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Laura M. Giurge
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Laura M. Giurge
London Business School

Ayse Yemiscigil
Harvard Kennedy School

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Laura M. Giurge[1]

Ayse Yemiscigil[2]

Joseph Sherlock[3]

Ashley V. Whillans[4*]

[1] London Business School

[2] Harvard Kennedy School

[3] Center for Advanced Hindsight, Duke University

[3] Harvard Business School

Corresponding author:

Ashley Whillans, Negotiations, Organizations & Markets Unit, Harvard Business School,

Cambridge, MA, 1-617-308-1539, awhillans@hbs.edu

ABSTRACT

The COVID-19 global pandemic continues to alter how people spend their time, with possible downstream consequences for subjective well-being. Using diverse samples from the United States, Canada, Denmark, Brazil, and Spain ($n = 30,018$) and following a preregistered analytic plan, we find notable gender differences in time-use, with women and especially mothers spending more time on necessities such as childcare and household chores than fathers during the pandemic. We also provide longitudinal evidence that young women engaged in less active leisure in the initial weeks of COVID-19 compared to young men, and that these differences in active leisure predicted lower subjective well-being one month later ($n = 924$). Together, these data represent one of the most rigorous empirical investigations examining how time-use relates to well-being during the forced lockdowns created by the COVID-19 pandemic. By focusing on time—a critical but largely overlooked resource—these results point toward underexamined inequalities that policymakers and organizational leaders should carefully consider when designing policies now and post-COVID-19.

Keywords: time-use, subjective well-being, gender, work-life balance, COVID-19

SIGNIFICANCE STATATEMENT

Despite saving time on commuting and having both caretakers at home, we find pervasive gender inequalities in time-use during COVID-19. Surveys of diverse samples with over 30,000 respondents reveal that women and especially mothers spent more time on necessities, such as childcare or household chores, and less time on active leisure activities, such as socializing and going outdoors as compared to fathers. Across samples, time spent on active leisure activities was positively associated with subjective well-being. We supplement these correlational findings with a longitudinal sample of college students and show that increases in active leisure predict changes in subjective well-being. Yet, across studies, young women engaged in *less* active leisure in the first weeks of COVID-19, which predicted lower subjective well-being one month later. This research reveals persistent time-use inequalities that predict differences in subjective well-being.

The COVID-19 pandemic continues to disrupt our lives. Organizational leaders and policymakers are responding to the crisis by introducing new policies such as allowing employees to work from home until 2021 and switching to a hybrid organizational structure where employees can work some days at the office and some days at home[1,2]. However, these changes are being implemented with little evidence regarding the nature and magnitude of the disruptions that employees have been experiencing in their daily lives.

Most research thus far has been devoted to how the pandemic has altered employee productivity[3,4]. A survey of 4,535 principal investigators revealed that female scientists with young children living at home experienced a decline in time spent on research[5]. Analyzing patterns in technology use from over 3 million users, DeFilippis et al.[3] found that time spent in meetings decreased while the average work day expanded, with more time spent answering emails. As this research suggests, COVID-19 has transformed how people spend their time. Yet, no empirical research has examined time-use beyond productivity. In this paper, we sought to understand how different groups of people across countries spent their time and how any observed time-use differences predict differences in self-reported subjective well-being (SWB) during the pandemic.

SWB refers to a person's global evaluation of how happy they are, and includes both a cognitive (i.e. assessments of one's life quality) and an emotional component (i.e. high positive affect, low negative affect)[6]. While prior work has primarily focused on the link between income and happiness[7], emerging research suggests that how people spend their time is equally if not more important for SWB[8–11]. Irrespective of income, spending time on active leisure activities such as socializing or exercising, promotes happiness[12]. Yet, certain groups in society, primarily low-income women, tend to spend most of their time on necessities (e.g., household chores and caretaking responsibilities), leaving little time for leisure activities[11].

COVID-19 provides a unique situation to study differences in time-use and SWB for two primary reasons. First, recent estimates from the Gallup organization[13] suggest that the average number of days that people around the world have worked from home has more than doubled

during the pandemic, as compared to autumn 2019. This has likely resulted in many households having both household members working from home which should, in theory, equalize or at least reduce the gender gap in time spent on necessities between mothers and fathers. Second, and relatedly, recent estimates[14] suggest that in the US alone the daily commute has saved working adults 89 million hours each week since the pandemic started. Reduced commutes could also leave people with more time to engage in leisure activities. Thus, we might expect individuals to engage in *more* (vs. less) active leisure and to exhibit greater self-reported happiness as a result of this increase in leisure activities (see Smeets, Whillans, Bekkers, & Norton[12] for a similar argument).

To explore the question of how people are spending their time, and whether and how time-use is shaping SWB during COVID-19, we implemented eight surveys between mid-March and mid-June 2020, including nationally representative surveys of people living in the US ($n = 440$) and Canada ($n = 840$), working parents living in the US ($n = 400$), working adults living in Spain ($n = 866$), employed adults working from home in the US ($n = 1,513$), Brazil ($n = 21,844$), and globally ($n = 933$), and full-time college students ($n = 3,182$). See Table 1 for sample characteristics. See the Methods and Measures section for details on the sampling strategy for each study.

In all samples, consistent with prior research,[15] we measured SWB by asking respondents to rate their overall happiness. Respondents then reported how much time they allocated to various activities in a typical day during the pandemic. Our primary time-use outcomes included work hours, overall leisure, and necessities[12,16]. While the exact composites differed slightly by dataset, time spent on necessities was typically a composite of household chores and taking care of others, overall leisure was a composite of active (e.g., time spent exercising) and passive leisure (e.g., time spent watching TV), and time spent working typically comprised of a composite of time spent working or studying (in student samples) (See *SI Appendix*, Table S2 and S3a-h for exact time-use measures employed across samples and sample specific time-use descriptive statistics).

Across five of the eight correlational studies where we measured time spent on necessities with over 30,000 respondents, women spent more time on necessities than men during the

pandemic (Fig. 1). Exploring these gender differences by parental status, parents spent more time on necessities such as cooking and cleaning than non-parents (Fig. 2). Among parents ($n = 11,321$), mothers reported spending more time on necessities than fathers (Fig. 3). These effects held controlling for our preregistered set of covariates: age, income, education, number of children, household size, and number of days since survey launch (preregistration number "45781", http://aspredicted.org/blind.php?x=e7qg3s).

In the surveys of remote workers who were recruited primarily from the US and Brazil ($n = 24,290$), respondents also indicated what their time allocation looked like in a typical day prior to the pandemic, allowing us to examine changes in time-use and happiness. Overall, people reported experiencing a decline in time spent devoted to work and active leisure activities. In contrast, people reported experiencing an increase in time devoted to passive leisure (e.g., time spent watching TV) and necessities during the pandemic as compared to before it (Fig. 4). See detailed statistics in *SI Appendix*, Tables S4a-4c. Controlling for time-use pre-COVID-19, in the US and Brazil samples, we also found a significant interaction between gender and parental status, indicating that mothers spent more time on necessities than fathers, above and beyond the time they spent on necessities pre-COVID-19 (Fig. 5). Thus, the pandemic—from our data—increased the already existent "motherhood penalty" with mothers spending more of their day on necessities[17–19].

Next, we examined whether and how time-use related to happiness. Consistent with prior research[12], the association between time spent pursuing active leisure activities such as socializing and volunteering and happiness was positive and reached significance in six of the eight samples (Fig. 6).
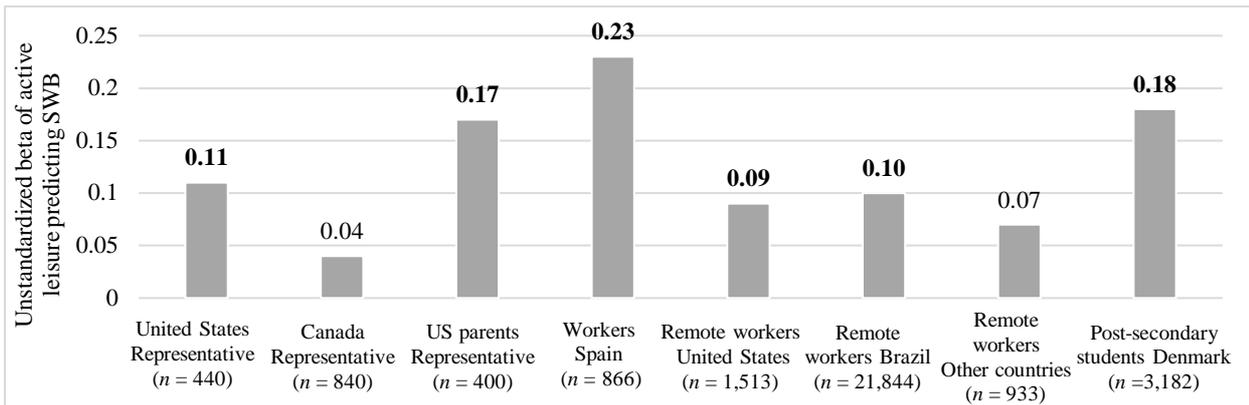
Fig. 6. | The association between active leisure and overall happiness across studies 1-8. Bold numbers indicate a significant effect based on models with our preregistered covariates. Results are similar without covariates. See Tables S5g, S6g, S7e, S8h, S9f, S10f, S11f in *SI Appendix* for results with other time-use measures.

