

Supplementary Material

Nature visits buffered against loneliness during COVID-19, especially among those mainly working remotely. A population-based study of working adults in Sweden.

Table S1. Overview of some key dates and governmental decisions for the wide public in Sweden from January 2020 - September 2021.

Date	Measure
30 January 2020	WHO declares the outbreak of a "Public Health Emergency of International Concern".
15 February 2020	First reported COVID-19-related death in Europe (France).
11 March 2020	WHO declaration of a pandemic. Public gatherings with more than 500 people forbidden in Sweden.
16 March 2020	Individuals aged 70+ advised to avoid close physical contact in Sweden. Advise to work from home, if possible, in Sweden.
29 March 2020	Restriction of public gatherings to max. 50 people in Sweden.
1 April 2020	National ban on visiting retirement homes in Sweden.
24 November 2020	Restriction of general gatherings and activities to eight people in Sweden.
27 December 2020	Start of the vaccination process in Sweden.
27 May 2021	Swedish government presents plan to phase out restrictions over summer, successively.
29 September 2021	Restrictions lifted in Sweden.

Note: Sources [2, 6]

Table S2. Response frequencies of variables with different coding as described under Methods

General NRH during COVID-19			
<i>4 categories</i>	n	%	<i>3 categories</i>
Never (1)	15	1.5 %	Never – Monthly (1)
Sometime/sometimes per month (2)	217	22.2 %	
Sometime/sometimes per week (3)	458	46.8 %	Weekly (2)
Every day (4)	288	29.4 %	Daily (3)
Remote work during COVID-19			
<i>5 categories</i>			
Not at all	208	21.1 %	Not at all
1-25% of the time	222	22.6 %	
26-50% of the time	109	11.1 %	≤ 50%
51-75% of the time	90	9.1 %	
76-100% of the time	355	36.1 %	> 50%
PA during COVID-19			
<i>4 categories</i>			<i>2 categories</i>
Never	8	0.8 %	Not regularly
Very little PA, took occasional walks	217	22.2 %	
Engagement occasionally in PA	289	29.6 %	Regularly
Engagement regularly in PA	463	47.4 %	

Table S3. Zero-order Spearman's correlation coefficients r (and associated p -values) between remote work, general NRH, loneliness, and covariates, before and during COVID-19.

	Remote work	General NRH 2020	Before COVID-19 Loneliness	During COVID-19 Loneliness	Age	Sex	Income	Relationship	Children at home
General NRH 2020	0.055 (0.085)	-							
Before COVID-19 Loneliness	0.052 (0.107)	-0.011 (0.729)	-						
During COVID-19 Loneliness	0.095** (0.003)	-0.071* (0.028)	0.649*** ($< .001$)	-					
Age	-0.044 (0.168)	0.072* (0.025)	-0.088** (0.006)	-0.083** (0.009)	-				
Sex	0.050 (0.120)	0.063* (0.048)	0.066* (0.041)	0.111*** ($< .001$)	-0.078* (0.014)	-			
Income	0.116*** ($< .001$)	0.026 (0.414)	-0.078* (0.015)	-0.029 (0.364)	-0.100** (0.002)	-0.200*** ($< .001$)	-		
Relationship	0.032 (0.313)	0.097** (0.003)	-0.221*** ($< .001$)	-0.161*** ($< .001$)	0.011 (0.728)	-0.023 (0.481)	0.045 (0.162)	-	
Children at home	-0.044 (0.168)	0.004 (0.895)	0.009 (0.785)	0.015 (0.647)	0.547*** ($< .001$)	-0.011 (0.730)	-0.156*** ($< .001$)	-0.167*** ($< .001$)	-
PA during COVID-19	0.079* (0.013)	0.332*** ($< .001$)	-0.037 (0.255)	-0.078* (0.015)	-0.033 (0.299)	0.126*** ($< .001$)	0.013 (0.695)	0.078* (0.016)	-0.031 (0.337)

Note: * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

Table S4. Model 1b fixed effects parameter estimates from the linear mixed effects model.

