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When speech becomes emotional: cross-cultural vocal emotion recognition in Dutch and Korean

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Appendices

Appendix A. Summary of results of one-sample *t*-test analyses for Hypothesis 1.

	Mean	<i>t</i>	<i>df</i>	95% Confidence Interval	
				Lower	Upper
Dutch listeners					
Dutch speakers	0.47	32.69***	30	0.45	0.49
Korean speakers	0.38	34.77***	30	0.36	0.40
Korean listeners					
Dutch speakers	0.36	22.80***	23	0.34	0.38
Korean speakers	0.43	23.70***	23	0.40	0.46

“****” $p < .001$, “***” $p < .01$, “**” $p < .05$, “.” $.05 < p < .10$

All tests used the Bonferroni-corrected p value of .0125.

Appendix B. Summary of results of one-sample *t*-test analyses for Hypothesis 5.

	Mean	<i>t</i>	<i>df</i>	95% CI	
				Lower	Upper
Basic emotions					
Dutch listeners					
Dutch speakers	0.56	24.55***	30	0.52	0.60
Korean speakers	0.47	30.81***	30	0.45	0.49
Non-basic emotions					
Dutch listeners					
Dutch speakers	0.38	23.29***	30	0.36	0.40
Korean speakers	0.29	15.40***	30	0.27	0.31
Basic emotions					
Korean listeners					
Dutch speakers	0.49	23.04***	23	0.46	0.52
Korean speakers	0.46	18.08***	23	0.42	0.50
Non-basic emotions:					
Korean listeners					
Dutch speakers	0.23	8.45***	23	0.20	0.26
Korean speakers	0.39	20.63***	23	0.36	0.42

“****” $p < .001$, “***” $p < .01$, “**” $p < .05$, “.” $.05 < p < .10$

Statistical significance was established against the Bonferroni-corrected p value of .00625.

Appendix C. Summary of LME models 1 through 10. Significant p -values ($p \leq .05$) in boldface.

Model 1: Linear mixed effects model for Dutch listeners, all responses				
Random effects	<i>Variance</i>			
Listener (Intercept)	0.09			
Speaker Language	0.04			
Speaker (Intercept)	0.09			
Residual	0.92			
Fixed effects	β	SE	t	p
Intercept	2.82	0.10	28.98	< .001
Speaker Language	-0.64	0.16	-3.91	< .001
Emotion (Joy)	-0.20	0.04	-4.64	< .001
Emotion (Pride)	-0.89	0.04	-20.61	< .001
Emotion (Fear)	-0.27	0.04	-6.28	< .001
Emotion (Tenderness)	-1.23	0.04	-28.54	< .001
Emotion (Relief)	-0.96	0.04	-22.27	< .001
Emotion (Sadness)	-0.69	0.04	-15.99	< .001
Emotion (Irritation)	-1.07	0.04	-24.77	< .001
Speaker Language $\times$ Emotion (Joy)	0.10	0.09	1.22	.223
Speaker Language $\times$ Emotion (Pride)	0.85	0.09	9.84	< .001
Speaker Language $\times$ Emotion (Fear)	0.50	0.09	5.76	< .001
Speaker Language $\times$ Emotion (Tenderness)	0.47	0.09	5.46	< .001
Speaker Language $\times$ Emotion (Relief)	0.53	0.09	6.21	< .001
Speaker Language $\times$ Emotion (Sadness)	1.00	0.09	11.64	< .001
Speaker Language $\times$ Emotion (Irritation)	0.52	0.09	6.04	< .001

Model 2: Linear mixed effects model for Korean listeners, all responses				
Random effects	<i>Variance</i>			
Listener (Intercept)	0.15			
Speaker Language	0.04			
Speaker (Intercept)	0.09			
Residual	0.93			
Fixed effects	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	3.14	0.11	27.42	< .001
Speaker Language	-0.15	0.17	-0.90	.380
Emotion (Joy)	-0.40	0.05	-8.21	< .001
Emotion (Pride)	-0.99	0.05	-20.16	< .001
Emotion (Fear)	-0.48	0.05	-9.82	< .001
Emotion (Tenderness)	-1.23	0.05	-25.02	< .001
Emotion (Relief)	-1.24	0.05	-25.04	< .001
Emotion (Sadness)	-0.87	0.05	-17.66	< .001
Emotion (Irritation)	-1.34	0.05	-27.21	< .001
Speaker Language $\times$ Emotion (Joy)	-0.38	0.10	-3.88	< .001
Speaker Language $\times$ Emotion (Pride)	0.55	0.10	5.54	< .001
Speaker Language $\times$ Emotion (Fear)	0.01	0.10	0.11	.916
Speaker Language $\times$ Emotion (Tenderness)	0.37	0.10	3.80	< .001
Speaker Language $\times$ Emotion (Relief)	0.11	0.10	1.08	.279
Speaker Language $\times$ Emotion (Sadness)	0.45	0.10	4.57	< .001
Speaker Language $\times$ Emotion (Irritation)	0.40	0.10	4.04	< .001

Model 3: LME model analyses for Dutch listeners, correct responses				
Random effects		Variance		
Listener (Intercept)		0.10		
Speaker Language		0.04		
Speaker (Intercept)		0.08		
Residual		0.67		
Fixed effects	β	SE	t	p
Intercept	3.19	0.10	31.84	< .001
Speaker Language	−0.48	0.17	−2.84	< .010
Emotion (Joy)	−0.32	0.06	−5.09	< .001
Emotion (Pride)	−0.88	0.09	−10.21	< .001
Emotion (Fear)	−0.44	0.05	−8.05	< .001
Emotion (Tenderness)	−0.96	0.07	−14.60	< .001
Emotion (Relief)	−0.97	0.06	−17.50	< .001
Emotion (Sadness)	−0.83	0.05	−17.01	< .001
Emotion (Irritation)	−1.12	0.05	−20.85	< .001
Speaker Language × Emotion (Joy)	−0.09	0.13	−0.70	.482
Speaker Language × Emotion (Pride)	0.74	0.17	4.27	< .001
Speaker Language × Emotion (Fear)	0.40	0.11	3.69	< .001
Speaker Language × Emotion (Tenderness)	0.50	0.13	3.82	< .001
Speaker Language × Emotion (Relief)	0.34	0.11	3.08	< .010
Speaker Language × Emotion (Sadness)	0.76	0.10	7.84	< .001
Speaker Language × Emotion (Irritation)	0.50	0.11	4.65	< .001

Model 4: LME model analyses for Korean listeners, correct responses				
Random effects	<i>Variance</i>			
Listener (Intercept)	0.13			
Speaker Language	0.08			
Speaker (Intercept)	0.06			
Residual	0.69			
Fixed effects	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	3.28	0.10	31.36	< .001
Speaker Language	-0.26	0.16	-1.64	.109
Emotion (Joy)	-0.32	0.08	-3.91	< .001
Emotion (Pride)	-0.63	0.08	-7.79	< .001
Emotion (Fear)	-0.55	0.07	-7.86	< .001
Emotion (Tenderness)	-0.64	0.08	-7.65	< .001
Emotion (Relief)	-1.16	0.07	-17.07	< .001
Emotion (Sadness)	-0.84	0.06	-14.95	< .001
Emotion (Irritation)	-1.25	0.07	-17.68	< .001
Speaker Language $\times$ Emotion (Joy)	-0.43	0.16	-2.61	< .010
Speaker Language $\times$ Emotion (Pride)	0.90	0.16	5.62	< .001
Speaker Language $\times$ Emotion (Fear)	0.21	0.14	1.50	.135
Speaker Language $\times$ Emotion (Tenderness)	0.49	0.17	2.94	< .010
Speaker Language $\times$ Emotion (Relief)	0.32	0.14	2.39	< .050
Speaker Language $\times$ Emotion (Sadness)	0.61	0.11	5.36	< .001
Speaker Language $\times$ Emotion (Irritation)	0.55	0.14	3.94	< .001

Model 5: Linear mixed effects model analyses for Arousal, all responses				
Random effects	<i>Variance</i>			
Listener (Intercept)	0.10			
Arousal	0.04			
Listener (Intercept)	0.02			
Speaker Language	0.04			
Speaker (Intercept)	0.04			
Arousal	0.07			
Speaker (Intercept)	0.06			
Listener Language	0.00			
Residual	0.99			
Fixed effects	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	2.24	0.09	23.89	< .001
Speaker Language	-0.05	0.16	-0.34	.743
Listener Language	0.17	0.10	1.72	.091
Arousal	-0.67	0.08	-8.95	< .001
Speaker Language $\times$ Listener Language	0.18	0.06	2.76	< .010
Speaker Language $\times$ Arousal	0.28	0.14	2.01	.064
Listener Language $\times$ Arousal	-0.05	0.07	-0.80	.425
Speaker Lang. $\times$ Listener Lang. $\times$ Arousal	0.02	0.07	0.30	.766
Model 6: Linear mixed effects model analyses for Arousal, correct responses				
Random effects	<i>Variance</i>			
Listener (Intercept)	0.03			
Arousal	0.04			
Listener (Intercept)	0.07			
Speaker Language	0.05			
Speaker (Intercept)	0.01			
Arousal	0.09			
Speaker (Intercept)	0.05			
Listener Language	0.01			
Residual	0.71			
Fixed effects	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	2.60	0.08	32.86	< .001
Speaker Language	-0.05	0.14	-0.39	.700
Listener Language	0.09	0.10	0.98	.330
Arousal	-0.68	0.08	-8.36	< .001
Speaker Language $\times$ Listener Language	0.10	0.10	1.07	.293
Speaker Language $\times$ Arousal	0.44	0.15	2.85	< .050
Listener Language $\times$ Arousal	-0.01	0.07	-0.16	.872
Speaker Lang. $\times$ Listener Lang. $\times$ Arousal	0.05	0.09	0.53	.595

Model 7: Linear mixed effects model analyses for Valence, all responses				
Random effects	<i>Variance</i>			
Listener (Intercept)	0.04			
Listener (Intercept)	0.08			
Speaker Language	0.04			
Speaker (Intercept)	0.01			
Valence	0.08			
Speaker (Intercept)	0.08			
Listener Language	0.00			
Residual	0.10			
Fixed effects	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	2.24	0.09	25.00	< .001
Speaker Language	-0.05	0.16	-0.35	.729
Listener Language	0.17	0.09	1.78	.080
Valence	-0.30	0.07	-4.27	< .001
Speaker Language $\times$ Listener Language	0.18	0.06	2.80	< .010
Speaker Language $\times$ Valence	-0.03	0.14	-0.24	.811
Listener Language $\times$ Valence	0.02	0.04	0.54	.588
Speaker Lang. $\times$ Listener Lang. $\times$ Valence	-0.04	0.07	-0.53	.596
Model 8: Linear mixed effects model analyses for Valence, correct responses				
Random effects	<i>Variance</i>			
Listener (Intercept)	0.05			
Valence	0.03			
Listener (Intercept)	0.06			
Speaker Language	0.06			
Speaker (Intercept)	0.00			
Valence	0.07			
Speaker (Intercept)	0.06			
Listener Language	0.01			
Residual	0.84			
Fixed effects	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	2.52	0.08	32.19	< .001
Speaker Language	-0.06	0.13	-0.43	.674
Listener Language	0.09	0.10	0.95	.348
Valence	-0.17	0.08	-2.23	< .050
Speaker Language $\times$ Listener Language	0.13	0.10	1.33	.192
Speaker Language $\times$ Valence	0.02	0.14	0.14	.892
Listener Language $\times$ Valence	0.07	0.07	1.06	.294
Speaker Lang. $\times$ Listener Lang. $\times$ Valence	0.33	0.11	3.07	< .010

Model 9: Linear mixed effects model analyses for Basicness, all responses					
Random effects		Variance			
Listener (Intercept)		0.09			
Basicness		0.04			
Listener (Intercept)		0.03			
Speaker Language		0.04			
Speaker (Intercept)		0.05			
Basicness		0.11			
Speaker (Intercept)		0.04			
Listener Language		0.00			
Residual		0.96			
Fixed effects		β	SE	t	p
Intercept		2.24	0.09	25.12	< .001
Speaker Language		-0.05	0.15	-0.36	.727
Listener Language		0.17	0.10	1.77	.082
Basicness		-0.75	0.09	-8.68	< .001
Speaker Language $\times$ Listener Language		0.18	0.07	2.74	< .010
Speaker Language $\times$ Basicness		0.26	0.17	1.60	.132
Listener Language $\times$ Basicness		-0.02	0.06	-0.26	.789
Speaker Lang. $\times$ Listener Lang. $\times$ Basicness		0.15	0.07	2.18	< .050

Model 10: LME model analyses for Basicness, correct responses					
Random effects		Variance			
Listener (Intercept)		0.01			
Basicness		0.02			
Listener (Intercept)		0.10			
Speaker Language		0.05			
Speaker (Intercept)		0.02			
Basicness		0.15			
Speaker (Intercept)		0.04			
Listener Language		0.01			
Residual		0.75			
Fixed effects		β	SE	t	p
Intercept		2.48	0.08	31.22	< .001
Speaker Language		-0.03	0.13	-0.22	.826
Listener Language		0.08	0.10	0.88	.385
Basicness		-0.54	0.10	-5.36	< .001
Speaker Language $\times$ Listener Language		0.19	0.09	2.09	< .050
Speaker Language $\times$ Basicness		0.22	0.20	1.09	.295
Listener Language $\times$ Basicness		0.11	0.06	1.80	.078
Speaker Lang. $\times$ Listener Lang. $\times$ Basicness		0.23	0.10	2.34	< .050

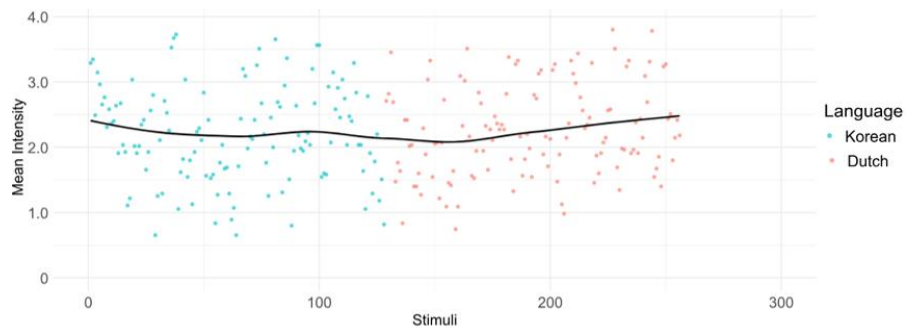
Appendix D. Intercepts for Arousal, Valence, and Basicness for eight emotions, for all responses and for correctly identified emotions only.

Emotion	Arousal		Valence		Basicness	
	all	correct	all	correct	all	correct
Anger	0.39	0.39	0.58	0.66	0.35	0.45
Joy	0.11	0.09	0.59	0.46	0.07	0.11
Fear	0.03	-0.10	0.22	0.11	-0.01	-0.10
Sadness	0.30	0.13	-0.19	-0.24	-0.41	-0.46
Pride	-0.53	-0.38	-0.05	-0.03	0.17	0.18
Relief	-0.01	-0.08	-0.20	-0.33	0.03	-0.07
Irritation	-0.12	-0.19	-0.61	-0.54	-0.08	-0.23
Tenderness	-0.16	0.15	-0.35	-0.11	-0.12	0.12

Appendix E. Recognition accuracy (Acc., %) and intensity ratings (Int., 0-4) by Dutch and Korean listeners, for Dutch and Korean speakers.

