Supplementary Information

The influence of working-from-home and digital device use on sleep, physical activity, and wellbeing following COVID-19 lockdown and reopening.

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Table S1. Weekly compliance rate (%) for each measure

	Week 1 (27/4-3/5)	Week 2 (4/5-10/5)	Week 3 (11/5-17/5)	Week 4 (18/5-24/5)	Week 5 (25/5-31/5)	Week 6 (1/6-7/6)	Week 7 (8/6 – 14/6)	Week 8 (15/6-21/6)	Week 9 (22/6-28/6)	Week 10 (29/6-5/7)	Week 11 (6/7-12/7)
Enrolled subjects	36	102	195	198	198	198	198	198	162	173	157
Oura	80.16	90.20	91.58	93.29	91.49	89.75	89.32	84.92	84.22	86.37	86.62
EMA (Daytime)	86.90	83.19	83.59	81.10	78.79	76.55	75.83	70.13	69.84	67.46	68.61
EMA (Evening)	85.71	83.89	82.56	80.88	75.47	75.47	77.85	71.36	69.22	70.36	69.79
Phone tracking	95.24	97.76	97.00	97.40	97.04	95.38	97.33	96.68	97.71	96.37	95.00

Table S2. Comparison of sleep and well-being measures during and after lockdown.

	Lockdown (April 2020 – May 2020)	Post-lockdown (Jun 2020 – July 2020)	Test statistic	p-value	CI	Effect size
Physical activity						
Daily steps	5808.50 (3310.39)	7007.58 (3648.43)	Z(187)=-8.11	<.001*	-	r=-0.59
Sleep measures						
Bedtime (hh:mm)	01:48 (1:33)	01:34 (1:27)	t(197)=4.01	<.001*	[0.12, 0.35]	d=0.29
Wake time (hh:mm)	09:40 (1:40)	09:13 (1:40)	t(197)=5.99	<.001*	[0.30, 0.60]	d=0.43
Time in bed (h)	7.83 (0.77)	7.59 (0.77)	t(197)=6.83	<.001*	[0.17. 0.30]	d=0.49
Total sleep time (h)	6.71 (0.72)	6.52 (0.74)	t(197)=6.30	<.001*	[0.13,0.25]	d=0.45
Sleep onset latency (min)	11.37 (3.73)	10.79 (3.04)	Z(197)=-3.33	0.001*	-	r=-0.24
Sleep efficiency (%)	85.96 (4.90)	86.02 (5.06)	Z(197)=-0.82	0.415	-	r=-0.06
Social jetlag (WEMST – WDMST) (min)	23.54 (40.82)	31.47 (46.55)	Z(195)=-3.28	0.001*	-	r=-0.23
Bedtime SD (h)	1.08 (0.70)	1.15 (0.76)	Z(197)=-2.52	0.012*	-	r=-0.18
Wake time SD (h)	1.10 (0.69)	1.23 (0.71)	Z(197)=-2.66	0.008*	-	r=-0.19
Mid sleep time SD	0.95 (0.75)	1.03 (0.78)	Z(197)=-2.84	0.005*	-	r=-0.20

Self-reported nap duration (>0-120min)	54.38 (29.05)	54.25 (28.32)	t(159)=0.07	0.942	[-3.33,3.58]	d=0.01
Percentage of days with nap reported	29.20 (24.59)	25.81 (24.12)	t(196)=2.81	0.006*	[1.01,5.79]	d=0.20
Well-being measures (EMA)						
Self-reported sleep quality (0-4)	2.56 (0.54)	2.64 (0.56)	t(196)=-4.34	<.001*	[-0.12,-0.45]	d=-0.31
Self-reported stress (Daytime) (0-100)	39.89 (19.56)	44.02 (20.75)	Z(196)=-5.41	<.001*	-	r=-0.38
Self-reported stress (Evening) (0-100)	39.44 (18.80)	43.08 (20.11)	Z(196)=-4.47	<.001*	-	r=-0.32
Self-reported mood (Daytime) (0-100)	55.05 (13.23)	55.69(14.03)	Z(196)=-1.84	0.067*	-	r=-0.13
Self-reported mood (Evening) (0-100)	57.32 (12.28)	55.73 (13.46)	Z(196)=-2.65	0.008*	-	r=-0.19
Self-reported loneliness (0-100)	34.65(20.59)	34.28 (21.31)	Z(196)=-1.24	0.216	-	r=-0.09
Smartphone usage (Tappigraphy)						
Total daily screen unlock time (hr)	5.70 (2.56)	5.74 (2.50)	Z(196)=-0.43	0.670	-	r=-0.03
Bedtime phone usage (min)	27.51 (15.33)	28.32 (14.71)*	Z(198)=-2.10	0.036*	-	r=-0.15

