restrictions already being in place (e.g. Newby et al., 2020; Vindegaar & Benros, 2020). These studies lack pre-event measures and thus do not allow for drawing conclusions about the impact of the pandemic itself. Several studies tried to resolve this issue by comparing samples of people surveyed before the outbreak with similar samples surveyed afterward. They point to negative mental health effects (e.g. Niedzwiedz et al., 2020; Pierce et al., 2020; Sibley et al., 2020). This is corroborated by Anaya et al. (2023), who exploit the variation in interview dates around the time of the first wave of the pandemic to perform a regression discontinuity design (RDD). In a similar way, Brodeur et al. (2021) find Google searches for worries, sadness, and loneliness to have increased due to the pandemic. Altindag et al. (2022) utilize the fact that Turkey introduced strict mobility restrictions only for adults aged 65 and older. Using cross-sectional data and an RDD design, they find worsened mental health outcomes as a result of curbs due to increasing social and physical isolation. None of these studies documents whether well-being adapts to the pandemic over time.

Panel data allow for the analysis of how changes affect the same persons over time and therefore, in principle, adaptation. In the process, studies manage to circumvent bias from stable characteristics that are particularly important for well-being (Ferrer-i-Carbonell & Frijters, 2004; Lykken & Tellegen, 1996). Banks and Xu (2020) document a negative mental health effect of the pandemic compared to predicted levels of mental health based on previous waves of panel survey data. Kivi et al. (2020) find stable life satisfaction and, somewhat surprisingly, improvements in self-rated health and financial satisfaction. Similarly, Recchi et al. (2020) show an increase in experiential well-being and higher levels of self-rated health during the first lockdown compared to previous years. In contrast, Quintana-Domeque and Proto (2022) compare self-reported mental health before and at two time points during the pandemic and document a persisting decline (see also Proto & Quintana-Domeque, 2021).

An issue in these studies is that the pre-event measures of well-being stem from at least 1 year before COVID-19, which means that other events and trends could bias results. Studies with smaller time lags more clearly point to the negative effects of the pandemic on both evaluative and experiential indicators of well-being (Möhring et al., 2021; Zacher & Rudolph, 2021). In contrast, Pelly et al. (2021) find no negative effects of the pandemic on worker well-being. These studies are limited to the first wave of the pandemic and do not address adaptation.

[3] Some studies used pre-COVID data to predict the pandemic's impact. Hamermesh (2020) expects some mitigation of negative well-being effects for couples, as working from home meant they spent more time together.

Studies relying on two close time points before and after the pandemic limit the bias from previous events and trends, but they need to assume that the one prepandemic observation of a person's well-being is unbiased (free from any idiosyncratic effects leading to mean reversion). The aforementioned panel studies with longer time lags but several prepandemic time points from previous years are able to better predict a baseline level of well-being as a comparison point. Our study combines both advantages (several pre-event measures, short time lags) by using monthly panel data over 2019 and 2020 to estimate developments during the pandemic. We are able to compare well-being during the pandemic relative to a within-person reference level of well-being that smooths out any short-term changes and facilitates controlling for seasonal effects. Monthly observations of the same workers allow us to zoom in on changes in well-being around the crucial time points. As our central contribution, we analyze adaptation over two waves of COVID-19 and across various indicators of well-being based on the same sample.

3. DATA

We make use of the German Job Search Panel (GJSP; see Hetschko et al., 2022 for a detailed account). The data collection initially aimed at measuring the impact of job search on various indicators of well-being using high-frequency panel data. Participants were recruited from the end of 2017 to May 2019, namely, employees aged 18–60 years who had registered as job seekers with the German Federal Employment Agency. Once people signed up for the survey they completed monthly questionnaires using a smartphone app over up to 2 years. Unlike studies that relied on personal interviews (Ward & Edwards, 2021), we did not need to adjust the mode of surveying participants that could have biased outcomes (Conti & Pudney, 2011).[4]

When the pandemic hit at the beginning of 2020, 83 percent of GJSP participants were employed, despite having been recruited as job seekers. This has two main reasons. First, 40 percent of all jobseeker registrations in Germany do not result in actual unemployment (Stephan, 2016). Second, before the pandemic, unemployment was low in Germany, which is why many participants had found new jobs by the time the pandemic started. As a result, the data facilitate a study on the dynamic impact of the COVID-19 pandemic on employees. Given that the recruitment of participants for the 2-year panel study stopped in May 2019, some respondents were no longer observed in 2020. We only kept observations of workers in the sample who were observed at least once after the start of the first lockdown in Germany (March 2020). In a sensitivity check, we additionally required people to be observed during the second wave of COVID-19.

Mental health was measured using a short German version (*Allgemeine Depressionsskala Kurzform* (ADS-K); Hautzinger et al., 2012) of the commonly

[4] We used an adjusted version of the "Happiness Analyzer" running on both iOS and Android (Ludwigs & Erdtmann, 2019). Apps are a flexible, convenient, and cost-effective way of surveying people at high frequency. A potential issue is sample selectivity. Compared to the contacted population of workers, actual participants were better educated, younger, and more often female (Hetschko et al., 2022). We control for these characteristics. Respondents could borrow a smartphone from the survey institute if they needed one to participate.

used Center of Epidemiological Studies Depression Scale ("CES-D", Radloff, 1977). The CES-D is commonly used as an inverse measure for this purpose, even though it might not comprehensively capture all aspects of mental health (Breedvelt et al., 2020). The short version comprises 15 items on how often subjects experienced feelings of failure, anxiety, problems with sleep, and the like, over the course of the previous week (see Table A1 in the Online Appendix S1). Four-point scales ranging from "0" (not at all/rarely [less than 1 day]) to "1" (sometimes [for 1 or 2 days]), "2" (often [for 3 or 4 days]), and "3" (mostly/always [5–7 days]) were used ("do not know" was categorized as missing). We used the individual mean score across the 15 CES-D items as a measure of mental health, provided that at least eight items were answered.

Life satisfaction was measured using the Satisfaction with Life Scale (Diener et al., 1985). Subjects indicated on seven-point scales whether they agreed with the statements that (1) their life is close to their ideals, (2) the conditions of their life are excellent, (3) they are satisfied with their life, (4) they have gotten the things they want in life, and (5) they would change almost nothing if they could live their life over. The life satisfaction score is the average of the responses to the five statements. People also indicated their satisfaction with specific domains of life (job, leisure, family life, and household chores) on single-item scales from 0 to 10, following the approach of a large-scale yearly panel survey (Goebel et al., 2019).

Unlike other survey modes, apps allow for assessing people's momentary happiness using the "gold standard" Experience Sampling Method, which does not suffer from recall biases as subjects indicate their feelings in real time (Hektner et al., 2007; Kahneman & Krueger, 2006; Luhmann et al., 2012). GJSP participants were contacted at six random points in time on one day of each month via pop-up notifications. They were given 15 minutes (and, after a reminder, another 15 minutes) to complete a short version of the Multidimensional Mood State Questionnaire using five-point scales for each mood (Steyer et al., 1997). Provided that respondents completed at least three episodes on the same day, we calculated the person's daily averages. Happy/unhappy are used in this study as measures of momentary happiness. Further insights are obtained from indications of calm/restless and awake/sleepy.

To facilitate comparisons across outcomes, we transformed all individual (i) indicators of well-being (S) into POMP scores ("percentage of maximum possible"). POMP scores range from 0 to 100 and serve as an easily interpretable unstandardized effect size (Cohen et al., 1999):

$$\text{POMP}_{S,i} = \frac{\text{Value}_{S,i} - \text{Min}_S}{\text{Max}_S - \text{Min}_S} \cdot 100 \tag{1}$$

Table A2 in the Online Appendix S1 presents the means, standard deviations, and quartiles of the analyzed outcome variables at the time of the first lockdown and for the period before the pandemic on which the reference level of well-being is based on our study.

