

THE LANCET Psychiatry

Supplementary appendix 2

This appendix formed part of the original submission and has been peer reviewed. We post it as supplied by the authors.

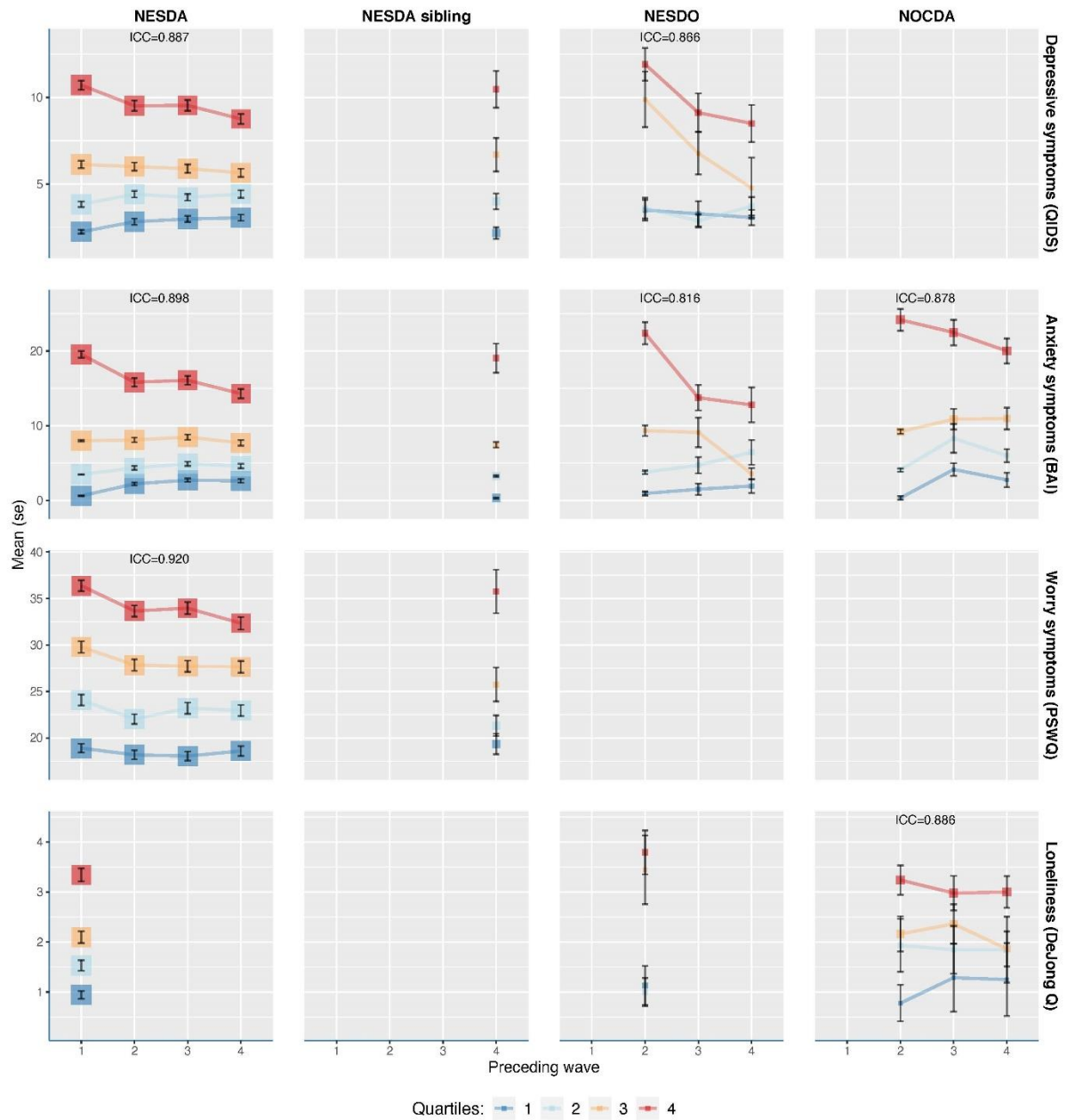
Supplement to: Pan K-Y, Kok AAL, Eikelenboom M, et al. The mental health impact of the COVID-19 pandemic on people with and without depressive, anxiety, or obsessive-compulsive disorders: a longitudinal study of three Dutch case-control cohorts. *Lancet Psychiatry* 2020; published online Dec 8. [http://dx.doi.org/10.1016/S2215-0366\(20\)30491-0](http://dx.doi.org/10.1016/S2215-0366(20)30491-0).