Values represent means and standard deviations. Pairwise comparisons are conducted with paired t-tests/Wilcoxon signed-rank tests on participants with complete data for both variables. Asterisks indicate differences that remain significant after controlling the false discovery rate at 0.1 using the Benjamini-Hochberg procedure. Effect sizes show Cohen's d for t-test comparisons, and r for for Wilcoxon signed-rank tests.

Table S3a. Regression analysis predicting sleep outcomes from demographics, and work location Post-Lockdown

	Bedtime (hrs) [N=174]	Wake time (hrs) [N=174]	Total sleep time (hrs) [N=174]	Social jet lag (hrs) [N=173][2]	Physical activity (daily steps) [N=167][1]
	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]
Age	-0.07 (0.003)* [-0.11,-0.02]	-0.09 (0.001)* [-0.14,-0.04]	-0.01 (0.512) [-0.03,0.02]	0.01 (0.504) [-0.02,0.04]	86.80 (0.175) [-39.10,212.70]
Gender					
Female (reference)	-	-	-	-	-
Male	0.43 (0.052) [-0.01,0.87]	0.32 (0.213) [-0.18,0.81]	-0.34 (0.006)* [-0.59,-0.10]	0.09 (0.492) [-0.18,0.37]	487.23 (0.434) [-739.01,1713.47]
Occupation					
Student (reference)	-	-	-	-	-
Staff	-0.31 (0.260) [-0.85,0.23]	-0.34 (0.277) [-0.96,0.28]	0.05 (0.757) [-0.26,0.35]	0.14 (0.412) [-0.20,0.48]	995.15 (0.196) [-517.60,2507.89]
Work location (post-lockdown)					
In-office workdays (prop.)	-0.66 (0.011)* [-1.18,-0.15]	-0.90 (0.003)* [-1.49,-0.32]	-0.10 (0.485) [-0.39,0.19]	-0.14 (0.401) [-0.46,0.18]	1911.81 (0.009)* [478.34,3345.29]

*Asterisks indicate differences that remain significant after controlling the false discovery rate at 0.1 using the Benjamini-Hochberg procedure.

[1] N = 7 participants did not wear the wearable during the day and were excluded from group analysis.

[2] N = 1 participant did not record any weekend sleep data and was excluded from group analysis.

Table S3b. Regression analysis predicting well-being measures from demographics, and work location Post-Lockdown

	Stress (morning 0-100) [N=174]	Stress (evening 0-100) [N=174]	Mood (morning 0-100) [N=174]	Mood (evening 0-100) [N=174]	Loneliness (0-100) [N=174]
	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]
Age	0.36 (0.344) [-0.38,1.09]	0.24 (0.515) [-0.48,0.95]	0.11 (0.667) [-0.38,0.60]	0.06 (0.816) [-0.41,0.52]	-0.77 (0.042) [-1.51,-0.03]
Gender					
Female (reference)	-	-	-	-	-
Male	-1.23 (0.735) [-8.36,5.91]	-0.70 (0.841) [-7.64,6.23]	2.39 (0.322) [-2.35,7.12]	1.69 (0.462) [-2.84,6.23]	6.10 (0.095) [-1.06,13.26]
Occupation					
Student (reference)	-	-	-	-	-
Staff	-0.35 (0.939) [-9.22,8.53]	0.05 (0.990) [-8.57,8.68]	1.69 (0.572) [-4.20,7.58]	1.33 (0.643) [-4.31,6.97]	2.90 (0.522) [-6.01,11.80]
Work location (post-lockdown)					
In-office workdays (prop.)	0.65 (0.879) [-7.73,9.02]	0.02 (0.997) [-8.12,8.16]	-5.76 (0.043)* [-11.32,-0.19]	-5.47 (0.044)* [-10.79,-0.14]	2.79 (0.513) [-5.61,11.20]

*Asterisks indicate differences that remain significant after controlling the false discovery rate at 0.1 using the Benjamini-Hochberg procedure.