Further variables in our analysis are gender, the level of education, being single (as opposed to people who have a partner), and children living in the same household. We distinguish between employment (either dependent or self-employed),

unemployment, people taking part in active labor market policy schemes, and other states. Five categories of net monthly household income in euros are also considered (<1,000; 1,000–2,000; 2,000–3,000; 4,000–5,000; >5,000). Underlying health conditions are used to identify people at risk of a severe COVID-19 infection, provided that the condition itself has at least medium-level severity: cardiovascular disease, asthma or respiratory distress, cancer, diabetes, gallbladder issues, liver disease, kidney disease, or obesity (body mass index ≥ 30).[5] Table A3 in the Online Appendix S1 describes the sample at the time of the first lockdown.

4. EVENT STUDY

4.1. *Timeline*

Our study covers the time period from December 2018 to December 2020. Similar to other European countries, the first COVID-19 infection in Germany was recorded at the end of January 2020. In February, the pandemic started to spread exponentially, leading to extensive restrictions in March (Naumann et al., 2020). We set the starting time of the event to the day of the nationwide closures of schools and kindergartens on March 13, 2020. Large-scale events had already been canceled 3 days earlier. Contact restrictions and closures of hospitality businesses, nonessential retail, and close-contact services (e.g. hairdressers) followed within days. People were advised to work from home where possible. The first individual survey response within 30 days starting March 13, 2020, is considered as the observation at the time of the event ($t = 0$). The survey response within 30 days before that date is, therefore, the last pre-event measure ($t = -1$), the response before that is $t = -2$, and so on. We consider all the observations of workers in 2019 until the start of the lockdown to obtain a pre-event reference level of well-being (i.e. from $t = -15$ to $t = -3$). After the month of the event, our data cover eight further 30-day intervals (until $t = 8$), thus including the start of the second wave in fall 2020. Table A4 in the Online Appendix S1 gives an account of the days covered by each time period. Figure 1 depicts the evolution of the COVID-19 pandemic in Germany in 2020.

According to the Robert Koch Institute (2021b), the 7-day average peaked at about 5,000 infections per day during the first wave. By July 2020 (at the start of $t = 4$), infections had reached a low point with below 400 cases per day. Many restrictions had been lifted by then. Mask-wearing and limitations on large-scale events remained, among other measures. The low point in case numbers was followed by a long period of slow growth, reaching about 2,000 daily infections on October 1. Then, the number of cases soared and only leveled off at 18,000–20,000 in mid-November (i.e. the turn from $t = 7$ to $t = 8$). On November 2, 2020, Germany tightened COVID-19 restrictions again. Hospitality and close-contact service businesses, as well as cinemas and theatres, had to close. In December 2020, that is, at the end of $t = 8$ and thus our investigation period, Germany saw another surge of cases and even tighter restrictions. The ultimate peak of 25,000 cases a day around

[5] This is based on information from the Robert Koch Institute's, Germany, main public health authority (Robert Koch Institute, 2021a). We added only obesity, which has been shown to exacerbate COVID-19 (Deng et al., 2020).

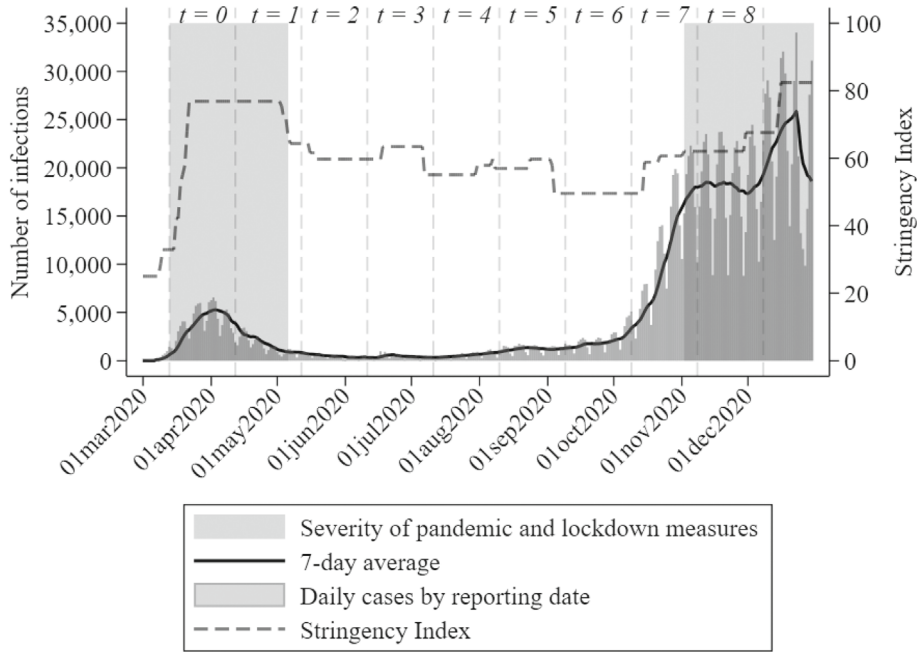

Figure 1. Daily infections and lockdown restrictions during the COVID-19 pandemic in Germany (2020).

Notes: The figure displays the daily number of COVID-19 infections based on their reporting date and the average number of reported infections over the past 7 days. The stringency index captures the degree of closure and containment measures in place (see Hale et al., 2021). Based on this, the shaded area depicts the low (light gray) or high (gray) severity of the pandemic and lockdown measures in place during 2020.

Source: infas 360 GmbH and Robert Koch Institute (2021) and Hale et al. (2021)

the turn of the year is not covered anymore in our analysis due to low numbers of observations.

4.2. *Empirical Model*

We estimate the change in worker well-being at the first wave of the pandemic ($t=0$, $t=1$) and the start of the second wave ($t=6$ to $t=8$) using an event-study design, controlling for individual-specific fixed effects. This has been the standard approach to analyzing adaptation in the well-being literature (e.g. Clark et al., 2016). Our outcomes are estimated conditionally on the point in time around the event of the first lockdown (monthly lags and leads, from $\text{TIME}_{i,t=-2}$ to $\text{TIME}_{i,t=8}$). In the process, we cover prospective effects from the time when the first cases were detected ($\text{TIME}_{i,t=-2}$) in Germany and the first wave took off ($\text{TIME}_{i,t=-1}$). Furthermore, we are able to examine potential adaptation between the first two waves and the start of the second wave ($t=2$ to $t=5$). The $\text{TIME}_{i,t}$ variables are coded as dummy variables and take the value 1 during the specified time interval and 0 otherwise.

To contrast the well-being levels during the pandemic with prepandemic levels, we rely on the prepandemic average level of well-being of the same persons

across monthly measurements between December 19, 2018, and January 12, 2020 (denoted in our results outputs as $t=-15$ to $t=-3$). As this is modeled as an individual-specific fixed effect (α_i), the reference level of well-being is the intraindividual well-being average over that period of time.

We estimate the following equation:

$$\begin{aligned}(2)\qquad \mathrm{POMP}_{S,i,t} = {} & \beta_{-2}\mathrm{TIME}_{i,t=-2} + \beta_{-1}\mathrm{TIME}_{i,t=-1} + \beta_0\mathrm{TIME}_{i,t=0} \\ & + \beta_1\mathrm{TIME}_{i,t=1} + \ \ldots\ + \beta_8\mathrm{TIME}_{i,t=8} + \mathbf{X_{i,t}}'\gamma + \alpha_i + \varepsilon_{i,t}\end{aligned}$$

$\mathrm{POMP}_{S,i,t}$ represents the different outcome measures S of individual i at time t. Vector $\boldsymbol{X}$ contains several covariates. We include being part of the COVID-19 risk group, having a partner, living with children, being employed (also includes part-time employment or self-employed), registered as unemployed, registered as job seeking and in training, and other employment states. Having (no) occupational degree or having a university degree and income (five categories, with €1,000–2,000 as the reference category) is also considered. To control for the weather and other seasonal effects, we consider the meteorological seasons as binary variables throughout. Some people are observed in the early state of participating in the GJSP, in particular, during the early months of our panel (until mid-2019 or $t=-7$). Therefore, job search might affect and bias their level of well-being. Therefore, we also separately control for being observed in the first 3 months, or first year, of GJSP participation.

Parsimonious models without most of these covariates yield almost exactly the same findings and are presented as a robustness check. A selection of these variables is also later used to explore effect heterogeneity across subgroups (e.g. gender and parental status). Standard errors are clustered at the individual level.