To document changes over time in active leisure and SWB, we conducted a longitudinal study with college students ($n = 924$) in March at the start of the pandemic lockdown (T1) and one month later while still in lockdown (T2). See *SI Appendix* Table S13a for sample demographics and S13b for time-use descriptive statistics. Following a preregistered analytic plan (preregistration number "46013", http://aspredicted.org/blind.php?x=wf4d9u), we found that active leisure was positively associated with changes in SWB one month later. However, young women engaged in less active leisure compared to young men, and differences in time spent on active leisure at T1 predicted lower SWB one month later. We expand on these findings in more detail in the following sections.

Table 1

Demographic characteristics of survey respondents, and descriptives of main study variables in studies 1-8

| Study	Study 1	Study 2	Study 3	Study 4	Study 5	Study 6	Study 7	Study 8
Sample	US representative	Canada representative	US parents representative	Spain working adults	US remote workers	Brazil remote workers	Other countries remote workers	Denmark college students
n	440	840	400	866	1,513	21,844	933	3,182
Mean (*SD*) age, years	49.27 (16.42)	42.58 (17.37)	38.01 (8.73)	47 (22.56)	42.69 (11.68)	43.18 (10.41)	39.10 (9.71)	26.22 (6.12)
% White	79.4%	56%	--	--	61.1%	59.2%	65.9%	--
% female	55.1%	62.1%	53.6%	68.6%	61.3%	51.8%	56.1%	67.2%
% parents	54.2%	42.7%	100%	89%	34.5%	40.8%	44.1%	--
% with a master degree and above	--	--	--	43.6%	57.9%	46.8%	62.2%	--
% employed full-time and part-time	50.3%	52.1%	61.8%	90.4%	--	--	--	--
Mean (*SD*) weekly hours worked	--	--	--	37.16 (7.43) [a]	--	--	--	--
Median category, household income	$50K–$55K	6 (0; 10)	$70K–$80K	€3K–€5K [b]	$5–$7K [b]	>R$7K [b]	Middle [b c]	--
Median (range) no. children	1 (0; 6)	0 (0; 8)	2 (1; 7)	1 (0; 4)	0 (0; 7)	0 (0; 15)	0 (0; 9)	--
% Married/partnership	57.2%	60.1%	82.8%	85.9% [e]	83.3% [e]	85.6% [e]	83.2% [e]	--
Mean (*SD*) Happiness	6.03 (2.53)	5.87 (2.62)	2.98 (1.16) [d]	6.93 (1.47)	7.44 (1.81)	7.85 (1.99)	7.24 (1.95)	6.32 (2.13)
Mean (*SD*) Life satisfaction	6.32 (2.24)	5.83 (1.92)	--	--	7.67 (1.71)	7.70 (2.10)	7.37 (1.97)	--
Mean (*SD*) Positive Affect	--	--	--	3.64 (.74)	--	--	--	3.58 (.74)
Mean (*SD*) Negative Affect	--	--	--	2.45 (.89)	--	--	--	2.77 (.87)