Table S4a. Regression analysis predicting sleep outcomes from demographics, and work location Post-Lockdown (work location groups)

	Bedtime (hrs) [N=174]	Wake time (hrs) [N=174]	Total sleep time (hrs) [N=174]	Social jet lag (hrs) [N=173][2]	Physical activity (daily steps) [N=167][1]
	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]
Age	-0.07 (0.003)* [-0.11,-0.02]	-0.09 (<0.001)* [-0.14,-0.04]	-0.01 (0.528) [-0.03,0.02]	0.01 (0.576) [-0.02,0.04]	102.76 (0.111) [-23.97,229.48]
Gender					
Female (reference)	-	-	-	-	-
Male	0.43 (0.050) [0.00,0.87]	0.32 (0.206) [-0.18,0.81]	-0.34 (0.006)* [-0.59,-0.10]	0.10 (0.460) [-0.17,0.37]	419.44 (0.500) [-806.88,1645.76]
Occupation					
Student (reference)	-	-	-	-	-
Staff	-0.28 (0.311) [-0.83,0.26]	-0.31 (0.330) [-0.93,0.32]	0.05 (0.769) [-0.26,0.36]	0.16 (0.367) [-0.19,0.50]	815.12 (0.296) [-719.90,2350.14]
Work location (post-lockdown)					
Home (100%) reference	-	-	-	-	-
In-person (<50%)	-0.64 (0.007)* [-1.11,-0.18]	-0.75 (0.006)* [-1.28,-0.22]	-0.11 (0.426) [-0.37,0.16]	0.15 (0.320) [-0.14,0.44]	-458.66 (0.495) [-1783.53,866.21]
In-person (>50%)	-0.69 (0.005)* [-1.17,0.21]	-0.87 (0.002)* [-1.42,-0.32]	-0.09 (0.534) [-0.36,0.19]	-0.08 (0.620) [-0.38,0.23]	1449.16 (0.036)* [97.08,2801.24]

*Asterisks indicate differences that remain significant after controlling the false discovery rate at 0.1 using the Benjamini-Hochberg procedure.

[1] N = 7 participants did not wear the wearable during the day and were excluded from group analysis.

[2] N = 1 participant did not record any weekend sleep data and was excluded from group analysis.

Table S4b. Regression analysis predicting well-being measures from demographics, and work location Post-Lockdown (work location groups)

	Stress (morning 0-100) [N=174]	Stress (evening 0-100) [N=174]	Mood (morning 0-100) [N=174]	Mood (evening 0-100) [N=174]	Loneliness (evening 0-100) [N=174]
	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]	Unstandardized B (p-value) [95% CI]
Age	0.39 (0.302) [-0.35,1.13]	0.27 (0.467) [-0.46,0.99]	0.06 (0.808) [-0.43,0.55]	0.03 (0.907) [-0.44,0.50]	-0.75 (0.048) [-1.50,-0.01]
Gender					
Female (reference)	-	-	-	-	-
Male	-1.32 (0.716) [-8.47,5.83]	-0.78 (0.824) [-7.73,6.17]	2.54 (0.289) [2.18,7.26]	1.79 (0.437) [-2.75,6.32]	6.07 (0.096) [-1.10,13.23]
Occupation					
Student (reference)	-	-	-	-	-
Staff	-0.98 (0.830) [-9.99,8.03]	0.51 (0.909) [-9.27,8.25]	2.54 (0.401) [-3.41,8.48]	1.88 (0.516) [-3.83,7.60]	2.39 (0.602) [-6.64,11.42]
Work location (post-lockdown)					
Home (100%) reference	-	-	-	-	-
In-person (<50%)	-0.69 (0.859) [-8.36,6.98]	-0.69 (0.855) [-8.15,6.77]	-1.73 (0.502) [-6.79,3.34]	-2.97 (0.230) [-7.83,1.89]	3.64 (0.351) [-4.04,11.33]
In-person (>50%)	2.42 (0.547) [-5.51,10.36]	1.83 (0.641) [-5.89,9.54]	-6.75 (0.012)* [-11.98,-1.51]	-5.99 (0.020)* [-11.02,-0.96]	4.65 (0.249) [-3.29,12.60]

*Asterisks indicate differences that remain significant after controlling the false discovery rate at 0.1 using the Benjamini-Hochberg procedure.