5. RESULTS

5.1. *Main Measures of Worker Well-Being*

We start with the ratings of our global measures of mental health (CES-D), life evaluation (Satisfaction with Life Scale), and experiential happiness (momentary mood happy/unhappy). Figure 2 depicts the results. At $t=-2$ and $t=-1$, that is, in the month preceding the first lockdown, our inverse measure of mental health, the CES depression score (Figure 2), is significantly increased relative to the intraindividual average from the turn of the year 2018/2019 to January 2020. That being said, the effect sizes of $t=-2$ and $t=-1$ are small (around 2 POMP). They correspond to about 11 and 10 percent of the standard deviation of the reference level of well-being in the sample.[6]

This does not seem to be a seasonal effect over the winter, as the meteorological seasons are controlled for, and additional analyses (not reported) did not indicate

[6] To assess coefficient sizes, we always use the standard deviation of the reference level of the respective well-being indicator (the average across all time intervals between $t=-15$ and $t=-3$). Details for all outcome variables can be obtained from Table A2 in the Online Appendix S1.

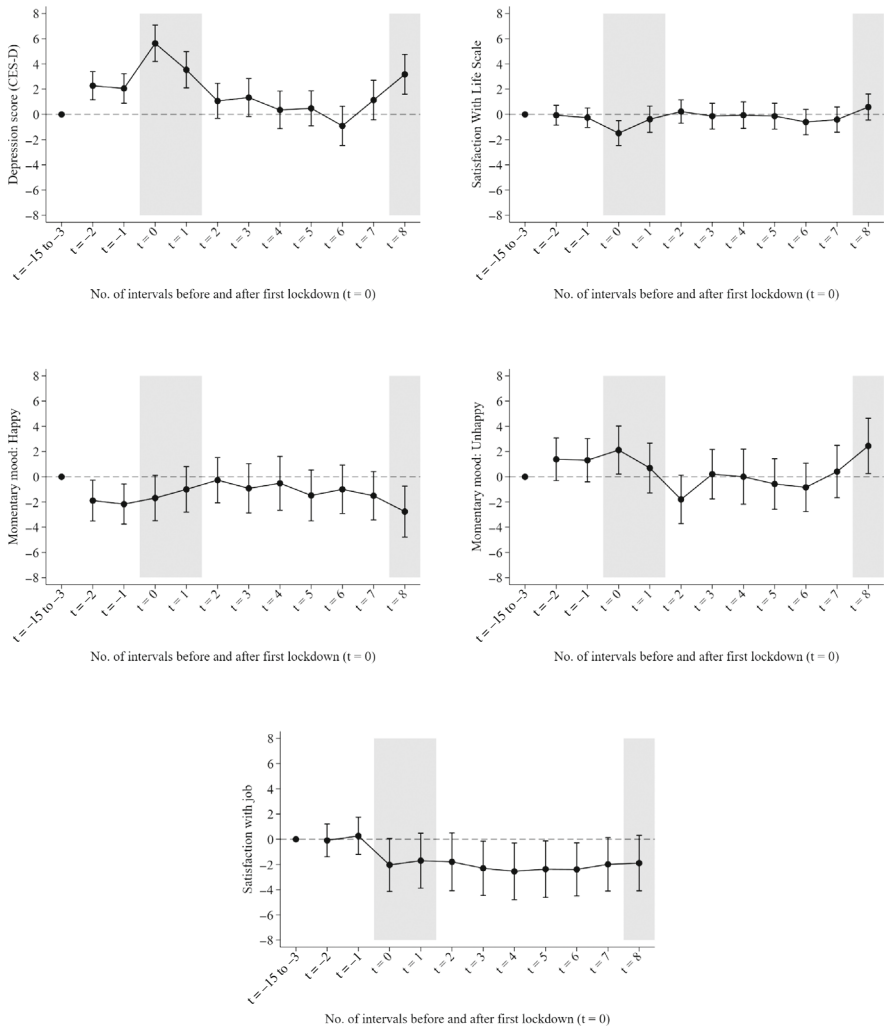

Figure 2. Worker well-being during the COVID-19 pandemic.

Notes: The figure displays individual-specific fixed effects of the respective outcome for the 2 months before the first lockdown in Germany, the month of the first lockdown ($t = 0$), and the following 8 months. The dashed line depicts the intraindividual average of the respective outcome from December 19, 2018, to January 12, 2020, that is, the reference level of well-being ($t = -15$ to $t = -3$). The shaded area depicts the low (light gray) or high (gray) severity of the pandemic and lockdown measures in place during 2020. The full list of results is reported in Tables A5 and A7–A10 (column 1) in the Online Appendix S1. Whiskers denote 95 percent confidence intervals. Standard errors are clustered at the individual level

an increase in CES-D for $t = -3$. It seems more plausible that we see the prospective effects of the pandemic when the first cases emerged in Germany ($t = -2$) and the virus spread quickly on the eve of lockdown ($t = -1$). Note that the first national cases received extensive media attention. As early as $t = -2$, the pandemic became the dominant topic in the German media (Degen, 2021). Google Trends data also reveal that Google searches for "coronavirus," "SARS," and "Wuhan" in Germany soared during $t = -2$ and $t = -1$ (see Figure A1 in the Online Appendix S1).

Moreover, an item of the CES-D that responds more strongly than others before $t = 0$ is "I was bothered by things that usually don't bother me," pointing to an unusual event as a trigger of the prospective changes (see Table A6 in the Online Appendix S1).

At the start of the first lockdown, $t = 0$, the depression score peaks at nearly six POMP scores above the baseline, which is about 28 percent of the standard deviation of that baseline in the sample. By comparison, using the same measure of mental health, Young (2012) finds that entering unemployment increases the depression score by 40 percent of a standard deviation, which the author considers large. Against this background, the change in the depression score around the event of the first lockdown seems important as well. However, it is soon followed by a gradual decline over the next 4 months (i.e. until $t = 4$). Here, people indicate scores in keeping with their prepandemic average. This is in line with both previous literature and theoretical considerations: well-being decreased during the first wave of COVID-19, but much of this decline also dissipates again when infection rates fall and restrictions are lifted. With the start of the second wave of the pandemic, the depression score increases again but not up to the level of the first wave. However, our investigation period does not cover the whole second wave, which is why this result needs to be interpreted with caution.

The changes we find in life satisfaction are less pronounced (Figure 2). Only for the first lockdown month ($t = 0$) do we see a significant but small drop of 1.4 POMP points. This corresponds to about 8 percent of the standard deviation and is considerably smaller than the loss workers experience when entering unemployment.[7] After rapid adaptation, we do not observe another statistically significant decrease in life satisfaction at the start of the second wave. While this is in line with the expectation of adaptation, the main finding is that the pandemic was hardly associated with workers' cognitive evaluation of their lives. As we additionally show in Table A7 in the Online Appendix S1, the decline in life satisfaction is even limited to the first 2 weeks of lockdown.

We also find a drop of around 2 POMP scores in experienced happiness over the 2 months before lockdown, during the first lockdown month, and when the second wave takes off (Figure 2; sometimes the statistical significance is only at the 10 percent level). The decline in momentary happiness at $t = 0$ corresponds to about 8 percent of the standard deviation, while unhappiness increases by about 10 percent of the standard deviation. The size of the coefficient is roughly in line with the unemployment-related change in momentary happiness recently found by Lawes et al. (2022).[8] In keeping with the finding for mental health, momentary happiness reduces at times of rising infections even before restrictions are tightened. Similar to life satisfaction, the decline in momentary happiness during the first lockdown dissipates after the first 2 weeks in lockdown (see Tables A8 and A9 in the Online Appendix S1).

[7] Converted to POMP, the aforementioned study by Clark et al. (2008) estimates a reduction in life satisfaction upon entering unemployment of 5 points for females and 8 points for males.

[8] This confirms that the changes we estimate are not large for momentary happiness, too. According to recent studies, unemployment attracts either no or a small positive effect (Lawes et al., 2022, 2023; Wolf et al., 2022).

