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Table S1. Non-responder analysis

	Responders, n (%) N=57 643	Non-responders, n (%) N=77 147	p-value
Age, years, mean ± SD <i>Missing, n</i>	55.3 ± 12.6 0	50.6 ± 12.3 0	<.001
Sex			<.001
Male	22,787 (39.5)	32,993 (42.8)	
Female	34,856 (60.5)	44,122 (57.2)	
<i>Missing, n</i>	0	32	
Asthma [†] <i>Missing, n</i>	4 722 (8.2) 197	7 220 (9.4) 442	<.001
Allergic rhinitis* <i>Missing, n</i>	15 245 (27.1) 1 408	20 514 (27.2) 1 680	.77
Skin diseases [§]			
Eczema	9,053 (15.7)	11,592 (15.0)	.00
Psoriasis	1,733 (3.0)	1,995 (2.6)	<.001
Severe acne	1,582 (2.7)	2,254 (2.9)	.05
<i>Missing, n</i>	2 128	2 489	
Lifetime prevalence of self-reported mental disorders			
Chronic fatigue syndrome	652 (1.2)	995 (1.3)	.01
Burnout	5 046 (9.0)	6 148 (8.2)	<.001
Depression	5 283 (9.5)	7 532 (10.0)	<.001
Social phobia	492 (0.9)	660 (0.9)	1.0
Agoraphobia (fear of open spaces)	272 (0.5)	409 (0.5)	.14
Panic disorder	1 501 (2.7)	2 412 (3.2)	<.001
(other) anxiety disorder	1 609 (2.9)	2 446 (3.3)	<.001
Manic-depressive disorder (bipolar disorder)	169 (0.3)	211 (0.3)	.49
Schizophrenia	30 (0.1)	62 (0.1)	.05
Obsessive compulsive disorder	167 (0.3)	339 (0.5)	<.001
ADHD	364 (0.7)	942 (1.3)	<.001
Eating disorder	796 (1.4)	1 214 (1.6)	.01
<i>Missing, n</i>	1 750	2 163	
Point prevalence of mental disorders based on the M.I.N.I.			
Major depressive disorder <i>Missing, n</i>	872 (1.6) 2 329	1 773 (2.4) 2 439	<.001
Dysthymia <i>Missing, n</i>	526 (1.0) 3 366	915 (1.3) 4 465	<.001
Panic disorder <i>Missing, n</i>	109 (0.2) 2 329	191 (0.3) 2 439	.03
Agoraphobia <i>Missing, n</i>	1 985 (3.6) 2 329	2 889 (3.9) 2 439	.01
Social phobia <i>Missing, n</i>	404 (0.7) 2 330	736 (1.0) 2 439	<.001
Generalized anxiety disorder <i>Missing, n</i>	1 901 (3.4) 2 329	3 541 (4.7) 2 439	<.001
At least one depression disorder(s) <i>Missing, n</i>	1 398 (2.5) 2 494	2 688 (3.6) 2 694	<.001
At least one anxiety disorder(s) <i>Missing, n</i>	3 771 (6.8) 2 330	6 141 (8.2) 2 439	<.001
At least one depression or anxiety disorder(s) <i>Missing, n</i>	4 385 (7.9) 2 440	7 256 (9.7) 2 584	<.001
Loneliness			
Overall loneliness (6-item)			
Not lonely (0-1)	28 855 (73.1)	14 503 (70.7)	<.001
Lonely (2-6)	10 630 (26.9)	5 998 (29.3)	
<i>Missing, n</i>	18 158	56 646	
Emotional loneliness subscale (3-item)			<.001
Not lonely (0-1)	34 867 (88.4)	17 685 (86.5)	
Lonely (2-3)	4 576 (11.6)	2 770 (13.5)	

<i>Missing, n</i>	<i>18 200</i>	<i>56 692</i>	
Social loneliness subscale (3-item)			<.001
Not lonely (0-1)	31 870 (80.8)	16 280 (79.5)	
Lonely (2-3)	7 579 (19.2)	4 189 (20.5)	
<i>Missing, n</i>	<i>18 194</i>	<i>56 678</i>	

All characteristics are self-reported.

Abbreviation: n, number; SD, standard deviation; AD, atopic dermatitis; ADHD, attention deficit hyperactivity disorder.

[†]Based on a question from the baseline assessment, "Have you ever had asthma?"

^{*}Based on a question from the baseline assessment, "Do you have any form of nasal allergy, including hay fever, or have you ever had this?"

[§]Exact missing values regarding other skin diseases could not be calculated, as the relevant question was designed as a multiple response question, "Could you indicate which of the following disorders you have (had)?" with several response options, including among others eczema, psoriasis and severe acne. The missing values were calculated for the subjects who did not check any of the response options of this specific question.

Table S2. Association between disease severity of atopic dermatitis, mental disorders, and loneliness.