Names	Effect	Estimate	SE	95% CI		df	t	p
				Lower	Upper			
Intercept	Intercept	0.830	0.030	0.772	0.889	943	27.805	< .001
Time	Before vs. During	0.411	0.024	0.363	0.458	948	16.916	< .001
Remote work 1	RW 0 vs. 1	-0.012	0.063	-0.135	0.111	948	-0.187	0.852
Remote work 2	RW 0 vs. 2	0.142	0.060	0.024	0.260	947	2.349	0.019
NRH 2	NRH 1 vs. 2	0.069	0.057	-0.043	0.181	944	1.209	0.227
NRH 3	NRH 1 vs. 3	-0.054	0.064	-0.179	0.071	947	-0.848	0.397
Age 2	48 to 55	-0.132	0.062	-0.253	-0.011	940	-2.138	0.033
Age 3	56 to 63	-0.274	0.067	-0.404	-0.144	942	-4.120	< .001
Age 4	64 to 81	-0.161	0.075	-0.309	-0.014	943	-2.142	0.032
Sex	female	0.119	0.046	0.029	0.209	941	2.581	0.010
Income 2	40% cut	0.029	0.082	-0.131	0.189	941	0.356	0.722
Income 3	60% cut	0.104	0.081	-0.055	0.262	941	1.284	0.199
Income 4	80% cut	-0.039	0.080	-0.196	0.117	942	-0.490	0.624
Income 5	Highest 20%	0.012	0.080	-0.144	0.168	941	0.150	0.881
Relationship	Married/partner	-0.329	0.054	-0.435	-0.223	941	-6.076	< .001
Children at home	No	0.062	0.055	-0.045	0.170	941	1.136	0.256
Time * Remote work 1	Before vs. During * RW 0 vs. 1	0.061	0.064	-0.065	0.186	950	0.943	0.346
Time * Remote work 2	Before vs. During * RW 0 vs. 2	0.150	0.061	0.030	0.269	950	2.454	0.014
Time * NRH 2	Before vs. During * NRH 1 vs. 2	-0.039	0.058	-0.153	0.075	946	-0.669	0.503
Time * NRH 3	Before vs. During * NRH 1 vs. 3	-0.129	0.064	-0.255	-0.003	949	-2.011	0.045
Remote work 1 * NRH 2	RW 0 vs. 1 * NRH 1 vs. 2	-0.276	0.149	-0.567	0.015	947	-1.861	0.063
Remote work 2 * NRH 2	RW 0 vs. 2 * NRH 1 vs. 2	-0.275	0.142	-0.553	0.004	947	-1.929	0.054
Remote work 1 * NRH 3	RW 0 vs. 1 * NRH 1 vs. 3	-0.156	0.165	-0.480	0.168	950	-0.946	0.344
Remote work 2 * NRH 3	RW 0 vs. 2 * NRH 1 vs. 3	-0.165	0.157	-0.473	0.142	949	-1.053	0.292
Time * Remote work 1 * NRH 2	Before vs. During * RW 0 vs. 1 * NRH 1 vs. 2	-0.300	0.152	-0.598	-0.002	949	-1.975	0.049
Time * Remote work 2 * NRH 2	Before vs. During * RW 0 vs. 2 * NRH 1 vs. 2	-0.371	0.146	-0.656	-0.086	948	-2.548	0.011
Time * Remote work 1 * NRH 3	Before vs. During * RW 0 vs. 1 * NRH 1 vs. 3	-0.102	0.169	-0.433	0.230	952	-0.601	0.548
Time * Remote work 2 * NRH 3	Before vs. During * RW 0 vs. 2 * NRH 1 vs. 3	-0.400	0.160	-0.714	-0.085	951	-2.491	0.013

Note: Model 1b includes fixed effects of time, remote work, and general NRH + covariates on loneliness.

Linear mixed effects model fit by restricted maximum likelihood. AIC = 3965.424; BIC = 4234.655; R² Marginal = 0.141; R² Conditional = 0.646.

Remote work coding: 0 ("Not at all"), 1 ("≤ 50%"), and 2 ("> 50%"). NRH coding: 1 ("Never to monthly"), 2 ("Weekly"), and 3 ("Daily").

Reference categories for the respective factors were: Time = 0 ("Before COVID-19"), Remote work = 0 ("Not at all"), and NRH = 1 ("Never to Monthly"), Age = 1 ("27 to 47"), Sex = 0 ("Male"), Income = 1 ("Lowest 20%), Relationship = 0 ("Single"), Children at home = 1 ("Yes").

Table S5. Model 1c fixed effects parameter estimates from the linear mixed effects model.