Emotion	Dutch listeners				Korean listeners			
	Dutch speakers		Kor. speakers		Dutch speakers		Kor. speakers	
	Acc.	Int.	Acc.	Int.	Acc.	Int.	Acc.	Int.
Anger	62.28	3.14	37.50	2.50	64.95	3.22	33.42	3.07
Joy	42.46	2.89	22.41	2.35	20.92	3.01	21.20	2.47
Pride	20.91	1.83	8.19	2.03	20.11	1.95	24.73	2.35
Fear	40.95	2.62	53.88	2.47	26.09	2.73	51.09	2.59
Tenderness	29.74	1.67	23.71	1.50	14.40	1.80	34.24	2.02
Relief	48.28	1.91	41.59	1.80	36.14	1.93	39.40	1.89
Sadness	80.82	1.95	73.49	2.31	82.61	2.12	81.25	2.42
Irritation	53.45	1.81	44.40	1.69	64.95	3.22	33.42	3.07

Appendix F. Mean intensity ratings for all data, with a smooth LOESS line to show the pattern over time (from stimulus 1 to stimulus 256).



Appendix G. Summary of LME models 1 through 15 for Hypotheses 1–3 in all data, Dutch data, and Korean data. Significant p -values ($p \leq .05$) in boldface.

All data	F0 M			
Random effects				
Speaker (Intercept)	Variance			
Residual	2.71			
Fixed effects	β	SE	t	p
Intercept	30.04	0.69	43.64	< .001
Gender	-7.93	0.91	-8.71	< .001
Speaker Language	-5.67	1.38	-4.12	< .001
Emotion (Joy)	-1.34	0.78	-1.72	0.087.
Emotion (Pride)	-4.50	0.78	-5.76	< .001
Emotion (Anger)	-0.94	0.78	-1.21	0.228
Emotion (Tenderness)	-9.83	0.78	-12.60	< .001
Emotion (Relief)	-7.59	0.78	-9.73	< .001
Emotion (Sadness)	-7.42	0.78	-9.51	< .001
Emotion (Irritation)	-6.04	0.78	-7.74	< .001
Speaker Language $\times$ Emotion (Joy)	0.28	1.56	0.18	0.859
Speaker Language $\times$ Emotion (Pride)	6.49	1.56	4.16	< .001
Speaker Language $\times$ Emotion (Anger)	3.81	1.56	2.44	< .050
Speaker Language $\times$ Emotion (Tenderness)	6.50	1.56	4.17	< .001
Speaker Language $\times$ Emotion (Relief)	5.66	1.56	3.63	< .001
Speaker Language $\times$ Emotion (Sadness)	6.38	1.56	4.08	< .001
Speaker Language $\times$ Emotion (Irritation)	5.77	1.56	3.69	< .001

F0-SD					
Random effects		Variance			
Speaker (Intercept)		0.29			
Residual		1.29			
Fixed effects		β	SE	t	p
Intercept		14.30	0.24	59.35	< .001
Gender		0.37	0.48	0.77	0.443
Speaker Language		-0.52	0.48	-1.09	0.280
Emotion (Joy)		0.79	0.28	2.77	< .010
Emotion (Pride)		1.14	0.28	4.03	< .001
Emotion (Anger)		1.36	0.28	4.80	< .001
Emotion (Tenderness)		0.42	0.28	1.49	0.138
Emotion (Relief)		0.09	0.28	0.31	0.760
Emotion (Sadness)		0.15	0.28	0.54	0.591
Emotion (Irritation)		1.38	0.28	4.88	< .001
Gender $\times$ Speaker Language		0.79	0.96	0.82	0.417
Gender $\times$ Emotion (Joy)		0.11	0.57	0.19	0.847
Gender $\times$ Emotion (Pride)		-0.04	0.57	-0.07	0.946
Gender $\times$ Emotion (Anger)		-0.09	0.57	-0.17	0.867
Gender $\times$ Emotion (Tenderness)		-0.69	0.57	-1.22	0.226
Gender $\times$ Emotion (Relief)		0.13	0.57	0.23	0.817
Gender $\times$ Emotion (Sadness)		-0.71	0.57	-1.25	0.212
Gender $\times$ Emotion (Irritation)		0.24	0.57	0.42	0.677
Speaker Language $\times$ Emotion (Joy)		-0.39	0.57	-0.70	0.488
Speaker Language $\times$ Emotion (Pride)		-1.08	0.57	-1.91	0.057
Speaker Language $\times$ Emotion (Anger)		0.11	0.57	0.20	0.847
Speaker Language $\times$ Emotion (Tenderness)		0.25	0.57	0.44	0.657
Speaker Language $\times$ Emotion (Relief)		-0.37	0.57	-0.65	0.513
Speaker Language $\times$ Emotion (Sadness)		0.41	0.57	0.73	0.466
Speaker Language $\times$ Emotion (Irritation)		-0.28	0.57	-0.49	0.621
Gender $\times$ Speaker Language $\times$ Emotion (Joy)		0.16	1.13	0.14	0.891
Gender $\times$ Speaker Language $\times$ Emotion (Pride)		-2.95	1.13	-2.60	< .050
Gender $\times$ Speaker Language $\times$ Emotion (Anger)		-1.74	1.13	-1.53	0.127
Gender $\times$ Speaker Language $\times$ Emotion (Tenderness)		-3.39	1.13	-2.99	< .010
Gender $\times$ Speaker Language $\times$ Emotion (Relief)		-0.10	1.13	-0.09	0.928
Gender $\times$ Speaker Language $\times$ Emotion (Sadness)		-0.49	1.13	-0.43	0.665
Gender $\times$ Speaker Language $\times$ Emotion (Irritation)		-0.46	1.13	-0.40	0.686
F0-min					
Random effects		Variance			
Speaker (Intercept)		1.94			
Residual		10.21			
Fixed effects		β	SE	t	p
Intercept		24.74	0.66	37.27	< .001
Gender		-7.41	0.80	-9.22	< .001
Speaker Language		-3.25	1.33	-2.45	< .050
Emotion (Joy)		-3.08	0.80	-3.86	< .001
Emotion (Pride)		-6.19	0.80	-7.75	< .001
Emotion (Anger)		-5.17	0.80	-6.47	< .001
Emotion (Tenderness)		-8.57	0.80	-10.73	< .001

Emotion (Relief)	-6.43	0.80	-8.05	< .001
Emotion (Sadness)	-5.69	0.80	-7.12	< .001
Emotion (Irritation)	-7.41	0.80	-9.28	< .001
Speaker Language × Emotion (Joy)	0.86	1.60	0.54	0.592
Speaker Language × Emotion (Pride)	7.63	1.60	4.78	< .001
Speaker Language × Emotion (Anger)	3.52	1.60	2.20	< .050
Speaker Language × Emotion (Tenderness)	3.30	1.60	2.06	< .050
Speaker Language × Emotion (Relief)	5.03	1.60	3.15	< .010
Speaker Language × Emotion (Sadness)	4.33	1.60	2.71	< .010
Speaker Language × Emotion (Irritation)	4.98	1.60	3.12	< .010
F0-max				
Random effects	Variance			
Speaker (Intercept)	3.37			
Residual	18.43			
Fixed effects	β	SE	t	p
Intercept	34.67	0.89	39.09	< .001
Gender	-7.51	1.06	-7.07	< .001
Speaker Language	-6.77	1.77	-3.82	< .001
Emotion (Joy)	-0.60	1.07	-0.56	0.574
Emotion (Pride)	-3.39	1.07	-3.16	< .010
Emotion (Anger)	-0.06	1.07	-0.05	0.959
Emotion (Tenderness)	-8.09	1.07	-7.53	< .001
Emotion (Relief)	-7.97	1.07	-7.42	< .001
Emotion (Sadness)	-6.57	1.07	-6.12	< .001
Emotion (Irritation)	-4.86	1.07	-4.53	< .001
Speaker Language × Emotion (Joy)	0.71	2.15	0.33	0.740
Speaker Language × Emotion (Pride)	5.26	2.15	2.45	< .050
Speaker Language × Emotion (Anger)	3.89	2.15	1.81	0.071
Speaker Language × Emotion (Tenderness)	3.33	2.15	1.55	0.122
Speaker Language × Emotion (Relief)	4.28	2.15	1.99	< .050
Speaker Language × Emotion (Sadness)	7.28	2.15	3.39	< .001
Speaker Language × Emotion (Irritation)	5.31	2.15	2.47	< .050
Sync				
Random effects	Variance			
Speaker (Intercept)	0.00005			
Residual	0.03			
Fixed effects	β	SE	t	p
Intercept	0.58	0.03	20.17	< .001
Gender	-0.05	0.02	-2.50	< .050
Speaker Language	-0.005	0.02	-0.22	0.828
Emotion (Joy)	0.02	0.04	0.49	0.625
Emotion (Pride)	-0.02	0.04	-0.51	0.614
Emotion (Anger)	0.04	0.04	0.90	0.368
Emotion (Tenderness)	0.002	0.04	0.05	0.957
Emotion (Relief)	-0.08	0.04	-2.06	< .050
Emotion (Sadness)	-0.07	0.04	-1.81	0.072
Emotion (Irritation)	0.03	0.04	0.79	0.433

Int-M				
Random effects		<i>Variance</i>		
Speaker (Intercept)		14.87		
Residual		29.23		
Fixed effects		<i>β</i>	<i>SE</i>	<i>t</i>
Intercept		69.11	1.36	50.91
Gender		-2.12	2.71	-0.78
Speaker Language		0.10	2.71	0.04
Emotion (Joy)		2.92	1.35	2.16
Emotion (Pride)		-3.08	1.35	-2.28
Emotion (Anger)		4.49	1.35	3.33
Emotion (Tenderness)		-10.49	1.35	-7.76
Emotion (Relief)		-8.31	1.35	-6.15
Emotion (Sadness)		-11.01	1.35	-8.15
Emotion (Irritation)		-5.29	1.35	-3.91
Gender $\times$ Speaker Language		8.82	5.43	1.62
Gender $\times$ Emotion (Joy)		1.44	2.70	0.53
Gender $\times$ Emotion (Pride)		0.89	2.70	0.33
Gender $\times$ Emotion (Anger)		0.52	2.70	0.19
Gender $\times$ Emotion (Tenderness)		0.93	2.70	0.34
Gender $\times$ Emotion (Relief)		2.33	2.70	0.86
Gender $\times$ Emotion (Sadness)		4.69	2.70	1.73
Gender $\times$ Emotion (Irritation)		5.02	2.70	1.86
Speaker Language $\times$ Emotion (Joy)		2.84	2.70	1.05
Speaker Language $\times$ Emotion (Pride)		14.39	2.70	5.32
Speaker Language $\times$ Emotion (Anger)		7.36	2.70	2.72
Speaker Language $\times$ Emotion (Tenderness)		18.37	2.70	6.80
Speaker Language $\times$ Emotion (Relief)		11.27	2.70	4.17
Speaker Language $\times$ Emotion (Sadness)		17.25	2.70	6.38
Speaker Language $\times$ Emotion (Irritation)		12.75	2.70	4.72
Gender $\times$ Speaker Language $\times$ Emotion (Joy)		-3.67	5.41	-0.68
Gender $\times$ Speaker Language $\times$ Emotion (Pride)		-5.63	5.41	-1.04
Gender $\times$ Speaker Language $\times$ Emotion (Anger)		-7.37	5.41	-1.36
Gender $\times$ Speaker Language $\times$ Emotion (Tenderness)		1.39	5.41	0.26
Gender $\times$ Speaker Language $\times$ Emotion (Relief)		3.76	5.41	0.70
Gender $\times$ Speaker Language $\times$ Emotion (Sadness)		17.58	5.41	3.25
Gender $\times$ Speaker Language $\times$ Emotion (Irritation)		1.13	5.41	0.21

Int-SD				
Random effects		Variance		
Speaker (Intercept)		0.17		
Residual		3.07		
Fixed effects		β	SE	p
Intercept		9.06	0.33	27.74 < .001
Gender		-1.18	0.65	-1.80 0.074
Speaker Language		-3.36	0.65	-5.14 < .001
Emotion (Joy)		-0.54	0.44	-1.24 0.216
Emotion (Pride)		-0.28	0.44	-0.63 0.530
Emotion (Anger)		1.06	0.44	2.43 < .050
Emotion (Tenderness)		-1.72	0.44	-3.92 < .001
Emotion (Relief)		0.33	0.44	0.75 0.453
Emotion (Sadness)		-0.22	0.44	-0.50 0.618
Emotion (Irritation)		0.10	0.44	0.24 0.813
Gender $\times$ Speaker Language		0.93	0.60	1.55 0.147
Gender $\times$ Emotion (Joy)		-0.73	0.88	-0.83 0.408
Gender $\times$ Emotion (Pride)		0.92	0.88	1.05 0.297
Gender $\times$ Emotion (Anger)		0.22	0.88	0.25 0.805
Gender $\times$ Emotion (Tenderness)		0.05	0.88	0.06 0.951
Gender $\times$ Emotion (Relief)		0.20	0.88	0.23 0.816
Gender $\times$ Emotion (Sadness)		-0.44	0.88	-0.50 0.618
Gender $\times$ Emotion (Irritation)		0.55	0.88	0.62 0.534
Speaker Language $\times$ Emotion (Joy)		0.14	0.88	0.16 0.873
Speaker Language $\times$ Emotion (Pride)		1.21	0.88	1.38 0.168
Speaker Language $\times$ Emotion (Anger)		0.82	0.88	0.94 0.348
Speaker Language $\times$ Emotion (Tenderness)		2.88	0.88	3.29 < .010
Speaker Language $\times$ Emotion (Relief)		4.65	0.88	5.31 < .001
Speaker Language $\times$ Emotion (Sadness)		3.78	0.88	4.31 < .001
Speaker Language $\times$ Emotion (Irritation)		1.10	0.88	1.26 0.210