Table S5a. Regression analysis predicting lockdown sleep and physical activity from phone-use cluster (controlling for demographics, and work location)

	Bedtime (hrs) [N =197]		Wake time (hrs) [N=197]		Total sleep time (hrs) [N=197]		Social jet lag (hrs) [N=197]		Physical activity (daily steps) [N=195][1]	
	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]
Age	-0.06	.013* [-0.11, -0.01]	-0.08	.005* [-0.13, -0.02]	-0.01	.395 [-0.03, 0.01]	0.01	.302 [-0.01, 0.04]	61.99	.260 [-46.32, 170.30]
Gender										
Female (reference)	-	-	-	-	-	-	-	-	-	-
Male	0.50*	.033 [0.04, 0.95]	0.26	.287 [-0.22, 0.74]	-0.49	<.001* [-0.71, -0.27]	0.03	.783 [-0.18, 0.24]	-427.04	.406 [-1438.81, 584.73]
Occupation										
Student (reference)	-	-	-	-	-	-	-	-	-	-
Staff	-0.45	.124 [-1.03, 0.13]	-0.48	.124 [-1.09, 0.13]	0.09	.512 [-0.19, 0.38]	0.005	.969 [-0.27, 0.28]	646.36	.321 [-635.00, 1927.71]
Work location (lockdown)										
In-office > 3 days/week	-0.90	.138 [-2.09, 0.29]	-1.08	.091 [-2.34, 0.17]	-0.12	.692 [-0.70, 0.46]	0.53	.064 [-0.03, 1.08]	2897.51	.030 [280.65, 5514.38]
Bedtime phone-use cluster										
Cluster 1: low usage (reference)	-	-	-	-	-	-	-	-	-	-
Cluster 2: moderate usage/ramping up	0.12	.630 [-0.36, 0.59]	0.18	.481 [-0.32, 0.68]	0.04	.741 [-0.19, 0.27]	0.004	.975 [-0.22, 0.23]	-575.59	.281 [-1626.77, 475.59]
Cluster 3: high usage	0.49	.068 [-0.04, 1.01]	0.69*	.015 [0.14, 1.24]	0.04	.770 [-0.22, 0.29]	0.10	.430 [-0.15, 0.34]	-1259.46*	.033 [-2415.95, -102.97]

Asterisks indicate differences that remain significant after controlling the false discovery rate at 0.1 using the Benjamini-Hochberg procedure.
[1] N = 2 participants did not wear the wearable during the day and were excluded from group analysis.

Table S5b. Regression analysis predicting lockdown wellbeing from phone-use cluster (controlled for demographics, and work location)

	Stress (morning 0-100) [N=197]		Stress (evening 0-100) [N=197]		Mood (morning 0-100) [N=197]		Mood (evening 0-100) [N=197]		Loneliness (0-100) [N=197]	
	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]
Age	0.40	.224 [-0.25, 1.05]	0.25	.437 [-0.38, 0.89]	0.34	.147 [-0.12, 0.79]	0.11	.614 [-0.32, 0.54]	-0.75	.038* [-1.45, -0.04]
Gender										
Female (reference)	-		-		-		-		-	
Male	0.68	.825 [-5.37, 6.73]	0.54	.857 [-5.35, 6.43]	1.27	.553 [-2.95, 5.49]	1.90	.347 [-2.07, 5.86]	4.90	.141 [-1.64, 11.44]
Occupation										
Student (reference)	-		-		-		-		-	
Staff	3.28	.402 [-4.42, 10.98]	3.29	.388 [-4.21, 10.78]	0.17	.951 [-5.20, 5.53]	0.72	.777 [-4.32, 5.77]	7.32	.084 [-1.00, 15.64]
Work location (lockdown)										
In-office > 3 days/week	20.99*	.010* [5.18, 36.80]	17.54	.026* [2.16, 32.93]	-7.83	.163 [-18.84, 3.19]	-6.85	.194 [-17.21, 3.52]	4.01	.644 [-13.08, 21.10]
Bedtime phone-use cluster										
Cluster 1: low usage (reference)	-		-		-		-		-	
Cluster 2: moderate usage/ramping up	0.18	.955 [-6.15, 6.51]	0.54	.863 [-5.62, 6.70]	2.36	.293 [-2.05, 6.77]	4.24	.045* [0.09, 8.39]	1.71	.622 [-5.13, 8.55]
Cluster 3: high usage	-3.88	.272 [-10.81, 3.06]	-3.07	.370 [-9.82, 3.67]	-0.96	.695 [-5.79, 3.87]	2.29	.322 [-2.26, 6.83]	1.37	.719 [-6.12, 8.86]

Asterisks indicate differences that remain significant after controlling the false discovery rate at 0.1 using the Benjamini-Hochberg procedure.