Note. The symbol "--" indicates that the variable was not assessed in that study. Sample size is based on available responses on our core outcome variables: overall happiness. Household income is reported in the local currency. [a] Some of the respondents in this study (32.2%) entered values that would be impossible on a weekly basis (e.g., 325 hours). We changed these values to reflect values that would be possible on a weekly basis (e.g. from 325 hours to 32.5 hours). [b] In these studies, we recorded monthly income. [c] In this study income was recorded from 1 = *very low* to 5 = *very high*. [d] Happiness in this study was measured in 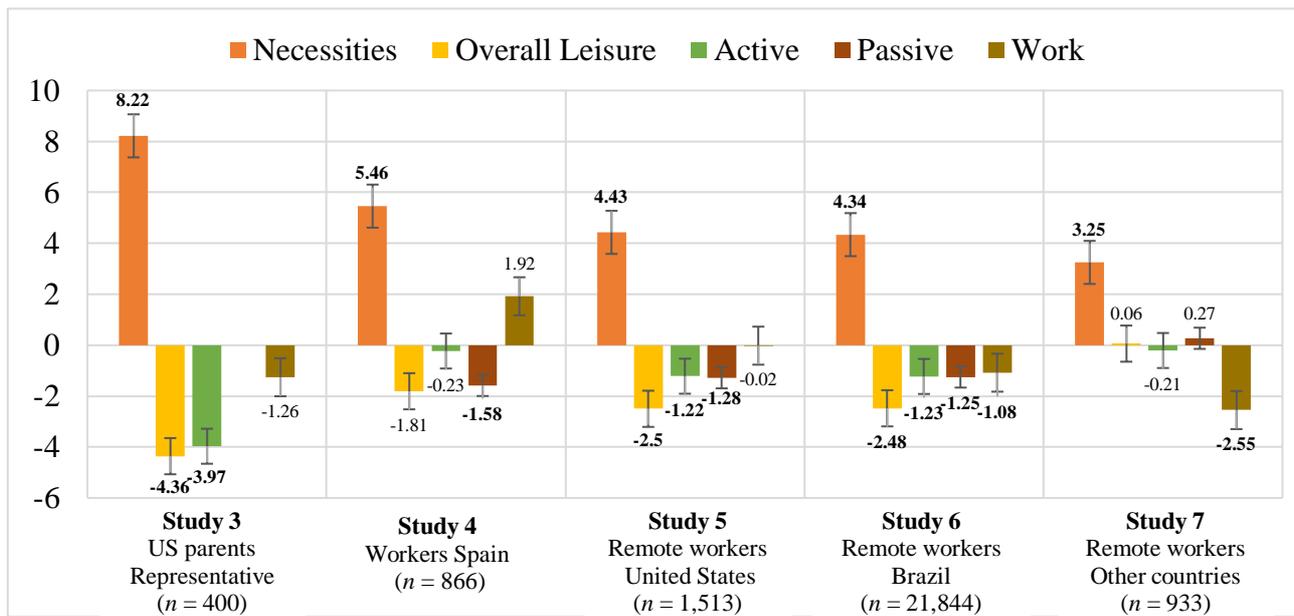comparison to before COVID-19: "When compared to before the COVID-19 pandemic, how happy are you?" on a scale from 1 = *much less happy* to 5 = *much happier*. [e] In these studies, we measured whether respondents lived with at least one other adult (e.g., roommate, spouse, partner, parent, grandparent). The percentage reflects how many respondents indicated living with at least one other adult.
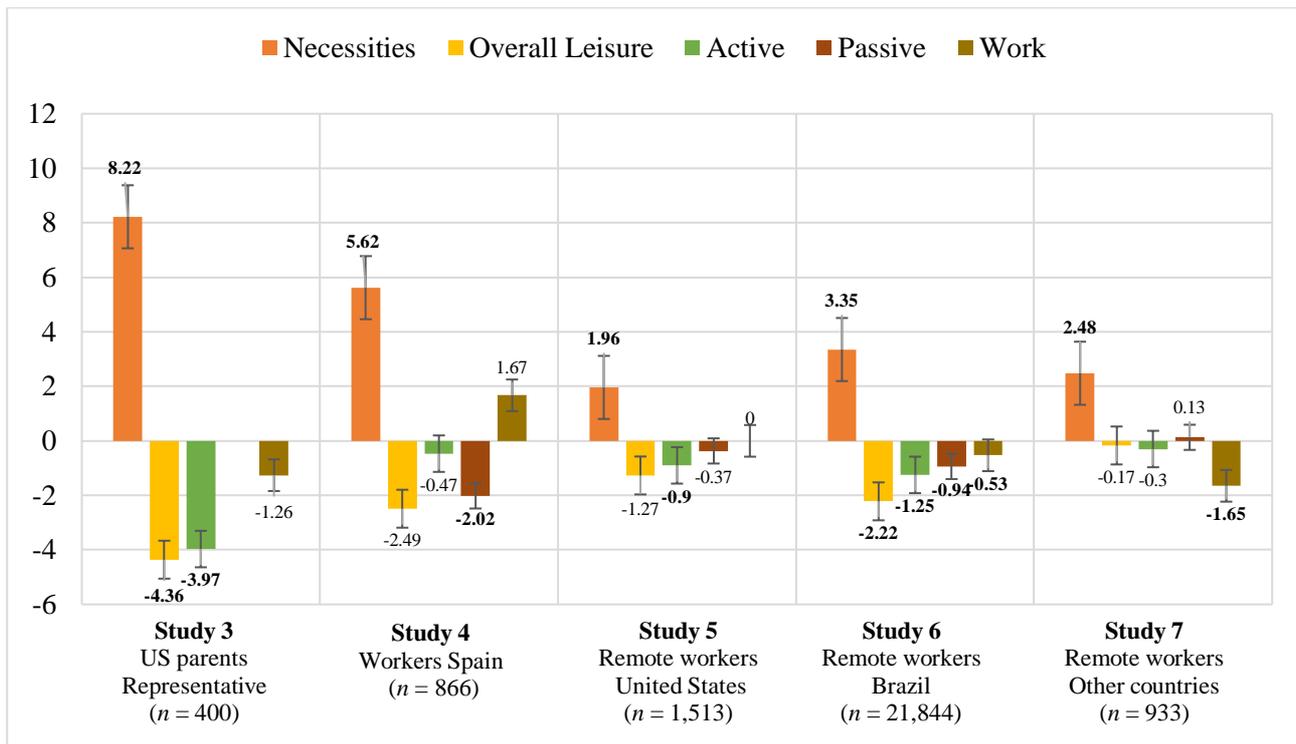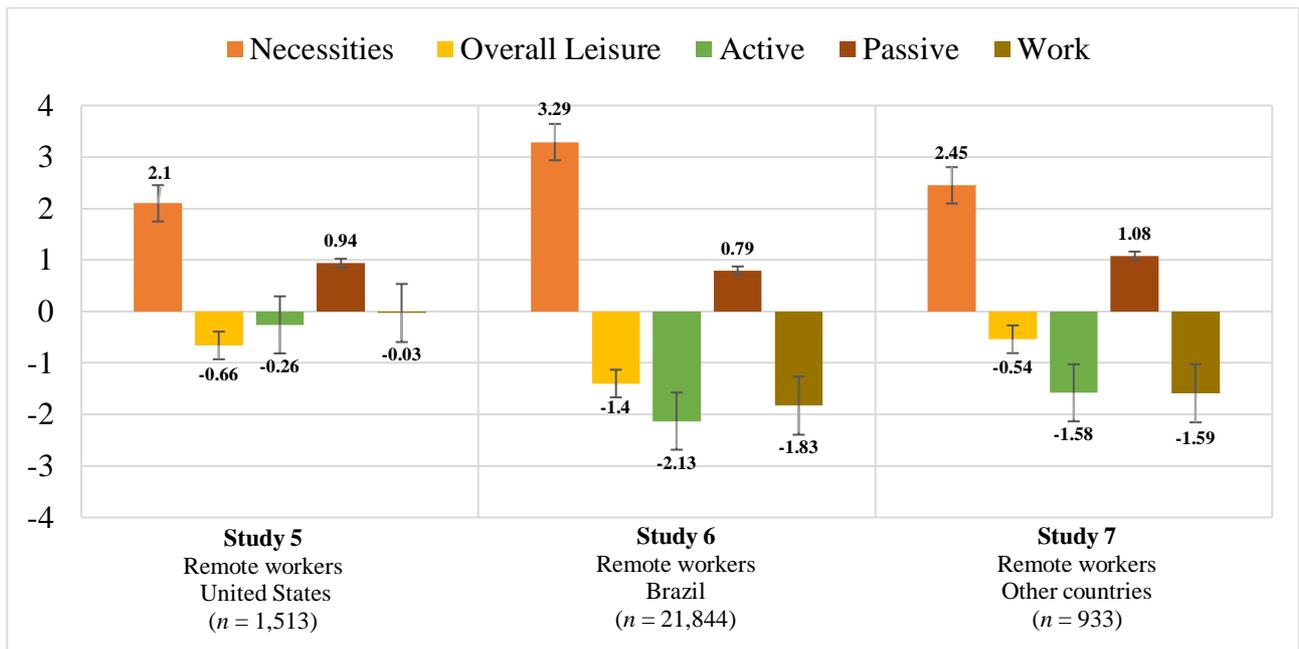
Fig. 1. | Time-use differences by gender (1 = *female*) in Studies 3-7. In Studies 1-2 and Study 8 we did not measure time spent on necessities. Error bars represent the standard error. Bold numbers indicate significant mean differences based on models with our preregistered covariates. Results hold without covariates. <u>Differences in time-use are reported as mean differences between women and men based on time-use episode weighted statistics[12,16]. Bars above zero indicate that women spent more time than men in the respective activity, while bars below zero indicate that women spent less time in the respective activity than men.</u> Time-use that are not present means they were not measured in that sample. While time-use measures differ across samples, necessities is typically a composite of household chores and taking care of others, overall leisure is a composite of active (e.g., time spent exercising) and passive leisure (e.g., time spent watching TV), and time spent working is a composite of time spent working or studying (in student samples) (see *SI Appendix* Table S2 and S3a-h for sample time-use descriptive statistics). Given that the skewness value of the time-use composite for work in Study 5 was above 8.32 (thus above the preregistered cutoff point of 2), we log transformed this variable. Detailed statistics are available in *SI Appendix* (see Tables S5a, S6a, S7a, S8a, S9a, S10a, S11a, S12a).
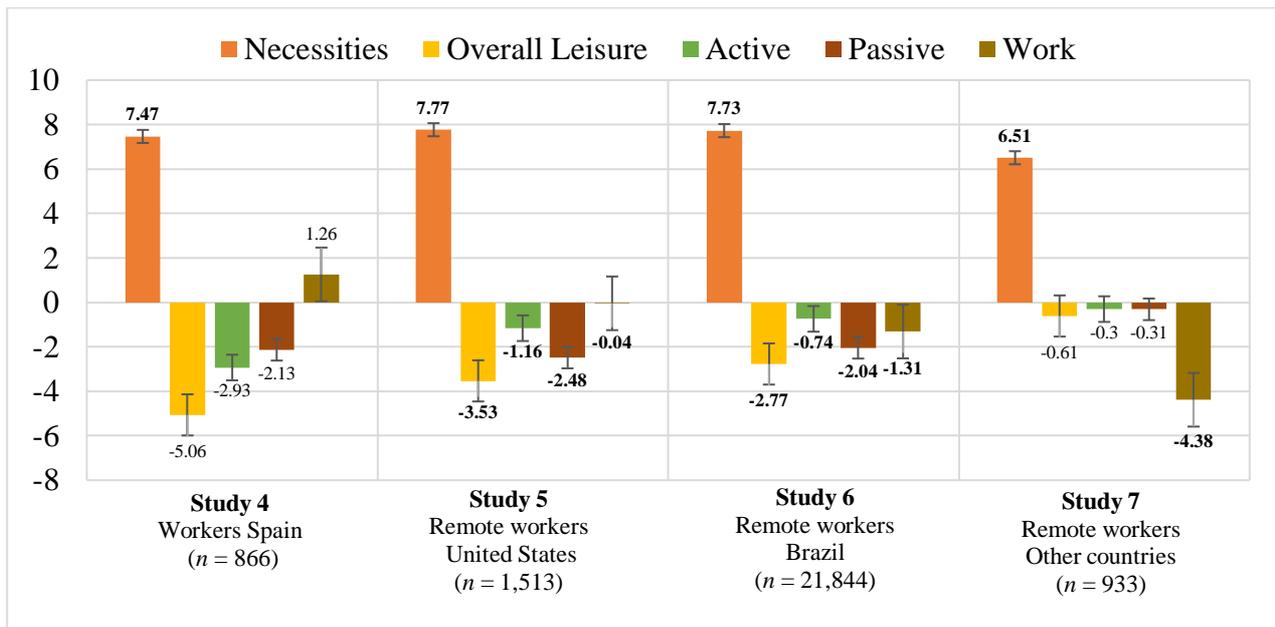
Fig. 2. | Time-use differences by parental status (1 = *yes*) in Studies 4-7. In Studies 1-2 and Study 8 we did not measure time spent on necessities. Study 3 was a sample of working parents only. Error bars represent the standard error. Bold numbers indicate significant mean differences based on models with our preregistered covariates. Results hold without covariates. <u>Differences in time-use are reported as mean differences between women and men based on time-use episode weighted statistics[12,16]</u>. <u>Bars above zero indicate that parents spent more time than non-parents in the respective activity, while bars below zero indicate that parents spent less time in the respective activity than non-parents.</u> Time-use that are not present means they were not measured in that sample. While time-use measures differ across samples, necessities is typically a composite of household chores and taking care of others, overall leisure is a composite of active (e.g., time spent exercising) and passive leisure (e.g., time spent watching TV), and time spent working is a composite of time spent working or studying (in student samples) (see *SI Appendix* Table S2 and S3a-i for sample time-use descriptive statistics). Given that the skewness value of the time-use composite for work in Study 5 was above 8.32 (thus above the preregistered cutoff point of 2), we log transformed this variable. Detailed statistics are available in *SI Appendix* (see Tables S5a, S6a, S7a, S8a, S9a, S10a, S11a, S12a).

Fig. 3. | Time-use differences by gender among parents only (1 = *mothers*) in Studies 3-7. In Studies 1-2 and Study 8 we did not measure time spent on necessities. Error bars represent the standard error. Bold numbers indicate significant mean differences based on models with our preregistered covariates. Results hold without covariates. Differences in time-use are reported as mean differences between mothers and fathers based on time-use episode weighted statistics[12,16]. Bars above zero indicate that mothers spent more time than fathers in the respective activity, while bars below zero indicate that mothers spent less time in the respective activity than fathers. Time-use that are not present means they were not measured in that sample. While time-use measures differ across samples, necessities is typically a composite of household chores and taking care of others, overall leisure is a composite of active (e.g., time spent exercising) and passive leisure (e.g., time spent watching TV), and time spent working is a composite of time spent working or studying (in student samples) (see *SI Appendix* Table S2 and S3a-i for sample time-use descriptive statistics). Given that the skewness value of the time-use composite for work in Study 5 was above 8.32 (thus above the preregistered cutoff point of 2), we log transformed this variable. Detailed statistics are available in *SI Appendix* (see Tables S5a, S6a, S7a, S8a, S9a, S10a, S11a, S12a).