Tilt				
Random effects		<i>Variance</i>		
Speaker (Intercept)		3.33		
Residual		6.71		
Fixed effects		<i>β</i>	<i>SE</i>	<i>t</i>
Intercept				<i>p</i>
Gender		-6.28	0.65	-9.72
Speaker Language		2.49	1.29	1.93
Emotion (Joy)		4.39	1.29	3.39
Emotion (Pride)		-1.80	0.65	-2.77
Emotion (Anger)		-0.69	0.65	-1.07
Emotion (Tenderness)		-1.10	0.65	-1.69
Emotion (Relief)		1.24	0.65	1.91
Emotion (Sadness)		1.70	0.65	2.63
Emotion (Irritation)		1.38	0.65	2.14
Gender $\times$ Speaker Language		1.62	0.65	2.50
Gender $\times$ Emotion (Joy)		-4.04	2.58	-1.56
Gender $\times$ Emotion (Pride)		-2.77	1.29	-2.14
Gender $\times$ Emotion (Anger)		-2.02	1.29	-1.56
Gender $\times$ Emotion (Tenderness)		-0.80	1.29	-0.62
Gender $\times$ Emotion (Relief)		-4.58	1.29	-3.53
Gender $\times$ Emotion (Sadness)		-4.71	1.29	-3.63
Gender $\times$ Emotion (Irritation)		-3.79	1.29	-2.93
Speaker Language $\times$ Emotion (Joy)		-4.63	1.29	-3.57
Speaker Language $\times$ Emotion (Pride)		-3.53	1.29	-2.73
Speaker Language $\times$ Emotion (Anger)		-6.29	1.29	-4.86
Speaker Language $\times$ Emotion (Tenderness)		-4.64	1.29	-3.58
Speaker Language $\times$ Emotion (Relief)		-7.52	1.29	-5.80
Speaker Language $\times$ Emotion (Sadness)		-5.65	1.29	-4.36
Speaker Language $\times$ Emotion (Irritation)		-3.89	1.29	-3.01
Gender $\times$ Speaker Language $\times$ Emotion (Joy)		-5.52	1.29	-4.26
Gender $\times$ Speaker Language $\times$ Emotion (Pride)		1.76	2.59	0.68
Gender $\times$ Speaker Language $\times$ Emotion (Anger)		6.81	2.59	2.63
Gender $\times$ Speaker Language $\times$ Emotion (Tenderness)		2.13	2.59	0.82
Gender $\times$ Speaker Language $\times$ Emotion (Relief)		4.70	2.59	1.81
Gender $\times$ Speaker Language $\times$ Emotion (Sadness)		4.63	2.59	1.79
Gender $\times$ Speaker Language $\times$ Emotion (Irritation)		2.44	2.59	0.94
		7.32	2.59	2.83

F1				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.06		
Residual		0.40		
Fixed effects		<i>β</i>	<i>SE</i>	<i>t</i>
Intercept		6.43	0.13	50.65
Gender		0.38	0.25	1.51
Speaker Language		-0.10	0.25	-0.41
Emotion (Joy)		-0.11	0.16	-0.70
Emotion (Pride)		-0.18	0.16	-1.12
Emotion (Anger)		0.02	0.16	0.15
Emotion (Tenderness)		-0.76	0.16	-4.79
Emotion (Relief)		-0.19	0.16	-1.21
Emotion (Sadness)		-0.31	0.16	-1.96
Emotion (Irritation)		-0.27	0.16	-1.70
Gender $\times$ Speaker Language		2.25	0.51	4.43
Gender $\times$ Emotion (Joy)		-0.01	0.32	-0.03
Gender $\times$ Emotion (Pride)		0.21	0.32	0.66
Gender $\times$ Emotion (Anger)		-0.64	0.32	-2.01
Gender $\times$ Emotion (Tenderness)		-0.19	0.32	-0.59
Gender $\times$ Emotion (Relief)		-0.17	0.32	-0.52
Gender $\times$ Emotion (Sadness)		0.11	0.32	0.35
Gender $\times$ Emotion (Irritation)		-0.31	0.32	-0.98
Speaker Language $\times$ Emotion (Joy)		-0.28	0.32	-0.87
Speaker Language $\times$ Emotion (Pride)		0.59	0.32	1.85
Speaker Language $\times$ Emotion (Anger)		-0.07	0.32	-0.23
Speaker Language $\times$ Emotion (Tenderness)		-0.50	0.32	-1.56
Speaker Language $\times$ Emotion (Relief)		-0.38	0.32	-1.19
Speaker Language $\times$ Emotion (Sadness)		-0.26	0.32	-0.83
Speaker Language $\times$ Emotion (Irritation)		-0.04	0.32	-0.14
Gender $\times$ Speaker Language $\times$ Emotion (Joy)		-0.33	0.64	-0.52
Gender $\times$ Speaker Language $\times$ Emotion (Pride)		-1.34	0.64	-2.10
Gender $\times$ Speaker Language $\times$ Emotion (Anger)		-2.82	0.64	-4.43
Gender $\times$ Speaker Language $\times$ Emotion (Tenderness)		-2.85	0.64	-4.48
Gender $\times$ Speaker Language $\times$ Emotion (Relief)		-2.36	0.64	-3.71
Gender $\times$ Speaker Language $\times$ Emotion (Sadness)		-2.88	0.64	-4.53
Gender $\times$ Speaker Language $\times$ Emotion (Irritation)		-1.14	0.64	-1.79

F2				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.04		
Residual		0.18		
Fixed effects		<i>β</i>	<i>SE</i>	<i>t</i>
Intercept				<i>p</i>
		12.10	0.09	132.83
Gender		0.50	0.18	2.72
Speaker Language		0.66	0.18	3.63
Emotion (Joy)		-0.20	0.10	-1.87
Emotion (Pride)		-0.15	0.10	-1.42
Emotion (Anger)		-0.07	0.10	-0.69
Emotion (Tenderness)		-0.06	0.10	-0.55
Emotion (Relief)		0.05	0.10	0.46
Emotion (Sadness)		0.00	0.10	0.04
Emotion (Irritation)		-0.12	0.10	-1.10
Gender $\times$ Speaker Language		0.32	0.36	0.89
Gender $\times$ Emotion (Joy)		-0.16	0.21	-0.75
Gender $\times$ Emotion (Pride)		0.21	0.21	1.01
Gender $\times$ Emotion (Anger)		-0.08	0.21	-0.37
Gender $\times$ Emotion (Tenderness)		-0.36	0.21	-1.74
Gender $\times$ Emotion (Relief)		-0.03	0.21	-0.14
Gender $\times$ Emotion (Sadness)		0.13	0.21	0.64
Gender $\times$ Emotion (Irritation)		-0.27	0.21	-1.30
Speaker Language $\times$ Emotion (Joy)		-0.27	0.21	-1.31
Speaker Language $\times$ Emotion (Pride)		-0.55	0.21	-2.62
Speaker Language $\times$ Emotion (Anger)		-0.81	0.21	-3.88
Speaker Language $\times$ Emotion (Tenderness)		-1.17	0.21	-5.57
Speaker Language $\times$ Emotion (Relief)		-0.80	0.21	-3.81
Speaker Language $\times$ Emotion (Sadness)		-0.59	0.21	-2.82
Speaker Language $\times$ Emotion (Irritation)		-0.84	0.21	-4.01
Gender $\times$ Speaker Language $\times$ Emotion (Joy)		0.001	0.42	0.001
Gender $\times$ Speaker Language $\times$ Emotion (Pride)		0.20	0.42	0.48
Gender $\times$ Speaker Language $\times$ Emotion (Anger)		-0.43	0.42	-1.02
Gender $\times$ Speaker Language $\times$ Emotion (Tenderness)		-0.76	0.42	-1.81
Gender $\times$ Speaker Language $\times$ Emotion (Relief)		-0.06	0.42	-0.14
Gender $\times$ Speaker Language $\times$ Emotion (Sadness)		-0.69	0.42	-1.65
Gender $\times$ Speaker Language $\times$ Emotion (Irritation)		0.33	0.42	0.78

F3				
Random effects	Variance			
Speaker (Intercept)	0.03			
Residual	0.07			
Fixed effects	β	SE	t	p
Intercept	15.61	0.06	256.84	< .001
Gender	0.02	0.12	0.17	0.866
Speaker Language	0.46	0.12	3.82	< .001
Emotion (Joy)	-0.12	0.07	-1.81	0.071
Emotion (Pride)	-0.09	0.07	-1.31	0.190
Emotion (Anger)	0.00	0.07	-0.06	0.954
Emotion (Tenderness)	-0.17	0.07	-2.58	< .050
Emotion (Relief)	-0.06	0.07	-0.97	0.331
Emotion (Sadness)	-0.03	0.07	-0.50	0.615
Emotion (Irritation)	-0.01	0.07	-0.18	0.856
Gender $\times$ Speaker Language	0.48	0.24	1.97	0.055
Gender $\times$ Emotion (Joy)	-0.10	0.13	-0.81	0.421
Gender $\times$ Emotion (Pride)	-0.01	0.13	-0.08	0.939
Gender $\times$ Emotion (Anger)	-0.19	0.13	-1.43	0.154
Gender $\times$ Emotion (Tenderness)	-0.33	0.13	-2.57	< .050
Gender $\times$ Emotion (Relief)	-0.09	0.13	-0.67	0.506
Gender $\times$ Emotion (Sadness)	0.02	0.13	0.16	0.874
Gender $\times$ Emotion (Irritation)	-0.17	0.13	-1.32	0.187
Speaker Language $\times$ Emotion (Joy)	-0.20	0.13	-1.51	0.134
Speaker Language $\times$ Emotion (Pride)	-0.37	0.13	-2.81	< .010
Speaker Language $\times$ Emotion (Anger)	-0.43	0.13	-3.31	< .010
Speaker Language $\times$ Emotion (Tenderness)	-0.59	0.13	-4.52	< .001
Speaker Language $\times$ Emotion (Relief)	-0.41	0.13	-3.11	< .010
Speaker Language $\times$ Emotion (Sadness)	-0.50	0.13	-3.84	< .001
Speaker Language $\times$ Emotion (Irritation)	-0.34	0.13	-2.58	< .050
Gender $\times$ Speaker Language $\times$ Emotion (Joy)	-0.37	0.26	-1.42	0.157
Gender $\times$ Speaker Language $\times$ Emotion (Pride)	0.07	0.26	0.29	0.774
Gender $\times$ Speaker Language $\times$ Emotion (Anger)	-0.70	0.26	-2.67	< .010
Gender $\times$ Speaker Language $\times$ Emotion (Tenderness)	-0.68	0.26	-2.59	< .050
Gender $\times$ Speaker Language $\times$ Emotion (Relief)	-0.29	0.26	-1.10	0.273
Gender $\times$ Speaker Language $\times$ Emotion (Sadness)	-0.81	0.26	-3.12	< .010
Gender $\times$ Speaker Language $\times$ Emotion (Irritation)	-0.05	0.26	-0.17	0.863

AR				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.28		
Residual		0.66		
Fixed effects		<i>β</i>	<i>SE</i>	<i>t</i>
Intercept		5.48	0.20	28.08
Gender		0.99	0.39	2.55
Speaker Language		3.33	0.39	8.54
Emotion (Joy)		-0.48	0.20	-2.38
Emotion (Pride)		-0.75	0.20	-3.68
Emotion (Anger)		-0.78	0.20	-3.85
Emotion (Tenderness)		-0.99	0.20	-4.89
Emotion (Relief)		-0.90	0.20	-4.45
Emotion (Sadness)		-0.85	0.20	-4.18
Emotion (Irritation)		-0.85	0.20	-4.20
Gender $\times$ Speaker Language		0.83	0.57	1.46
Gender $\times$ Emotion (Joy)		0.37	0.41	0.92
Gender $\times$ Emotion (Pride)		-0.45	0.41	-1.10
Gender $\times$ Emotion (Anger)		-0.62	0.41	-1.53
Gender $\times$ Emotion (Tenderness)		-0.10	0.41	-0.26
Gender $\times$ Emotion (Relief)		0.27	0.41	0.67
Gender $\times$ Emotion (Sadness)		-0.51	0.41	-1.26
Gender $\times$ Emotion (Irritation)		-0.57	0.41	-1.40
Speaker Language $\times$ Emotion (Joy)		-0.45	0.41	-1.10
Speaker Language $\times$ Emotion (Pride)		-1.10	0.41	-2.70
Speaker Language $\times$ Emotion (Anger)		-0.96	0.41	-2.37
Speaker Language $\times$ Emotion (Tenderness)		-1.88	0.41	-4.64
Speaker Language $\times$ Emotion (Relief)		-1.34	0.41	-3.29
Speaker Language $\times$ Emotion (Sadness)		-1.99	0.41	-4.91
Speaker Language $\times$ Emotion (Irritation)		-1.27	0.41	-3.13

PPQ				
Random effects	Variance			
Speaker (Intercept)	1.91			
Residual	1.28			
Fixed effects	β	SE	t	p
Intercept	< .01	< .001	15.10	< .001
Gender	< .001	< .001	2.82	< .010
Speaker Language	< .01	< .001	3.86	< .001
Emotion (Joy)	< .001	< .001	-0.93	0.353
Emotion (Pride)	< .001	< .001	-2.27	< .050
Emotion (Anger)	< .001	< .001	-1.63	0.105
Emotion (Tenderness)	< .001	< .001	-0.42	0.675
Emotion (Relief)	< .001	< .001	0.75	0.455
Emotion (Sadness)	< .001	< .001	1.31	0.192
Emotion (Irritation)	< .001	< .001	-0.53	0.598
Gender $\times$ Speaker Language	< .01	< .001	2.38	< .050
Gender $\times$ Emotion (Joy)	< .001	< .001	0.55	0.585
Gender $\times$ Emotion (Pride)	< .001	< .001	-0.86	0.389
Gender $\times$ Emotion (Anger)	< .001	< .001	-1.95	0.050
Gender $\times$ Emotion (Tenderness)	< .001	< .001	0.27	0.788
Gender $\times$ Emotion (Relief)	< .001	< .001	0.63	0.530
Gender $\times$ Emotion (Sadness)	< .001	< .001	0.65	0.515
Gender $\times$ Emotion (Irritation)	< .001	< .001	-0.82	0.411
Speaker Language $\times$ Emotion (Joy)	< .001	< .001	-0.37	0.712
Speaker Language $\times$ Emotion (Pride)	< -.01	< .001	-3.06	< .010
Speaker Language $\times$ Emotion (Anger)	< -.01	< .001	-3.93	< .001
Speaker Language $\times$ Emotion (Tenderness)	< -.01	< .001	-4.95	< .001
Speaker Language $\times$ Emotion (Relief)	< -.01	< .001	-3.36	< .001
Speaker Language $\times$ Emotion (Sadness)	< -.01	< .001	-3.32	< .010
Speaker Language $\times$ Emotion (Irritation)	< -.01	< .001	-3.12	< .010
Gender $\times$ Speaker Language $\times$ Emotion (Joy)	< .001	< .001	-0.83	0.411
Gender $\times$ Speaker Language $\times$ Emotion (Pride)	< .001	< .001	-1.20	0.233
Gender $\times$ Speaker Language $\times$ Emotion (Anger)	< -.01	< .001	-1.41	0.161
Gender $\times$ Speaker Language $\times$ Emotion (Tenderness)	< -.01	< .001	-3.11	< .010
Gender $\times$ Speaker Language $\times$ Emotion (Relief)	< -.01	< .001	-2.11	< .050
Gender $\times$ Speaker Language $\times$ Emotion (Sadness)	< -.01	< .001	-3.61	< .001
Gender $\times$ Speaker Language $\times$ Emotion (Irritation)	< -.01	< .001	-1.93	0.055