Between the two waves of the pandemic, workers reported the same levels of feeling happy as before COVID-19. Compared to mental health and life satisfaction, variations are less precisely estimated due to a somewhat smaller number of observations (see Table A2 in the Online Appendix S1). Recall that we required people to indicate momentary happiness for at least three time points over the course of a single day. In contrast to mental health and life satisfaction, the decline of momentary happiness during the second COVID-19 wave is not significantly different from that of the first wave.

We conclude our analysis of the main outcomes of worker well-being with job satisfaction and thus an area of life where COVID-19 brought about manifold changes, such as uncertainty about future employment stability, working from home, digitization, and being furloughed. As Figure 2 shows, job satisfaction declines during the pandemic. At $t = 0$, job satisfaction is reduced by approximately 9 percent of the standard deviation. A reduction in 2 POMP scores does not seem large. In the year before people quit their jobs, their job satisfaction is reduced by around 9 points.[9] However, we see no adaptation during the course of the pandemic: job satisfaction continues to be reduced by around 2 points throughout our investigation period after the first lockdown. This could be due to the fact that changes in working life continued for many even between the waves of the pandemic and that uncertainty about the security of the job continued in the aftermath of the economic downturn.

5.2. *Sensitivity Analyses*

The results of four sensitivity analyses are displayed in Figures A2–A6 in the Online Appendix S1. We estimate our empirical model again for the presumably more representative subsample of workers who started participation in the GJSP due to a mass layoff since mass layoffs, in general, affect a large variety of workers irrespective of their individual characteristics. None of the estimates deviates significantly from those based on the main sample. To ensure that changes in employment status do not bias estimated coefficients, another robustness check is based on the subsample of employed individuals. The findings are in line with those for the entire sample. In addition, our results do not differ from the baseline model if we use a parsimonious specification, controlling only for the season, COVID-19 risk group, and the month of survey participation. The final sensitivity analysis excludes observations from the main sample that are no longer observed during the second wave of COVID-19 at $t = 8$. The idea is to rule out that selective attrition distorts the comparison of effects over time. This does not seem to be the case as this sensitivity analysis also produces results that closely resemble our main estimates (see, again, Figures A2–A6).

We should not expect much variation in our covariates within the same workers over an investigation period of only 23 months. Nevertheless, the covariate effects correspond to the previous literature, underpinning the plausibility of our empirical model (Tables A5–A10 in the Online Appendix S1). Income is positively related

[9] To obtain this comparison, we used the estimates of Chadi and Hetschko (2018) according to which workers who quit their jobs within the next year report 9 POMP scores lower job satisfaction.

to life satisfaction but not necessarily to momentary happiness and mental health (cf. Apouey & Clark, 2015; Kahneman & Deaton, 2010). Life satisfaction and mental health decrease with being at risk of severe COVID-19 (i.e. poor physical health; see, e.g. Lucas, 2007; Ohrnberger et al., 2017). Unlike momentary happiness, life satisfaction is lower when workers are unemployed (e.g. Knabe et al., 2010). Somewhat surprisingly, unemployment does not seem to negatively correlate with mental health, in contrast to the findings by, for instance, Young (2012) and Cygan-Rehm et al. (2017).

5.3. *Satisfaction with Further Life Domains, Restlessness, and Tiredness*

The pandemic also had an impact on the ways people could spend their leisure time, with contact restrictions and closures of restaurants, shops, and cultural venues. Not surprisingly, leisure satisfaction declined during the first lockdown and the second lockdown (by roughly 4 POMP scores; see upper left panel of Figure 3). The decline during the first wave corresponds to about 18 percent of

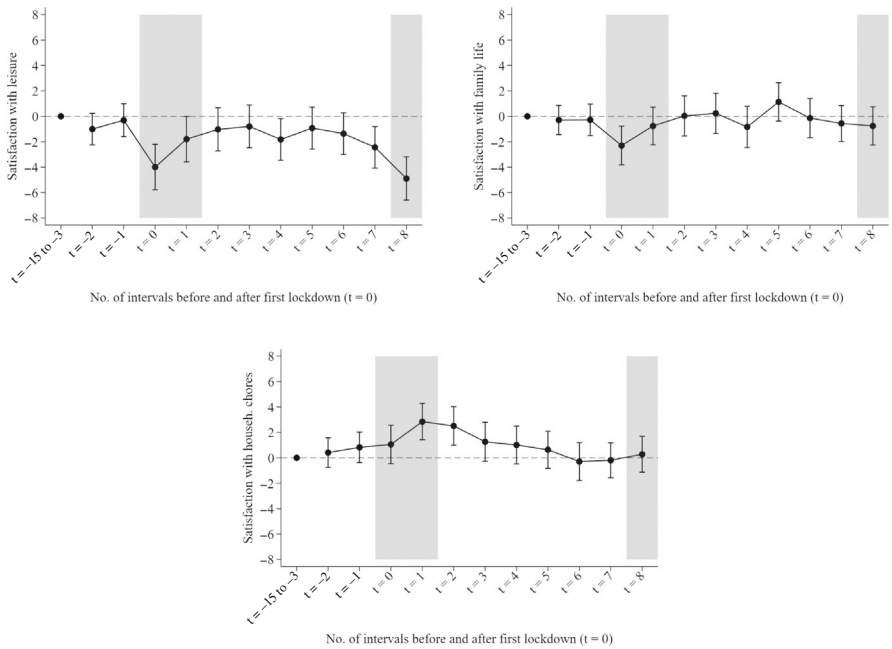

Figure 3. Satisfaction with certain areas of life during the COVID-19 pandemic.
Notes: The figure displays individual-specific fixed effects of the respective outcome for the 2 months before the first lockdown in Germany, the month of the first lockdown, and the following 8 months. The dashed line depicts the intraindividual average of the respective outcome from December 19, 2018, to January 12, 2020, that is, the reference level of well-being ($t = -15$ to $t = -3$). The shaded area depicts the low (light gray) or high (gray) severity of the pandemic and lockdown measures in place during 2020. Full results can be obtained on request from the authors. Whiskers denote 95 percent confidence intervals. Standard errors clustered at the individual level

the standard deviation. Between the two waves of the pandemic, we observe only partial adaptation.

Another area of life that was expected to be negatively affected by lockdowns is family life. Homeschooling presented a challenge to working parents. Visiting relatives living in a different household, region, or a care home was restricted at times. Satisfaction with family life drops slightly during the first lockdown (about 10 percent of the standard deviation). No significant deviations from prepandemic levels are observed thereafter (Figure 3, upper right panel).

Domestic work is the last area of life we are able to examine more closely (Figure 3, lower panel). We observe a positive development over the course of the pandemic, in particular, 1 to 2 months after the first lockdown began ($t=1$, $t=2$). An interpretation could be that a reduction in the marginal utility of leisure time (due to restrictions to private life), saved commuting time, or reduced hours initiated a shift of focus onto domestic work (refurbishments, repairs, gardening). The increase, however, appears to be limited to the first wave of the pandemic.

We cast further light on the multiple changes during the pandemic using additional mood assessments, namely, sleepy/awake (upper panel of Figure 4) and restless/calm (see lower panel of Figure 4). In keeping with the idea that restrictions to private life and working life free up time, people feel less sleepy (more awake) during and after the first lockdown. The coefficient of $t=0$ corresponds to about 13 percent of the standard deviation for sleepy and awake, respectively. This is in line with the idea that uncertainty plays a role in the well-being impact of the pandemic (for an in-depth analysis of sleep patterns during the pandemic, see Hisler & Twenge, 2021). In contrast, restlessness increases during both waves of the pandemic as soon as infections rise and not only with the introduction of curbs (lower panel of Figure 4).