Names	Effect	Estimate	SE	95% CI		df	t	p
				Lower	Upper			
Intercept	Intercept	0.822	0.030	0.763	0.880	942	27.404	< .001
Time	Before vs. During	0.412	0.024	0.364	0.459	947	16.938	< .001
Remote work 1	RW 0 vs. 1	-0.010	0.063	-0.133	0.113	946	-0.156	0.876
Remote work 2	RW 0 vs. 2	0.146	0.060	0.027	0.264	946	2.414	0.016
NRH 2	NRH 1 vs. 2	0.096	0.058	-0.018	0.209	942	1.657	0.098
NRH 3	NRH 1 vs. 3	0.000	0.067	-0.131	0.131	944	0.003	0.998
Age 2	48 to 55	-0.136	0.062	-0.257	-0.015	939	-2.206	0.028
Age 3	56 to 63	-0.285	0.066	-0.415	-0.155	940	-4.286	< .001
Age 4	64 to 81	-0.170	0.075	-0.317	-0.022	941	-2.255	0.024
Sex	female	0.132	0.046	0.042	0.223	940	2.866	0.004
Income 2	40% cut	0.028	0.082	-0.132	0.188	939	0.347	0.729
Income 3	60% cut	0.091	0.081	-0.067	0.249	939	1.130	0.259
Income 4	80% cut	-0.043	0.080	-0.199	0.113	940	-0.543	0.587
Income 5	Highest 20%	0.014	0.079	-0.142	0.169	939	0.172	0.863
Relationship	Married/partner	-0.324	0.054	-0.430	-0.218	939	-5.996	< .001
Children at home	No	0.064	0.055	-0.043	0.171	939	1.170	0.242
Physical activity	Regularly	-0.116	0.047	-0.208	-0.024	939	-2.469	0.014
Time * Remote work 1	Before vs. During * RW 0 vs. 1	0.062	0.064	-0.064	0.188	949	0.963	0.336
Time * Remote work 2	Before vs. During * RW 0 vs. 2	0.149	0.061	0.029	0.268	949	2.442	0.015
Time * NRH 2	Before vs. During * NRH 1 vs. 2	-0.041	0.058	-0.155	0.073	946	-0.704	0.482
Time * NRH 3	Before vs. During * NRH 1 vs. 3	-0.131	0.064	-0.257	-0.005	949	-2.036	0.042
Remote work 1 * NRH 2	RW 0 vs. 1 * NRH 1 vs. 2	-0.268	0.148	-0.559	0.023	945	-1.807	0.071
Remote work 2 * NRH 2	RW 0 vs. 2 * NRH 1 vs. 2	-0.246	0.142	-0.525	0.033	945	-1.730	0.084
Remote work 1 * NRH 3	RW 0 vs. 1 * NRH 1 vs. 3	-0.151	0.165	-0.475	0.173	948	-0.913	0.361
Remote work 2 * NRH 3	RW 0 vs. 2 * NRH 1 vs. 3	-0.155	0.157	-0.462	0.152	948	-0.989	0.323
Time * Remote work 1 * NRH 2	Before vs. During * RW 0 vs. 1 * NRH 1 vs. 2	-0.306	0.152	-0.605	-0.007	948	-2.009	0.045
Time * Remote work 2 * NRH 2	Before vs. During * RW 0 vs. 2 * NRH 1 vs. 2	-0.371	0.146	-0.656	-0.085	947	-2.546	0.011
Time * Remote work 1 * NRH 3	Before vs. During * RW 0 vs. 1 * NRH 1 vs. 3	-0.107	0.170	-0.440	0.225	951	-0.634	0.526
Time * Remote work 2 * NRH 3	Before vs. During * RW 0 vs. 2 * NRH 1 vs. 3	-0.400	0.160	-0.714	-0.085	951	-2.490	0.013

Note: Model 1c includes fixed effects of time, remote work, and general NRH + covariates and physical activity on loneliness.

Linear mixed effects model fit by restricted maximum likelihood. AIC = 3958.247; BIC = 4237.351; R^2 Marginal = 0.145; R^2 Conditional = 0.646. Remote work coding: 0 ("Not at all"), 1 (" $\leq 50\%$ "), and 2 (" $> 50\%$ "). NRH coding: 1 ("Never to monthly"), 2 ("Weekly"), and 3 ("Daily").