Table S6a. Regression analysis predicting post-lockdown sleep and physical activity from phone-use cluster (controlled for demographics, and work location)

	Bedtime (hrs) [N=173]		Wake time (hrs) [N=173]		Total sleep time (hrs) [N=173]		Social jet lag (hrs) [N=172][2]		Physical activity (daily steps) [N=166][1]	
	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]
Age	-0.06	.019* [-0.10, -0.01]	-0.07	.006* [-0.13, -0.02]	-0.01	.566 [-0.03, 0.02]	0.01	.518 [-0.02, 0.04]	57.91	.369 [-68.94, 184.76]
Gender										
Female (reference)	-		-		-		-		-	
Male	0.39	.079 [-0.05, 0.83]	0.27	.294 [-0.23, 0.76]	-0.36	.005* [-0.606, -0.11]	0.11	.425 [-0.16, 0.39]	512.09	.408 [-707.58, 1731.76]
Occupation										
Student (reference)	-		-		-		-		-	
Staff	-0.40	.147 [-0.94, 0.14]	-0.45	.156 [-1.07, 0.17]	0.03	.840 [-0.28, 0.34]	0.14	.405 [-0.20, 0.49]	1281.33	.097 [-233.78, 2796.44]
Work location (lockdown)										
In-office workdays (prop.)	-0.72	.006* [-1.23, -0.21]	-0.96	.001* [-1.54, -0.38]	-0.10	.514 [-0.39, 0.20]	-0.16	.327 [-0.48, 0.16]	2086.45	.004* [665.68, 3507.22]
Bedtime phone-use cluster										
Cluster 1: low usage (reference)	-		-		-		-		-	
Cluster 2: moderate usage/ramping up	0.29	.225 [-0.18, 0.77]	0.30	.280 [-0.25, 0.84]	0.04	.783 [-0.23, 0.31]	0.19	.212 [-0.11, 0.49]	-1581.97	.020* [-2913.95, -250.00]
Cluster 3: high usage	0.69	.012* [0.15, 1.22]	0.80	.010* [0.19, 1.41]	0.04	.787 [-0.26, 0.35]	0.09	.598 [-0.25, 0.43]	-2016.38	.009* [-3526.89, -505.86]

Asterisks indicate differences that remain significant after controlling the false discovery rate at 0.1 using the Benjamini-Hochberg procedure.
[1] N = 7 participants did not wear the wearable during the day and were excluded from group analysis.
[2] N = 1 participant did not record any weekend sleep data and was excluded from group analysis.

Table S6b. Regression analysis predicting post-lockdown wellbeing from phone-use cluster (controlled for demographics, and work location)

	Stress (morning 0-100) [N=173]		Stress (evening 0-100) [N=173]		Mood (morning 0-100) [N=173]		Mood (evening 0-100) [N=173]		Loneliness (0-100) [N=173]	
	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]	Unstandardized B	p-value [95% CI]
Age	0.44	.249 [-0.31, 1.19]	0.33	.373 [-0.40, 1.05]	0.08	.764 [-0.42, 0.58]	0.03	.888 [-0.44, 0.51]	-0.61	.105 [-1.36, 0.13]
Gender										
Female (reference)	-		-		-		-		-	
Male	-0.99	.783 [-8.12, 6.13]	-0.53	.880 [-7.43, 6.37]	2.81	.246 [-1.96, 7.58]	2.08	.368 [-2.47, 6.62]	5.35	.137 [-1.72, 12.43]
Occupation										
Student (reference)	-		-		-		-		-	
Staff	-0.05	.991 [-8.93, 8.82]	0.30	.945 [-8.29, 8.89]	1.89	.531 [-4.05, 7.82]	1.42	.622 [-4.24, 7.07]	2.26	.613 [-6.55, 11.07]
Work location (lockdown)										
In-office workdays (prop.)	0.24	.955 [-8.09, 8.57]	-0.37	.929 [-8.43, 7.70]	-6.18*	.030* [-11.75, -0.61]	-5.95*	.028* [-11.26, -0.64]	2.95	.483 [-5.32, 11.22]
Bedtime phone-use cluster										
Cluster 1: low usage (reference)	-		-		-		-		-	
Cluster 2: moderate usage/ramping up	-6.37	.108 [-14.15, 1.41]	-6.84	.075 [-14.38, 0.69]	4.86	.067 [-0.35, 10.06]	5.68	.025* [0.72, 10.64]	-8.86	.025* [-16.59, -1.13]
Cluster 3: high usage	1.50	.735 [-7.23, 10.24]	1.62	.707 [-6.84, 10.07]	0.95	.748 [-4.89, 6.79]	1.70	.547 [-3.86, 7.27]	2.98	.499 [-5.70, 11.65]