5.4. *Differences Between Subgroups of Workers*

To derive policy implications for firms and society as a whole, it is crucial to identify groups of workers who are especially affected by the pandemic and thus in need of support. To this end, we estimate interaction variables of subgroups (vector ***Group***), which are elements of vector $\boldsymbol{X}$, with the two waves of the pandemic (represented by the time variables $t=0$ and $t=8$):

$$
\begin{aligned}
(3)\quad \mathrm{POMP}_{S,i,t} = {} & \beta_{-2}\mathrm{TIME}_{i,t=-2} + \beta_{-1}\mathrm{TIME}_{i,t=-1} \\
& + \beta_0\mathrm{TIME}_{i,t=0} + \left(\mathrm{TIME}_{i,t=0} \times \mathrm{Group}_{\mathbf{i,t=0}}\right)'\pi \\
& + \beta_1\mathrm{TIME}_{i,t=1} + \ldots + \beta_8\mathrm{TIME}_{i,t=8} + \left(\mathrm{TIME}_{i,t=8} \times \mathrm{Group}_{\mathbf{i,t=8}}\right)'\rho \\
& + \mathbf{X_{i,t}}'\gamma + \alpha_i + \varepsilon_{i,t}
\end{aligned}
$$

It should be kept in mind that comparing different groups of workers requires substantial numbers of observations, which limits our ability to provide in-depth subgroup analyses. The following findings therefore provide starting points for future investigations, not conclusive assessments. Detailed results are displayed in Tables A5–A10 (Online Appendix S1).

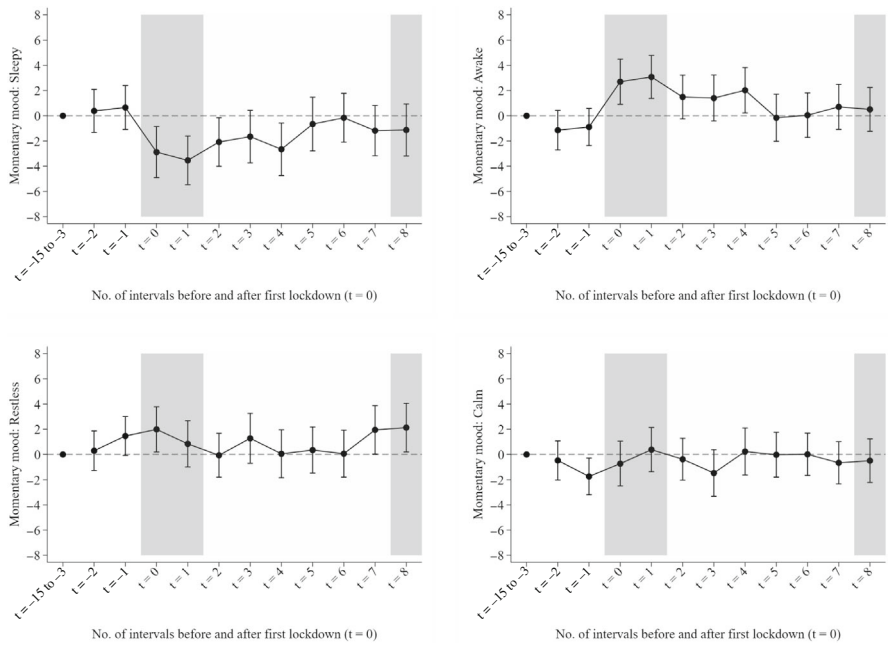

Figure 4. Mood assessments of sleepy/awake and restless/calm during the COVID-19 pandemic.
Notes: The figure displays individual-specific fixed effects of the respective outcome for the 2 months before the first lockdown in Germany, the month of the first lockdown, and the following 8 months. The dashed line depicts the intraindividual average of the respective outcome from December 19, 2018, to January 12, 2020, that is, the reference level of well-being ($t = -15$ to $t = -3$). The shaded area depicts the low (light gray) or high (gray) severity of the pandemic and lockdown measures in place during 2020. Full results can be obtained on request from the authors. Whiskers denote 95 percent confidence intervals. Standard errors clustered at the individual level

The impact of COVID-19 on women and their mental health has been of great concern over the course of the pandemic. Female-dominated industries bear the brunt of the economic effects of restrictions, which makes women more likely than men to lose work or work fewer hours and experience a reduction in income (Alon et al., 2021). Increased childcare responsibilities may also impact women, in particular (Del Boca et al., 2020; Sevilla & Smith, 2020). Nevertheless, we find no significant gender differences in the evolution of mental health, life satisfaction, job satisfaction (or other areas of life), and momentary happiness around key pandemic events such as the first lockdown, unlike other studies using data for different countries (e.g. Anaya et al., 2023; Beland et al., 2021; Etheridge & Spantig, 2022; Hupkau & Petrongolo, 2020; Takaku & Yokoyama, 2021).[10] One might speculate at length why we do not confirm these results. Given that our sample is relatively young, many female workers might not have children yet. Also, young couples might follow a more gender-equal division of household chores.

[10] Stantcheva (2022) reviews the literature and concludes that the pandemic has deepened the gender gap in unpaid work at home and also had more negative effects on women's mental health.

Our sample size does not allow us to reasonably combine gender and parental status; for instance, Zoch et al. (2021) find women to be more negatively affected than men in terms of life satisfaction. At least we can distinguish between workers living in households with and without children independent of their gender. We do not find that the former suffer more during the pandemic than the latter, in contrast to results obtained by Cheng et al. (2021).

Next, we examine the well-being impact of the pandemic dependent on workers' health. A natural guess would be to expect people who are at a high risk of severe illness from COVID-19 to suffer, in particular. However, their life satisfaction and mental health do not differ from other workers during the first wave of the pandemic. If anything, during the second wave, their life satisfaction deviates positively from the rest of the sample. One possible explanation is that workers with underlying health conditions may generally benefit from lockdown measures concerning working life, such as social distancing, face coverings, and working from home.

To identify workers with high mental health risks, we calculate the average depression score for each worker over the year 2019. An "elevated depression score" is defined as a score of at least 17 (Hautzinger et al., 2012; sum across 15 items, the maximum score is 45), which applies to 18 percent of our sample. However, their depression score does not change more during the pandemic than that of subjects who reported a lower risk of depression before the pandemic (Table A5 in the Online Appendix S1).

If a crisis in the German economy forces employers to reduce their labor input substantially, the government financially supports a reduction of hours across the firm to prevent layoffs (*Kurzarbeit*, or short-time work). According to official statistics (Bundesagentur für Arbeit, 2021), the number of short-time workers increased from 440,000 in February 2020 to almost 6 million in April 2020 (about 18 percent of all nonmarginal employees). After the pandemic broke out, we asked participants whether they were currently subject to Germany's short-time work scheme. Therefore, we can only distinguish between individuals who reported being short-time workers and those who did not from the second month of the first lockdown ($t = 1$).[11] Our analyses reveal that life satisfaction (Table A7 in the Online Appendix S1), mental health (Table A5 in the Online Appendix S1), and job satisfaction (Table A10, Online Appendix S1) decrease particularly when participating in short-time work at the time of the second month into the first lockdown ($t = 1$). The interaction coefficients range from about 2 POMP scores (life satisfaction) to 6 POMP scores (job satisfaction). While *Kurzarbeit* prevents severe income losses, it might be perceived as an early sign of increased job insecurity, which generally translates into declines in mental health and satisfaction (Luechinger et al., 2010; Reichert & Tauchmann, 2017).

6. CONCLUDING REMARKS

Our study on the effects of the COVID-19 pandemic on worker well-being has produced a number of important new insights. The results confirm that

[11] For the second wave, we have too few observations of short-time workers to facilitate meaningful analyses.

workers' mental health decreases during the first and second waves of the pandemic. In addition, declines are documented in other domains of well-being, namely, life satisfaction, job satisfaction, and momentary happiness. In terms of size, however, the well-being changes during the pandemic are mostly estimated to be small. While the initial change in mental health seems large, it is soon followed by adaptation and therefore should be characterized as moderate. Indeed, except for job satisfaction, the changes in all indicators of well-being around waves of the pandemic are of a transitory nature only.

The literature usually deals with well-being measures separately, as they matter for different reasons. Measures of subjective well-being, such as life satisfaction and momentary happiness, are employed to generate an overall indicator of how a person is doing, essentially a measure of welfare (Odermatt & Stutzer, 2018). It is reassuring that these indicators, much in line with the previous literature, did not drastically deteriorate during the pandemic. However, mental disorders come at a high monetary cost, for instance, in terms of health care and workers being absent (Dahmann & Schnitzlein, 2019). This cost will increase if epidemics or pandemics recur and take a toll on people's mental health.