APQ				
Random effects		<i>Variance</i>		
Speaker (Intercept)		< .001		
Residual		< .001		
Fixed effects		<i>β</i>	<i>SE</i>	<i>t</i>
Intercept		0.05	0.003	14.69
Gender		0.02	0.010	2.62
Speaker Language		0.01	0.010	2.04
Emotion (Joy)		0.01	0.004	1.18
Emotion (Pride)		0.01	0.004	1.27
Emotion (Anger)		0.01	0.004	1.95
Emotion (Tenderness)		0.01	0.004	1.90
Emotion (Relief)		0.004	0.004	1.00
Emotion (Sadness)		0.01	0.004	2.40
Emotion (Irritation)		0.01	0.004	1.95
Gender $\times$ Speaker Language		0.03	0.01	2.07
Gender $\times$ Emotion (Joy)		0.02	0.01	1.91
Gender $\times$ Emotion (Pride)		-0.001	0.01	-0.10
Gender $\times$ Emotion (Anger)		-0.01	0.01	-0.72
Gender $\times$ Emotion (Tenderness)		0.02	0.01	2.68
Gender $\times$ Emotion (Relief)		0.02	0.01	2.55
Gender $\times$ Emotion (Sadness)		0.02	0.01	2.40
Gender $\times$ Emotion (Irritation)		0.003	0.01	0.37
Speaker Language $\times$ Emotion (Joy)		-0.002	0.01	-0.24
Speaker Language $\times$ Emotion (Pride)		-0.02	0.01	-2.16
Speaker Language $\times$ Emotion (Anger)		-0.03	0.01	-3.21
Speaker Language $\times$ Emotion (Tenderness)		-0.04	0.01	-5.51
Speaker Language $\times$ Emotion (Relief)		-0.02	0.01	-2.66
Speaker Language $\times$ Emotion (Sadness)		-0.03	0.01	-3.90
Speaker Language $\times$ Emotion (Irritation)		-0.02	0.01	-2.94
Gender $\times$ Speaker Language $\times$ Emotion (Joy)		-0.01	0.02	-0.63
Gender $\times$ Speaker Language $\times$ Emotion (Pride)		-0.04	0.02	-2.25
Gender $\times$ Speaker Language $\times$ Emotion (Anger)		-0.02	0.02	-1.28
Gender $\times$ Speaker Language $\times$ Emotion (Tenderness)		-0.06	0.02	-4.06
Gender $\times$ Speaker Language $\times$ Emotion (Relief)		-0.03	0.02	-2.13
Gender $\times$ Speaker Language $\times$ Emotion (Sadness)		-0.07	0.02	-4.44
Gender $\times$ Speaker Language $\times$ Emotion (Irritation)		-0.03	0.02	-1.98

HNR					
Random effects		Variance			
Speaker (Intercept)		0.95			
Residual		4.42			
Fixed effects		β	SE	t	p
Intercept		14.42	0.44	32.44	< .001
Gender		-2.49	0.89	-2.80	< .010
Speaker Language		-2.74	0.89	-3.08	< .010
Emotion (Joy)		-0.52	0.53	-0.99	0.324
Emotion (Pride)		-0.70	0.53	-1.33	0.184
Emotion (Anger)		-1.87	0.53	-3.57	< .001
Emotion (Tenderness)		0.70	0.53	1.33	0.185
Emotion (Relief)		0.44	0.53	0.84	0.399
Emotion (Sadness)		-0.36	0.53	-0.68	0.494
Emotion (Irritation)		-0.58	0.53	-1.11	0.269
Gender $\times$ Speaker Language		-4.69	1.78	-2.64	< .050
Gender $\times$ Emotion (Joy)		-1.08	1.05	-1.03	0.305
Gender $\times$ Emotion (Pride)		-0.08	1.05	-0.07	0.942
Gender $\times$ Emotion (Anger)		0.58	1.05	0.56	0.578
Gender $\times$ Emotion (Tenderness)		-1.28	1.05	-1.21	0.226
Gender $\times$ Emotion (Relief)		-1.17	1.05	-1.11	0.267
Gender $\times$ Emotion (Sadness)		-0.44	1.05	-0.42	0.673
Gender $\times$ Emotion (Irritation)		0.56	1.05	0.53	0.596
Speaker Language $\times$ Emotion (Joy)		0.57	1.05	0.54	0.590
Speaker Language $\times$ Emotion (Pride)		2.09	1.05	1.99	< .050
Speaker Language $\times$ Emotion (Anger)		3.25	1.05	3.09	< .010
Speaker Language $\times$ Emotion (Tenderness)		6.16	1.05	5.87	< .001
Speaker Language $\times$ Emotion (Relief)		4.39	1.05	4.18	< .001
Speaker Language $\times$ Emotion (Sadness)		3.94	1.05	3.75	< .001
Speaker Language $\times$ Emotion (Irritation)		3.32	1.05	3.16	< .010
Gender $\times$ Speaker Language $\times$ Emotion (Joy)		4.05	2.10	1.93	0.055
Gender $\times$ Speaker Language $\times$ Emotion (Pride)		6.26	2.10	2.98	< .010
Gender $\times$ Speaker Language $\times$ Emotion (Anger)		4.53	2.10	2.16	< .050
Gender $\times$ Speaker Language $\times$ Emotion (Tenderness)		6.92	2.10	3.30	< .010
Gender $\times$ Speaker Language $\times$ Emotion (Relief)		7.35	2.10	3.50	< .001
Gender $\times$ Speaker Language $\times$ Emotion (Sadness)		9.27	2.10	4.41	< .001
Gender $\times$ Speaker Language $\times$ Emotion (Irritation)		4.45	2.10	2.12	< .050

Dutch data		F0-M		
Random effects		<i>Variance</i>		
Speaker (Intercept)		1.67		
Residual		8.58		
Fixed effects		β	<i>SE</i>	<i>p</i>
Intercept		32.88	0.86	38.10
Gender		-7.18	1.05	-6.84
Emotion (Joy)		-1.48	1.04	-1.43
Emotion (Pride)		-7.74	1.04	-7.48
Emotion (Anger)		-2.85	1.04	-2.75
Emotion (Tenderness)		-13.09	1.04	-12.64
Emotion (Relief)		-10.43	1.04	-10.07
Emotion (Sadness)		-10.61	1.04	-10.25
Emotion (Irritation)		-8.92	1.04	-8.62
F0-SD				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.36		
Residual		1.38		
Fixed effects		β	<i>SE</i>	<i>p</i>
Intercept		14.56	0.36	40.33
Emotion (Joy)		0.98	0.41	2.37
Emotion (Pride)		1.68	0.41	4.06
Emotion (Anger)		1.31	0.41	3.15
Emotion (Tenderness)		0.30	0.41	0.71
Emotion (Relief)		0.27	0.41	0.66
Emotion (Sadness)		-0.05	0.41	-0.13
Emotion (Irritation)		1.52	0.41	3.67
F0-min				
Random effects		<i>Variance</i>		
Speaker (Intercept)		1.77		
Residual		11.08		
Fixed effects		β	<i>SE</i>	<i>p</i>
Intercept		26.36	0.96	27.59
Gender		-6.53	1.11	-5.89
Emotion (Joy)		-3.51	1.18	-2.99
Emotion (Pride)		-10.01	1.18	-8.50
Emotion (Anger)		-6.93	1.18	-5.89
Emotion (Tenderness)		-10.22	1.18	-8.69
Emotion (Relief)		-8.94	1.18	-7.60
Emotion (Sadness)		-7.86	1.18	-6.68
Emotion (Irritation)		-9.90	1.18	-8.41

F0-max				
Random effects		<i>Variance</i>		
Speaker (Intercept)		2.58		
Residual		20.77		
Fixed effects		β	<i>SE</i>	<i>p</i>
Intercept		38.05	1.27	29.89
Gender		-6.66	1.39	-4.79
Emotion (Joy)		-0.96	1.61	-0.60
Emotion (Pride)		-6.02	1.61	-3.74
Emotion (Anger)		-2.00	1.61	-1.24
Emotion (Tenderness)		-9.75	1.61	-6.05
Emotion (Relief)		-10.11	1.61	-6.27
Emotion (Sadness)		-10.21	1.61	-6.34
Emotion (Irritation)		-7.51	1.61	-4.66
Sync				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.0002		
Residual		0.02		
Fixed effects		β	<i>SE</i>	<i>p</i>
Intercept		0.54	0.04	14.52
Gender		-0.05	0.03	-1.67
Emotion (Joy)		0.03	0.05	0.64
Emotion (Pride)		0.01	0.05	0.20
Emotion (Anger)		0.11	0.05	2.15
Emotion (Tenderness)		0.04	0.05	0.79
Emotion (Relief)		-0.06	0.05	-1.20
Emotion (Sadness)		-0.01	0.05	-0.14
Emotion (Irritation)		0.06	0.05	1.13
Int-M				
Random effects		<i>Variance</i>		
Speaker (Intercept)		31.08		
Residual		23.22		
Fixed effects		β	<i>SE</i>	<i>p</i>
Intercept		69.06	2.31	29.90
Emotion (Joy)		1.50	1.70	0.88
Emotion (Pride)		-10.27	1.70	-6.03
Emotion (Anger)		0.82	1.70	0.48
Emotion (Tenderness)		-19.67	1.70	-11.55
Emotion (Relief)		-13.95	1.70	-8.19
Emotion (Sadness)		-19.64	1.70	-11.53
Emotion (Irritation)		-11.66	1.70	-6.85

Int-SD				
Random effects		Variance		
Speaker (Intercept)	0.38			
Residual	2.54			
Fixed effects	β	SE	t	p
Intercept	10.74	0.45	23.66	< .001
Gender	-1.55	0.52	-2.98	< .050
Emotion (Joy)	-0.61	0.56	-1.09	0.278
Emotion (Pride)	-0.88	0.56	-1.57	0.120
Emotion (Anger)	0.65	0.56	1.16	0.249
Emotion (Tenderness)	-3.16	0.56	-5.60	< .001
Emotion (Relief)	-2.00	0.56	-3.54	< .001
Emotion (Sadness)	-2.11	0.56	-3.74	< .001
Emotion (Irritation)	-0.45	0.56	-0.79	0.429
Tilt				
Random effects		Variance		
Speaker (Intercept)	3.73			
Residual	5.25			
Fixed effects	β	SE	t	p
Intercept	-8.47	0.89	-9.51	< .001
Gender	4.51	1.78	2.53	< .050
Emotion (Joy)	-0.03	0.81	-0.04	0.970
Emotion (Pride)	2.46	0.81	3.03	< .010
Emotion (Anger)	1.22	0.81	1.51	0.135
Emotion (Tenderness)	5.00	0.81	6.17	< .001
Emotion (Relief)	4.53	0.81	5.59	< .001
Emotion (Sadness)	3.33	0.81	4.11	< .001
Emotion (Irritation)	4.38	0.81	5.41	< .001
Gender $\times$ Emotion (Joy)	-3.65	1.62	-2.25	< .050
Gender $\times$ Emotion (Pride)	-5.42	1.62	-3.35	< .010
Gender $\times$ Emotion (Anger)	-1.87	1.62	-1.15	0.252
Gender $\times$ Emotion (Tenderness)	-6.92	1.62	-4.27	< .001
Gender $\times$ Emotion (Relief)	-7.02	1.62	-4.33	< .001
Gender $\times$ Emotion (Sadness)	-5.01	1.62	-3.09	< .010
Gender $\times$ Emotion (Irritation)	-8.29	1.62	-5.11	< .001

F1					
Random effects		Variance			
Speaker (Intercept)		0.02			
Residual		0.26			
Fixed effects		β	SE	t	p
Intercept		6.48	0.14	46.97	< .001
Gender		-0.74	0.28	-2.68	< .010
Emotion (Joy)		0.03	0.18	0.15	0.881
Emotion (Pride)		-0.47	0.18	-2.64	< .010
Emotion (Anger)		0.06	0.18	0.34	0.736
Emotion (Tenderness)		-0.51	0.18	-2.86	< .010
Emotion (Relief)		0.00	0.18	-0.02	0.981
Emotion (Sadness)		-0.18	0.18	-1.00	0.318
Emotion (Irritation)		-0.25	0.18	-1.39	0.168
Gender $\times$ Emotion (Joy)		0.16	0.36	0.44	0.664
Gender $\times$ Emotion (Pride)		0.88	0.36	2.45	< .050
Gender $\times$ Emotion (Anger)		0.77	0.36	2.14	< .050
Gender $\times$ Emotion (Tenderness)		1.24	0.36	3.45	< .001
Gender $\times$ Emotion (Relief)		1.02	0.36	2.83	< .010
Gender $\times$ Emotion (Sadness)		1.55	0.36	4.33	< .001
Gender $\times$ Emotion (Irritation)		0.26	0.36	0.72	0.475
F2					
Random effects		Variance			
Speaker (Intercept)		0.03			
Residual		0.15			
Fixed effects		β	SE	t	p
Intercept		11.77	0.12	102.00	< .001
Gender		0.35	0.14	2.51	< .050
Emotion (Joy)		-0.06	0.14	-0.43	0.671
Emotion (Pride)		0.13	0.14	0.91	0.365
Emotion (Anger)		0.33	0.14	2.42	< .050
Emotion (Tenderness)		0.53	0.14	3.81	< .001
Emotion (Relief)		0.45	0.14	3.24	< .010
Emotion (Sadness)		0.30	0.14	2.18	< .050
Emotion (Irritation)		0.30	0.14	2.21	< .050

F3				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.03		
Residual		0.05		
Fixed effects		β	<i>SE</i>	<i>p</i>
Intercept		15.38	0.08	186.32 < .001
Gender		-0.22	0.17	-1.33 0.204
Emotion (Joy)		-0.02	0.08	-0.26 0.799
Emotion (Pride)		0.10	0.08	1.25 0.215
Emotion (Anger)		0.21	0.08	2.71 < .010
Emotion (Tenderness)		0.13	0.08	1.62 0.107
Emotion (Relief)		0.14	0.08	1.78 0.077
Emotion (Sadness)		0.22	0.08	2.78 < .010
Emotion (Irritation)		0.16	0.08	2.00 < .050
Gender $\times$ Emotion (Joy)		0.08	0.16	0.51 0.610
Gender $\times$ Emotion (Pride)		-0.05	0.16	-0.30 0.762
Gender $\times$ Emotion (Anger)		0.16	0.16	1.03 0.305
Gender $\times$ Emotion (Tenderness)		0.00	0.16	0.02 0.981
Gender $\times$ Emotion (Relief)		0.06	0.16	0.36 0.720
Gender $\times$ Emotion (Sadness)		0.43	0.16	2.74 < .010
Gender $\times$ Emotion (Irritation)		-0.15	0.16	-0.96 0.339
AR				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.10		
Residual		0.40		
Fixed effects		β	<i>SE</i>	<i>p</i>
Intercept		3.81	0.19	19.66 < .001
Gender		0.68	0.39	1.76 0.088
Emotion (Joy)		-0.26	0.22	-1.16 0.250
Emotion (Pride)		-0.20	0.22	-0.89 0.375
Emotion (Anger)		-0.30	0.22	-1.34 0.182
Emotion (Tenderness)		-0.05	0.22	-0.23 0.820
Emotion (Relief)		-0.24	0.22	-1.05 0.297
Emotion (Sadness)		0.15	0.22	0.66 0.512
Emotion (Irritation)		-0.22	0.22	-0.97 0.333
Gender $\times$ Emotion (Joy)		0.23	0.45	0.50 0.615
Gender $\times$ Emotion (Pride)		-0.53	0.45	-1.18 0.240
Gender $\times$ Emotion (Anger)		-0.91	0.45	-2.02 < .050
Gender $\times$ Emotion (Tenderness)		-0.56	0.45	-1.24 0.217
Gender $\times$ Emotion (Relief)		0.75	0.45	1.67 0.098
Gender $\times$ Emotion (Sadness)		-0.56	0.45	-1.26 0.211
Gender $\times$ Emotion (Irritation)		-0.84	0.45	-1.88 0.064