Reference categories for the respective factors were: Time = 0 ("Before COVID-19"), Remote work = 0 ("Not at all"), and NRH = 1 ("Never to Monthly"), Age = 1 ("27 to 47"), Sex = 0 ("Male"), Income = 1 ("Lowest 20%"), Relationship = 0 ("Single"), Children at home = 1 ("Yes"), and Physical activity = 0 ("Not regularly").

Table S6. Multiple regression results for the group working remotely more than 50% of the time during COVID-19 (Remote work = "> 50%").

Omnibus ANOVA Test	Model 2a				Model 2b				Model 2c			
	df	Adj. R ²	F	p	df	Adj. R ²	F	p	df	Adj. R ²	F	p
Overall model	3	0.392	95.9	< .001	13	0.407	23.9	< .001	14	0.407	22.3	< .001
Pre-COVID-19 Loneliness levels	1		272.95	< .001	1		240.39	< .001	1		235.31	< .001
General NRH	2		6.71	0.001	2		7.12	< .001	2		4.98	0.007
Age					3		2.82	0.039	3		2.95	0.032
Sex					1		7.56	0.006	1		8.13	0.005
Income					4		1.41	0.231	4		1.43	0.224
Relationship					1		0.00	0.966	1		0.01	0.935
Children at home					1		0.27	0.605	1		0.30	0.581
PA during COVID-19									1		0.98	0.324
Residuals	438				421				420			

Model Coefficients – Loneliness 2021	95% CI				95% CI				95% CI			
	B	Lower	Upper	p	B	Lower	Upper	p	B	Lower	Upper	p
Intercept	0.40	0.263	0.531	< .001	0.16	-0.186	0.498	0.372	0.21	-0.149	0.568	0.251
Pre-COVID-19 Loneliness levels	0.88	0.771	0.979	< .001	0.86	0.748	0.966	< .001	0.85	0.743	0.961	< .001
General NRH 2020:												
Never to Monthly – Daily	0.35	0.161	0.536	< .001	0.36	0.173	0.553	< .001	0.32	0.120	0.530	0.002
Weekly – Daily	0.16	0.010	0.318	0.037	0.18	0.020	0.334	0.027	0.17	0.008	0.324	0.040
Age:												
48 to 55 – 27 to 47					-0.03	-0.220	0.153	0.726	-0.04	-0.232	0.144	0.646
56 to 63 – 27 to 47					-0.22	-0.423	-0.009	0.041	-0.23	-0.440	-0.022	0.031
64 to 81 – 27 to 47					0.06	-0.173	0.300	0.598	0.05	-0.188	0.288	0.677
Sex:												
female – male					0.20	0.057	0.341	0.006	0.21	0.065	0.351	0.005
Income:												
40% cut – Lowest 20%					0.04	-0.214	0.299	0.745	0.04	-0.215	0.298	0.749
60% cut – Lowest 20%					0.21	-0.047	0.461	0.109	0.20	-0.054	0.455	0.122
80% cut – Lowest 20%					0.16	-0.076	0.395	0.184	0.16	-0.078	0.393	0.189
Highest 20% – Lowest 20%					0.23	-0.003	0.463	0.053	0.24	0.002	0.468	0.048
Relationship:												
Married/partner – Single					0.00	-0.170	0.178	0.966	0.01	-0.167	0.181	0.935
Children at home:												
No – Yes					0.04	-0.122	0.210	0.605	0.05	-0.119	0.213	0.581
Physical activity during COVID-19:												
Regularly – Not regularly									-0.07	-0.220	0.073	0.324

**Estimated Marginal means for
Loneliness 2021**

General NRH	Mean	SE	Mean	SE	Mean	SE
Never to Monthly	1.28	0.07	1.24	0.08	1.22	0.08
Weekly	1.09	0.05	1.06	0.06	1.06	0.06
Daily	0.93	0.06	0.88	0.07	0.89	0.07

Note: Multiple regression model statistics including the factor general nature-related habits, loneliness during COVID-19 as the outcome, and covariate pre-COVID-19 loneliness means (Model 2a) + covariates (Model 2b) + Physical activity (PA) during COVID-19 (Model 2c). Model coefficients are presented as unstandardized regression coefficients. Reference categories for the respective factors were: Remote work = 0 ("Not at all"), Nature-related habits = 3 ("Daily"), Age = 1 ("27 to 47"), Sex = 0 ("Male"), Income = 1 ("Lowest 20%"), Relationship = 0 ("Single"), Children at home = 1 ("Yes"), and Physical activity = 0 ("Not regularly").

