Supplement To: Emotional Cues To Group Hierarchy

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Full List of Measures Taken in Each Study

Table S1

Overview of All Measures and Order of Completion for Study 1.

Construct	Measure / Task
Attention Check 1	Type "group" under "Other …" among a list of sports
Instruction & group prompt	See main document
Group recall prompts	- "Which group did you choose?" (open) - "How many years have you been a member of this group?" (number) - "How many years has the group as a whole (or at least the majority) been together?" (number) - "What is your role or position in this group?" (open) - "How many other persons are in your group?" (number) - "What is the structure of your group?" (*1 = All group members rank on the same level and have the same amount of influence.* to *7 = Some group members rank a lot higher and have much more influence than others.*) - "Where would you rank yourself in the structure of your group?" (1 = *At the bottom of the group structure* to 7 = *At the top of the group structure*)
Atmosphere	"How would you describe the general atmosphere in this group?" (open) "What is the general atmosphere in this group?" (*1 = very negative*, *7 = very positive*)
Expression frequency question	See main document
Rank-specificity question	See main document
Attention check 2	Select "Never" on a 7-point Likert scale
Demographics	Gender, age, education, employment, English command

Table S2

Overview of All Measures and Order of Completion for Studies 2-5.

Construct	Measure / Task	S2	S3	S4	S5
Instruction & manipulations	See main document	1	1	1	1
Hierarchy type (indirect)	See main document	2			
Hierarchy type (scales)	See main document		2	2	2
Autonomy / Relatedness / Competence	Work-related Basic Need Satisfaction scale (Van Den Broeck et al., 2010)	3			
Atmosphere	"How would you describe the general atmosphere in this group?" (open-ended)	4	3	3	3
	"What is the general atmosphere in this group?" (*1 = very negative*, *7 = very positive*)				
Relatedness	"Members of this group value social relationships and connections." (*1 = not at all*, *7 = very much*)	5	4		
Autonomy	"Members of this group value personal autonomy and uniqueness." (*1 = not at all*, *7 = very much*)	6	5		
Attractiveness	"To what degree would you want to be a member of this group?" (*1 = not at all*, *7 = very much*)	7	6	4	4
Attention check	Instruction to skip the question "Who is the current president of the USA" (Oppenheimer et al., 2009)	8	7	10	5
Authentic or Hubristic pride	See main document			5	
Manipulation checks	See main document	9	8	6	6
Valence	See main document			7	7
Social engagement	See main document			8	8
Hierarchy type (direct)	See main document	10	9	9	9
Trust	"Please indicate the degree to which each of the following statements applies to this group" *1 = Members of this group do not trust each other at all*, *7 = Members of this group trust each other completely*	11	10		
Cooperation/competition	"Members of this group cooperate with each other." and "Members of this group compete with each other." *1 = strongly disagree*, *7 = strongly agree*	12	11		

Construct	Measure / Task	S2	S3	S4	S5
Demographics	Gender, age, education, employment, English command	13	12	11	10

Note. S2 to S5 stand for Study 2 to Study 5. The numbers in these columns refer to the order in which the tasks/measures were completed, and contains no value if the task/measure was not included in a particular study.

Supplementary Tables

Table S3

Zero-order Correlations Between Emotion Expression Prevalence and Hierarchy Types (Study 1)

Measure	*M (SD)*	Prestige	Dominance	Anger	Fear	Sadness	Happiness	Admiration
Prestige	4.71 (1.61)	-						
Dominance	3.76 (1.61)	.41***	-					
Anger	2.90 (1.65)	.03	.17**	-				
Fear	2.41 (1.51)	-.01	.15**	.30***	-			
Sadness	2.88 (1.57)	.02	.21***	.39***	.47***	-		
Happiness	6.04 (1.00)	.11*	-.02	-.14**	-.07	-.03	-	
Admiration	5.23 (1.47)	.14**	.03	-.12*	.07	.04	.39***	-
Pride	4.95 (1.65)	-.03	-.02	.08	-.08	-.05	.12*	.16*

Note. $N = 384$.

* $p < .050$, ** $p < .010$, *** $p < .001$.