	Non-AD in lifetime N=51 174	Mild AD N= 541	Moderate-to-severe AD N=1 288	Mild AD vs. non-AD in lifetime		Moderate-to-severe AD vs. non-AD in lifetime	
	Prevalence, n (%)	Prevalence, n (%)	Prevalence, n (%)	Adjusted for age, sex, asthma and/or hay fever aOR (95% CI)	p-value	Adjusted for age, sex, asthma and/or hay fever aOR (95% CI)	p-value
Lifetime prevalence of self-reported mental disorders							
Chronic fatigue syndrome	541 (1.1)	11 (2.1)	38 (3.0)	1.46 (0.79-2.70)	.23	2.10 (1.46-3.01)	<.001
Burnout	4 427 (8.8)	51 (9.4)	142 (11.2)	0.98 (0.73-1.31)	.88	1.18 (0.98-1.42)	.08
Depression	4 567 (9.1)	59 (10.9)	171 (13.5)	1.06 (0.80-1.40)	.69	1.25 (1.05-1.48)	.01
Social phobia	417 (0.8)	<10 (<1.8) [†]	25 (2.0)	1.73 (0.84-3.55)	.14	2.17 (1.40-3.36)	.00
Agoraphobia (fear of open spaces)	231 (0.5)	0 (0)	16 (1.3)	-	-	2.17 (1.25-3.78)	.01
Panic disorder	1 255 (2.5)	16 (3.0)	75 (5.9)	1.03 (0.62-1.72)	.91	1.97 (1.52-2.55)	<.001
(other) anxiety disorder	1 386 (2.8)	17 (3.1)	56 (4.4)	1.07 (0.89-1.28)	.49	1.31 (0.98-1.75)	.06
Manic-depressive disorder (bipolar disorder)	141 (0.3)	<10 (<1.8) [†]	<10 (<0.8) [†]	2.40 (0.86-6.69)	.09	1.45 (0.61-3.44)	.40
Schizophrenia	26 (0.1)	0 (0)	0 (0)	-	-	-	-
Obsessive compulsive disorder	145 (0.3)	<10 (<1.8) [†]	<10 (<0.8) [†]	1.97 (0.61-6.35)	.26	1.30 (0.51-3.32)	.58
ADHD	301 (0.6)	<10 (<1.8) [†]	18 (1.4)	1.60 (0.74-3.47)	.23	1.65 (0.99-2.76)	.06
Eating disorder	657 (1.3)	10 (1.9)	39 (3.1)	1.18 (0.62-2.25)	.61	1.70 (1.20-2.43)	.00
<i>Missing, n</i>	928	10	17				
Point prevalence of mental disorders based on the M.I.N.I.							
Major depressive disorder	762 (1.5)	<10 (<1.8) [†]	27 (2.1)	0.91 (0.46-1.78)	.78	1.10 (0.73-1.65)	.65
<i>Missing, n</i>	1 464	9	30				
Dysthymia	460 (0.9)	<10 (<1.8) [†]	16 (1.3)	0.88 (0.36-2.15)	.77	1.06 (0.63-1.80)	0.83
<i>Missing, n</i>	2 375	20	57				
Panic disorder	90 (0.2)	<10 (<1.8) [†]	<10 (<0.8) [†]	2.77 (0.84-9.10)	.09	1.89 (0.72-4.93)	.20
<i>Missing, n</i>	1 464	9	30				
Agoraphobia	1 725 (3.5)	19 (3.6)	77 (6.1)	0.95 (0.60-1.52)	.84	1.65 (1.28-2.11)	<.001
<i>Missing, n</i>	1 464	9	30				
Social phobia	344 (0.7)	<10 (<1.8) [†]	13 (1.0)	1.16 (0.47-2.86)	.74	1.17 (0.66-2.10)	.59
<i>Missing, n</i>	1 464	9	30				
Generalized anxiety disorder	1 640 (3.3)	22 (4.1)	62 (4.9)	1.06 (0.69-1.64)	.79	1.18 (0.90-1.55)	.23
<i>Missing, n</i>	1 464	9	30				
At least one depression disorder(s)	1 222 (2.5)	14 (2.6)	43 (3.4)	0.90 (0.52-1.54)	.69	1.08 (0.78-1.50)	.63
<i>Missing, n</i>	1 613	11	30				
At least one anxiety disorder(s)	3 275 (6.6)	43 (8.1)	128 (10.2)	1.10 (0.80-1.52)	.54	1.36 (1.12-1.65)	.00
<i>Missing, n</i>	1 464	9	30				
At least one depression or anxiety disorder(s)	3 817 (7.7)	47 (8.9)	148 (11.8)	1.03 (0.76-1.39)	.87	1.33 (1.11-1.60)	.00
<i>Missing, n</i>	1 562	11	30				
Loneliness							

Overall loneliness (6-item)							
Not lonely (0-1)	26 117 (73.4)	241 (71.5)	527 (67.2)	1		1	
Lonely (2-6)	9 473 (26.6)	96 (28.5)	257 (32.8)	1.04 (0.82-1.32)	.75	1.26 (1.07-1.47)	.00
<i>Missing, n</i>	15 584	204	504				
Emotional loneliness subscale (3-item)							
Not lonely (0-1)	31 514 (88.6)	298 (88.4)	651 (83.2)	1		1	
Lonely (2-3)	4 037 (11.4)	39 (11.6)	131 (16.8)	0.90 (0.64-1.26)	.53	1.31 (1.08-1.60)	.01
<i>Missing, n</i>	15 623	204	506				
Social loneliness subscale (3-item)							
Not lonely (0-1)	28 790 (81.0)	266 (78.9)	604 (77.1)	1		1	
Lonely (2-3)	6 769 (19.0)	71 (21.1)	179 (22.9)	1.11 (0.85-1.45)	.45	1.25 (1.05-1.49)	.01
<i>Missing, n</i>	15 615	204	505				

All characteristics are self-reported.

Abbreviation: AD, atopic dermatitis; n, number; OR, odds ratio; CI, confidence interval; aOR, adjusted odds ratio; ADHD, attention deficit hyperactivity disorder.

*n<10 was displayed to prevent traceability to participants if a group size was smaller than 10, and the corresponding percentages were calculated based on the n=10.