Asterisks indicate differences that remain significant after controlling the false discovery rate at 0.1 using the Benjamini-Hochberg procedure.
[1] N = 7 participants did not wear the wearable during the day and were excluded from group analysis.
[2] N = 1 participant did not record any weekend sleep data and was excluded from group analysis.

Table S7. Sleep, physical activity, and wellbeing measures by bedtime phone use clusters

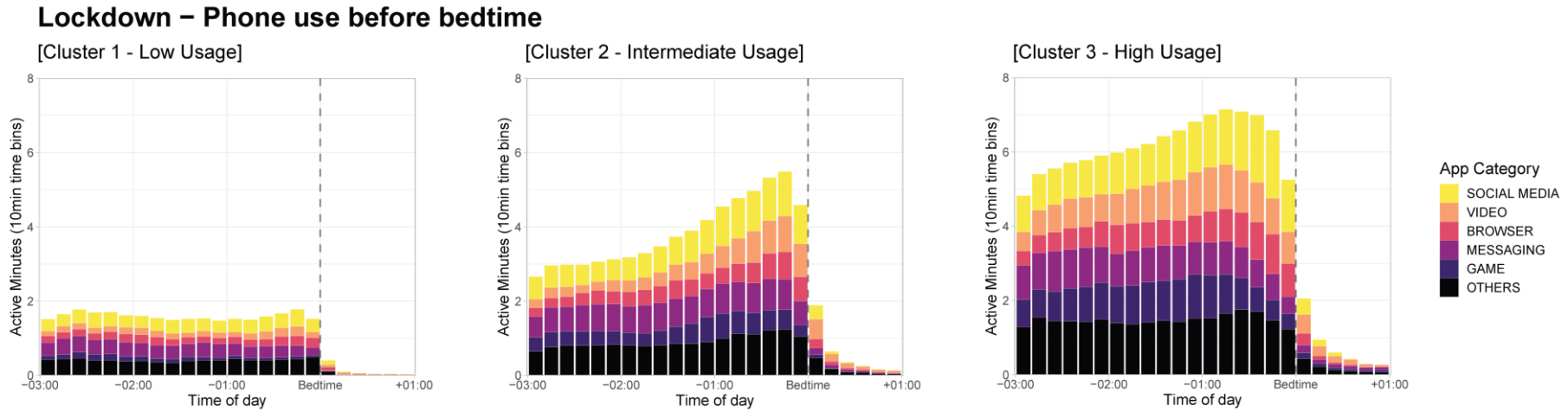
	Lockdown			Post-lockdown		
	Cluster 1	Cluster 2	Cluster 3	Cluster 1	Cluster 2	Cluster 3
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Sleep						
Bedtime (hh:mm)	01:38 (01:31)	01:44 (01:31)	02:08 (01:38)	01:09 (01:27)	01:22 (01:13)	01:55 (01:37)
Wake time (hh:mm)	09:25 (01:30)	09:34 (01:40)	10:08 (01:49)	08:43 (01:36)	08:55 (01:20)	09:37 (02:00)
Total sleep time (h)	6.68 (0.71)	6.71 (0.78)	6.76 (0.72)	6.45 (0.72)	6.49 (0.72)	6.49 (0.80)
Social jet lag (h)	0.36 (0.65)	0.38 (0.59)	0.45 (0.83)	0.48 (1.02)	0.66 (0.69)	0.54 (0.76)
Physical Activity						
Daily steps	6252.6 (4029.5)	5746.2 (2804.4)	5040.1 (2543.6)	8438.2 (5221.1)	7111.0 (2971.5)	6552.3 (3087.5)
Self-reported Wellbeing						
Morning Mood	54.47 (14.91)	56.67 (12.78)	52.93 (12.47)	53.95 (15.66)	58.40 (13.24)	54.19 (13.89)
Evening Mood	55.14 (14.04)	59.23 (11.28)	57.03 (12.28)	53.41 (14.06)	58.69 (12.53)	54.50 (14.01)
Morning Stress	40.96 (20.32)	41.76 (19.95)	37.16 (18.56)	47.87 (17.77)	41.47 (23.01)	48.29 (19.34)
Evening Stress	40.20 (19.37)	41.23 (19.03)	37.26 (18.42)	46.96 (16.76)	40.07 (22.18)	47.71 (19.08)
Loneliness	33.77 (21.25)	35.55 (21.03)	35.50 (20.29)	36.93 (21.47)	28.41 (20.17)	41.81 (21.09)