Supplementary Table 1: Individual Covid-19-specific items and Exploratory Factor Analysis results

Item (response options: 1=totally disagree – 5=totally agree)	N	Factor loading 1	Factor loading 2	Factor loading 3
Because of this period the quality of my sleep is worse	1482	.56	.23	-.07
This period makes me consume more snacks or sweets	1485	.43	-.07	.05
This period makes me drink more alcohol ^{a)}	1148	.35	-.11	<.01
This period makes me more emotional	1479	.65	.21	.02
In this period I am having more nightmares	1446	.57	.15	-.06
In this period it is hard to concentrate	1485	.60	.11	-.20
In this period I am more often lonely	1480	.33	.14	-.39 ^{b)}
This period makes me sad	1486	.56	.20	-.32
In this period I am more often irritable and tense	1485	.64	.12	-.15
I fear to become infected with corona	1476	.05	.66	.06
Because of the threat of the virus I dont leave my home anymore	1473	-.02	.51	-.22
This period makes me fearful	1486	.33	.56	-.14
I intensively follow the news about the virus through TV newspaper and or social media	1492	.02	.27	.03
Because of the threat of the virus I am anxious of getting close to other people	1484	.06	.75	-.03
I strictly follow the rules to prevent contamination and spread of the virus	1488	-.09	.48	.14
In this period I feel more connected to society	1486	.12	.12	.46
It is no problem to enjoy myself while being at home more often	1449	-.08	<.01	.54
I have confidence that the Netherlands will overcome this crisis	1490	-.08	-.07	.37
Despite the virus I stay active (household tasks, gardening, walking, sporting, yoga)	1478	-.14	-.11	.50
Despite the virus I actively maintain (via phone or online) contacts with friends	1486	-.02	.06	.53
Dimension label		Perceived mental health impact	Fear for COVID-19	Positive coping
Cronbach's alpha		.85 (n=1476)	.73 (n=1484)	.61 (n=1487)

a) Non-drinkers answered “not applicable” (coded as missing value)

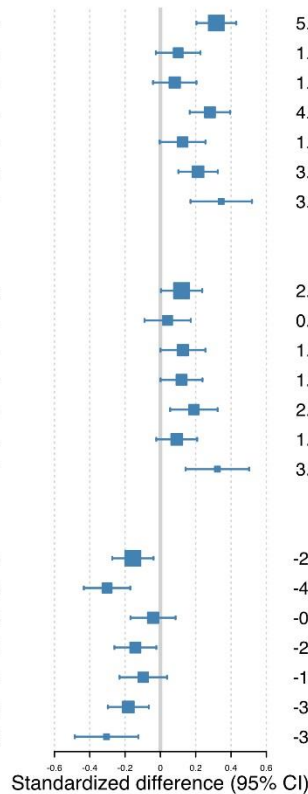
b) Because the item wording more closely resembled other aspects usually linked to mental health rather than perceived coping items, we included this item in the perceived mental health impact dimension



Supplementary Figure 1: Mean symptom scale scores over time for the up to four preceding waves dating back to 2006. X axis refers to assessment waves prior to the COVID-19 outbreak. Participants were categorized according to quartiles based on the symptom severity scores at the earliest wave of each cohort. Error bars represent standard errors of the mean, and each box is proportional to the number of subjects at that time point. There was evidence of substantial rank-order stability over the waves of follow-up, with high intra-class correlation (ICC) values.