Fig. 4. | Changes in time-use pre- and during COVID in Studies 5-7. Error bars represent the standard error. Bold numbers indicate significant mean differences based on models with our preregistered covariates. Results hold without covariates except for active leisure differences in Study 5. <u>Differences in time-use are reported as mean differences between time-use episode weighted statistics during vs. pre-COVID-19.</u> <u>Bars above zero indicate that respondents reported spending more time in the respective activity during than before the pandemic, while bars below zero indicate spending less time in the respective activity during than before the pandemic.</u> Across these three samples: necessities is a composite of 2 items (i.e. doing errands/household chores and taking care of/spending time with family); overall leisure is a composite of 1 item capturing active leisure like going outdoors, and 1 item capturing passive leisure like watching TV; work is a composite of 2 items (i.e. working productively, working unproductively). Given that the skewness value of the time-use composite for work in Study 5 was above 8.32 (thus above the preregistered cutoff point of 2), we log transformed this variable. Detailed statistics are available in *SI Appendix* (see Tables S4a-c and Tables S9b for US, S10b for Brazil, and S11b for other countries).
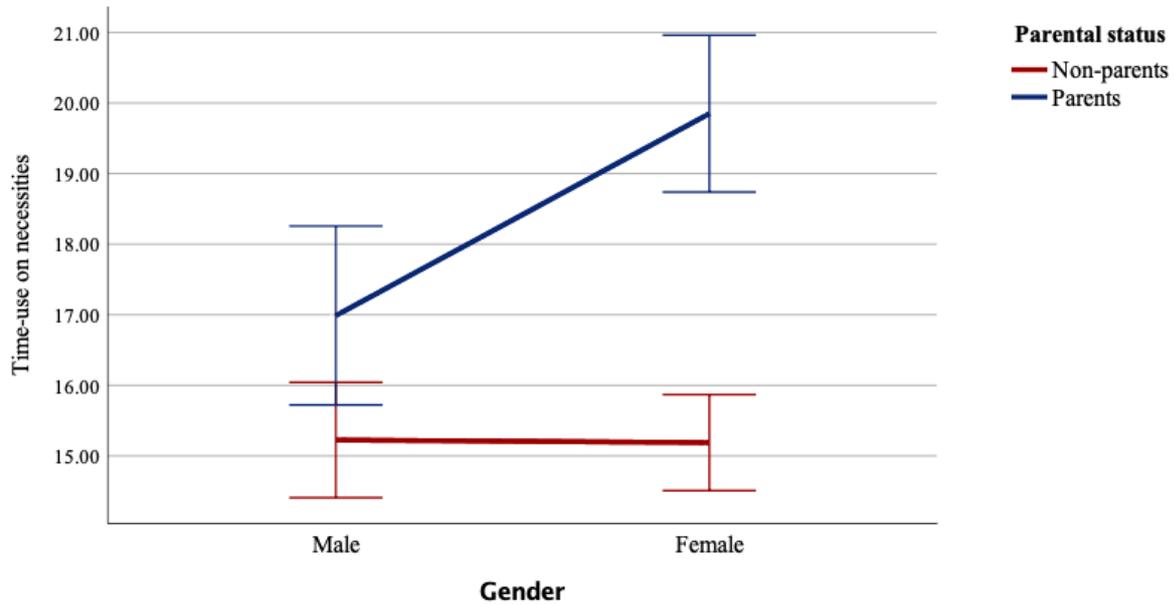
Panel A
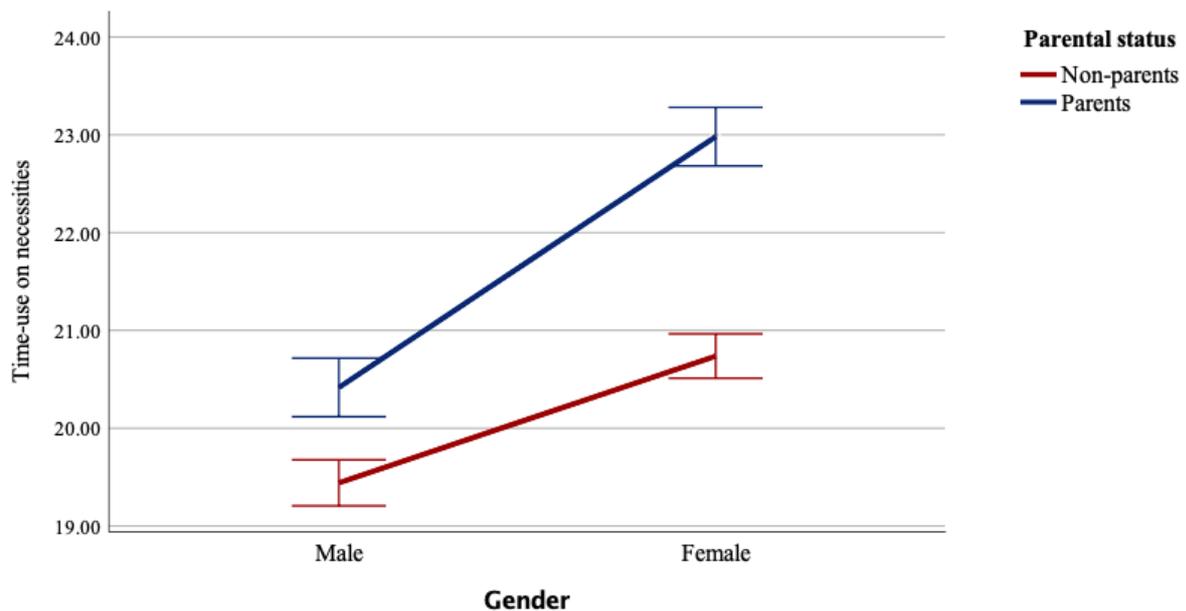
Panel B

Fig. 5 | Interaction between gender and parental status on time spent on necessities during COVID-19 while controlling for time spent on necessities pre-COVID-19 as well as our preregistered covariates: age, income, number of children, education, number of people in the household, and days since survey launch. Necessities is a composite of household chores and taking care of others. Error bars are $CI_{95\%}$. Panel A is the pattern observed in Study 5 and Panel B is the patterned observed in Study 6.

Detailed Results

As per our preregistered analytic plan (http://aspredicted.org/blind.php?x=e7qg3s), we first looked at how time-use varied by socio-demographic groups. Then, we looked at how SWB differed by socio-demographic groups. Although we examined various sociodemographic groups as per our preregistration, the most reliable results we observed were the differences between women and men with caretaking responsibilities. We therefore focus our primary analyses across studies on these comparisons.

We report the following results in the *SI Appendix*: 1. Differences in time-use across all socio-demographic groups (e.g., income, education, parental status, and relationship status or household size; see *SI Appendix,* Tables S5a-b, S6a-b, S7a-b, S8a-b, S9a-b, S10a-b, S11a-b, and S12a), 2. Differences in other self-reported SWB measures where available (i.e. life satisfaction, positive affect, negative affect, meaning in life) across all socio-demographic groups (see *SI Appendix,* Tables S5c, S6c, S7c, S8c, S9c, S10c, S11c, and S12b for happiness differences), 3. Moderation or mediation analyses in line with our preregistered analytic plan with time-use across socio-demographic groups (see *SI Appendix*, Tables S5d-f, S6d-f, S7d, S8f-g, S9d-e, S10d-e, S11d-e, 12c-f), 4. Differences in time-use and other self-reported SWB measures (see *SI Appendix,* Tables S5g, S6g, S7e, S8h, S9f, S10f, S11f, S12g), and 5. Differences in time-use and SWB with the individual time-use items that form the time-use composites separately see *SI Appendix*, Tables S7f, S8i, S9g, S10g, S11g, S12h). See Materials and Methods section for more details.

Study 1 (*n* = 440). We surveyed a representative sample of people living in the US. Respondents were nationally representative in terms of age, gender, ethnicity, and occupation status (i.e. full-time or part-time employed) for the US. As per our preregistered analytic plan, we first examined time-use differences by socio-demographic group. In this study, there was no relationship between time-use and gender (see *SI Appendix,* Tables S5a-b for detailed results and analyses across other

socio-demographic groups). However, we did find that women (vs. men) reported lower overall happiness ($\beta = -.10$, $p = .034$). Time-use did not explain these gender differences in happiness (*SI Appendix*, Table S5d; see Table S5e-f for results with life satisfaction and meaning in life).

In line with our preregistered analytic plan, we then examined the association between time-use and happiness. We found that time spent on active leisure was positively associated with happiness ($\beta = .11$, $p = .034$), while time spent on passive leisure was negatively associated with happiness ($\beta = -.18$, $p = .003$). See *SI Appendix* Table S5g for additional analyses with time-use, life satisfaction, and meaning in life. In this study, time-use was measured with one item for each activity: work, active leisure, and passive leisure, potentially accounting for the inconsistent results found in this study as compared to across our other studies.

Study 2 ($n = 840$). We surveyed a representative sample of people living in Canada. Respondents were nationally representative in terms of age, gender, ethnicity, and occupation status (i.e. full-time employed) for Canada. As per our pre-registration, we first examined time-use differences by socio-demographic group. Women (vs. men) spent less time on work activities ($M_{women} = 37.89$, $SD = 39.13$ vs. $M_{men} = 43.90$, $SD = 41.31$, $d = -.15$, $p = .044$) and more time on active leisure activities ($M_{women} = 62.11$, $SD = 39.13$ vs. $M_{men} = 56.10$, $SD = 41.31$, $d = .15$, $p = .044$). See *SI Appendix* Tables S6a-b for analyses across other socio-demographic groups. There were no significant interactions between gender and parental status on time-use (*SI Appendix*, Table S6b).

Exploratory analyses splitting the sample by parental status ($n = 359$) showed that mothers (vs. fathers) spent less time on work activities ($M_{mothers} = 36.88$, $SD = 39.39$ vs. $M_{fathers} = 40.98$, $SD = 41.87$; $d = -.10$, $p = .027$) but more time on active leisure activities ($M_{mothers} = 63.12$, $SD = 39.39$ vs. $M_{fathers} = 59.02$, $SD = 41.87$; $d = .10$, $p = .027$). Among non-parents ($n = 481$), gender differences were not significant for either work activities ($M_{non-mothers} = 38.56$, $SD = 39.01$ vs. $M_{non-fathers} = 46.62$, $SD = 40.74$; $d = -20$, $p = .376$) or active leisure ($M_{non-mothers} = 61.44$, $SD = 39.01$ vs. $M_{non-fathers} = 53.38$, $SD = 40.74$; $d = .20$, $p = .376$).