PPQ				
Random effects		Variance		
Speaker (Intercept)		3.50		
Residual		1.26		
Fixed effects		β	SE	t
Intercept		0.008	0.001	7.32
Gender		0.001	0.002	0.28
Emotion (Joy)		-0.001	0.001	-0.40
Emotion (Pride)		0.001	0.001	0.56
Emotion (Anger)		0.002	0.001	1.64
Emotion (Tenderness)		0.004	0.001	3.23
Emotion (Relief)		0.004	0.001	2.93
Emotion (Sadness)		0.004	0.001	3.30
Emotion (Irritation)		0.002	0.001	1.85
Gender $\times$ Emotion (Joy)		0.002	0.003	0.98
Gender $\times$ Emotion (Pride)		0.001	0.003	0.24
Gender $\times$ Emotion (Anger)		-0.001	0.003	-0.39
Gender $\times$ Emotion (Tenderness)		0.006	0.003	2.41
Gender $\times$ Emotion (Relief)		0.005	0.003	1.95
Gender $\times$ Emotion (Sadness)		0.008	0.003	3.04
Gender $\times$ Emotion (Irritation)		0.002	0.003	0.79
APQ				
Random effects		Variance		
Speaker (Intercept)		0.0001		
Residual		0.0003		
Fixed effects		β	SE	t
Intercept		0.04	0.01	7.55
Gender		0.00	0.01	0.33
Emotion (Joy)		0.01	0.01	0.92
Emotion (Pride)		0.01	0.01	2.22
Emotion (Anger)		0.02	0.01	3.34
Emotion (Tenderness)		0.03	0.01	4.79
Emotion (Relief)		0.01	0.01	2.37
Emotion (Sadness)		0.02	0.01	4.08
Emotion (Irritation)		0.02	0.01	3.16
Gender $\times$ Emotion (Joy)		0.02	0.01	1.65
Gender $\times$ Emotion (Pride)		0.02	0.01	1.39
Gender $\times$ Emotion (Anger)		0.00	0.01	0.36
Gender $\times$ Emotion (Tenderness)		0.05	0.01	4.36
Gender $\times$ Emotion (Relief)		0.04	0.01	3.03
Gender $\times$ Emotion (Sadness)		0.05	0.01	4.42
Gender $\times$ Emotion (Irritation)		0.02	0.01	1.52

HNR					
Random effects		Variance			
Speaker (Intercept)		0.78			
Residual		3.72			
Fixed effects		β	SE	t	p
Intercept		15.79	0.57	27.49	< .001
Gender		-0.15	1.15	-0.13	0.898
Emotion (Joy)		-0.80	0.68	-1.18	0.242
Emotion (Pride)		-1.75	0.68	-2.56	< .050
Emotion (Anger)		-3.50	0.68	-5.13	< .001
Emotion (Tenderness)		-2.38	0.68	-3.50	< .001
Emotion (Relief)		-1.75	0.68	-2.57	< .050
Emotion (Sadness)		-2.33	0.68	-3.42	< .001
Emotion (Irritation)		-2.24	0.68	-3.29	< .010
Gender $\times$ Emotion (Joy)		-3.11	1.36	-2.28	< .050
Gender $\times$ Emotion (Pride)		-3.21	1.36	-2.35	< .050
Gender $\times$ Emotion (Anger)		-1.68	1.36	-1.23	0.221
Gender $\times$ Emotion (Tenderness)		-4.74	1.36	-3.47	< .001
Gender $\times$ Emotion (Relief)		-4.84	1.36	-3.55	< .001
Gender $\times$ Emotion (Sadness)		-5.08	1.36	-3.73	< .001
Gender $\times$ Emotion (Irritation)		-1.67	1.36	-1.22	0.224

Korean data		F0-M			
Random effects		<i>Variance</i>			
Speaker (Intercept)		3.93			
Residual		10.92			
Fixed effects		<i>β</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept		27.21	1.08	25.11	< .001
Gender		-8.68	1.52	-5.72	< .010
Emotion (Joy)		-1.20	1.17	-1.03	0.305
Emotion (Pride)		-1.25	1.17	-1.07	0.286
Emotion (Anger)		0.96	1.17	0.82	0.412
Emotion (Tenderness)		-6.58	1.17	-5.63	< .001
Emotion (Relief)		-4.76	1.17	-4.08	< .001
Emotion (Sadness)		-4.24	1.17	-3.62	< .001
Emotion (Irritation)		-3.16	1.17	-2.70	< .010
		F0-SD			
Random effects		<i>Variance</i>			
Speaker (Intercept)		0.20			
Residual		1.21			
Fixed effects		<i>β</i>	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept		14.04	0.32	44.37	< .001
Gender		0.76	0.63	1.21	0.233
Emotion (Joy)		0.59	0.39	1.52	0.133
Emotion (Pride)		0.60	0.39	1.54	0.126
Emotion (Anger)		1.42	0.39	3.65	< .001
Emotion (Tenderness)		0.55	0.39	1.41	0.161
Emotion (Relief)		-0.10	0.39	-0.25	0.800
Emotion (Sadness)		0.36	0.39	0.93	0.356
Emotion (Irritation)		1.24	0.39	3.20	< .010
Gender $\times$ Emotion (Joy)		0.19	0.78	0.24	0.810
Gender $\times$ Emotion (Pride)		-1.51	0.78	-1.95	0.054
Gender $\times$ Emotion (Anger)		-0.96	0.78	-1.24	0.218
Gender $\times$ Emotion (Tenderness)		-2.38	0.78	-3.07	< .010
Gender $\times$ Emotion (Relief)		0.08	0.78	0.10	0.918
Gender $\times$ Emotion (Sadness)		-0.95	0.78	-1.23	0.222
Gender $\times$ Emotion (Irritation)		0.01	0.78	0.01	0.992

F0-min				
Random effects		<i>Variance</i>		
Speaker (Intercept)		2.09		
Residual		8.47		
Fixed effects		<i>β</i>	<i>SE</i>	<i>t</i>
Intercept		23.11	0.89	25.99
Gender		-12.75	1.78	-7.17
Emotion (Joy)		-2.66	1.03	-2.58
Emotion (Pride)		-2.38	1.03	-2.31
Emotion (Anger)		-3.41	1.03	-3.32
Emotion (Tenderness)		-6.92	1.03	-6.73
Emotion (Relief)		-3.91	1.03	-3.80
Emotion (Sadness)		-3.53	1.03	-3.43
Emotion (Irritation)		-4.92	1.03	-4.78
Gender $\times$ Emotion (Joy)		3.19	2.06	1.55
Gender $\times$ Emotion (Pride)		6.37	2.06	3.09
Gender $\times$ Emotion (Anger)		4.39	2.06	2.13
Gender $\times$ Emotion (Tenderness)		6.56	2.06	3.19
Gender $\times$ Emotion (Relief)		3.44	2.06	1.67
Gender $\times$ Emotion (Sadness)		7.41	2.06	3.60
Gender $\times$ Emotion (Irritation)		4.40	2.06	2.14
F0-max				
Random effects		<i>Variance</i>		
Speaker (Intercept)		4.43		
Residual		16.09		
Fixed effects		<i>β</i>	<i>SE</i>	<i>t</i>
Intercept		31.28	1.25	25.05
Gender		-8.35	1.65	-5.07
Emotion (Joy)		-0.25	1.42	-0.17
Emotion (Pride)		-0.76	1.42	-0.54
Emotion (Anger)		1.89	1.42	1.33
Emotion (Tenderness)		-6.42	1.42	-4.53
Emotion (Relief)		-5.83	1.42	-4.11
Emotion (Sadness)		-2.93	1.42	-2.06
Emotion (Irritation)		-2.21	1.42	-1.56

Sync				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.0002		
Residual		0.03		
Fixed effects		β	<i>SE</i>	<i>t</i>
Intercept		0.61	0.04	13.92
Gender		-0.06	0.03	-1.73
Emotion (Joy)		0.01	0.06	0.09
Emotion (Pride)		-0.05	0.06	-0.84
Emotion (Anger)		-0.04	0.06	-0.65
Emotion (Tenderness)		-0.04	0.06	-0.60
Emotion (Relief)		-0.10	0.06	-1.67
Emotion (Sadness)		-0.14	0.06	-2.25
Emotion (Irritation)		0.00	0.06	0.06
Int-M				
Random effects		<i>Variance</i>		
Speaker (Intercept)		1.54		
Residual		35.98		
Fixed effects		β	<i>SE</i>	<i>t</i>
Intercept		69.16	1.56	44.26
Gender		2.29	3.12	0.73
Emotion (Joy)		4.34	2.12	2.05
Emotion (Pride)		4.11	2.12	1.94
Emotion (Anger)		8.17	2.12	3.85
Emotion (Tenderness)		-1.30	2.12	-0.62
Emotion (Relief)		-2.67	2.12	-1.26
Emotion (Sadness)		-2.39	2.12	-1.13
Emotion (Irritation)		1.09	2.12	0.51
Gender $\times$ Emotion (Joy)		-0.40	4.24	-0.09
Gender $\times$ Emotion (Pride)		-1.93	4.24	-0.46
Gender $\times$ Emotion (Anger)		-3.17	4.24	-0.75
Gender $\times$ Emotion (Tenderness)		1.62	4.24	0.38
Gender $\times$ Emotion (Relief)		4.21	4.24	0.99
Gender $\times$ Emotion (Sadness)		13.48	4.24	3.18
Gender $\times$ Emotion (Irritation)		5.59	4.24	1.32

Int-SD				
Random effects	Variance			
Speaker (Intercept)	0.05			
Residual	3.55			
Fixed effects	β	SE	t	p
Intercept	7.38	0.48	15.47	< .001
Emotion (Joy)	-0.47	0.67	-0.71	0.478
Emotion (Pride)	0.33	0.67	0.50	0.621
Emotion (Anger)	1.48	0.67	2.22	< .050
Emotion (Tenderness)	-0.28	0.67	-0.41	0.679
Emotion (Relief)	2.66	0.67	3.99	< .001
Emotion (Sadness)	1.67	0.67	2.51	< .050
Emotion (Irritation)	0.65	0.67	0.98	0.328
Tilt				
Random effects	Variance			
Speaker (Intercept)	2.52			
Residual	8.19			
Fixed effects	β	SE	t	p
Intercept	-4.09	0.91	-4.49	< .001
Emotion (Joy)	-3.56	1.01	-3.52	< .001
Emotion (Pride)	-3.84	1.01	-3.79	< .001
Emotion (Anger)	-3.42	1.01	-3.38	< .010
Emotion (Tenderness)	-2.52	1.01	-2.49	< .050
Emotion (Relief)	-1.12	1.01	-1.11	0.270
Emotion (Sadness)	-0.56	1.01	-0.56	0.579
Emotion (Irritation)	-1.14	1.01	-1.13	0.263

F1				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.09		
Residual		0.55		
Fixed effects	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	6.38	0.21	29.93	< .001
Gender	1.51	0.43	3.54	< .001
Emotion (Joy)	-0.25	0.26	-0.95	0.342
Emotion (Pride)	0.12	0.26	0.44	0.659
Emotion (Anger)	-0.01	0.26	-0.05	0.962
Emotion (Tenderness)	-1.01	0.26	-3.85	< .001
Emotion (Relief)	-0.38	0.26	-1.45	0.149
Emotion (Sadness)	-0.44	0.26	-1.68	0.095
Emotion (Irritation)	-0.29	0.26	-1.11	0.269
Gender $\times$ Emotion (Joy)	-0.18	0.53	-0.34	0.738
Gender $\times$ Emotion (Pride)	-0.46	0.53	-0.88	0.383
Gender $\times$ Emotion (Anger)	-2.05	0.53	-3.90	< .001
Gender $\times$ Emotion (Tenderness)	-1.61	0.53	-3.07	< .010
Gender $\times$ Emotion (Relief)	-1.35	0.53	-2.56	< .050
Gender $\times$ Emotion (Sadness)	-1.33	0.53	-2.53	< .050
Gender $\times$ Emotion (Irritation)	-0.88	0.53	-1.67	0.097
F2				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.06		
Residual		0.22		
Fixed effects	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	12.43	0.14	86.17	< .001
Gender	0.50	0.19	2.64	< .050
Emotion (Joy)	-0.33	0.16	-2.02	< .050
Emotion (Pride)	-0.42	0.16	-2.58	< .050
Emotion (Anger)	-0.48	0.16	-2.92	< .010
Emotion (Tenderness)	-0.64	0.16	-3.90	< .001
Emotion (Relief)	-0.35	0.16	-2.13	< .050
Emotion (Sadness)	-0.29	0.16	-1.77	0.079
Emotion (Irritation)	-0.54	0.16	-3.26	< .010

F3				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.02		
Residual		0.09		
Fixed effects	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	15.84	0.09	177.53	< .001
Gender	0.26	0.18	1.46	0.155
Emotion (Joy)	-0.22	0.10	-2.07	< .050
Emotion (Pride)	-0.27	0.10	-2.58	< .050
Emotion (Anger)	-0.22	0.10	-2.10	< .050
Emotion (Tenderness)	-0.46	0.10	-4.44	< .001
Emotion (Relief)	-0.27	0.10	-2.55	< .050
Emotion (Sadness)	-0.28	0.10	-2.72	< .010
Emotion (Irritation)	-0.18	0.10	-1.73	0.087
Gender $\times$ Emotion (Joy)	-0.29	0.21	-1.39	0.167
Gender $\times$ Emotion (Pride)	0.03	0.21	0.13	0.895
Gender $\times$ Emotion (Anger)	-0.53	0.21	-2.56	< .050
Gender $\times$ Emotion (Tenderness)	-0.67	0.21	-3.22	< .010
Gender $\times$ Emotion (Relief)	-0.23	0.21	-1.10	0.273
Gender $\times$ Emotion (Sadness)	-0.39	0.21	-1.85	0.067
Gender $\times$ Emotion (Irritation)	-0.20	0.21	-0.94	0.352
AR				
Random effects		<i>Variance</i>		
Speaker (Intercept)		0.46		
Residual		0.89		
Fixed effects	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	7.14	0.34	21.21	< .001
Gender	1.21	0.51	2.38	0.055
Emotion (Joy)	-0.71	0.33	-2.12	< .050
Emotion (Pride)	-1.30	0.33	-3.88	< .001
Emotion (Anger)	-1.26	0.33	-3.78	< .001
Emotion (Tenderness)	-1.93	0.33	-5.79	< .001
Emotion (Relief)	-1.57	0.33	-4.70	< .001
Emotion (Sadness)	-1.85	0.33	-5.52	< .001
Emotion (Irritation)	-1.49	0.33	-4.45	< .001