Supplementary Table 2: Dimensions in the COVID-specific items in relation to specific mental disorders

COVID-19-specific dimension:	n	Crude mean (SE)	Adjusted standardized score; mean (SE)	t-statistic	p-value
Perceived mental health impact:					
Major depressive disorder	978	2.70 ± 0.76	0.24 ± 0.04	5.515	< 0.0001
Dysthymic disorder	370	2.80 ± 0.78	0.08 ± 0.05	1.562	0.12
Panic disorder	483	2.78 ± 0.75	0.06 ± 0.05	1.293	0.20
Generalized anxiety disorder	456	2.84 ± 0.74	0.22 ± 0.04	4.809	< 0.0001
Agoraphobia	405	2.81 ± 0.74	0.10 ± 0.05	1.903	0.057
Social anxiety disorder	522	2.79 ± 0.75	0.16 ± 0.04	3.745	0.0002
Obsessive-compulsive disorder	121	2.80 ± 0.85	0.26 ± 0.07	3.880	0.0001
Fear of Covid-19:					
Major depressive disorder	984	3.30 ± 0.74	0.09 ± 0.04	2.008	0.045
Dysthymic disorder	372	3.37 ± 0.75	0.03 ± 0.05	0.611	0.54
Panic disorder	486	3.40 ± 0.71	0.09 ± 0.05	1.965	0.050
Generalized anxiety disorder	458	3.36 ± 0.75	0.09 ± 0.04	1.976	0.048
Agoraphobia	409	3.43 ± 0.70	0.14 ± 0.05	2.769	0.0057
Social anxiety disorder	526	3.36 ± 0.69	0.07 ± 0.04	1.564	0.12
