## The impact of face masks on emotion recognition performance and perception of threat

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- Supporting Information -





Mean responses in the emotion recognition task (in percent) for (a) anger, (b) fear, (c) happiness, (d) sadness, (e) disgust and (f) neutral with depiction of misinterpretations of one emotion as another emotion in total and for faces with and without face mask separately (n = 790).

Version A					Version B			
Female		Male			Female		Male	
anger	young			1			anger	old
		anger	old	2	anger	young		
		happiness	old	3	neutral	medium		
happiness	medium			4			sadness	old
anger	old			5			neutral	old
		disgust	medium	6	disgust	medium		
0		sadness	young	/			anger	young
fear	young			8	anger	old		
		anger	young	9	6		sadness	medium
c	1.	fear	medium	10	fear	old		
tear	medium			11	happiness	medium	C	1 1
disgust	young	1:		12	1:		fear	old
		disgust	young	13	disgust	young	1	
1		nappiness	medium	14			nappiness	young
nappiness	young			16	hanninaaa	101100	Tear	meatum
neutral	young	foor	ald	17	nappiness	young		
noutral	madium	lear	olu	18	sauness	meatum	hanninass	modium
neunui	meanum	sadnoss	modium	19	sadness	Volung	nappiness	тешит
sadness	old	suuness	тешит	20	fear	young medium		
sadness	voung			21	jeur	mcatam	hanniness	old
sumess	young	neutral	medium	22			fear	voling
sadness	medium	neun ai	meann	23	neutral	old	Teur	young
5		neutral	voung	24		010	sadness	voung
		fear	voung	25	disgust	old	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<i>y</i> =8
happiness	old	<i>J</i> = ==	<i>y</i>	26	8		disgust	voung
disgust	old			27			disgust	medium
0		anger	medium	28	neutral	young	C	
		happiness	young	29		. 0	disgust	old
disgust	medium			30	happiness	old	C	
anger	medium			31	fear	young		
_		neutral	old	32			neutral	young
		disgust	old	33			neutral	medium
fear	old			34	sadness	old		
		sadness	old	35			anger	medium
neutral	old			36	anger	medium		

S1 Table 1. Pseudo-randomised order of stimuli for the two versions A and B used in the experimental condition *mask vs. original*.

The 72 adapted stimuli used in the experimental condition *mask vs. original* were split into two versions of 36 stimuli so that each poser was only seen once in each version (if male poser 'anger & old' was wearing a mask in version A, the same stimulus was presented without a face mask in version B). Both versions were balanced for emotion, sex, age and face mask and the order of stimuli was drawn randomly. Stimuli with face masks are typeset in italics, original stimuli in roman type.

Condition	Emotion	F	р	$R^2$	β
Mask	Anger	12.79	<.001*	.02	003
	Fear	9.24	.002*	.01	002
	Happiness	1.36	.244		
	Sadness	0.30	.585		
	Disgust	13.75	<.001*	.02	002
	Neutral	12.20	.001*	.02	002
Original	Anger	0.60	.438		
	Fear	3.37	.067		
	Happiness	0.03	.865		
	Sadness	8.15	.004*	.01	.002
	Disgust	4.78	.029*	.01	002
	Neutral	15.62	<.001*	.02	002

S1 Table 2. Emotion-specific results from regression analyses on the association of participant age with emotion recognition accuracy for faces with and without face mask.

Note. Results from regression analyses on the association of participant age with emotion recognition accuracy (percent correct) for faces with ('mask') and without face masks ('original') specific for each emotion (n = 790). For significant results,  $R^2$  and the  $\beta$ -coefficient indicating the direction of the correlation are provided. \* p < .05

Emotion	Condition		М	SD	р
Anger	original		0.85	0.22	•
e	e	vs. mask			<.001*
		vs. bubble			< .001*
		vs. half			< .001*
	mask		0.56	0.31	
		vs. bubble			.069
		vs. half			.618
	bubble		0.59	0.16	
		vs. half			1.000
	half		0.58	0.18	
Fear	original		0.83	0.24	
	8	vs. mask			.001*
		vs. bubble			<.001*
		vs. half			< .001*
	mask		0.79	0.24	
		vs. bubble			.182
		vs. half			<.001*
	bubble		0.76	0.21	
		vs. half			.372
	half		0.73	0.21	
Happiness	original		0.99	0.03	
mappiness	originar	vs mask	0.77	0.05	< 001*
		vs. hubble			< 001*
		vs. balf			< 001*
	mask	vs. nun	0.92	0.17	1.001
	mask	vs bubble	0.92	0.17	001*
		vs. balf			< 001*
	bubble	vs. nun	0.89	0.13	1.001
	000010	vs half	0.07	0.15	1.000
	half	vs. nun	0.88	0.14	1.000
Sadness	original		0.88	0.14	
Sauress	originar	ve meek	0.71	0.29	< 001*
		vs. hubble			< .001
		vs. balf			< .001
	mask	v5. 11d11	0.43	0.30	< .001
	mask	vs bubble	0.45	0.50	231
		vs. balf			1 000
	hubble	vs. nan	0.47	0.21	1.000
	bubble	vs half	0.47	0.21	204
	half	vs. nan	0.43	0.22	.204
Disquet	original		0.45	0.22	
Disgust	originar	va maak	0.80	0.28	< 001*
		vs. hubble			< .001
		vs. balf			< .001
	mask	vs. Itali	0.11	0.18	< .001
	mask	va hubbla	0.11	0.18	< 001*
		vs. bulble			< .001*
	bubble	v5. 11d11	0.26	0.17	< .001
	bubble	va half	0.20	0.17	057
	half	vs. nan	0.22	0.15	.037
Maartual	nani nainai na 1		0.22	0.15	
neutral	original	ve most	0.94	0.13	016*
		vs. mask			.010*
		vs. bubble			.001*
	maal	vs. nan	0.01	0.17	< .001*
	mask	va hubble	0.91	0.1/	1 000
		vs. bubble			1.000
	hubble	vs. nan	0.00	0.14	.001*
	oubble	ve half	0.90	0.14	174
	helf	v5. 11a11	0.97	0.10	.1/4
	11411		0.0/	0.19	