PPQ				
Random effects		Variance		
Speaker (Intercept)		< .002		
Residual		< .001		
Fixed effects		β	SE	t
Intercept		0.01	0.001	14.577
Gender		0.004	0.001	5.266
Emotion (Joy)		-0.001	0.001	-0.897
Emotion (Pride)		-0.01	0.001	-3.673
Emotion (Anger)		-0.01	0.001	-3.835
Emotion (Tenderness)		-0.01	0.001	-3.705
Emotion (Relief)		-0.002	0.001	-1.802
Emotion (Sadness)		-0.002	0.001	-1.386
Emotion (Irritation)		-0.003	0.001	-2.514
APQ				
Random effects		Variance		
Speaker (Intercept)		< .001		
Residual		< 0.002		
Fixed effects		β	SE	t
Intercept		0.06	0.004	15.33
Gender		0.03	0.01	4.30
Emotion (Joy)		0.004	0.005	0.74
Emotion (Pride)		-0.003	0.005	-0.71
Emotion (Anger)		-0.005	0.005	-0.99
Emotion (Tenderness)		-0.01	0.005	-2.84
Emotion (Relief)		-0.01	0.005	-1.31
Emotion (Sadness)		-0.01	0.005	-1.18
Emotion (Irritation)		-0.004	0.005	-0.78
Gender $\times$ Emotion (Joy)		0.01	0.01	1.00
Gender $\times$ Emotion (Pride)		-0.02	0.01	-1.84
Gender $\times$ Emotion (Anger)		-0.02	0.01	-1.58
Gender $\times$ Emotion (Tenderness)		-0.01	0.01	-1.09
Gender $\times$ Emotion (Relief)		0.003	0.01	0.33
Gender $\times$ Emotion (Sadness)		-0.02	0.01	-1.61
Gender $\times$ Emotion (Irritation)		-0.01	0.01	-1.27
HNR				
Random effects		Variance		
Speaker (Intercept)		1.12		
Residual		5.22		
Fixed effects		β	SE	t
Intercept		13.05	0.68	19.12
Gender		-2.52	0.85	-2.96
Emotion (Joy)		-0.24	0.81	-0.29
Emotion (Pride)		0.35	0.81	0.43
Emotion (Anger)		-0.25	0.81	-0.31
Emotion (Tenderness)		3.78	0.81	4.68
Emotion (Relief)		2.64	0.81	3.27
Emotion (Sadness)		1.61	0.81	2.00
Emotion (Irritation)		1.08	0.81	1.34

Appendix H. Plots of LME models 1 through 15 for Hypotheses 1—3 in all data.

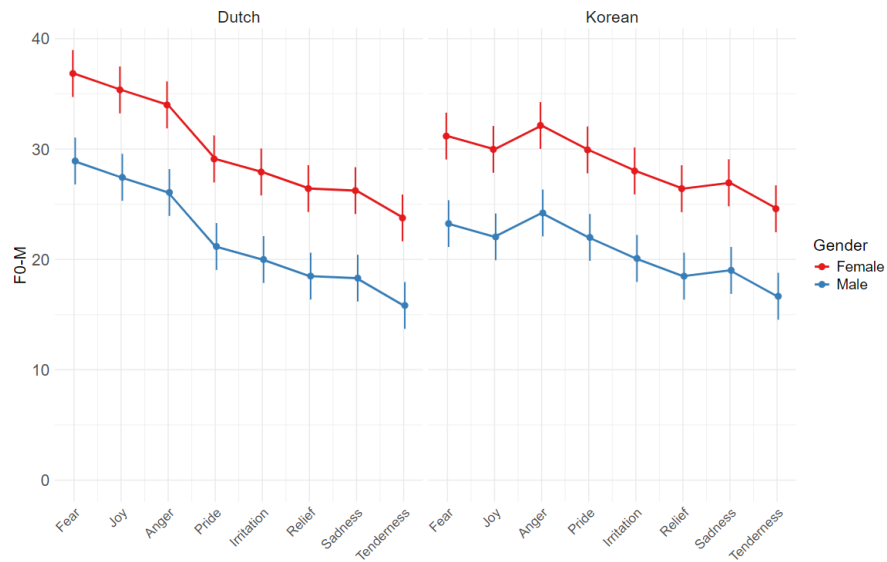


Figure H1. F0-M (semitones re. 50 Hz) between Dutch and Korean across females and males (the order of emotions from left to right is listed in a descending order of the respective acoustic parameter value in the following figures).

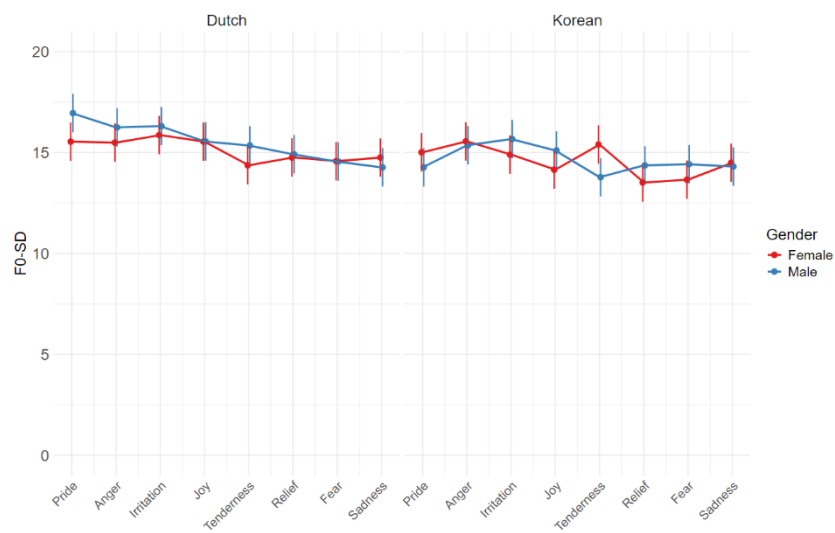


Figure H2. F0-SD (semitones) between Dutch and Korean across females and males.

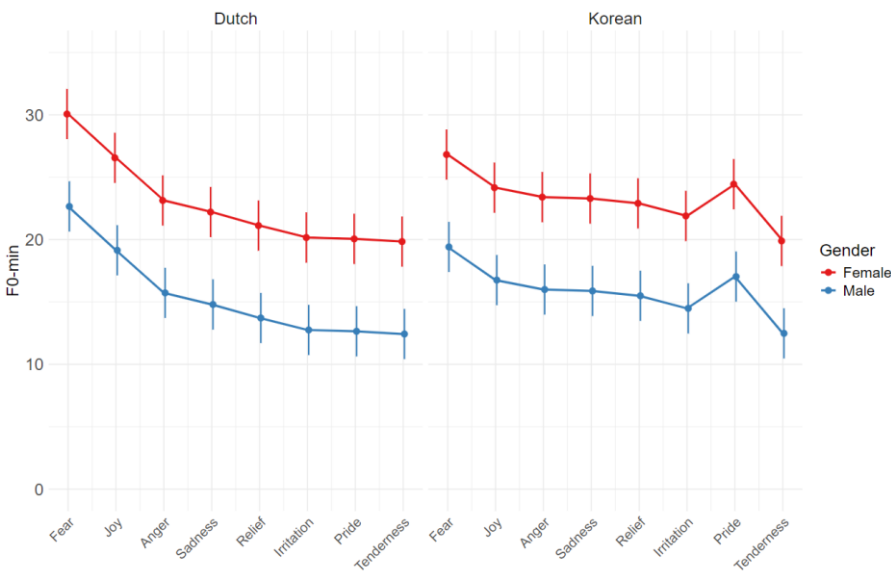


Figure H3. F0-min (semitones re. 50 Hz) between Dutch and Korean across females and males.

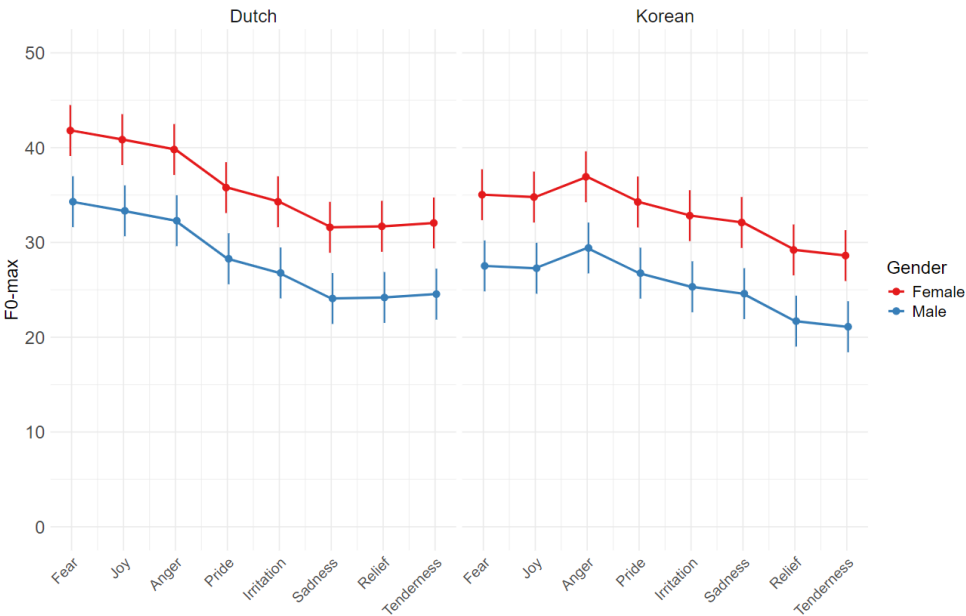


Figure H4. F0-max (semitones re. 50 Hz) between Dutch and Korean across females and males.

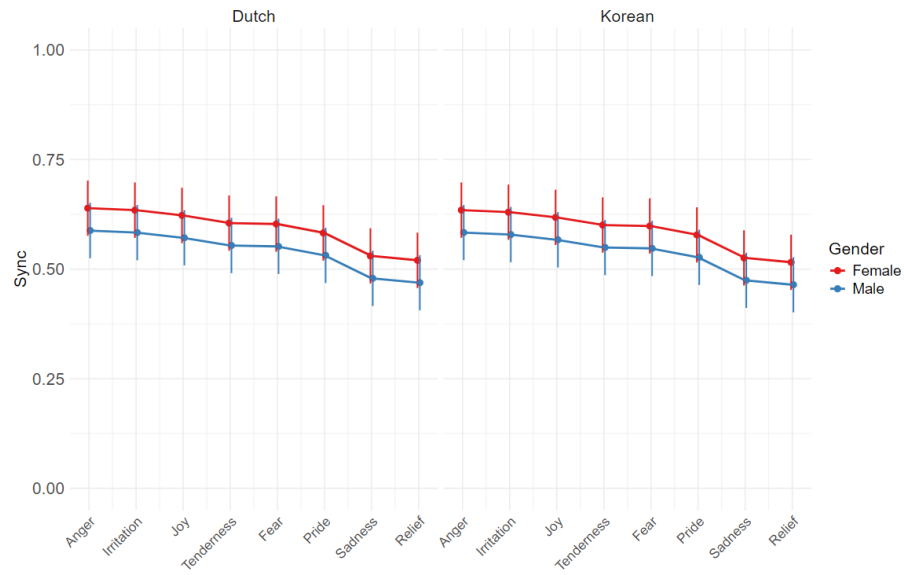


Figure H5. Synchronization (proportion of utterance duration) of F0-change between Dutch and Korean across females and males.

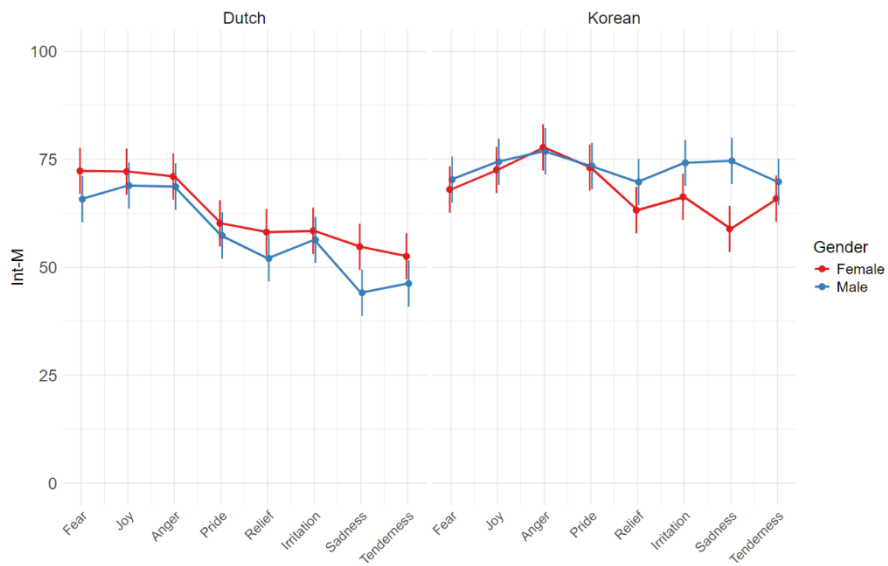


Figure H6. Int-M (decibels) between Dutch and Korean across females and males.

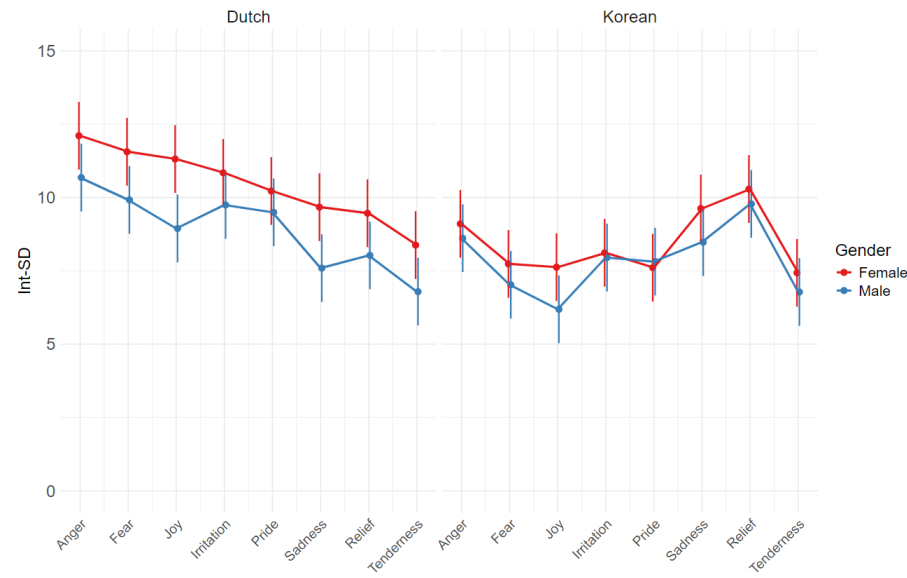


Figure H7. Int-SD (decibels) between Dutch and Korean across females and males.