Obsessive-compulsive disorder	123	3.37 ± 0.83	0.23 ± 0.07	3.516	0.0005
Positive coping:					
Major depressive disorder	987	3.63 ± 0.63	-0.09 ± 0.04	-2.617	0.0090
Dysthymic disorder	372	3.48 ± 0.66	-0.18 ± 0.04	-4.508	< 0.0001
Panic disorder	485	3.58 ± 0.65	-0.02 ± 0.04	-0.637	0.52
Generalized anxiety disorder	458	3.55 ± 0.65	-0.09 ± 0.04	-2.342	0.019
Agoraphobia	409	3.55 ± 0.66	-0.06 ± 0.04	-1.414	0.16
Social anxiety disorder	526	3.55 ± 0.67	-0.11 ± 0.04	-3.069	0.0022
Obsessive-compulsive disorder	123	3.56 ± 0.64	-0.18 ± 0.06	-3.324	0.0009



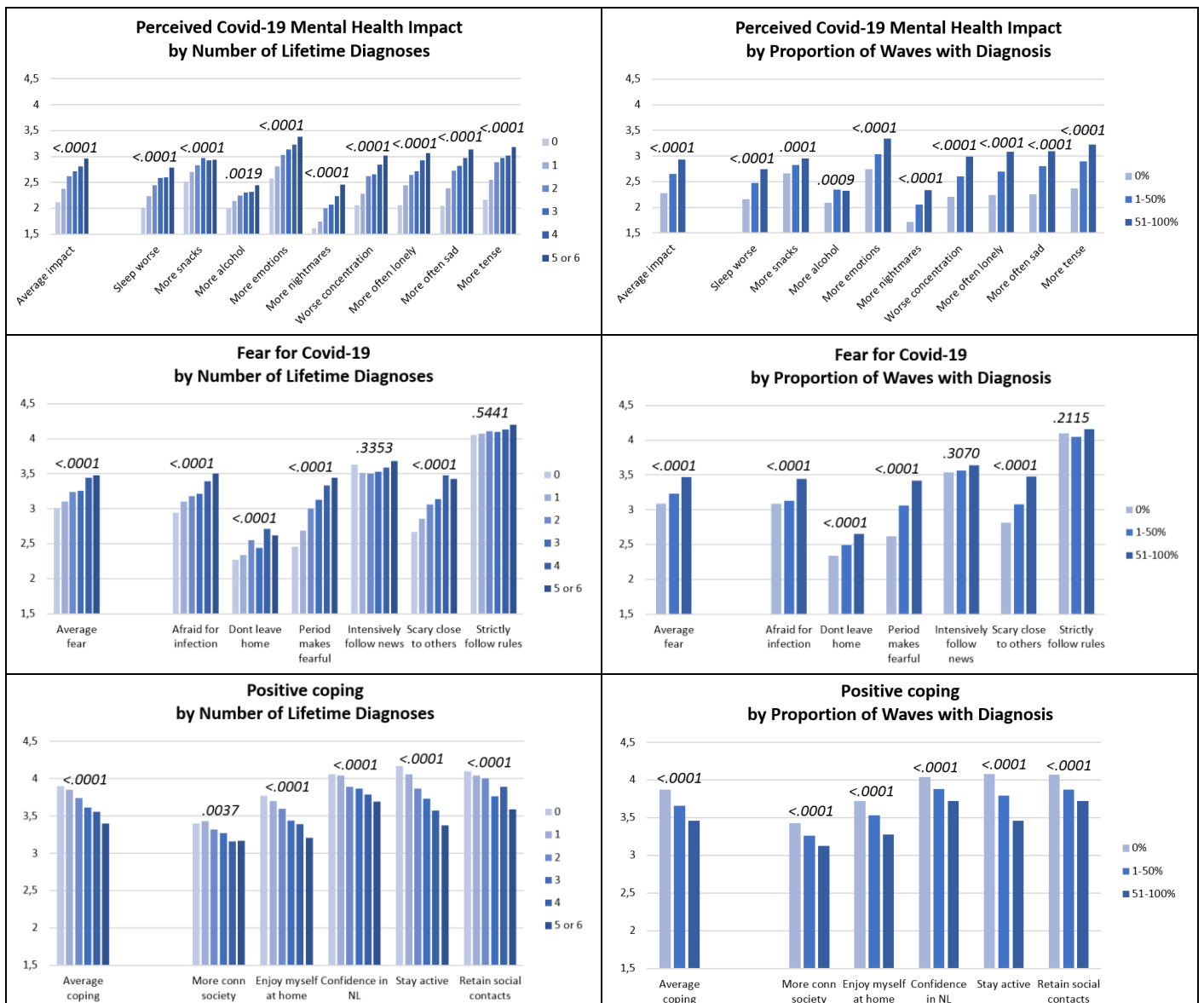
The crude mean refers to the mean score in each dimension of persons with the disorder. Persons could have multiple comorbid disorders. To create the forest plot, each COVID-19-specific dimension score was standardised. The adjusted standardised score refers to the mean score among the persons with that disorder, adjusted for all the other dummy variables indicating other disorders entered into one linear regression model, and additionally adjusted for age, sex, education, living situation, and date of response.