Table S7. Multiple regression results for the group **working remotely 50% or less of the time** during COVID-19 (Remote work = “≤50%).

Omnibus ANOVA Test	Model 2a				Model 2b				Model 2c			
	df	Adj. R ²	F	p	df	Adj. R ²	F	p	df	Adj. R ²	F	p
Overall model	3	0.481	101	< .001	13	0.481	23.7	< .001	14	0.483	22.2	< .001
Pre-Covid-19 Loneliness levels	1		299.87	< .001	1		262.27	< .001	1		262.96	< .001
General NRH	2		0.87	0.418	2		1.031	0.358	2		1.065	0.346
Age					3		0.511	0.675	3		0.475	0.700
Sex					1		6.537	0.011	1		6.365	0.012
Income					4		1.338	0.256	4		1.504	0.201
Relationship					1		0.016	0.901	1		0.035	0.851
Children at home					1		0.272	0.602	1		0.336	0.562
PA during COVID-19									1		2.108	0.148
Residuals	321				306				304			

**Model Coefficients –
Loneliness 2021**

	95% CI				95% CI				95% CI			
	B	Lower	Upper	p	B	Lower	Upper	p	B	Lower	Upper	p
Intercept	0.39	0.252	0.527	< .001	0.34	-0.004	0.688	0.053	0.42	0.057	0.784	0.023
Pre-COVID-19 Loneliness levels	1.02	0.906	1.139	< .001	1.01	0.889	1.134	< .001	1.01	0.891	1.137	< .001
General NRH 2020:												
Never to Monthly – Daily	0.05	-0.134	0.24	0.577	0.06	-0.134	0.252	0.547	0.02	-0.185	0.221	0.862
Weekly – Daily	-0.06	-0.218	0.105	0.489	-0.06	-0.231	0.104	0.455	-0.09	-0.266	0.078	0.284
Age:												
48 to 55 – 27 to 47					-0.06	-0.251	0.139	0.572	-0.05	-0.243	0.148	0.636
56 to 63 – 27 to 47					-0.13	-0.333	0.079	0.226	-0.12	-0.331	0.082	0.238
64 to 81 – 27 to 47					-0.06	-0.298	0.183	0.637	-0.07	-0.310	0.172	0.573
Sex:												
female – male					0.19	0.043	0.331	0.011	0.19	0.041	0.329	0.012
Income:												
40% cut – Lowest 20%					0.01	-0.262	0.283	0.938	0.00	-0.269	0.276	0.982
60% cut – Lowest 20%					-0.07	-0.333	0.193	0.603	-0.09	-0.351	0.179	0.523
80% cut – Lowest 20%					-0.15	-0.415	0.124	0.290	-0.17	-0.437	0.105	0.229
Highest 20% – Lowest 20%					0.08	-0.188	0.350	0.554	0.07	-0.196	0.343	0.591
Relationship:												
Married/partner – Single					0.01	-0.160	0.182	0.901	0.02	-0.155	0.188	0.851
Children at home:												
No – Yes					0.05	-0.126	0.217	0.602	0.05	-0.121	0.222	0.562
Physical activity during COVID-19:												
Regularly – Not regularly									-0.11	-0.252	0.038	0.148

**Estimated Marginal means for
Loneliness 2021**

General NRH	Mean		SE	Mean	SE		Mean	SE	
Never to Monthly	0.97	0.07		0.96	0.08		0.94	0.08	
Weekly	0.86	0.05		0.84	0.06		0.83	0.06	
Daily	0.92	0.07		0.90	0.08		0.92	0.08	

Note: Multiple regression model statistics including the factor general nature-related habits, loneliness during COVID-19 as the outcome, and covariate pre-COVID-19 loneliness means (Model 2a) + covariates (Model 2b) + Physical activity (PA) during COVID-19 (Model 2c). Model coefficients are presented as unstandardized regression coefficients. Reference categories for the respective factors were: Remote work = 0 (“Not at all”), Nature-related habits = 3 (“Daily”), Age = 1 (“27 to 47”), Sex = 0 (“Male”), Income = 1 (“Lowest 20%), Relationship = 0 (“Single”), Children at home = 1 (“Yes”), and Physical activity = 0 (“Not regularly”).

Table S8. Multiple regression results for the group **not at all working remotely** during COVID-19 (Remote work = “Not at all”).