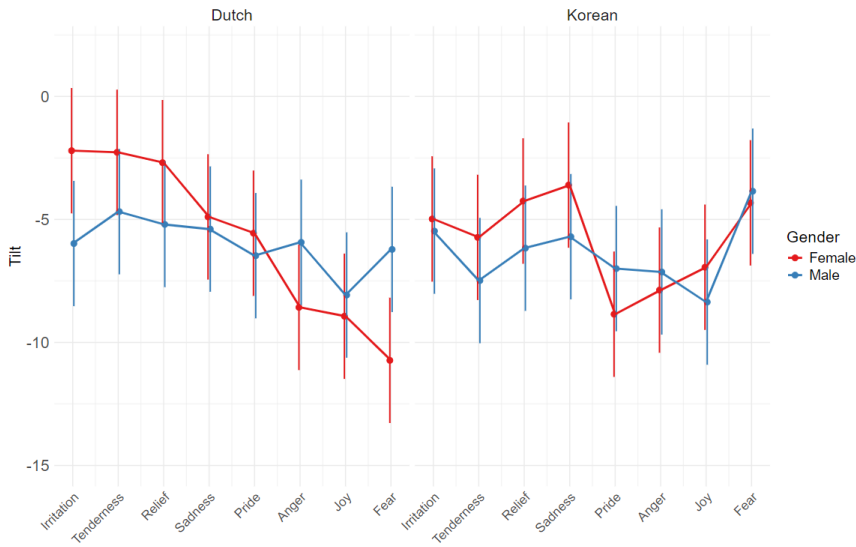


Figure H8. Spectral Tilt (decibels per octave) between Dutch and Korean across females and males.

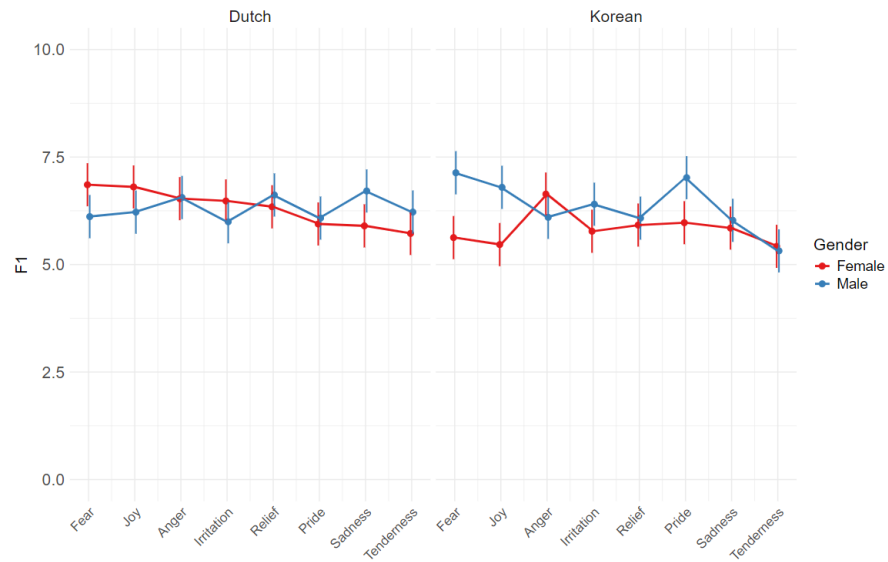


Figure H9. F1 (Equivalent Rectangular Bandwidths, ERB) between Dutch and Korean across females and males.

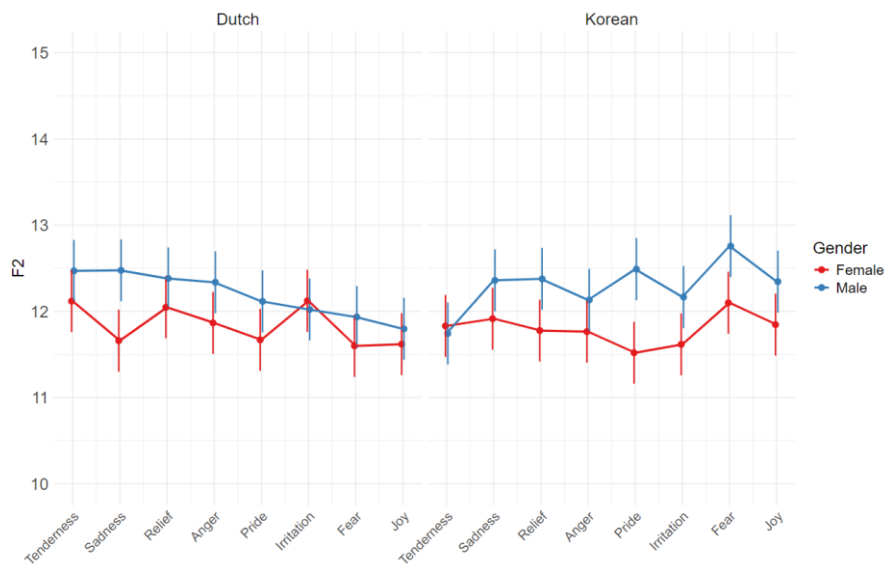


Figure H10. F2 (Equivalent Rectangular Bandwidths, ERB) between Dutch and Korean across females and males.

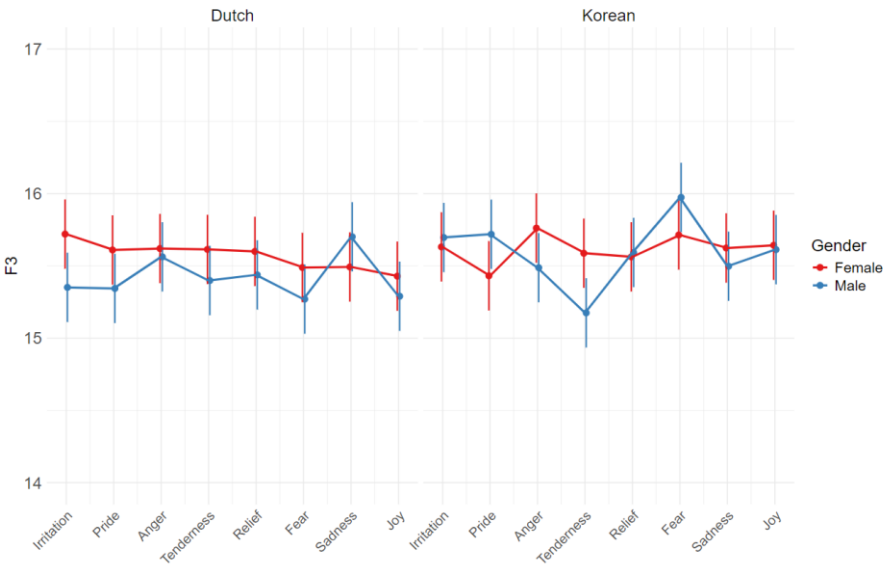


Figure H11. F3 (Equivalent Rectangular Bandwidths, ERB) between Dutch and Korean across females and males.

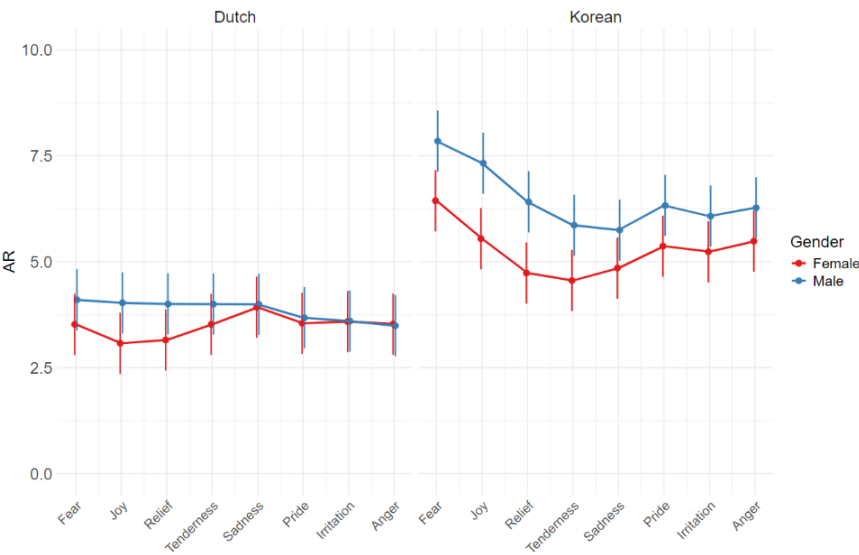


Figure H12. AR (syllables per second) between Dutch and Korean across females and males.

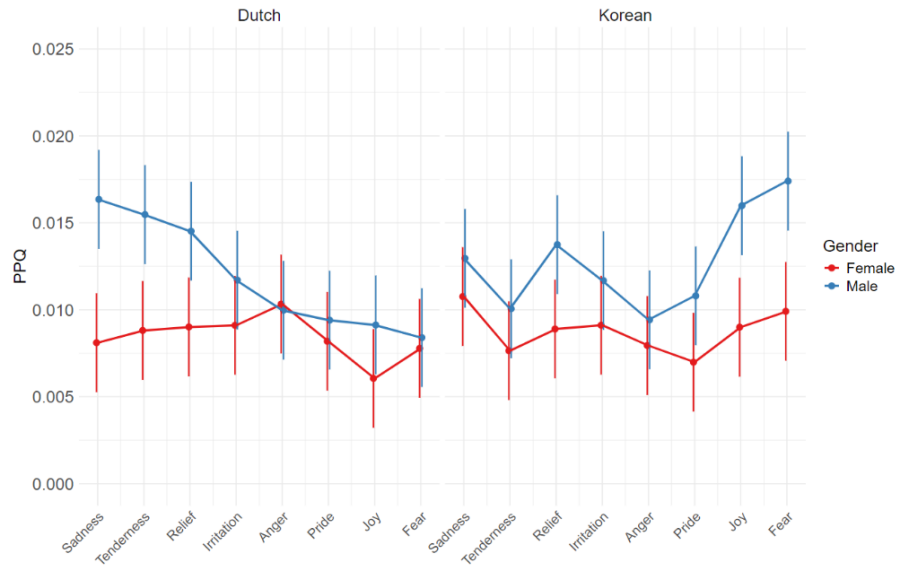


Figure H13. PPQ between Dutch and Korean across females and males.

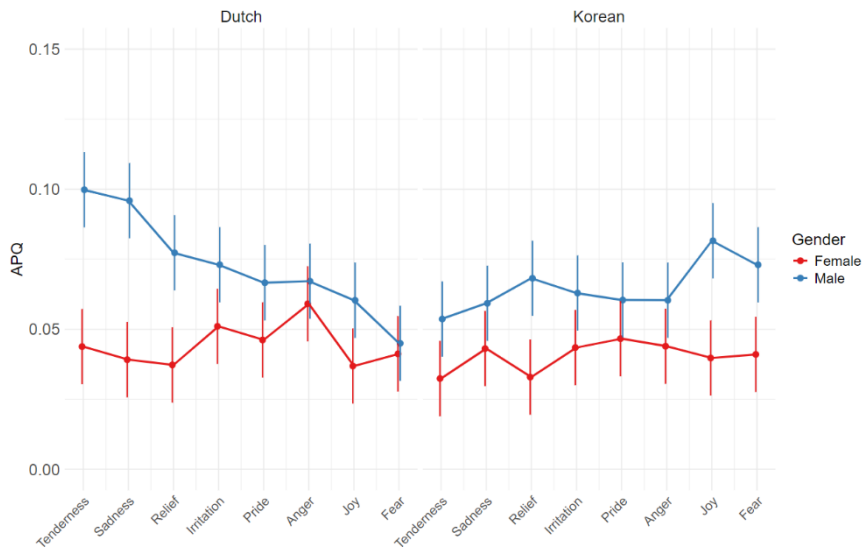


Figure H14. APQ between Dutch and Korean across females and males.

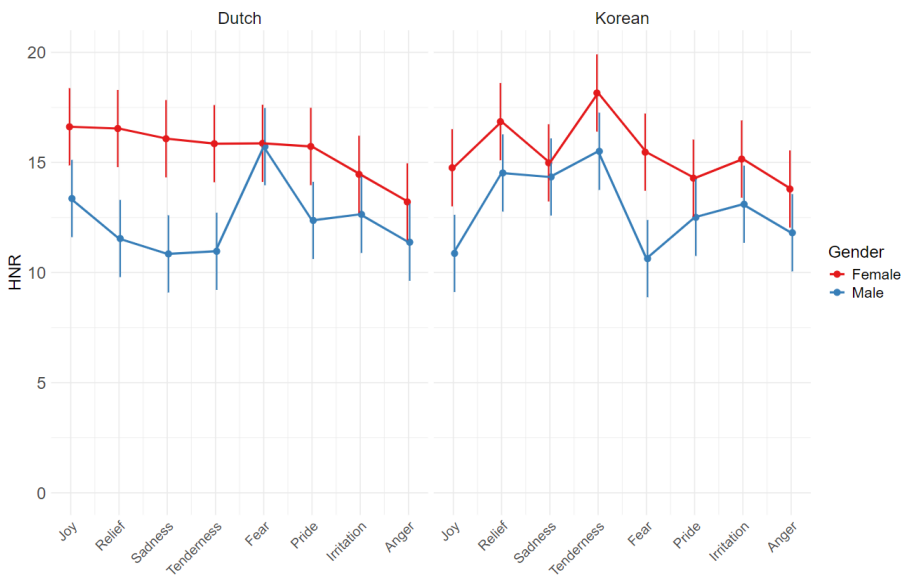


Figure H15. HNR (decibels) between Dutch and Korean across females and males.

Appendix I. Summary of confusion matrices for SVM models and classifiers.**Table II.** Confusion matrices for SVM models tested in-group (A, C) with Leave-One-Out cross-validation) and out-group (B, D). Panels E-F-G-H show the corresponding responses by human listeners. Correct classifications (%) are shown in bold in main diagonal. Empty cells have zero confusions.