Ecological Momentary Assessment (EMA) Questions

Sleep **Fill in according to your most recent sleep timing:**	**Well-being**	**Work-location** **(only during post-lockdown)**
Q1. Bedtime: [HH:MM scrolling option]	**Q1. How are you feeling right now?** Negative – Positive [100-points sliding bar]	**Q1. From what location did you work / attend lessons today?** Home / Office / Hospital / Other / Did not work
Q2. Waketime: [HH:MM scrolling option]	**Q2. How sleepy are you feeling right now?** Not at all sleepy - Very sleepy [100-points sliding bar]	
Q3. How was your sleep? Very good / Good/ Fair / Poor / Very poor	**Q3. How motivated are you feeling right now?** Not at all motivated - Very motivated [100-points sliding bar]	
Q4. How long did you nap for today? [0-100 min sliding bar]	**Q4. How stressed are you feeling right now?** Not at all stressed - Very stressed [100-points sliding bar]	
	Q5. How lonely are you feeling right now? Not at all lonely - Very lonely [100-points sliding bar]	

Phone app categorization

Across subjects, app usage was detected for 2914 mobile applications. For each of these apps, we extracted the app categories that they were labelled with from Google Play Store. All gaming apps were relabelled as “Game”. A total of 611 of these apps were not assigned a category as they were not available on Google Play Store at the point of extraction (e.g., apps removed from Google Play Store, system default apps, and apps installed through apk sharing). We then rank ordered the apps according to their total tap count and manually reassigned app categories to the 100 most used apps. This was done as the original categorisation provided by Google Play Store was relatively broad and would limit a more detailed interpretation of the different usage trends. For example, browser and messaging apps were mainly labelled as “Communication” apps.