## S1 Table 3. Differences in emotion recognition accuracy (percent correct) between the different conditions.

Significant effects obtained through analysis of variance were followed up with Bonferroni-corrected multiple comparisons to analyse differences in emotion recognition accuracy (percent correct) between the different conditions for each emotion separately. *Mask vs. original* (n = 790), *half vs. bubble* (n = 395 and n = 388). \* p < .05

Emotion	Condition	М	SD	р
Anger	mask original	73.88 76.93	16.69 17.45	.002 *
Fear	mask original	38.88 38.30	23.33 23.18	1.000
Happiness	mask original	12.38 9.49	13.43 12.10	<.001 *
Sadness	mask original	30.47 23.15	21.82 18.45	<.001 *
Disgust	mask original	40.44 32.56	22.37 22.49	<.001 *
Neutral	mask original	23.22 21.70	18.55 17.15	.460

S1 Table 4. Differences in rating of threat between faces with and without a mask for correctly recognised stimuli only.

Significant effects obtained through analysis of variance were followed up with Bonferroni-corrected multiple comparisons to analyse differences in rating of threat on a Visual Analogue Scale with a range from 0 to 100 between the different conditions for each emotion separately for correctly recognised 'mask' and 'original' stimuli only (n = 790).

\* *p* < .05

Condition	Emotion	F	р	$R^2$	β
Mask	Anger	23.71	<.001*	.03	259
	Fear	2.08	.149		
	Happiness	0.02	.879		
	Sadness	5.73	.017*	.01	132
	Disgust	8.00	.005*	.01	231
	Neutral	3.57	.059		
Original	Anger	4.21	.041*	.01	106
-	Fear	0.01	.935		
	Happiness	0.00	.971		
	Sadness	1.92	.166		
	Disgust	0.09	.761		
	Neutral	6.20	.013*	.01	118

S1 Table 5. Emotion-specific results from regression analyses on the association of participant age with rating of threat for faces with and without face mask.

Note. Results from regression analyses on the association of participant age with rating of threat on a Visual Analogue Scale with a range from 0 to 100 for faces with ('mask') and without face masks ('original') specific for each emotion (n = 790). For significant results,  $R^2$  and the  $\beta$ -coefficient indicating the direction of the correlation are provided.

\*p < .05

Emotion	Condition		М	SD	р	
Anger	original		74.24	18.44		
e	U	vs. mask			< .001*	
		vs. bubble			<.001*	
		vs. half			<.001*	
	mask		61.88	19.19		
		vs. bubble			.118	
		vs. half			.894	
	bubble		59.35	14.82		
		vs. half			1.000	
	half		60.33	14.25		
Fear	original		39.94	22.71	1 000	
		vs. mask			1.000	
		vs. bubble			.823	
		vs. half	20.40	21.76	1.000	
	mask		39.49	21.76	1 000	
		vs. bubble			1.000	
	hubble	vs. nan	27.05	20.04	.540	
	DUDDIE	ve half	57.95	20.94	084	
	half	v5. 11411	41.75	19 34	.004	
Hanniness	original		0.55	12.21		
mappiness	originar	vs mask	9.55	12.21	< 001*	
		vs. hubble			* 001	
		vs. balf			< 001*	
	mask	vo. nun	13.30	13.76	1001	
	musik	vs. bubble	15.50	15.70	.533	
		vs. half			.736	
	bubble		12.00	10.87		
		vs. half			.030*	
	half		14.48	10.90		
Sadness	original		25.26	17.74		
	C C	vs. mask			<.001*	
		vs. bubble			.070	
		vs. half			<.001*	
	mask		34.35	19.67		
		vs. bubble			<.001*	
		vs. half			1.000	
	bubble		28.08	16.01		
		vs. half			<.001*	
	half		33.81	17.09		
Disgust	original		32.59	21.68	0.0.4.4	
		vs. mask			*100.>	
		vs. bubble			.654	
		vs. half	40.10	20.28	1.000	
	mask		49.10	29.28	< 001*	
		vs. bubble			< .001*	
	hubble	vs. nali	20.24	14.27	< .001*	
	bubble	ve half	30.34	14.37	101	
	half	vs. nan	33.82	14 46	.171	
Neutral	original		22.09	16.07		
Neutrai	originar	vs mask	22.09	10.97	936	
		vs. hubble			018*	
		vs. half			.895	
	mask		23 28	17 97	.075	
	music	vs. bubble	23.20	11.01	< .001*	
		vs. half			1.000	
	bubble		19.02	13.69		
		vs. half			.001*	
	half		23.57	15.72		

## S1 Table 6. Differences in rating of threat between the different conditions.

Significant effects obtained through analysis of variance were followed up with Bonferroni-corrected multiple comparisons to analyse differences in rating of threat on a Visual Analogue Scale with a range from 0 to 100 between the different conditions for each emotion separately. *Mask vs. original* (n = 790), *half vs. bubble* (n = 395 and n = 388).

<sup>\*</sup> *p* < .05