In addition, our analysis shows that a common feature of most subjective indicators of quality of life is adaptation: declines are mostly observed when infection rates are high and restrictions have been imposed. Once infection rates start to fall and life returns to normal to some extent, workers' overall well-being converges to prepandemic levels. Importantly, changes in well-being were smaller during the second wave of the pandemic than during the first wave when it comes to mental health and life satisfaction—even though reported infection rates were much higher. Pandemics might therefore be another life event people, at least to some extent, get used to over time.

A notable exception from adaptation is job satisfaction where we find a persistent drop from the beginning of the first lockdown throughout the year 2020. Job satisfaction is often regarded as a direct measure of the well-being obtained from working and strongly predicts quitting (e.g. Clark, 2001; Green, 2010; Green & Heywood, 2011; Lepinteur, 2019). A permanent decline in job satisfaction for particular groups of workers due to COVID-19 might therefore be one reason for what has been perceived as signs of a "great resignation," that is, above-average numbers of people quitting since the pandemic (JOLTS, 2021).

Additional findings also allow for deriving preliminary implications as to why worker well-being seemingly responds to the pandemic. The increases in restlessness and the stronger negative changes in well-being among short-time workers point to the role of uncertainty about the future in mediating the pandemic's impact on well-being (see also Satici et al., 2020). Despite gaining leisure time and being prevented from losing much income, they might perceive their future employment stability and therefore income to be uncertain. Apparently, the short-time work program does not signal perfect insurance. It alleviates the immediate financial loss and, for some, prevents the harmful well-being effects of unemployment. In the process, workers can preserve their social status of being employed (see, e.g. Hetschko et al., 2021). Nevertheless, subsidized short-time work does not appear to fully buffer the individual well-being effect of the pandemic.

The fact that we do not find more subgroup differences in the well-being changes during the pandemic might point to the importance of restrictions that affect everyone, such as the limitations on personal freedoms. This corresponds to the results of a post-lockdown survey provided by Konrad and Simon (2021). Similarly, Serrano-Alarcón et al. (2022) report that the timing of the end of general restrictions coincides with the recovery of mental health. In the meantime, employers might want to increase psychological support for their employees, enabling them to cope with the disruption to their lives brought about by the restrictions.

As the first limitation of our study, the analysis does not cover the whole second wave of the pandemic in Germany, which lasted into the year 2021 and was immediately followed by a third wave. There was also a back-and-forth of loosened and tightened restrictions. This order of events might have had further implications for well-being that future studies could examine. As a restriction on external validity, we would like to point out that our results refer to a highly industrialized country that generously supported many groups suffering financially from the pandemic-induced restrictions.

Furthermore, our sample consists of workers who might have experienced a negative labor market shock already before the pandemic. Interestingly, we estimate small changes in cognitive well-being and momentary happiness as well as moderate changes in mental health, much in line with previous studies on more general populations. Therefore, there is no indication that our group of workers is somehow special. Similarly, their well-being adapted to prepandemic levels even though repeated labor market shocks have been shown to lead to sensitization (Luhmann & Eid, 2009). Therefore, we conclude that the previous experience of job search did not impact how our study participants coped with the COVID-19 pandemic.

All in all, our results emphasize the mental health cost of the pandemic and the associated lockdown measures. The political decision to impose a lockdown has to consider physical health benefits and the threats to mental health. We observe decreases in well-being when infections rose over a longer time span during the first and second waves. This implies that people's well-being may be negatively affected by an ongoing uncontrolled pandemic. Lockdown measures may alleviate this issue but at the same time yield other detrimental well-being effects. Since we observe swift adaptation, the good news is that when a pandemic is under control, recovery should soon follow.

References

Alon, T., Coskun, S., Doepke, M., Koll, D., & Tertilt, M. (2021). *From mancession to shecession: women's employment in regular and pandemic recessions*. NBER Working Paper 28632.

Altindag, O., Erten, B., & Keskin, P. (2022). Mental health costs of lockdowns: Evidence from age-specific curfews in Turkey. *American Economic Journal: Applied Economics*, *14*, 320–43.

Anaya, L., Howley, P., Waqas, M., & Yalonetzky, G. (2023). Locked down in distress: A causal estimation of the mental-health fallout from the COVID-19 pandemic in the UK. *Economic Inquiry* forthcoming.

Apouey, B., & Clark, A. E. (2015). Winning big but feeling no better? The effect of lottery prizes on physical and mental health. *Health Economics*, *24*, 516–38.

Banks, J., Fancourt, D., & Xu, X. (2021). Mental health and the COVID-19 pandemic. In J. F. Helliwell, R. Layard, J. D. Sachs, J.-E. De Neve, L. B. Aknin, & S. Wang (Eds.), *World happiness report* (Vol. 2021, pp. 107–30). Sustainable Development Solutions Network.
Banks, J., & Xu, X. (2020). The mental health effects of the first two months of lockdown during the COVID-19 pandemic in the UK. *Fiscal Studies*, *41*, 685–708.
Baron, E. J., Goldstein, E. G., & Wallace, C. T. (2020). Suffering in silence: How COVID-19 school closures inhibit the reporting of child maltreatment. *Journal of Public Economics*, *190*, 104258.
Beland, L.-P., Brodeur, A., Haddad, J., & Mikola, D. (2021). Determinants of family stress and domestic violence: Lessons from the COVID-19 outbreak. *Canadian Public Policy/Analyse de politiques*, *47*, 439–59.
Botha, F., de New, J. P., de New, S. C., Ribar, D. C., & Salamanca, N. (2021). Implications of COVID-19 labour market shocks for inequality in financial wellbeing. *Journal of Population Economics*, *34*, 655–89.
Breedvelt, J., Zamperoni, V., South, E., Uphoff, E., Gilbody, S., Bockting, C., Churchill, R., & Kousoulis, A. (2020). A systematic review of mental health measurement scales for evaluating the effects of mental health prevention interventions. *European Journal of Public Health*, *30*, 510–6.
Brodeur, A., Clark, A., Fleche, S., & Powdthavee, N. (2021). COVID-19, lockdowns and well-being: Evidence from Google Trends. *Journal of Public Economics*, *193*, 104346.
Bults, M., Beaujean, D., De Zwart, O., Kok, G., Van Empelen, P., Van Steenbergen, J., Richardus, J., & Voeten, H. (2011). Perceived risk, anxiety, and behavioural responses of the general public during the early phase of the influenza a (H1N1) pandemic in The Netherlands: Results of three consecutive online surveys. *BMC Public Health*, *11*, 1–3.
Bundesagentur für Arbeit. (2021). *Statistik: Realisierte Kurzarbeit (hochgerechnet)–Deutschland, Länder, Regionaldirektionen, Agenturen für Arbeit und Kreise (Monatszahlen)*. https://statistik.arbeitsagentur.de/Statistikdaten/Detail/Aktuell/iiia7/kurzarbeit-hr/kurzarbeit-hr-d-0-xlsx.xlsx?__blob=publicationFile&v=2. Last accessed July 9, 2021
Chadi, A., & Hetschko, C. (2018). The magic of the new: How job changes affect job satisfaction. *Journal of Economics and Management Strategy*, *27*, 23–39.
Cheng, Z., Mendolia, S., Paloyo, A., Savage, D., & Tani, M. (2021). Working parents, financial insecurity, and childcare: Mental health in the time of COVID-19 in the UK. *Review of the Economics of the Household*, *19*, 123–44.
Clark, A. (2001). What really matters in a job? Hedonic measurement using quit data. *Labour Economics*, *8*, 223–40.
Clark, A., Diener, E., Georgellis, Y., & Lucas, R. (2008). Lags and leads in life satisfaction: A test of the baseline hypothesis. *Economic Journal*, *118*, 222–43.
Clark, A., Georgellis, Y., & Sanfey, P. (2001). Scarring: The psychological impact of past unemployment. *Economica*, *68*, 221–41.
Clark, A. E., D'Ambrosio, C., & Ghislandi, S. (2016). Adaptation to poverty in long-run panel data. *Review of Economics and Statistics*, *98*, 591–600.
Clark, A. E., & Lepinteur, A. (2021). Pandemic policy and life satisfaction in Europe. *Review of Income and Wealth*, *68*, 393–408.
Cohen, P., Cohen, J., Aiken, L. S., & West, S. G. (1999). The problem of units and the circumstance for POMP. *Multivariate Behavioral Research*, *34*, 315–46.
Conti, G., & Pudney, S. (2011). Survey design and the analysis of satisfaction. *Review of Economics and Statistics*, *93*, 1087–93.
Cygan-Rehm, K., Kuehnle, D., & Oberfichtner, M. (2017). Bounding the causal effect of unemployment on mental health: Nonparametric evidence from four countries. *Health Economics*, *26*, 1844–61.
Dahmann, S. C., & Schnitzlein, D. D. (2019). No evidence for a protective effect of education on mental health. *Social Science & Medicine*, *241*, 112584.
Degen, M. (2021). Aus der Schockstarre zur Akteurszentrierung–die Phasen der Pandemie-Berichterstattung. *Zeitschrift für Politikwissenschaft*, *31*, 125–31.
Del Boca, D., Oggero, N., Profeta, P., & Rossi, M. (2020). Women's and men's work, housework and childcare, before and during COVID-19. *Review of Economics of the Household*, *18*, 1001–17.
Deng, M., Qi, Y., Deng, L., Wang, H., Xu, Y., Li, Z., Meng, Z., Tang, J., & Dai, Z. (2020). Obesity as a potential predictor of disease severity in young COVID-19 patients: A retrospective study. *Obesity*, *28*, 1815–25.
Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of Personality Assessment*, *49*, 71–5.
Diener, E., Lucas, R. E., & Scollon, C. N. (2006). Beyond the hedonic treadmill: Revising the adaptation theory of well-being. *American Psychologist*, *61*, 305–14.
Etheridge, B., & Spantig, L. (2022). The gender gap in mental well-being at the onset of the Covid-19 pandemic: Evidence from the UK. *European Economic Review*, *145*, 104114.