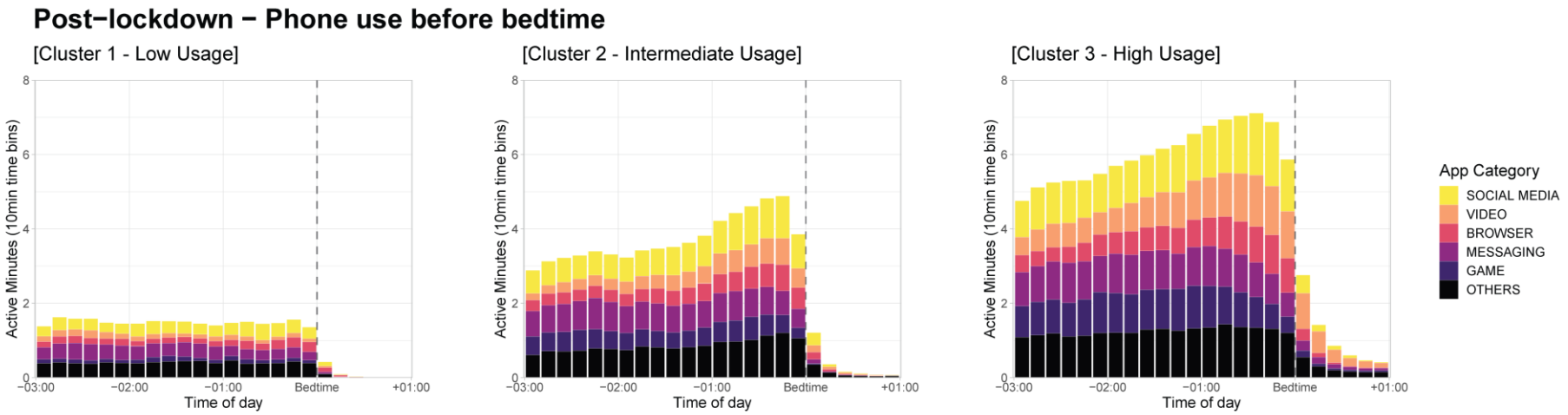


Supplementary Figure 1. Breakdown of phone usage based on app categories in the hours surrounding bedtime during lockdown.

Table S9. App usage duration in the hours before bedtime during lockdown by bedtime phone use clusters

Lockdown clusters	**App Category**	**-3:00 to -2:00**	**-2:00 to -1:00**	**-1:00 to 0:00**
Cluster 1 – Low usage	Social Media	2.14 (2.55)	2.07 (2.25)	2.33 (2.47)
	Video	0.94 (1.83)	0.93 (1.73)	1.15 (1.83)
	Browser	1.12 (1.41)	1.11 (1.71)	1.34 (1.83)
	Messaging	2.41 (2.75)	2.20 (2.31)	1.74 (1.72)
	Game	0.85 (1.72)	0.58 (1.21)	0.39 (0.93)
Cluster 2 – Intermediate usage	Social Media	3.45 (3.10)	4.48 (4.73)	6.63 (7.49)
	Video	1.53 (2.60)	2.44 (3.26)	4.86 (6.28)
	Browser	1.80 (2.15)	2.62 (3.52)	3.54 (3.55)
	Messaging	4.06 (3.40)	4.46 (4.00)	4.70 (4.79)
	Game	2.29 (4.23)	2.75 (5.10)	3.24 (6.47)
Cluster 3 – High usage	Social Media	5.95 (4.82)	7.24 (5.90)	9.56 (9.19)
	Video	4.25 (5.09)	6.03 (8.13)	6.39 (8.39)
	Browser	3.19 (4.34)	4.29 (5.47)	5.62 (6.44)
	Messaging	6.06 (5.77)	5.47 (5.39)	4.51 (4.52)
	Game	5.09 (7.08)	6.52 (8.48)	4.70 (6.50)

Values represent mean usage durations within the hour with standard deviations in parentheses



Supplementary Figure 2. Breakdown of phone usage based on app categories in the hours surrounding bedtime during post-lockdown.

Table S10. App usage duration in the hours before bedtime post-lockdown by bedtime phone use clusters

Post-lockdown clusters	**App Category**	**-3:00 to -2:00**	**-2:00 to -1:00**	**-1:00 to 0:00**
Cluster 1 – Low usage	Social Media	1.75 (2.04)	1.94 (1.97)	2.19 (2.29)
	Video	1.02 (2.15)	0.70 (1.50)	0.65 (1.20)
	Browser	1.02 (1.09)	0.83 (1.02)	1.33 (2.01)
	Messaging	2.40 (2.30)	2.21 (2.16)	1.61 (1.79)
	Game	0.57 (1.24)	0.67 (1.45)	0.59 (1.33)
Cluster 2 – Intermediate usage	Social Media	3.84 (4.03)	4.40 (3.79)	6.03 (5.45)
	Video	1.55 (2.51)	2.35 (3.97)	3.66 (5.68)
	Browser	1.88 (2.41)	2.37 (3.03)	3.51 (3.87)
	Messaging	4.57 (3.36)	4.37 (3.30)	4.24 (3.76)
	Game	3.08 (5.12)	2.73 (4.40)	3.04 (5.24)
Cluster 3 – High usage	Social Media	6.39 (5.27)	7.09 (5.50)	9.17 (7.64)
	Videos	3.61 (4.07)	5.15 (5.97)	7.50 (7.84)
	Browser	2.74 (4.34)	3.93 (6.78)	5.46 (7.80)
	Messaging	5.98 (5.35)	6.20 (5.13)	5.49 (6.17)
	Game	5.61 (9.92)	6.50 (11.59)	4.99 (8.68)

Values represent mean usage durations within the hour with standard deviations in parentheses