Unlike Study 1, there were no gender differences in happiness (*SI Appendix*, Table S6c). Time-use did not moderate the relationship between gender and happiness (*SI Appendix* Table S6d; see Tables S6e-f for results with life satisfaction and meaning in life). Finally, time-use was not associated with happiness (see *SI Appendix* Table S6g for detailed results and additional analyses). Similar to Study 1, in Study 2 time-use was measured with one item for each activity: work and active leisure, potentially accounting for why we observed inconsistent results in these two studies as compared to our other studies.

Study 3 (*n* = 400). We surveyed a representative sample of parents living in the US (i.e. representative by age, gender, and ethnicity) recruited by the professional survey company Qualtrics. First, examining time-use differences by gender, we found that mothers (vs. fathers) spent less time on overall leisure ($M_{mothers}$ = 22.88, SD = 15.37 vs. $M_{fathers}$ = 27.38 SD = 15.38; d = -.29, p = .010) and in particular less time on active leisure ($M_{mothers}$ = 11.53 SD = 11.32 vs. $M_{fathers}$ = 15.91 SD = 12.09; d = -.37, p = .002), but spent more time on necessities ($M_{mothers}$ = 42.44, SD = 21.01 vs. $M_{fathers}$ = 27.93 SD = 15.00; d = .79, p < .001). See *SI Appendix* Tables S7a-b for our other preregistered analyses across other groups.

Similar to Study 2, we found no association between gender and happiness (*SI Appendix*, Table S7c) and no moderation effects with time-use (*SI Appendix*, Table S7d). Similar to Study 1, preregistered analyses with time-use and happiness showed that time spent on overall leisure (β = .13, p = .013) and, in particular, on active leisure (β = .17, p = .001) was positively associated with happiness (*SI Appendix*, Table S7e; see Table S7f for analyses with the individual time-use measures).

Study 4 (*n* = 884). We surveyed public sector employees living in Barcelona, Spain. As per our preregistered analytic plan, we first analyzed time-use differences by socio-demographic group. We found that women (vs. men) spent less time on passive leisure (M_{women} = 6.78, SD = 6.06 vs. M_{men} =

8.92, $SD = 6.99$; $d = -.34$, $p = .003$) and more time on necessities ($M_\text{women} = 29.03$, $SD = 15.65$ vs.

$M_\text{men} = 22.85$, $SD = 10.82$; $d = .43$, $p < .001$). Similar to Study 2, there were no significant

interactions between gender and parental status on time-use (*SI Appendix*, Table S8b). Exploratory

analyses splitting the sample by parental status ($n = 467$) showed that mothers (vs. fathers) spent

less time on passive leisure ($M_\text{mothers} = 6.63$, $SD = 5.89$ vs. $M_\text{fathers} = 8.31$, $SD = 5.87$; $d = -.29$, $p =$

.019) and more time on necessities ($M_\text{mothers} = 29.76$, $SD = 14.84$ vs. $M_\text{fathers} = 23.68$, $SD = 11.01$; d

$= .44$, $p < .001$); among non-parents ($n = 58$), gender differences were significant for passive leisure

in models with our preregistered covariates only ($M_\text{non-mothers} = 8.03$, $SD = 7.34$ vs. $M_\text{non-fathers} =$

13.44, $SD = 11.84$; $d = -.59$, $p = .019$), but not for necessities ($M_\text{non-mothers} = 22.83$, $SD = 20.60$ vs.

$M_\text{non-fathers} = 16.75$, $SD = 6.95$; $d = .35$, $p = .344$).

Similar to Studies 2-3, we found no difference in happiness by gender (*SI Appendix*, Table

S8c). Preregistered moderation analyses indicated a significant interaction between gender and time

spent on passive leisure predicting happiness ($b = .06$, $p = .013$). The association between time

spent on passive leisure and happiness was positive for women ($b = .03$, $p = .013$) but non-

significant for men ($b = -.02$, $p = .210$). See *SI Appendix* Tables S8d-g for detailed results and

analyses with the other SWB measures (i.e. positive affect, negative affect, and meaning in life).

Finally, preregistered analyses with time-use and happiness suggested that time spent on

work was negatively associated with happiness ($\beta = -.10$, $p = .032$), while time spent on overall

leisure ($\beta = .16$, $p = .003$) was positively associated with happiness. Replicating findings from

Study 1 and 3, time spent on active leisure was positively associated with happiness ($\beta = .23$, $p <$

.001). See *SI Appendix*, Table S8h for additional results with time-use composites and other SWB

measures and Table S8i for analyses with the individual time-use measures.

Study 5 ($n = 1,513$). We surveyed remote workers living in the US and also captured time-use pre-

COVID-19. Preregistered analyses examining gender and time-use differences showed that women

(vs. men) spent less time on active leisure ($M_\text{women} = 6.47$, $SD = 3.96$ vs. $M_\text{men} = 7.10$, $SD = 4.28$; d

= -.15, p < .001), but spent more time on necessities (M_{women} = 16.81, SD = 10.08 vs. M_{men} = 15.66, SD = 7.83, d = .12, p < .001). Next, we ran exploratory analyses controlling for time-use pre-COVID-19. In models without covariates, gender differences in time-use did not hold when controlling for time-use pre-COVID-19. However, in models with our preregistered covariates, gender differences in time spent on necessities remained significant when controlling for time-use pre-COVID-19 (M_{women} = 16.81, SD = 10.08 vs. M_{men} = 15.66, SD = 7.83, d = .12, p = .004; *SI Appendix,* Table S9h). See *SI Appendix* Table S9a for other preregistered analyses with time-use differences by all measured socio-demographic groups (i.e. income, education, parental status, and household size) pre- and during COVID-19.

Following our preregistered analytic plan, we then examined time-use differences by socio-demographic group. We found a significant interaction between gender and parental status on time spent on work (b = -.03; p = .039), overall leisure (b = -2.20; p = .005), passive leisure (b = -1.49; p = .025), and necessities (b = 5.14; p < .001). Mothers (M = 1.53, SD = .12) spent less time on work activities than non-mothers (M = 1.58, SD = .12), d = -.42, p < .001. Fathers spent less time on work activities (M = 1.55, SD = .12) than non-fathers (M = 1.57, SD = .11), d = -.17, p = .025. As in Study 2, gender differences in time spent working were significant for parents (d = -.17, p = .046) but were not significant for non-parents (d = .08, p = .455).

Mothers spent less time on overall leisure compared to non-mothers ($M_{mothers}$ = 12.61, SD = 6.03 vs. $M_{non-mothers}$ = 17.39, SD = 6.97, d = -.71, p < .001). Differences in time spent on overall leisure between fathers and non-fathers were not significant ($M_{fathers}$ = 14.97, SD = 5.95 vs. $M_{non-fathers}$ = 17.46, SD = 7.04; d = -.37, p = .098). While gender differences in time spent on overall leisure were not significant among non-parents (d = -.01, p = .423), they *were* among parents, with mothers spending less time on overall leisure as compared to fathers (d = -.39, p < .001). Decomposing overall leisure, mothers spent less time on passive leisure compared to non-mothers ($M_{mothers}$ = 7.25, SD = 4.91 vs. $M_{non-mothers}$ = 10.62, SD = 5.97, d = -.60, p < .001). Differences in time spent on passive leisure were not significant among men ($M_{fathers}$ = 8.38, SD = 4.64 vs. M_{non-}

fathers = 10.22, SD = 5.87; d = -.34, p = .156). While gender differences in time spent on overall leisure were not significant among non-parents (d = .07, p = .498), they *were* among parents (d = -.24, p = .018). Thus, mothers spent less time on passive leisure than fathers.

Finally, mothers and fathers spent more time on necessities compared to non-mothers and non-fathers ($M_{mothers}$ = 24.05, SD = 10.99 vs. $M_{non-mothers}$ = 13.61, SD = 7.78, d = 1.17, p < .001; $M_{fathers}$ = 18.91, SD = 7.47 vs. $M_{non-fathers}$ = 13.59, SD = 7.35; d = .72, p < .001). Simple slope analyses showed that the gender differences in time spent on necessities were significant among parents (d = .53, p < .001); for non-parents they were not (d = .00, p = .983). These results suggest that during the initial weeks of COVID-19, mothers spent less time working or engaging in leisure activities, in particular passive leisure activities, and more time on necessities compared to fathers. See *SI Appendix* Table S9b for time-use differences across all measured socio-demographic groups.

Exploratory analyses controlling for time-use pre-COVID-19 showed a significant interaction between gender and parental status on overall leisure (F[1, 1,255] = 4.70, p = .030) and on necessities (F[1, 1,255] = 15.17, p < .001). Time spent on necessities increased for both mothers and fathers compared to non-mothers and non-fathers ($M_{mothers}$ = 23.84, SD = 10.93, vs. $M_{non-mothers}$= 13.56, SD = 7.75, d = 1.16, p < .001; $M_{fathers}$ = 18.98, SD = 7.51 vs. $M_{non-fathers}$ = 13.64, SD = 7.33, d = .72, p = .048). Simple slopes analyses showed that the differences in time spent on necessities *were* significant among parents (d = .53, p < .001) but not among non-parents (d = .01, p = .934), suggesting that mothers (vs. fathers) experienced an increase in time spent on necessities during COVID-19 (see Fig. 5, Panel A). See *SI Appendix*, Table S9h for these exploratory analyses.