Omnibus ANOVA Test	Model 2a				Model 2b				Model 2c			
	<i>df</i>	Adj. <i>R</i> ²	<i>F</i>	<i>p</i>	<i>df</i>	Adj. <i>R</i> ²	<i>F</i>	<i>p</i>	<i>df</i>	Adj. <i>R</i> ²	<i>F</i>	<i>p</i>
Overall model	3	0.414	47.2	< .001	13	0.414	11.4	< .001	14	0.424	11.1	< .001
Pre-COVID-19 Loneliness levels	1		134.25	< .001	1		117.81	< .001	1		117.23	< .001
General NRH	2		1.47	0.232	2		1.244	0.291	2		1.360	0.259
Age					3		0.768	0.513	3		0.826	0.481
Sex					1		2.445	0.120	1		4.131	0.044
Income					4		0.147	0.964	4		0.233	0.920
Relationship					1		0.734	0.393	1		0.700	0.404
Children at home					1		0.461	0.498	1		0.525	0.470
PA during COVID-19									1		3.814	0.052
Residuals	193				179				178			

**Model Coefficients –
Loneliness 2021**

	95% CI				95% CI				95% CI			
	<i>B</i>	Lower	Upper	<i>p</i>	<i>B</i>	Lower	Upper	<i>p</i>	<i>B</i>	Lower	Upper	<i>p</i>
Intercept	0.40	0.199	0.600	< .001	0.30	-0.217	0.822	0.252	0.41	-0.115	0.939	0.125
Pre-COVID-19 Loneliness levels	0.85	0.702	0.990	< .001	0.84	0.684	0.987	< .001	0.83	0.677	0.979	< .001
General NRH 2020:												
Never to Monthly – Daily	-0.04	-0.309	0.228	0.766	-0.03	-0.323	0.255	0.815	-0.12	-0.419	0.180	0.432
Weekly – Daily	0.15	-0.089	0.393	0.215	0.15	-0.112	0.407	0.263	0.09	-0.176	0.353	0.511
Age:												
48 to 55 – 27 to 47					0.09	-0.212	0.395	0.552	0.09	-0.216	0.386	0.579
56 to 63 – 27 to 47					-0.05	-0.372	0.274	0.764	-0.05	-0.366	0.275	0.779
64 to 81 – 27 to 47					0.16	-0.197	0.514	0.379	0.17	-0.181	0.525	0.338
Sex:												
female – male					0.18	-0.046	0.397	0.120	0.23	0.007	0.462	0.044
Income:												
40% cut – Lowest 20%					-0.05	-0.403	0.303	0.778	-0.05	-0.402	0.298	0.770
60% cut – Lowest 20%					0.04	-0.322	0.400	0.831	0.04	-0.323	0.393	0.846
80% cut – Lowest 20%					0.06	-0.334	0.446	0.777	0.08	-0.305	0.471	0.672
Highest 20% – Lowest 20%					-0.01	-0.401	0.380	0.958	-0.04	-0.427	0.351	0.848
Relationship:												
Married/partner – Single					-0.12	-0.389	0.153	0.393	-0.11	-0.383	0.155	0.404
Children at home:												
No – Yes					0.10	-0.182	0.372	0.498	0.10	-0.174	0.376	0.470
Physical activity during COVID-19:												
Regularly – Not regularly									-0.23	-0.459	0.002	0.052

**Estimated Marginal means for
Loneliness 2021**

General NRH	Mean		SE	Mean	SE		Mean	SE	
Never to Monthly	0.83		0.10	0.88		0.11	0.82		0.11
Weekly	1.02		0.08	1.06		0.09	1.03		0.09
Daily	0.87		0.10	0.91		0.11	0.94		0.11

Note: Multiple regression model statistics including the factor general nature-related habits, DV Mean loneliness during COVID-19, and covariate pre-COVID-19 loneliness means (Model 2a) + covariates (Model2b) + Physical activity (PA) during COVID-19 (Model 2c). Model coefficients are presented as unstandardized regression coefficients. Reference categories for the respective factors were: Remote work = 0 (“Not at all”), Nature-related habits = 3 (“Daily”), Age = 1 (“27 to 47”), Sex = 0 (“Male”), Income = 1 (“Lowest 20%”), Relationship = 0 (“Single”), Children at home = 1 (“Yes”), and Physical activity = 0 (“Not regularly”).