Table S4

Pairwise Differences Between Emotion Expression Correlations with Dominance and Prestige (Study 1)

Expression	Anger	Fear	Sadness	Happiness	Admiration	Pride
Anger	-	0.02	-0.01	-0.17*	-0.19*	-0.01
Fear	-0.01	-	-0.03	-0.20**	-0.21**	-0.03
Sadness	-0.04	-0.03	-	-0.16*	-0.18*	0.00
Happiness	0.10	0.11	0.15*	-	-0.01	0.17*
Admiration	0.11	0.11	0.15*	0.00	-	0.18**
Pride	0.15*	0.16*	0.19*	0.04	0.04	-

Note. Lower triangle contains pairwise differences in correlations with dominance; upper triangle contains pairwise differences in correlations with prestige. E.g., the (anger, fear) value in the lower triangle is calculated as $\rho_{anger_dominance} - \rho_{fear_dominance}$. Significance tested using the bootstrapping approach from Wilcox (2016; overlapping case) based on Spearman's correlations (10,000 resamples).

* $p < .050$, ** $p < .010$, *** $p < .001$.

Table S5

Manipulation Checks Contrast Tests for Study 2

Measure	**Contrast**	***t*(258)**	**Cohen's *d***	***p***	***p̃***
MC anger	Angry - Neutral	13.65	2.07	< .001	< .001
	Happy - Neutral	22.66	3.42	< .001	< .001
MC happiness	Happy - Neutral	20.32	2.66	< .001	< .001
	Happy - Angry	23.52	3.55	< .001	< .001
MC neutral	Neutral - Happy	12.83	1.70	< .001	< .001
	Neutral - Angry	16.39	2.49	< .001	< .001

Note. All tests are one-tailed. MC = Manipulation check $\tilde{p}$ = Bonferroni-Holm adjusted *p*-values at the level of the DV (2 tests each).

Table S6

Zero-Order Correlations in Study 2

Measure	**Dominance (indirect)**	**Dominance (direct)**	**Prestige (indirect)**
1. Dominance (indirect)	-		
2. Dominance (direct)	.38***	-	
3. Prestige (indirect)	-.15*	-.24***	-
4. Prestige (direct)	-.09	-.10	.49***

Note. $N = 261$.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table S7

Full Contrast Test Results Including Hypothesis Tests for Study 2

Contrast	**Measure**	***t*(258)**	**Cohen's *d***	***p***	***p̃***
Angry - Neutral	Dominance direct	1.29	0.20	0.099	.197
	Dominance indirect	1.05	0.16	0.146	.197
	Prestige direct	-3.86	-0.58	< .001	< .001
	Prestige indirect	-4.65	-0.71	< .001	< .001
Happy - Neutral	Dominance direct	-3.80	-0.58	< .001	< .001
	Dominance indirect	-1.19	-0.18	0.117	0.117
	Prestige direct	3.39	0.52	< .001	.001
	Prestige indirect	5.14	0.78	< .001	< .001

Note. All tests are one-tailed. p = unadjusted p-value; $\tilde{p}$ = Bonferroni-Holm adjusted p-value based on 4 tests per contrast.

Table S8

Manipulation Checks Contrast Tests for Study 3

Measure	**Contrast**	***t*(558)**	**Cohen's *d***	***p***	***p̃***
MC anger	Angry - Sad	16.46	1.96	< .001	< .001
	Angry - Neutral	19.05	2.29	< .001	< .001
	Angry - Happy	22.28	2.63	< .001	< .001
MC sadness	Sad - Angry	13.50	1.61	< .001	< .001
	Sad - Neutral	17.47	2.11	< .001	< .001
	Sad - Happy	20.20	2.40	< .001	< .001
MC neutral	Neutral - Angry	20.79	2.49	< .001	< .001
	Neutral - Sad	18.12	2.19	< .001	< .001
	Neutral - Happy	19.72	2.36	< .001	< .001
MC happiness	Happy - Angry	18.69	2.20	< .001	< .001
	Happy - Sad	16.81	2.00	< .001	< .001
	Happy - Neutral	14.76	1.77	< .001	< .001

Note. All tests are one-tailed. MC = Manipulation check. $\tilde{p}$ = Bonferroni-Holm adjusted *p*-values at the level of the DV (3 tests each).