Preregistered analyses with gender and happiness showed that similar to Studies 2-4, there were no significant differences in happiness by gender (*SI Appendix*, Table S9c). Preregistered moderation analyses revealed a significant interaction between gender and time spent on work, leisure, and necessities in predicting happiness. The association between time spent on work and happiness was positive for women (b = 1.07, p = .037) and non-significant for men (b = -.76, p = .264). The relationship between time spent on overall leisure and happiness was negative for

women ($b = .01$, $p = .613$), but non-significant for men ($b = -.02$, $p = .013$). Finally, the association between time spent on necessities and happiness was negative for women ($b = -.02$, $p = .007$) but non-significant for men ($b = .01$, $p = .511$). See *SI Appendix* Table S9d for additional results and Table S9e for results with life satisfaction.

Finally, preregistered analyses with time-use and happiness showed that time spent on overall leisure was negatively associated with happiness ($\beta = -.06$, $p = .025$). Decomposing this effect and replicating our findings from Studies 1, 3 and 4, time spent on active leisure was positively associated with happiness ($\beta = .09$, $p = .002$), while time spent on passive leisure was negatively associated with happiness ($\beta = -.15$, $p < .001$). See *SI Appendix* Table S9f for additional results, including with life satisfaction, and Table S9g for results with the individual time-use measures.

Study 6 ($n = 21,844$). We surveyed remote workers living in Brazil and similar to Study 5, we captured time-use pre-COVID-19. As per our preregistered analytic plan, we first examined time-use differences by socio-demographic group. We found that women (vs. men) spent less time on work activities ($M_{women} = 34.51$, $SD = 9.19$ vs. $M_{men} = 34.95$, $SD = 9.16$; $d = -.05$, $p < .001$) and overall leisure ($M_{women} = 13.76$, $SD = 6.51$ vs. $M_{men} = 15.79$, $SD = 6.81$; $d = -.30$, $p < .001$). We also found that women (vs. men) spent less time on active leisure ($M_{women} = 4.40$, $SD = 3.79$ vs. $M_{men} = 5.62$, $SD = 4.40$; $d = -.30$, $p < .001$) as well as passive leisure ($M_{women} = 9.37$, $SD = 5.21$ vs. $M_{men} = 10.18$, $SD = 5.48$; $d = -.15$, $p < .001$). Similar to the results from Studies 3-5 where we measured time spent on necessities, women spent more time on necessities as compared to men ($M_{women} = 22.14$, $SD = 10.54$ vs. $M_{men} = 19.32$, $SD = 9.60$; $d = .28$, $p < .001$). Unlike Study 5 where gender differences in time-use during COVID-19 were no longer significant when controlling for pre-COVID-19 time-use, in this study these exploratory analyses revealed that the following gender differences *were* significant: overall leisure ($M_{women} = 13.76$, $SD = 6.51$ vs. $M_{men} = 15.79$, $SD = 6.81$; $d = -.30$, $p < .001$), active leisure ($M_{women} = 4.40$, $SD = 3.79$ vs. $M_{men} = 5.62$, $SD = 4.40$; $d = -$

.30, $p < .001$), and necessities ($M_{women} = 22.14$, $SD = 10.54$ vs. $M_{men} = 19.32$, $SD = 9.60$; $d = .28$, $p < .001$), possibly due to having a larger sample size to detect such differences (*SI Appendix*, Table S10h). See *SI Appendix* Table S10a for time-use differences by all measured socio-demographic groups (i.e. income, education, parental status, and household size) pre- and during COVID-19.

Following our preregistered analytic plan, we next examined time-use differences across socio-demographic groups. We found significant interactions between gender and parental status on time spent on work ($b = -1.11$; $p < .001$), overall leisure ($b = -.91$; $p < .001$), and necessities ($b = 2.55$; $p < .001$). Mothers (vs. non-mothers) and fathers (vs. non-fathers) spent less time on work activities ($M_{mothers} = 33.39$, $SD = 9.38$ vs. $M_{non-mothers} = 35.43$, $SD = 9.13$, $d = -.22$, $p < .001$; $M_{fathers} = 34.52$, $SD = 9.25$ vs. $M_{non-fathers} = 35.50$ $SD = 9.46$; $d = -.10$, $p < .001$). Yet, while gender differences in time spent working were not significant among non-parents as in our previous studies ($d = -.01$, $p = .579$), they *were* among parents ($d = -.12$, $p < .001$), with mothers working less than fathers. These effects hold controlling for our preregistered covariates: age, income, education, number of children, living with others or not, and number of days since survey launch.

Mothers (vs. non-mothers) and fathers (vs. non-fathers) spent less time on overall leisure activities ($M_{mothers} = 11.50$, $SD = 6.05$ vs. $M_{non-mothers} = 15.04$, $SD = 6.47$, $d = -.56$, $p < .001$; $M_{fathers} = 14.18$, $SD = 6.26$ vs. $M_{non-fathers} = 16.86$ $SD = 7.03$, $d = -.40$, $p < .001$). Gender differences in time spent on overall leisure were significant among parents ($d = -.44$, $p < .001$) and non-parents ($d = -.27$, $p < .001$) such that women, and in particular mothers, spent less time on overall leisure in a typical day during the pandemic.

Following our preregistered analytic plan, we analyzed active and passive leisure separately and found a significant interaction between gender and parental status only on time spent on passive leisure ($b = -.80$; $p < .001$). For parents, mothers spent less time on passive leisure as compared to fathers ($M_{mothers} = 7.76$, $SD = 4.65$ vs. $M_{fathers} = 9.11$, $SD = 4.83$, $d = -.28$, $p < .001$). For non-parents, women spent less time on passive leisure as compared to men ($M_{women} = 10.47$, $SD = 5.33$ vs. $M_{men} = 11.07$, $SD = 5.84$, $d = -11$, $p < .001$).

Finally, mothers and fathers spent more time on necessities compared to non-mothers and non-fathers ($M_{mothers} = 26.60$, $SD = 11.05$ vs. $M_{non\text{-}mothers} = 19.32$, $SD = 9.26$, $d = .72$, $p < .001$; $M_{fathers} = 22.18$, $SD = 9.70$ vs. $M_{non\text{-}fathers} = 17.27$, $SD = 9.07$; $d = .53$, $p < .001$). The gender differences in time spent on necessities were significant among non-parents ($d = .22$, $p < .001$) and parents ($d = .43$, $p < .001$), suggesting that women, in general, and mothers, in particular, spent most time on necessities.

Next, we ran exploratory analyses controlling for time-use pre-COVID-19 and found a significant interaction between gender and parental status on overall leisure ($F[1, 19,116] = 15.96$, $p < .001$), passive leisure ($F[1, 19,116] = 17.74$, $p < .001$), and necessities ($F[1, 19,116] = 39.80$, $p < .001$). Time spent on overall leisure decreased for both mothers and fathers compared to non-mothers and non-fathers ($M_{mothers} = 11.63$, $SD = 6.03$ vs. $M_{non\text{-}mothers} = 15.15$, $SD = 15.15$, $d = -.56$, $p < .001$; $M_{fathers} = 14.25$, $SD = 6.25$ vs. $M_{non\text{-}fathers} = 16.95$, $SD = 6.99$, $d = -.40$, $p = .048$). The differences in time-use were significant among non-parents ($d = -.15$, $p < .001$) and parents ($d = -.43$, $p = .934$), suggesting that women, and especially mothers, experienced a decrease in time spent on overall leisure during COVID-19. These differences hold for our preregistered covariates.

Regarding passive leisure differences, both mothers and fathers spent less time pursuing passive leisure activities ($M_{mothers} = 7.74$, $SD = 4.62$ vs. $M_{non\text{-}mothers} = 10.42$, $SD = 5.30$, $d = -.53$, $p < .001$; $M_{fathers} = 9.07$, $SD = 4.80$ vs. $M_{non\text{-}fathers} = 11.01$, $SD = 5.80$, $d = -.36$, $p = .004$). While these differences in time-use were not significant among non-parents ($d = -.11$, $p = .915$), they *were* among parents ($d = -.28$, $p < .001$).

In terms of necessities and similar to Study 5 results, both mothers and fathers spent more time on necessities ($M_{mothers} = 26.52$, $SD = 11.05$ vs. $M_{non\text{-}mothers} = 19.28$, $SD = 9.13$, $d = .73$, $p < .001$; $M_{fathers} = 22.13$, $SD = 9.67$ vs. $M_{non\text{-}fathers} = 17.21$, $SD = 8.99$, $d = .53$ $p < .001$). The differences in time-use were significant among non-parents ($d = .23$, $p < .001$) and among parents ($d = .42$, $p < .001$), suggesting that while both parents spent more time on necessities during the pandemic than before, mothers experienced a greater increase in time spent on necessities (see Fig. 5, Panel B).

Similar to Studies 2-5, we found no difference in happiness by gender (*SI Appendix*, Table S10c). However, gender interacted with time spent on overall leisure ($b = .01$, $p = .001$), active leisure ($b = .02$; $p = .001$), and necessities ($b = -.01$, $p < .001$) to predict happiness. The association between time spent on overall leisure and happiness was positive for women ($b = .01$, $p = .010$), but non-significant for men ($b = -.00$, $p = .245$). The relationship between time spent on active leisure and happiness was positive for women ($b = .06$, $p < .001$) and men ($b = .04$, $p < .001$). Finally, the association between time spent on necessities and happiness was negative for women ($b = -.01$, $p < .001$), but non-significant for men ($b = .00$, $p = .441$). See *SI Appendix* Table S10d for detailed results and analyses with other socio-demographic groups and Table S10e for results with life satisfaction.