Ferrer-i-Carbonell, A., & Frijters, P. (2004). How important is methodology for the estimate of the determinants of happiness? *Economic Journal*, *114*, 641–59.
Frijters, P., Johnston, D., & Shields, M. (2011). Life satisfaction dynamics with quarterly life event data. *Scandinavian Journal of Economics*, *113*, 190–211.
Giuntella, O., Hyde, K., Saccardo, S., & Sadoff, S. (2021). Lifestyle and mental health disruptions during COVID-19. *Proceedings of the National Academy of Sciences*, *118*, 1–9.
Goebel, J., Grabka, M., Liebig, S., Kroh, M., Richter, D., Schröder, C., & Schupp, J. (2019). The German socio-economic panel (SOEP). *Jahrbücher für Nationalökonomie und Statistik*, *239*(2), 345–60.
Green, C., & Heywood, J. (2011). Flexible contracts and subjective well-being. *Economic Inquiry*, *49*, 716–29.
Green, F. (2010). Well-being, job satisfaction and labour mobility. *Labour Economics*, *17*, 897–903.
Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., Webster, S., Cameron-Blake, E., Hallas, L., Majumdar, S., & Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 government response tracker). *Nature Human Behaviour*, *5*, 529–38.
Hamermesh, D. (2020). Life satisfaction, loneliness and togetherness, with an application to Covid-19 lock-downs. *Review of Economics of the Household*, *18*, 983–1000.
Hautzinger, M., Bailer, M., Hofmeister, D., & Keller, F. (2012). *Allgemeine Depressionsskala: ADS*. Hogrefe.
Hektner, J., Schmidt, J., & Csikszentmihalyi, M. (2007). *Experience sampling method: Measuring the quality of everyday life*. Sage Publications.
Hetschko, C., Knabe, A., & Schöb, R. (2019). Looking back in anger? Retirement and unemployment scarring. *Demography*, *56*, 1105–29.
Hetschko, C., Knabe, A., & Schöb, R. (2021). Happiness, work, and identity. In K. F. Zimmermann (Ed.), *Handbook of labor, Human Resources and Population Economics*. Springer.
Hetschko, C., Schmidtke, J., Eid, M., Lawes, M., Schöb, R., & Stephan, G. (2022). *The German Job Search Panel*. OSF preprints. https://osf.io/7jazr
Hisler, G., & Twenge, J. M. (2021). Sleep characteristics of U.S. adults before and during the COVID-19 pandemic. *Social Science & Medicine*, *276*, 113849.
Huebener, M., Waights, S., Spiess, K., Siegel, N., & Wagner, G. (2021). Parental well-being in times of Covid-19 in Germany. *Review of Economics of the Household*, *19*, 91–122.
Hupkau, C., & Petrongolo, B. (2020). Work, care and gender during the COVID-19 crisis. *Fiscal Studies*, *41*, 623–51.
Immel, L., Neumeier, F., & Peichl, A. (2022). The unequal consequences of the Covid-19 pandemic: Evidence from a large representative German population survey. *Review of Income and Wealth*, *68*, 471–96.
infas 360 GmbH and Robert Koch Institute. (2021). *Infektionen–Kennziffern zu Corona-Infektionszahlen*. https://www.corona-datenplattform.de/. Last accessed: July 9, 2021
JOLTS. (2021). *The job openings and labor turnover survey. Latest quit rates*. https://data.bls.gov/timeseries/JTS000000000000000QUR. Last accessed: December 12, 2021
Kahneman, D., & Deaton, A. (2010). High income improves evaluation of life but not emotional well-being. *Proceedings of the National Academy of Sciences*, *107*, 16489–93.
Kahneman, D., & Krueger, A. B. (2006). Developments in measurements of subjective well-being. *Journal of Economic Perspectives*, *20*, 3–24.
Kivi, M., Hansson, I., & Bjälkebring, P. (2020). Up and about: Older adults' well-being during the COVID-19 pandemic in a Swedish longitudinal study. *Journals of Gerontology: Series B*, *76*, e4–e9.
Knabe, A., & Rätzel, S. (2011). Scarring or scaring? The psychological impact of past unemployment and future unemployment risk. *Economica*, *78*, 283–93.
Knabe, A., Rätzel, S., Schöb, R., & Weimann, J. (2010). Dissatisfied with life but having a good day: Time-use and well-being of the unemployed. *Economic Journal*, *120*, 867–89.
Konrad, K., & Simon, S. (2021). *Paternalism attitudes and the happiness value of fundamental freedoms*. Working Paper of the Max Planck Institute for Tax Law and Public Finance 2021-04.
Lau, A., Chi, I., Cummins, R., Lee, T., Chou, K.-L., & Chung, L. (2008). The SARS (severe acute respiratory syndrome) pandemic in Hong Kong: Effects on the subjective wellbeing of elderly and younger people. *Aging and Mental Health*, *12*, 746–60.
Lawes, M., Hetschko, C., Schöb, R., Stephan, G., & Eid, M. (2022). Examining interindividual differences in unemployment-related changes of subjective well-being: No moderation effects of psychological well-being across various unemployment contexts. Preprint at: https://psyarxiv.com/3bgpm
Lawes, M., Hetschko, C., Schöb, R., Stephan, G., & Eid, M. (2023). The impact of unemployment on cognitive, affective, and eudaimonic well-being facets: Investigating immediate effects and short-term adaptation. *Journal of Personality and Social Psychology*, *124*, 659–81.
Layard, R., Clark, A., De Neve, J.-E., Krekel, C., & Fancourt, D. (2020). *When to release the lockdown: A wellbeing framework for analysing costs and benefits*. CEP Occasional Paper 49.