Table S9

Zero-Order Correlations in Study 3

Measure	**Dominance (scale)**	**Dominance (direct)**	**Prestige (scale)**
1. Dominance (scale)	-		
2. Dominance (direct)	.78***	-	
3. Prestige (scale)	-.38***	-.35***	-
4. Prestige (direct)	-.50***	-.49***	.61***

Note. $N = 562$.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table S10

Full Contrast Test Results Including Hypothesis Tests for Study 3

Contrast	**DV**	***t*(558)**	**Cohen's *d***	***p***	***p̃***
Angry - Neutral[a]	Dominance direct	6.11	0.73	< .001	< .001
	Dominance indirect	4.74	0.57	< .001	< .001
	Prestige direct	-5.58	-0.67	< .001	< .001
	Prestige indirect	-5.25	-0.63	< .001	< .001
Happy - Neutral[a]	Dominance direct	-3.76	-0.45	< .001	< .001
	Dominance indirect	-3.62	-0.43	< .001	< .001
	Prestige direct	4.49	0.54	< .001	< .001
	Prestige indirect	3.92	0.47	< .001	< .001
Sad - Angry[b]	Dominance direct	-3.54	-0.42	< .001	.001
	Dominance indirect	-2.62	-0.31	.009	.009
	Prestige direct	4.73	0.56	< .001	< .001
	Prestige indirect	4.69	0.56	< .001	< .001
Sad - Neutral[b]	Dominance direct	2.58	0.31	.010	.041
	Dominance indirect	2.12	0.26	.034	.103
	Prestige direct	-0.88	-0.11	.378	.756
	Prestige indirect	-0.59	-0.07	.558	.756

Note. [a] = one-tailed hypothesis test, [b] = two-tailed exploratory test. p = unadjusted p-value; $\tilde{p}$ = Bonferroni-Holm adjusted p-value based on 4 tests per contrast.

Table S11

Manipulation Checks Contrast Tests for Study 4

Measure	**Contrast**	***t*(439)**	**Cohen's *d***	***p***	***p̃***
MC anger	Angry - Sad	17.34	2.62	< .001	< .001
	Angry - Neutral	12.60	1.90	< .001	< .001
	Angry - Proud	22.12	3.37	< .001	< .001
	Angry - Happy	22.59	3.45	< .001	< .001
MC sadness	Sad - Angry	18.05	2.72	< .001	< .001
	Sad - Neutral	12.96	1.91	< .001	< .001
	Sad - Proud	24.94	3.72	< .001	< .001
	Sad - Happy	25.22	3.76	< .001	< .001
MC neutral	Neutral - Angry	15.15	2.29	< .001	< .001
	Neutral - Sad	16.52	2.44	< .001	< .001
	Neutral - Proud	11.88	1.77	< .001	< .001
	Neutral - Happy	13.29	1.98	< .001	< .001
MC proud	Proud - Angry	16.04	2.45	< .001	< .001
	Proud - Sad	16.99	2.53	< .001	< .001
	Proud - Neutral	14.09	2.10	< .001	< .001
	Proud - Happy	-0.05	-0.01	.520	.520
MC happy	Happy - Angry	26.36	4.02	< .001	< .001
	Happy - Sad	26.07	3.89	< .001	< .001
	Happy - Neutral	23.90	3.56	< .001	< .001
	Happy - Proud	0.50	0.08	0.309	0.309

Note. All tests are one-tailed. MC = Manipulation check. $\tilde{p}$ = Bonferroni-Holm adjusted *p*-values at the level of the DV (4 tests each).

Table S12

Zero-Order Correlations in Study 4

Measure	r_1	r_2	r_3	r_4	r_5
1. Dominance (scale)	-				
2. Dominance (direct)	0.78***	-			
3. Prestige (scale)	-0.56***	-0.47***	-		
4. Prestige (direct)	-0.56***	-0.51***	0.68***	-	
5. Valence	-0.63***	-0.57***	0.62***	0.60***	-
6. Social Engagement Orientation	-0.67***	-0.65***	0.61***	0.60***	0.80***

Note. $N = 444$.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table S13

Full Contrast Test Results Including Hypothesis Tests for Study 4

Contrast	**Measure**	***t*(439)**	**Cohen's *d***	***p***	***p̃***
Angry - Neutral	Dominance (direct)	5.08	0.77	< .001	< .001
	Dominance (scale)	5.12	0.77	< .001	< .001
	Prestige (direct)	-5.80	-0.88	< .001	< .001
	Prestige (scale)	-6.25	-0.94	< .001	< .001
Happy - Neutral	Dominance (direct)	-5.18	-0.77	< .001	< .001
	Dominance (scale)	-5.78	-0.86	< .001	< .001
	Prestige (direct)	5.21	0.78	< .001	< .001
	Prestige (scale)	4.81	0.72	< .001	< .001
Proud - Happy	Dominance (direct)	-0.59	-0.09	.724	> .999
	Dominance (scale)	-0.23	-0.03	.590	> .999
	Prestige (direct)	-1.95	-0.29	.026	.103
	Prestige (scale)	-1.14	-0.17	.127	.380
Proud - Neutral	Dominance (direct)	-5.79	-0.86	< .001	< .001
	Dominance (scale)	-6.01	-0.90	< .001	< .001
	Prestige (direct)	3.24	0.48	.001	.001
	Prestige (scale)	3.66	0.55	< .001	< .001
Sad - Angry	Dominance (direct)	-4.52	-0.68	< .001	< .001
	Dominance (scale)	-2.00	-0.30	.023	.047
	Prestige (direct)	2.24	0.34	.013	.039
	Prestige (scale)	1.25	0.19	.106	.106
Sad - Neutral	Dominance (direct)	0.58	0.09	.281	.281
	Dominance (scale)	3.19	0.47	.001	.002
	Prestige (direct)	-3.65	-0.54	< .001	< .001
	Prestige (scale)	-5.12	-0.75	< .001	< .001