Preregistered analyses with time-use and happiness showed that time spent on work activities ($\beta = -.04$, $p < .001$) and on passive leisure ($\beta = -.07$, $p < .001$) was negatively associated with happiness, while time spent on active leisure was positively associated with happiness ($\beta = .10$, $p < .001$). See *SI Appendix* Table S10f for additional results, including with life satisfaction, and Table S10g for results with the individual time-use measures.

Study 7 ($n = 933$). We surveyed remote workers globally and similar to Studies 5-6 we captured time-use pre-COVID-19. As per our preregistered analytic plan, we first looked at time-use differences by socio-demographic group. We found that women (vs. men) spent less time on work activities ($M_{\text{women}} = 34.95$, $SD = 9.68$ vs. $M_{\text{men}} = 36.85$, $SD = 8.96$; $d = -.20$, $p = .021$) but more time on necessities ($M_{\text{women}} = 19.60$, $SD = 10.87$ vs. $M_{\text{men}} = 16.89$, $SD = 8.91$; $d = .27$, $p < .001$). In this study, gender differences in time-use were not significant when running exploratory analyses controlling for time-use pre-COVID-19 (*SI Appendix,* Table S11h). See *SI Appendix* Table S11a for all analyses with time-use differences by socio-demographic group (i.e. income, education, parental status, and household size) pre-COVID-19 and during COVID-19.

Following our preregistered analytic plan, we examined time-use differences across groups. We found a significant interaction between gender and parental status on time spent on necessities ($b = 2.83$; $p = .031$). Mothers (vs. non-mothers) and fathers vs. (non-fathers) spent more time on necessities ($M_{\text{mothers}} = 24.92$, $SD = 10.92$ vs. $M_{\text{non-mothers}} = 15.12$, $SD = 8.72$, $d = 1.01$, $p < .001$; $M_{\text{fathers}} = 20.57$, $SD = 9.31$ vs. $M_{\text{non-fathers}} = 13.95$, $SD = 7.61$; $d = .79$, $p < .001$). However, while differences in time-use among non-parents were not significant ($d = .14$; $p = .559$), they *were* among parents: mothers spent more time on necessities than fathers ($d = .42$, $p < .001$). See *SI Appendix* Table S11b for other time-use differences across socio-demographic groups.

Next, we ran exploratory analyses controlling for time-use pre-COVID-19. Unlike Studies 5-6 results, the interaction between gender and parental status on necessities was not significant even in models with covariates ($F[1, 729] = .114$, $p = .735$), suggesting that in this sample the increase in time spent on necessities did not differ by gender among parents, possibly due to the diversity of countries included in this sample. See *SI Appendix*, Tale S11h for detailed results.

Similar to Studies 2-6, we found no differences in happiness by gender (*SI Appendix*, Table S11c). We found no significant moderation with time-use (*SI Appendix*; Table S11d; see Table S11e for results with life satisfaction). Finally, analyses with time-use and happiness showed that only time spent on passive leisure was negatively associated with happiness ($\beta = -.09$, $p = .033$) (*SI Appendix*, Table S11d; see *SI Appendix* Table S11g for results with individual time-use measures and life satisfaction).

Study 8 ($n = 3,182$). We surveyed post-secondary students living in Denmark. Following our registered analytic plan, we first examined time-use differences by socio-demographic group. In this study, we only recorded gender. Thus, we examine time-use differences by gender only. We found that women (vs. men) spent more time on work activities like studying and engaging in paid work ($M_{\text{women}} = 46.60$, $SD = 21.93$ vs. $M_{\text{men}} = 43.80$, $SD = 22.27$; $d = .13$, $p = .007$) but less time on overall leisure ($M_{\text{women}} = 53.40$, $SD = 21.93$ vs. $M_{\text{men}} = 56.20$, $SD = 22.27$; $d = -.13$, $p = .007$).

Decomposing overall leisure, women (vs. men) spent more time on active leisure activities (M_{women}= 23.33, SD = 16.36 vs. M_{men} = 19.17, SD = 15.58; d = .26, p < .001), and less time on passive leisure (M_{women}= 30.07, SD = 18.68 vs. M_{men} = 37.03, SD = 21.59; d = -.36, p < .001). These results aligned with those from Study 2 where we surveyed Canadian individuals and found that women (vs. men) spent more time on active leisure. One possible explanation is that both Canada and Denmark are relatively egalitarian countries. See *SI Appendix* Table S12a-S12b for results with the other SWB measures in this study (i.e. positive affect, negative affect, and meaning in life).

Contrary to Study 1 where we surveyed individuals living in the US, our preregistered analyses showed that women reported greater happiness than men (β = .04, p = .030). Our preregistered mediation analyses showed that differences in time spent on active and passive leisure explained gender differences in happiness. Stated differently, women reported greater happiness because they spent more time on active leisure and less time on passive leisure (*SI Appendix,* Table S12c; see Tables S12d-f for results with positive affect, negative affect, and meaning in life).

Finally, as per our preregistered analytic plan, we examined the link between time-use and happiness. We found that time spent on active leisure was positively associated with happiness (β = .18, p < .001), while time spent on passive leisure was negatively associated with happiness (β = -.17, p < .001). See *SI Appendix* Tables S11g for additional results and Table S11h for results with the individual time-use measures and all SWB measures recorded in this study.

Study 9: Longitudinal Sample of College Students (n = 924). We surveyed full-time college students aged 18 to 25 from multiple countries in early March 2020 (T1) and one month later (T2). Similar to our correlational studies, in the main text we report results with our preregistered covariates that might vary depending on the model: age, gender, race, socio-economic status (which is a composite of parental education and income), number of co-habitants, and number of days since survey launch (see preregistration at: http://aspredicted.org/blind.php?x=wf4d9u).

Unlike our correlational studies, we preregistered examining the composite measure of SWB (i.e. overall happiness, positive affect, and reverse-scored negative affect; see Materials and Methods section for details). We report results with the individual components of SWB in *SI Appendix*. Examining gender differences in time-use at T1, young women (vs. men) engaged in less active leisure (β = -.02, p < .001) and, consistent with our prior studies, engaged in more necessities (β = .14, p = .002). See *SI Appendix* Table S13c for time-use differences by all measured socio-demographic groups (i.e. socio-economic status, parental education, and parental income).

Following our preregistered analytic plan, we then examined gender differences in SWB. We found that young women reported lower SWB compared to young men at T1 (β = -.23, p < .001) and at T2 (β = -.16, p = .013). When we controlled for T1 SWB, the gender differences in T2 SWB were no longer significant (β = -.01, p = .832). See *SI Appendix* Tables S13d-f for results with the other socio-demographic groups and the SWB components.

Analyses with time-use and happiness showed that time spent on active leisure at T1 was positively associated with SWB at T2 (β = 1.81, p < .001), while time spent on passive leisure at T1 was negatively associated with SWB at T2 (β = -.67, p = .002). When we controlled for T1 SWB, the relationship between time-use and SWB were no longer significant (β = .41, p = .062), but showed positive and significant associations with overall happiness (β = .79, p = .003), which is our critical dependent measure in the correlational samples. See *SI Appendix* Tables S13g-h for results with the other SWB measures.

Finally, our preregistered mediational analyses showed that lower engagement in active leisure at T1 explained why young women (vs. men) reported lower SWB at T2 (β = -.05, p = .004; 95%CI = [-.076; -.015]). However, time-use differences in necessities at T1 did not explain why young women (vs. men) reported lower SWB at T2 (β = .01, p = .164; 95%CI = [-.004; .025]). See Table S13i for a detailed description of how individual time-use measures (e.g., commuting, exercising, relaxing, etc.) differ by gender and SES.

Discussion

How did people spend their time at the outbreak of the COVID-19 pandemic and what were the implications of time-use for subjective well-being? Across eight correlational datasets (n = 30,018) and a longitudinal sample of college students (n = 924), one of the most robust findings based on preregistered analyses is that time spent on active leisure activities (e.g., exercising, spending time with family and friends) was positively associated with overall happiness. Apart from Canada and Denmark—two countries that have more egalitarian social policies such as shorter work days and guaranteed parental leave[20]—women as compared to men spent less time on active leisure (e.g., exercising, socializing) and more time on necessities (e.g., household chores). These results held controlling for a variety of demographics such as age, income, number of children, and education.

Furthermore, in our longitudinal sample, which comprised of college students aged 18 to 25 years old, young women reported spending less time on active leisure activities as compared to young men, which in turn predicted lower subjective well-being one month later. These findings suggest that time-use inequalities in adulthood might be a result of habits learnt during young adults' formative years (i.e. 18-25[21]). On a broader level, our data suggests that while spending more time on active leisure activities is beneficial for subjective well-being, women report spending less hours of their day pursuing such activities. These time-use inequalities might therefore help to explain existing gender gaps in well-being[22]. More broadly, in the face of the ongoing disruptions created by the COVID-19 pandemic, organizational leaders and policymakers should carefully consider how to promote time equality when designing policies now and post-COVID-19[11].

Materials and Methods

This project has been approved by the appropriate Institutional Review Boards. We preregistered

our analysis plan for the correlational (http://aspredicted.org/blind.php?x=e7qg3s) and longitudinal

data (http://aspredicted.org/blind.php?x=wf4d9u). Data and code for this paper are available at:

https://osf.io/cqr7k/?view_only=08c946a8ba2444e1ace32cccb28666d3.

Studies 1-8. How did people spent their time during the initial months of the COVID-19 pandemic,

and how did time-use relate to subjective well-being? To provide an initial answer to this question,

we surveyed 30,018[1] individuals between mid-March 2020 and mid-June 2020 from different

countries (e.g., Brazil, Spain, Denmark), including nationally representative samples (e.g., US and

Canada), and with diverse characteristics (e.g., working parents, remote workers, students). Below

we provide additional details about each data collection.