Supplementary Table 3: Change in symptoms from before to during the COVID-19 pandemic in relation to specific mental disorders

Independent variable:	n	Baseline mean	Covid mean	Crude change (SE)	p-value	Adjusted change (SE)	t-stat	p-value
Depressive symptoms (QIDS):								
Major depressive disorder	894	6.94	7.02	0.09 ± 0.21	0.67	0.02 ± 0.32	0.056	0.96
Dysthymic disorder	369	9.01	8.53	-0.49 ± 0.35	0.17	-0.77 ± 0.35	-2.181	0.029
Panic disorder	448	7.45	7.38	-0.08 ± 0.30	0.80	-0.04 ± 0.35	-0.111	0.91
Generalized anxiety disorder	434	8.09	7.91	-0.18 ± 0.31	0.55	-0.21 ± 0.33	-0.629	0.53
Agoraphobia	379	7.74	7.57	-0.17 ± 0.34	0.62	-0.16 ± 0.37	-0.442	0.66
Social anxiety disorder	491	7.80	7.61	-0.19 ± 0.29	0.52	-0.35 ± 0.32	-1.075	0.28
Anxiety symptoms (BAI):								
Major depressive disorder	984	10.16	10.09	-0.06 ± 0.41	0.88	0.03 ± 0.63	0.041	0.97
Dysthymic disorder	373	12.75	12.04	-0.71 ± 0.69	0.30	-0.64 ± 0.70	-0.921	0.36
Panic disorder	481	12.75	12.26	-0.49 ± 0.66	0.46	-0.57 ± 0.69	-0.829	0.41
Generalized anxiety disorder	456	12.51	12.02	-0.50 ± 0.64	0.44	-0.39 ± 0.64	-0.612	0.54
Agoraphobia	404	13.15	12.82	-0.33 ± 0.73	0.65	0.14 ± 0.72	0.189	0.85
Social anxiety disorder	523	12.26	11.84	-0.42 ± 0.60	0.48	-0.40 ± 0.62	-0.640	0.52
Obsessive-compulsive disorder	120	14.03	14.92	0.89 ± 1.51	0.56	0.68 ± 0.97	0.697	0.49
Worry symptoms (PSWQ):								
Major depressive disorder	852	28.86	28.90	0.04 ± 0.49	0.93	-1.02 ± 0.81	-1.256	0.21
Dysthymic disorder	343	32.80	32.04	-0.77 ± 0.77	0.32	-0.94 ± 0.89	-1.050	0.29
Panic disorder	428	30.75	30.64	-0.11 ± 0.70	0.88	0.35 ± 0.88	0.400	0.69
Generalized anxiety disorder	419	32.51	32.17	-0.34 ± 0.69	0.62	-0.45 ± 0.82	-0.547	0.58
Agoraphobia	360	31.12	30.33	-0.79 ± 0.78	0.31	-1.41 ± 0.93	-1.522	0.13
Social anxiety disorder	471	30.82	30.51	-0.31 ± 0.66	0.64	-0.48 ± 0.81	-0.596	0.55
Loneliness (DeJong Q):								
Major depressive disorder	886	2.41	2.56	0.15 ± 0.10	0.12	0.03 ± 0.17	0.153	0.88
Dysthymic disorder	336	3.08	2.90	-0.17 ± 0.16	0.28	-0.43 ± 0.18	-2.392	0.017
Panic disorder	439	2.58	2.67	0.08 ± 0.14	0.56	0.04 ± 0.18	0.239	0.81
Generalized anxiety disorder	413	2.75	2.78	0.03 ± 0.14	0.82	-0.05 ± 0.17	-0.273	0.78
Agoraphobia	363	2.76	2.75	-0.01 ± 0.15	0.95	-0.14 ± 0.19	-0.730	0.47
Social anxiety disorder	465	2.88	2.84	-0.04 ± 0.14	0.77	-0.26 ± 0.16	-1.583	0.11
Obsessive-compulsive disorder	124	2.50	2.70	0.20 ± 0.26	0.43	-0.13 ± 0.24	-0.563	0.57