Note. All tests are one-tailed hypothesis tests. p = unadjusted p-value; $\tilde{p}$ = Bonferroni-Holm adjusted p-value based on 4 tests per contrast.

Table S14

Manipulation Checks Contrast Tests for Study 5

Measure	**Contrast**	***t*(816)**	**Cohen's *d***	***p***	***p̃***
MC neutral	Neutral - Proud	28.31	2.42	< .001	< .001
	Neutral - Happy	26.82	2.29	< .001	< .001
MC happy	Happy - Proud	1.37	0.12	.085	.085
	Happy - Neutral	23.97	2.05	< .001	< .001
MC pride	Proud - Neutral	23.99	2.05	< .001	< .001
	Pride - Happy	8.17	0.70	< .001	< .001

Note. One-tailed tests. MC = Manipulation check $\tilde{p}$ = Bonferroni-Holm adjusted *p*-values at the level of the DV (2 tests each).

Table S15

Zero-Order Correlations in Study 5

Measure	r_1	r_2	r_3	r_4	r_5
1. Dominance (scale)	-				
2. Dominance (direct)	0.64***	-			
3. Prestige (scale)	-0.27***	-0.33***	-		
4. Prestige (direct)	-0.32***	-0.37***	0.50***	-	
5. Valence	-0.45***	-0.47***	0.40***	0.37***	-
6. Social Engagement Orientation	-0.56***	-0.54***	0.45***	0.45***	0.75***

Note. N =819.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table S16

Full Contrast Test Results Including Hypothesis Tests for Study 5

Measure	***t*(816)**	**Cohen's *d***	***p***	***p̃***
Contrast: Happy – Neutral (Hypothesis 2)				
Dominance (scale)	-5.42	-0.46	< .001	< .001
Dominance (direct)	-5.86	-0.50	< .001	< .001
Prestige (scale)	3.87	0.33	< .001	< .001
Prestige (direct)	3.61	0.31	< .001	< .001
Contrast: Proud – Happy (Hypothesis 4a)				
Dominance (scale)	0.05	0.00	.480	> .999
Dominance (direct)	0.22	0.02	.414	> .999
Prestige (scale)	1.66	0.14	.952	> .999
Prestige (direct)	0.74	0.06	.769	> .999
Contrast: Proud – Neutral (Hypothesis 4b)				
Dominance (scale)	-5.37	-0.46	< .001	< .001
Dominance (direct)	-5.63	-0.48	< .001	< .001
Prestige (scale)	5.53	0.47	< .001	< .001
Prestige (direct)	4.34	0.37	< .001	< .001

Note. One-tailed hypothesis tests. p = unadjusted p-value; $\tilde{p}$ = Bonferroni-Holm adjusted p-value based on 4 tests per contrast.

References

Oppenheimer, D. M., Meyvis, T., & Davidenko, N. (2009). Instructional manipulation checks: Detecting satisficing to increase statistical power. *Journal of Experimental Social Psychology*, *45*(4), 867–872. https://doi.org/10.1016/j.jesp.2009.03.009

Van Den Broeck, A., Vansteenkiste, M., De Witte, H., Soenens, B., & Lens, W. (2010). Capturing autonomy, competence, and relatedness at work: Construction and initial validation of the Work-related Basic Need Satisfaction scale. *Journal of Occupational and Organizational Psychology*, *83*(4), 981–1002. https://doi.org/10.1348/096317909X481382

Wilcox, R. R. (2016). Comparing dependent robust correlations. *British Journal of Mathematical and Statistical Psychology*, *69*(3), 215–224. https://doi.org/10.1111/bmsp.12069