Across all datasets, respondents rated their overall happiness on a scale from 0 (*not at all*) to

10 (*extremely*)[23]. Single item measures of subjective well-being have been commonly used in prior

research[15,24]. This served as our critical dependent measure. See Table S1 for more information

about the measures employed in each study. The primary time-use outcomes that we focused on

were as follows: work, overall leisure, and necessities. Consistent with prior research, we analyzed

episode-weighted statistics across studies, where the amount of time respondents reported spending

on each activity was weighted by the total amount of time spent in all measured activities[12,16].

Where available and in line with prior research[12], we split overall leisure into passive and active

leisure. See *SI Appendix*, Table S2 and Tables S3a-3h for sample time-use descriptive statistics.

Across all correlational studies, we first examined how the primary time-use composites (i.e.

work, overall leisure, and necessities) varied by socio-demographic groups, as available in each

dataset: gender (1 = female), income (tertial split low vs. medium vs. high, unless otherwise

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[1] Our preregistration indicates 30,028 by mistake. The overall sample size is based on available responses on our core outcome variable: overall happiness.

specified), education (1 = at least a master degree), parental status (1 = yes), and relationship status (1 = married or in a marriage like relationship). In studies where relationship status was not measured, we used household size (1 = living with others) as a covariate. For these analyses, we ran regression analyses and used Bonferroni corrections to control for the use of multiple comparisons. Next, we examined time-use differences in work, overall leisure, and necessities across groups by examining two-way interactions between socio-demographic groups. In these two-way interaction analyses we treated income and education as continuous, consistent with past research[15].

Next, we examined how overall happiness differed by socio-demographic groups (e.g., age and education) and by time-use using regression analyses. As per our preregistration, if the socio-demographic variables were significantly associated with overall happiness, we ran mediation analyses to examine whether differences in the primary time-use composites explained why these socio-demographic variables predict overall happiness. Again, as per our preregistration, for socio-demographic variables that were not significantly associated with overall happiness, we examined whether there was moderation such that people within a socio-demographic group who spent different amounts of time in the primary time-use composites reported different experiences of overall happiness. For these analyses we again treated income and education as continuous.

Consistent prior work[12,15], we conducted the above analyses with and without these covariates as available per dataset (see Table 1 for sample demographics): age, gender, education, relationship status/household size, number of children, household income, employment status, and number of days since survey launch. In line with prior work[12], we also examined passive leisure (e.g., activities such as watching TV, napping, resting) and active leisure (e.g., activities such as exercising, spending time with others) separately.

As mentioned above, in the main text we discuss only significant results that emerged across models with and without our preregistered covariates (as available per samples). Statistics presented

in the main text are based on models *with* covariates. Other results[2], including those that hold in models with covariates but not in those without (and vice versa) are available in the *SI Appendix*.

Study 1. We recruited a representative sample of adults living in the US. Respondents completed the one item of overall happiness as well as the Cantril Ladder measure of life satisfaction[25] by indicating where they currently stand in life on a ladder from 0 (*bottom step = worth possible life*) to 10 (*top step = best possible life*) and a one item of meaning in life (i.e. "To what extent do you agree that your life has a clear sense of purpose these days?"; 1 = *strongly agree*; 7 = *strongly disagree*). Next, respondents indicated how many hours per week they spend on paid work, active leisure, and passive leisure (see *SI Appendix,* Table S3a for detailed wording).

Study 2. We recruited a representative sample of adults living in Canada. Respondents completed the same measures of happiness, life satisfaction, and meaning in life as in Study 1. Next, respondents indicated how many hours per week they spend on paid work and active leisure (see *SI Appendix* Table S3b for detailed wording). For Study 1 and 2, the data were collected as part of a larger, globally representative study examining how cultural norms shaped COVID-19 outbreaks.

Study 3. We recruited a representative sample of parents living in the US as part of a larger nationally representative study examining childcare during COVID-19. In this study, respondents completed the one item of overall happiness anchored pre-COVID-19 (i.e. "When compared to before the COVID-19 pandemic, how happy are you?"; 1 = *much less happy* to 5 = *much happier*). Next, respondents indicated the percentage of total time in a typical day during the COVID-19 pandemic they allocated to various activities (see *SI Appendix* Table S3c for detailed measures).

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[2] We preregistered running analyses with ideal time-use items where available (i.e. Study 4, 5, 6 and 7). However, given the primary focus in this paper is on understanding time-use before and during covid-19 across socio-demographic groups and how these time-use differences relate to SWB, we have not yet analyzed the ideal time-use measures.

Study 4. We recruited working adults living in Spain as part of a larger study examining time-use, work experiences, and well-being among public sector workers. The survey items were translated and back-translated in Catalan. Respondents completed the one item of overall happiness as well as measures assessing the affective component of SWB. Specifically, respondents rated their positive and negative affect over the past four weeks using the Schedule for Positive and Negative Affect scale (SPANE[26]; 1 = *very rarely/never* to 5 = *very often/always*). Respondents also rated their meaning in life over the past four weeks using a 3-item scale[27] (e.g. "I understand my life's meaning"; 1 = *not at all true* to 7 = *extremely true*). Next, respondents indicated the percentage of their time in a typical workday since COVID-19 that they allocate to various activities (see *SI Appendix* Table S3d for detailed measures and Table S8i for the results of these measures with the SWB measures).

Study 5. We recruited working adults living in the US as part of a larger study examining remote working during COVID-19. In this study, respondents completed the one item of overall happiness and one item capturing life satisfaction (i.e. "Overall, how satisfied are you with your life?"; 1 = *not at all* to 10 = *completely*). Respondents indicated how many hours they spent on various activities in a typical work day since working remotely due to COVID-19 (see *SI Appendix* Table S3e for detailed measures) and how many hours they spent on the same activities in a typical work day before COVID-19 (see *SI Appendix* Table S4a for time-use differences pre- and during COVID-19).

Study 6. We recruited working adults living in Brazil as part of a larger study examining remote working during COVID-19. Similar to Study 5, respondents completed the one item of overall happiness and one item capturing life satisfaction. Respondents indicated how many hours they spent on various activities in a typical work day since working remotely due to COVID-19 (see *SI Appendix* Table S3f for detailed measures) and how many hours they spent on the same activities in

a typical work day before COVID-19 (see Table S4b for time-use differences pre- and during COVID-19).

Study 7[3]. We recruited working adults globally as part of a larger study examining remote working during COVID-19. Similar to Studies 5-6, respondents completed the one item of overall happiness and one item capturing life satisfaction. Respondents indicated how many hours they spent on various activities in a typical work day since working remotely due to COVID-19 (see *SI Appendix* Table S3g for detailed measures) and how many hours they spent on the same activities in a typical work day before COVID-19 (see *SI Appendix* Table S4c for time-use differences pre- and during COVID-19).

Study 8. We recruited post-secondary students living in Denmark as part of a larger study examining time-use, meaning, and well-being among students during COVID-19. Respondents completed the one item of overall happiness as well as the positive affect, negative affect, and meaning in life scales used in Study 4. Next, respondents indicated how many hours they spent during the previous week on various activities (see *SI Appendix* Table S3h for detailed measures).

Study 9. We supplemented these correlational samples with a longitudinal study examining time-use differences by socio-demographic group and how time-use relates to SWB. This study was collected as part of a larger study examining students' meaning, time-use, and well-being at the outbreak of COVID-19. We advertised the Time 1 (T1) survey during March-May 2020 to full-time college students between the ages of 18 and 25. Respondents who did not fit these criteria could not access the survey. We used online convenience sampling where the research team distributed the survey link in their networks and on social media. We further asked initial respondents to refer the

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[3] We preregistered 9 datasets, however, we combined two datasets that used the same measures, one where we recruited remote workers living in Israel (n = 231) with one where we recruited remote workers globally (n = 702), to have a higher sample size and thus greater statistical power.

survey to their network. As compensation, we provided participants a 1 in 20 chance of winning a $50 Amazon gift card. Finally, we advertised our survey on Amazon Mechanical Turk (AMT), using the same screening criteria. Respondents on AMT were paid $3 for completing our survey. We contacted respondents who completed our T1 survey for our Time 2 (T2) survey during May-June 2020 and used the same compensation for both data collection methods.

We collected 1,887 responses at T1. We identified unique responses using participants' self-generated aliases. When aliases were identical, we excluded the observation with a higher number of missing values. If the number of missing values was equal, we excluded the observation with a later response date –assuming that the earlier response could be considered to be 'naive'. This resulted in 1,869 observations. At T2, we collected 1,210 responses. Applying the same exclusion criteria as above left us with 1,104 observations at T2 (59% of T1 responses after exclusions). In total, we were able to match 924 observations using aliases (49% of T1 responses after exclusions). The majority of our sample (81%) was recruited via online channels (vs. AMT).

Respondents completed the one item of overall happiness as well as the positive affect, negative affect, and meaning in life scales used in Study 4 and 8. In this study, respondents provided more extensive descriptions of how they spent their time over the previous seven days using items adapted from prior work on time-use[12,16]. Work was measured as the sum of time spent in commuting, working, school/learning. Active leisure was measured as the sum of time spent praying/worshipping/meditating, socializing, exercising, intimate relations, going outdoors, hobbies. Passive leisure was measured as the sum of time spent watching tv, napping/resting, relaxing, doing nothing. Necessities was measured as the sum of time spent shopping, personal hygiene, preparing food, doing housework. All measures were captured at T1 and T2.

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