Standardized change (SE) (95% CI)

The baseline mean refers to the mean of average score across the preceding pre-COVID waves of persons with the disorder. The Covid mean refers to the mean score of persons with the disorder at the online COVID wave. The crude change with the p-value refers to the difference in mean score between pre-COVID wave and online COVID wave of persons with the disorder. To create the forest plot, each change in symptom score was standardised. The adjusted change with the p-value was derived from mixed models where all the interaction terms of dummy variables indicating disorders with time were simultaneously entered into one model, adjusted for age, sex, education, living situation, and date of response.



Supplementary Figure 2: Dimensions and COVID-specific items in relation to severity (number of lifetime disorders) and chronicity (percentage of previous waves with current disorders) of mental disorders Italic numbers are *p*-values for differences between groups, derived from Analysis of Variance

Supplementary Table 4: Change in symptoms from before to during the COVID-19 pandemic in relation to severity (number of lifetime disorders) and chronicity (percentage of previous waves with current disorders) of mental disorders

Independent variable:	n	Baseline mean	Covid mean	Crude change (SE)	Adjusted change (SE)	t-stat	Adjusted p-value	p-value for interaction
Number of disorders in previous waves:								
Depressive symptoms (QIDS)								
0 disorders (ref.)	332	2.59	3.40	0.82 ± 0.18	Ref.			t=-20.76 p < 0.0001
1 disorder	263	4.28	4.56	0.28 ± 0.26	-0.54 ± 0.42	-1.279	0.20	
2 disorders	215	5.42	5.97	0.55 ± 0.35	-0.27 ± 0.44	-0.599	0.55	
3 disorders	191	6.81	6.67	-0.14 ± 0.41	-0.95 ± 0.46	-2.075	0.038	
4 disorders	175	7.68	8.18	0.50 ± 0.46	-0.31 ± 0.47	-0.663	0.51	
5 or 6 disorders	194	9.89	8.99	-0.90 ± 0.48	-1.72 ± 0.46	-3.766	0.0002	
Anxiety symptoms (BAI)								
0 disorders (ref.)	328	2.58	3.06	0.48 ± 0.28	Ref.			t=-7.60 p = 0.0058
1 disorder	271	4.91	5.35	0.43 ± 0.43	-0.04 ± 0.84	-0.053	0.96	
2 disorders	252	7.38	8.09	0.71 ± 0.62	0.23 ± 0.85	0.268	0.79	
3 disorders	225	10.04	9.53	-0.51 ± 0.77	-0.99 ± 0.88	-1.127	0.26	
4 disorders	195	11.65	12.01	0.36 ± 0.93	-0.11 ± 0.92	-0.125	0.90	
5 or 6 disorders	205	17.07	15.72	-1.36 ± 1.05	-1.83 ± 0.90	-2.022	0.043	
Worry symptoms (PSWQ)								
0 disorders (ref.)	299	17.31	19.42	2.11 ± 0.56	Ref.			t=-33.63 p < 0.0001
1 disorder	254	22.60	23.21	0.62 ± 0.72	-1.52 ± 1.05	-1.450	0.15	
2 disorders	206	25.98	27.70	1.72 ± 0.93	-0.41 ± 1.11	-0.368	0.71	
3 disorders	186	29.05	29.67	0.63 ± 0.99	-1.51 ± 1.14	-1.324	0.19	
4 disorders	167	31.70	31.04	-0.66 ± 1.09	-2.81 ± 1.18	-2.387	0.017	
5 or 6 disorders	181	35.32	33.40	-1.92 ± 1.02	-4.07 ± 1.15	-3.546	0.0004	
Loneliness (DeJong Q)								
0 disorders (ref.)	258	0.90	1.38	0.48 ± 0.11	Ref.			t=-14.90 p = 0.0001
1 disorder	232	1.57	1.88	0.31 ± 0.16	-0.16 ± 0.23	-0.719	0.47	
2 disorders	225	1.76	2.18	0.41 ± 0.17	-0.06 ± 0.23	-0.278	0.78	
3 disorders	209	2.48	2.60	0.12 ± 0.19	-0.36 ± 0.23	-1.536	0.12	
4 disorders	181	2.73	2.75	0.02 ± 0.21	-0.46 ± 0.24	-1.881	0.060	
5 or 6 disorders	183	3.38	3.20	-0.17 ± 0.22	-0.65 ± 0.24	-2.693	0.0071	
Percentage of previous waves with disorders:								
Depressive symptoms (QIDS)								
0% waves with disorders (ref.)	685	3.38	4.15	0.77 ± 0.15	Ref.			t=-37.99 p < 0.0001
1-50% waves with disorders	383	6.32	6.41	0.09 ± 0.26	-0.68 ± 0.32	-2.136	0.033	
51-100% waves with disorders	302	9.84	9.16	-0.69 ± 0.38	-1.45 ± 0.34	-4.225	< 0.0001	
Anxiety symptoms (BAI)								
0% waves with disorders (ref.)	700	3.91	4.52	0.61 ± 0.26	Ref.			t=-12.33 p = 0.0004
1-50% waves with disorders	396	8.43	8.62	0.19 ± 0.49	-0.43 ± 0.63	-0.681	0.50	
51-100% waves with disorders	380	15.74	14.80	-0.94 ± 0.75	-1.55 ± 0.64	-2.418	0.016	
Worry symptoms (PSWQ)								
0% waves with disorders (ref.)	652	20.04	21.58	1.54 ± 0.44	Ref.			t=-21.79 p < 0.0001
1-50% waves with disorders	363	29.21	29.34	0.13 ± 0.69	-1.42 ± 0.80	-1.782	0.075	
51-100% waves with disorders	278	34.80	33.93	-0.87 ± 0.80	-2.42 ± 0.87	-2.781	0.0055	
Loneliness (DeJong Q)								
0% waves with disorders (ref.)	581	1.23	1.66	0.43 ± 0.09	Ref.			t=-12.21 p = 0.0005
1-50% waves with disorders	378	2.23	2.36	0.12 ± 0.14	-0.30 ± 0.16	-1.847	0.065	
51-100% waves with disorders	329	3.23	3.20	-0.03 ± 0.16	-0.46 ± 0.17	-2.658	0.0079	

The baseline mean refers to the mean of average score across the preceding pre-COVID waves. The Covid mean refers to the mean score at the online COVID wave. The crude change refers to the difference in mean score between pre-COVID wave and online COVID wave. To create the forest plot, each change in symptom score was standardised. The adjusted change with the p-value was derived from mixed models where the interaction term of mental disorder status with time was entered, adjusted for age, sex, education, living situation, and date of response.