Table S9. Percentages and mean scores of general NRH and NRH in different environments, by degree of remote work.

Remote work group	General NRH			Mobility			Park			Green playground			Forest			Water			Other natural areas		
	Not at all	≤ 50%	> 50%	Not at all	≤ 50%	> 50%	Not at all	≤ 50%	> 50%	Not at all	≤ 50%	> 50%	Not at all	≤ 50%	> 50%	Not at all	≤ 50%	> 50%	Not at all	≤ 50%	> 50%
NRH coding																					
Never (1)	2.9	1.2	1.1	16.6	15.0	16.1	37.9	32.9	35.1	64.0	68.5	70.4	12.2	10.4	9.7	21.9	17.0	18.9	29.2	26.0	24.1
Monthly (2)	24.9	23.5	20.0	27.8	26.3	21.5	38.9	43.0	34.7	23.6	22.0	18.3	44.9	45.0	40.2	50.7	48.9	41.8	46.7	50.5	46.4
Weekly (3)	43.9	47.6	47.6	35.1	37.0	39.9	18.7	20.1	23.0	8.4	7.3	8.1	33.7	35.5	38.4	22.4	28.2	29.5	16.9	20.7	22.3
Daily (4)	28.3	27.7	31.2	20.5	21.7	22.4	4.4	4.0	7.2	3.9	2.1	3.2	9.3	9.2	11.7	5.0	5.9	9.8	7.2	2.8	7.1
Mean score	2.98	3.02	3.09	2.60	2.65	2.69	1.90	1.95	2.02	1.52	1.43	1.44	2.40	2.43	2.52	2.10	2.23	2.30	2.02	2.00	2.12

Table S10. Stepwise addition of effects in the unadjusted LMM (Model 1a).

Model steps	Model fit			Fixed Effect Omnibus Test			Fixed Effects Parameter Estimates			
	AIC	BIC	R^2 Marg.	Factors	F	p	Effect	B	SE	p
Model step 1	4089.70	4162.08	0.0798							
							Intercept	0.75	0.02	< .001
Simple main effect				Time	360.75	< .001	Before vs. During	0.42	0.02	< .001
Simple main effect				Remote work	4.30	0.014	RW 0 vs. 1	-0.02	0.06	0.782
Simple main effect							RW 0 vs. 2	0.12	0.06	0.042
Simple main effect				NRH	3.96	0.019	NRH 1 vs. 2	0.02	0.06	0.703
Simple main effect							NRH 1 vs. 3	-0.12	0.06	0.048
Model step 2	4091.01	4233.67	0.0838							
							Intercept	0.75	0.02	< .001
Simple main effect				Time	289.70	< .001	Before vs. During	0.41	0.02	< .001
Simple main effect				Remote work	4.50	0.011	RW 0 vs. 1	0.00	0.06	0.991
Simple main effect							RW 0 vs. 2	0.14	0.06	0.021
Simple main effect				NRH	3.79	0.023	NRH 1 vs. 2	0.05	0.06	0.422
Simple main effect							NRH 1 vs. 3	-0.11	0.06	0.097
Two-way interactions				Time * Remote work	2.73	0.066	Before vs. During * RW 0 vs. 1	0.02	0.06	0.712
Two-way interactions							Before vs. During * RW 0 vs. 2	0.12	0.06	0.047
Two-way interactions				Time * NRH	3.43	0.033	Before vs. During * NRH 1 vs. 2	-0.08	0.06	0.176
Two-way interactions							Before vs. During * NRH 1 vs. 3	-0.16	0.06	0.009
Two-way interactions				Remote work * NRH	0.75	0.557	RW 0 vs. 1 * NRH 1 vs. 2	-0.21	0.15	0.161
Two-way interactions							RW 0 vs. 2 * NRH 1 vs. 2	-0.24	0.15	0.100
Two-way interactions							RW 0 vs. 1 * NRH 1 vs. 3	-0.11	0.17	0.511
Two-way interactions							RW 0 vs. 2 * NRH 1 vs. 3	-0.16	0.16	0.316
Model step 3	4087.36	4261.82	0.0859							
							Intercept	0.75	0.02	< .001
Simple main effect				Time	292.99	< .001	Before vs. During	0.41	0.02	< .001
Simple main effect				Remote work	4.516	0.011	RW 0 vs. 1	0.00	0.06	0.996
Simple main effect							RW 0 vs. 2	0.14	0.06	0.021
Simple main effect				NRH	3.81	0.023	NRH 1 vs. 2	0.05	0.06	0.427
Simple main effect							NRH 1 vs. 3	-0.11	0.06	0.095
Two-way interactions				Time * Remote work	3.47	0.032	Before vs. During * RW 0 vs. 1	0.05	0.06	0.420
Two-way interactions							Before vs. During * RW 0 vs. 2	0.15	0.06	0.015
Two-way interactions				Time * NRH	1.81	0.164	Before vs. During * NRH 1 vs. 2	-0.04	0.06	0.517
Two-way interactions							Before vs. During * NRH 1 vs. 3	-0.12	0.06	0.068
Two-way interactions				Remote work * NRH	0.74	0.563	RW 0 vs. 1 * NRH 1 vs. 2	-0.21	0.15	0.163
Two-way interactions							RW 0 vs. 2 * NRH 1 vs. 2	-0.24	0.15	0.102
Two-way interactions							RW 0 vs. 1 * NRH 1 vs. 3	-0.11	0.17	0.515
Two-way interactions							RW 0 vs. 2 * NRH 1 vs. 3	-0.16	0.16	0.323
Three-way interactions				Time * Remote work * NRH	2.90	0.021	Before vs. During * RW 0 vs. 1 * NRH 1 vs. 2	-0.29	0.15	0.054
Three-way interactions							Before vs. During * RW 0 vs. 2 * NRH 1 vs. 2	-0.38	0.15	0.009
Three-way interactions							Before vs. During * RW 0 vs. 1 * NRH 1 vs. 3	-0.10	0.17	0.532
Three-way interactions							Before vs. During * RW 0 vs. 2 * NRH 1 vs. 3	-0.40	0.16	0.013