Lepinteur, A. (2019). The shorter workweek and worker wellbeing: Evidence from Portugal and France. *Labour Economics*, *58*, 204–20.
Lucas, R. (2007). Long-term disability is associated with lasting changes in subjective well-being: Evidence from two nationally representative longitudinal studies. *Journal of Personality and Social Psychology*, *92*, 717–30.
Ludwigs, K., & Erdtmann, S. (2019). The happiness analyzer–Developing a new technique for measuring subjective well-being. *International Journal of Community Well-Being*, *1*, 101–14.
Luechinger, S., Meier, S., & Stutzer, A. (2010). Why does unemployment hurt the employed? Evidence from the life satisfaction gap between the public and the private sector. *Journal of Human Resources*, *45*, 998–1045.
Luhmann, M., & Eid, M. (2009). Does it really feel the same? Changes in life satisfaction following repeated life events. *Journal of Personality and Social Psychology*, *97*, 363–81.
Luhmann, M., Hofmann, W., Eid, M., & Lucas, R. E. (2012). Subjective well-being and adaptation to life events: A meta-analysis. *Journal of Personality and Social Psychology*, *102*, 592–615.
Lykken, D., & Tellegen, A. (1996). Happiness is a stochastic phenomenon. *Psychological Science*, *7*, 186–9.
Möhring, K., Naumann, E., Reifenscheid, M., Wenz, A., Rettig, T., Krieger, U., Friedel, S., Finkel, M., Cornesse, C., & Blom, A. G. (2021). The COVID-19 pandemic and subjective well-being: Longitudinal evidence on satisfaction with work and family. *European Societies*, *23*, S601–17.
Naumann, E., Möhring, K., Reifenscheid, M., Wenz, A., Rettig, T., Lehrer, R., Krieger, U., Juhl, S., Friedel, S., Fikel, M., Cornesse, C., & Blom, A. G. (2020). COVID-19 policies in Germany and their social, political, and psychological consequences. *European Policy Analysis*, *6*, 191–202.
Newby, J. M., O'Moore, K., Tang, S., Christensen, H., & Faasse, K. (2020). Acute mental health responses during the COVID-19 pandemic in Australia. *PLoS One*, *15*, e0237172.
Niedzwiedz, C., Green, M., Benzeval, M., Campbell, D., Craig, P., Demou, E., Leyland, A., Pearce, A., Thomson, R., Whitley, E., & Katikireddi, S. V. (2020). Ethnic and socioeconomic differences in SARS-CoV-2 infection: Prospective cohort study using UK biobank. *BMC Medicine*, *18*, 1–14.
Odermatt, R., & Stutzer, A. (2018). Subjective well-being and public policy. In E. Diener, et al. (Eds.), *Handbook of wellbeing* (pp. 954–68). DEF Publishers.
OECD. (2020). *Job retention schemes during the COVID-19 lockdown and beyond*. In: OECD Policy Responses to Coronavirus (COVID-19). https://www.oecd.org/coronavirus/policy-responses/job-retention-schemes-during-the-covid-19-lockdown-and-beyond-0853ba1d/. Last accessed: December 13, 2021
Ohrnberger, J., Fichera, E., & Sutton, M. (2017). The relationship between physical and mental health: A mediation analysis. *Social Science & Medicine*, *195*, 42–9.
Pelly, D., Doyle, O., Daly, M., & Delaney, L. (2021). *Worker well-being before and during the COVID-19 restrictions: a longitudinal study in the UK*. UCD Centre for Economic Research Working Paper Series 21/05.
Pierce, M., Hope, H., Ford, T., Hatch, S., Hotopf, M., John, A., Kontopantelis, E., Webb, R., Wessely, S., McManus, S., & Abel, K. M. (2020). Mental health before and during the COVID-19 pandemic: A longitudinal probability sample survey of the UK population. *Lancet Psychiatry*, *7*, 883–92.
Proto, E., & Quintana-Domeque, C. (2021). COVID-19 and mental health deterioration by ethnicity and gender in the UK. *PLoS One*, *16*, e0244419.
Quintana-Domeque, C., & Proto, E. (2022). On the persistence of mental health deterioration during the covid-19 pandemic by sex and ethnicity in the UK: Evidence from understanding society. *The BE Journal of Economic Analysis & Policy*, *22*, 361–72.
Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*, 385–401.
Recchi, E., Ferragina, E., Helmeid, E., Pauly, S., Safi, M., Sauger, N., & Schradie, J. (2020). The "eye of the hurricane" paradox: An unexpected and unequal rise of well-being during the Covid-19 lockdown in France. *Research in Social Stratification and Mobility*, *68*, 100508.
Reichert, A., & Tauchmann, H. (2017). Workforce reduction, subjective job insecurity, and mental health. *Journal of Economic Behavior & Organization*, *133*, 187–212.
Robert Koch Institute. (2021a). *Informationen Und Hilfestellungen Für Personen Mit Einem Höheren Risiko Für Einen Schweren COVID-19-Krankheitsverlauf*. https://www.rki.de/DE/Content/InfAZ/N/Neuartiges_Coronavirus/Risikogruppen.html. Last accessed: July 9, 2021
Robert Koch Institute. (2021b). *Covid-19-Dashboard*. https://experience.arcgis.com/experience/478220a4c454480e823b17327b2bf1d4. Last accessed: July 9, 2021
Satici, B., Saricali, M., Satici, S. A., & Griffiths, M. D. (2020). Intolerance of uncertainty and mental wellbeing: Serial mediation by rumination and fear of COVID-19. *International Journal of Mental Health and Addiction*, *15*, 1–12.

Serrano-Alarcón, M., Kentikelenis, A., McKee, M., & Stuckler, D. (2022). Impact of COVID-19 lockdowns on mental health: Evidence from a quasi-natural experiment in England and Scotland. *Health Economics*, *31*, 284–96.
Sevilla, A., & Smith, S. (2020). Baby steps: The gender division of childcare during the COVID-19 pandemic. *Oxford Review of Economic Policy*, *36*, 169–86.
Sibley, C., Greaves, L., Satherley, N., Wilson, M., Overall, N., Lee, C., Milojev, P., Bulbulia, J., Osborne, D., Milfont, T., Houkamau, C., Duck, I., Vickers-Jones, R., & Barlow, F. (2020). Effects of the COVID-19 pandemic and nationwide lockdown on trust, attitudes toward government, and well-being. *American Psychologist*, *75*, 618–30.
Stantcheva, S. (2022). *Inequalities in the Times of a Pandemic*. NBER Working Paper 29657.
Stephan, G. (2016). Arbeitsuchend, aber (noch) nicht arbeitslos: Was kommt nach der Meldung? *WSI Mitteilungen*, *69*, 292–9.
Steyer, R., Schwenkmezger, P., Notz, P., & Eid, M. (1997). *Der Mehrdimensionale Befindlichkeitsfragebogen (MDBF)*. Hogrefe Verlag.
Takaku, R., & Yokoyama, I. (2021). What the COVID-19 school closure left in its wake: Evidence from a regression discontinuity analysis in Japan. *Journal of Public Economics*, *195*, 104364.
Thompson, R., Garfin, D. R., Holman, A., & Silver, R. C. (2017). Distress, worry, and functioning following a global health crisis: A national study of Americans' responses to Ebola. *Clinical Psychological Science*, *5*, 513–21.
Vindegaar, N., & Benros, M. E. (2020). COVID-19 pandemic and mental health consequences: Systematic review of the current evidence. *Brain, Behavior, and Immunity*, *89*, 531–42.
Ward, J., & Edwards, K. (2021). CPS nonresponse during the COVID-19 pandemic: Explanations, extent, and effects. *Labour Economics*, *72*, 102060.
Wolf, T., Metzing, M., & Lucas, R. E. (2022). Experienced well-being and labor market status: The role of pleasure and meaning. *Social Indicators Research*, *163*, 691–721.
Young, C. (2012). Losing a job: The nonpecuniary cost of unemployment in the United States. *Social Forces*, *91*, 609–34.
Zacher, H., & Rudolph, C. (2021). Individual differences and changes in subjective wellbeing during the early stages of the COVID-19 pandemic. *American Psychologist*, *76*, 50–62.
Zoch, G., Bächmann, A.-C., & Vicari, B. (2021). Who cares when care closes? Care-arrangements and parental working conditions during the COVID-19 pandemic in Germany. *Journal of European Societies*, *23*, S576–88.

Supporting Information

Additional supporting information may be found in the online version of this article at the publisher's web site:

Appendix S1. Supplementary Appendix.
Data S1 Data Code.