Note: Step 1, adding simple main effects. Step 2, adding two-way interaction effects. Step 3, adding three-way interaction effects.

Reference categories for the respective factors were: Time = 0 ("Before COVID-19"), Remote work = 0 ("Not at all"), and NRH = 1 ("Never to Monthly").

Table S11. Loneliness classifications before and during COVID-19 in the whole sample and split by the groups of Remote work and General NRH.

		Loneliness classification	Frequency in % Before COVID-19 Loneliness	Frequency in % During COVID-19 Loneliness
Whole Sample		No – Minimal	83.1	59.5
		Mild	12.1	22.2
		Moderate	4.1	11.6
		Severe	0.6	6.7
Remote Work	General NRH			
Not at all (0)	Never – Monthly (1)	No – Minimal	80.0	67.9
		Mild	10.9	17.9
		Moderate	5.5	5.4
		Severe	3.6	8.9
	Weekly (2)	No – Minimal	76.4	53.9
		Mild	16.9	24.7
		Moderate	5.6	13.5
		Severe	1.1	7.9
	Daily (3)	No – Minimal	89.1	65.5
		Mild	7.3	17.2
		Moderate	3.6	15.5
		Severe	0.0	1.7
≤ 50% (1)	Never – Monthly (1)	No – Minimal	85.0	59.3
		Mild	10.0	23.5
		Moderate	3.8	12.3
		Severe	1.3	4.9
	Weekly (2)	No – Minimal	84.6	63.5
		Mild	12.2	23.1
		Moderate	3.2	9.6
		Severe	0.0	3.8
	Daily (3)	No – Minimal	91.0	70.3
		Mild	6.7	16.5
		Moderate	2.2	7.7
		Severe	0.0	5.5
> 50% (2)	Never – Monthly (1)	No – Minimal	83.0	44.7
		Mild	10.6	29.8
		Moderate	5.3	11.7
		Severe	1.1	13.8
	Weekly (2)	No – Minimal	79.6	56.1
		Mild	15.2	19.3
		Moderate	4.7	16.5
		Severe	0.5	8.0
	Daily (3)	No – Minimal	84.7	61.2
		Mild	12.4	25.9
		Moderate	2.9	7.9
		Severe	0.0	5.0

Note: The classification of loneliness was adapted from recommendations regarding use of the short version of the UCLA Loneliness scale in an epidemiological research context [59]. No – Minimal loneliness: 0 (Never) – 1 (Rarely); Mild loneliness: 1.25 – 1.75; Moderate loneliness: 2 (Sometimes) – 2.5; Severe loneliness: 2.75 – 3 (Often).