Responses (down)	In-group								Out-group							
	A. Dutch model								B. Dutch model, Korean data							
	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness
Anger	100		13	25					69	25	38	50	13	6	6	
Fear		100		56					13	31		13	38	6	19	
Irritation			19		13			6	6		6		6	13	13	13
Joy				19						6		0				6
Pride			50		75	6	6		13		19	25	25	6	6	19
Relief						13								0		
Sadness					13	81	88	25		19	19		13	56	38	50
Tenderness			19				6	69		19	19	13	6	13	13	19
Responses (down)	C. Korean model								D. Korean model, Dutch data							
	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness
	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness
Anger	94	19	44	44	63	6	13		81	63	19	88	25	6		
Fear	6	69		31	6	6			19	25	19			6	19	13
Irritation			0								0					
Joy		6	13	13	13	6	19	6			19	0	19	38	25	31
Pride				6	6		13	13		6	13	13	13		6	
Relief			19		6	6	13	13			31		44	19	13	
Sadness			6		6	50	44			6				19	19	6
Tenderness		6	19	6		25		69						13	19	50
Responses (down)	E. Dutch listeners, Dutch data								F. Dutch listeners, Korean data							
	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness
	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness
Anger	63	8	19	11	7	1			39	4	10	16	8	1		2
Fear		41	2	11		4	7	6	5	56	4	11	13	15	9	5
Irritation	34	6	61	9	16	7		1	41	4	53	12	20	5	1	4
Joy		2	2	41	25	5		14	3		3	22	19	4	1	19
Pride	2	1	7	4	25	4		8	3		4	4	8	3	1	17
Relief		3	3	15	18	54	2	11	4	6	16	14	19	48	5	14
Sadness		38	4	9	1	16	85	24	3	27	5	16	9	14	76	9
Tenderness		1	2	1	7	9	5	34	1	2	5	4	3	11	7	31
Responses (down)	G. Korean listeners, Korean data								H. Korean listeners, Dutch data							
	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness
	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness
Anger	67	13	39	17	15	7		2	35	10	12	18	6	4	1	
Fear		26	5	7	2	2	2	1	1	52	1	8	4	7	3	
Irritation	29	13	27	18	18	10	1	2	61	4	63	12	20	10	2	2
Joy	1	4	5	21	16	4		10			1	22	18	7	1	18
Pride	3	3	8	15	23	3		3	1	1	3	9	26	1		4
Relief		2	12	4	15	39	10	22	1	3	11	12	16	44	8	28
Sadness	1	38	2	14	3	30	86	43	1	31	8	17	8	24	83	8
Tenderness		2	2	4	8	6	1	16			1	3	3	2	2	40

Table I2. Distance matrix (lower triangle only) for all pairs of combinations of Dutch (Du) and Korean (Ko) in-group and out-group identifications of emotions by SVM models and by human listeners.

	SVM models				Human listeners			
Training/Listeners	Du	Du	Ko	Ko	Du	Du	Ko	Ko
Test data/Speakers	Du	Ko	Ko	Du	Du	Ko	Ko	Du
Train: Du, Test: Du	0							
Train: Du, Test: Ko	1.69	0						
Train: Ko, Test: Ko	1.80	1.57	0					
Train: Ko, Test: Du	2.22	1.98	1.69	0				
Listen: Du, Speak: Du	1.40	1.57	1.68	1.81	0			
Listen: Du Speak: Ko	1.50	1.47	1.61	1.78	0.54	0		
Listen: Ko, Speak: Ko	1.46	1.57	1.66	1.81	0.48	0.50	0	
Listen: Ko, Speak: Du	1.46	1.45	1.61	1.77	0.57	0.75	0.63	0

Appendix J

Table J1. Hofstede's Six Cultural Dimension Scores for America, France, The Netherlands, and South Korea²⁷

Country	PDI	IDV	MAS	UAI	LTO	IVR
America	40	91	62	46	26	68
France	68	71	43	86	63	48
The Netherlands	38	80	14	53	67	68
South Korea	60	18	39	85	100	29

²⁷ PDI: power distance; IDV: individualism vs. collectivism; MAS: masculinity vs. femininity; UAI: uncertainty avoidance; LTO: long-term vs. short-term orientation; and IVR: indulgence vs. restraint. <https://geerthofstede.com/country-comparison-graphs/>

Table J2. Cultural distance matrix between America, France, the Netherlands, and South Korea²⁸

	America	France	Netherlands	South Korea
America		70.10	64.49	121.56
France			57.68	67.97
Netherlands				92.67
South Korea				

Appendix K. Recognition accuracy in Dutch and Korean recordings by American English and French listeners

Emotion	American English listeners		French listeners	
	Dutch speakers	Korean speakers	Dutch speakers	Korean speakers
Anger	0.54	0.30	0.72	0.46
Fear	0.42	0.51	0.52	0.57
Irritation	0.46	0.48	0.40	0.39
Joy	0.45	0.17	0.52	0.28
Pride	0.22	0.08	0.30	0.12
Relief	0.47	0.47	0.39	0.29
Sadness	0.76	0.74	0.75	0.68
Tenderness	0.26	0.24	0.25	0.37

²⁸ The cultural distance was calculated according to the Euclidean distance formula in six dimensions.

Appendix L

Table L1. Confusion matrices for American English listeners responding to Dutch and Korean recordings.

Responses (down)	Dutch recordings								Korean recordings							
	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness
Anger	54	6	15	9	5	2	0	2	30	2	5	10	5	1	0	0
Fear	1	42	1	10	2	2	5	3	4	51	1	14	14	8	4	1
Irritation	36	6	46	12	16	5	0	3	45	4	49	13	17	7	1	4
Joy	1	5	4	45	22	5	0	10	3	2	2	17	18	2	1	12
Pride	6	2	12	5	22	3	0	4	9	0	6	4	8	1	1	7
Relief	0	2	4	8	8	47	3	12	3	5	8	13	16	47	6	10
Sadness	0	33	2	9	3	11	77	28	3	25	7	20	8	13	74	13
Tenderness	0	3	1	0	5	10	8	26	0	7	5	3	2	11	10	24
Neutrality	2	3	14	3	19	16	9	15	6	5	18	7	11	11	4	28

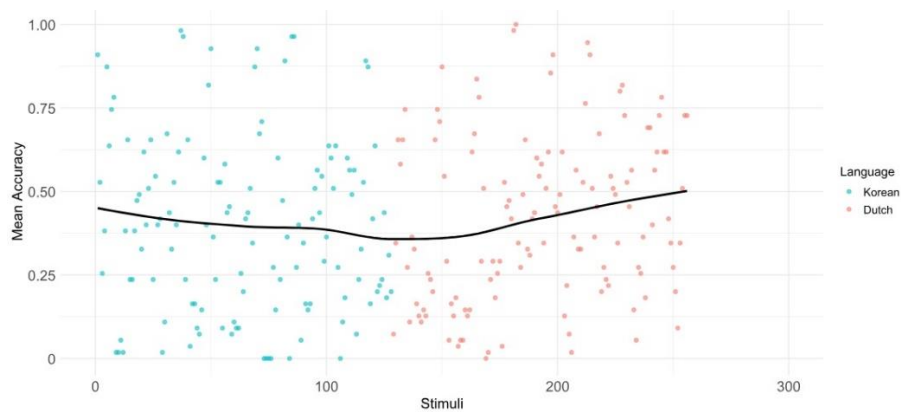
Table L2. Confusion matrices for French listeners responding to Dutch and Korean recordings.

Responses (down)	Dutch recordings								Korean recordings							
	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness
Anger	73	8	25	10	5	3	1	1	46	5	14	13	6	2	0	0
Fear	0	52	1	9	0	2	8	2	4	57	5	15	11	12	8	0
Irritation	17	12	40	11	8	9	3	1	29	5	39	4	13	7	2	3
Joy	2	3	4	52	31	11	0	21	4	2	4	28	24	7	2	16
Pride	6	1	10	1	30	6	0	9	8	1	6	10	12	5	0	9
Relief	0	3	2	3	7	39	3	9	2	5	8	8	15	29	6	9
Sadness	0	21	1	4	0	9	75	18	0	19	5	15	6	19	68	4
Tenderness	0	0	2	0	6	10	3	25	1	2	3	2	3	7	9	37
Neutrality	1	1	14	2	12	11	7	14	5	4	16	4	11	13	5	21

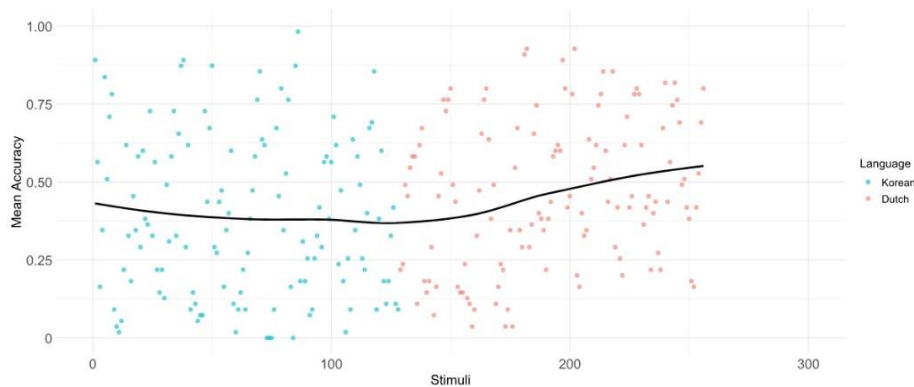
Appendix M. Distance matrix for vocal emotions of Dutch and Korean listeners (in-group only).

	A. Dutch listeners							
	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness
Anger	0							
Fear	2.26	0						
Irritation	1.35	2.04	0					
Joy	2.03	1.72	1.81	0				
Pride	2.03	2.04	1.59	1.07	0			
Relief	2.37	1.98	2.03	1.61	1.50	0		
Sadness	2.61	1.54	2.36	2.11	2.27	2.10	0	
Tenderness	2.40	1.87	2.09	1.60	1.45	1.60	1.82	0
	B. Korean listeners							
	Anger	Fear	Irritation	Joy	Pride	Relief	Sadness	Tenderness
Anger	0							
Fear	2.25	0						
Irritation	0.76	2.14	0					
Joy	1.53	1.71	1.40	0				
Pride	1.79	2.07	1.48	0.85	0			
Relief	1.91	1.83	1.52	1.14	1.37	0		
Sadness	2.38	1.93	2.08	1.70	2.04	1.58	0	
Tenderness	2.51	2.56	2.24	1.72	1.84	1.71	2.37	0

Appendix N. Mean Accuracy for Dutch and Korean listeners, with a smooth LOESS line to show the pattern over time (from stimulus 1 to stimulus 256).



Appendix O. Mean Accuracy for American English and French listeners, with a smooth LOESS line to show the pattern over time (from stimulus 1 to stimulus 256).



Appendix P. Instruction

P1. Dutch version

Instructie (a)

Het experiment van vandaag bestaat uit twee delen. Nu zullen we het eerste deel van het experiment uitleggen.

Je luistert naar de geluiden en bepaalt welke emotie de geluiden volgens jou uitdrukken.

De geluiden die je uit een headset hoort, zijn betekenisloos, maar verschillende Koreaanse sprekers hebben verschillende emoties geuit. Het is jouw taak om naar één geluid tegelijk te luisteren en uit voorbeelden op een scherm te kiezen welke emotie bij elk geluid hoort. Het voorbeeld op een scherm heeft 8 emoties. ①bang/angstig ②boos ③geïrriteerd/geërgerd ④verdrietig ⑤tederheid ⑥opgelucht ⑦trots ⑧gelukkig/blij. Als je denkt dat de zin zonder enige emotie wordt uitgedrukt, kies je voor de [neutrale] knop.

Terwijl je een soort van emoties bepaalt, moet je de intensiteit van de emotie bepalen. Met andere woorden, je moet beslissen hoe sterk de Koreaanse spreker de emotie voelt. Omdat sterke emotie op een rustige en introverte manier kan worden uitgedrukt, moet je je niet concentreren op de manier van expressie, maar op de intensiteit van de emotie zelf. Elk van de 8 emoties uit het voorbeeld op een scherm vormen vier cirkels van verschillende grootte.

De grootte van de cirkels staat voor de intensiteit van de emotie, wat betekent dat de grote cirkel staat voor sterke intensiteit en de kleine cirkel voor zwakke intensiteit. Klik op een cirkel op basis van het soort en de intensiteit van de emotie.

Als je het nodig vindt, kun je maximaal twee verschillende emoties voor één geluid kiezen. Houd ook rekening met de intensiteit van elke soort emotie. Als u op dezelfde cirkel klikt waarop u zojuist hebt geklikt, wordt deze keuze geannuleerd. Als u nog een keer wilt horen, drukt u nogmaals op de knop [Nogmaals]. Let er echter op dat u meer aandacht besteedt aan de eerste indruk die u krijgt. Druk na uw keuze op de [volgende]-knop om de volgende proefperiode te starten.

Nu gaan we oefenproeven starten. Stel al uw vragen tijdens de oefentrials. Na de oefentrials begint het eigenlijke experiment.

Instructie (b)

Laten we nu het tweede deel van het experiment uitleggen.

Zoals je in het eerste deel hebt gedaan, luister je naar de geluiden en beslis je welke emotie de geluiden uitdrukken.

Je hoort weer dezelfde zinloze zin met de zin die je in het eerste deel hebt gehoord. In deze tijd hebben verschillende Nederlandstaligen echter uiteenlopende emoties geuit. Jouw taak is om naar één geluid tegelijk te luisteren en uit voorbeelden op een scherm te kiezen welke emotie bij elk geluid hoort. Het voorbeeld op een scherm heeft 8 emoties. ①bang/angstig ②boos ③geïrriteerd/geërgerd ④verdrietig ⑤tederheid ⑥opgelucht ⑦trots ⑧gelukkig/blij. Als je denkt dat de zin zonder enige emotie wordt uitgedrukt, kies je voor de [neutrale] knop.

Terwijl je een soort van emoties bepaalt, moet je de intensiteit van de emotie bepalen. Met andere woorden, u moet beslissen hoe sterk de Nederlandstalige de emotie voelt. Omdat sterke emotie op een rustige en introverte manier kan worden uitgedrukt, moet je je niet concentreren op de manier van expressie, maar op de intensiteit van de emotie zelf. Elk van de 8 emoties uit het voorbeeld op een scherm vormen vier cirkels van verschillende grootte. De grootte van de cirkels staat voor de intensiteit van de emotie, wat betekent dat de grote cirkel staat voor sterke intensiteit en de kleine cirkel voor zwakke intensiteit. Klik op een cirkel op basis van het soort en de intensiteit van de emotie.

Als je het nodig vindt, kun je maximaal twee verschillende emoties voor één geluid kiezen. Houd ook rekening met de intensiteit van elke soort emotie. Als u op dezelfde cirkel klikt waarop u zojuist hebt geklikt, wordt deze keuze geannuleerd. Als u nog een keer wilt horen, drukt u nogmaals op de knop [Nogmaals]. Let er echter op dat u meer aandacht besteedt aan de eerste indruk die u krijgt. Druk na uw keuze op de [volgende]-knop om de volgende proefperiode te starten.

Nu gaan we oefenproeven starten. Stel al uw vragen tijdens de oefentrials. Na de oefentrials begint het eigenlijke experiment en ben je klaar.

P2. Korean version

지시 (a)

오늘의 실험은 두 부분으로 구성됩니다. 이제 실험의 첫 부분에 대해 설명하겠습니다.

소리를 듣고 소리가 표현하는 감정을 결정합니다.

헤드셋에서 들리는 소리는 의미가 없지만 여러 한국어 사용자가 다양한 감정을 표현했습니다. 당신의 임무는 한 번에 하나의 소리를 듣고 화면의 예에서 각 소리가 포함하는 감정을 선택하는 것입니다. 화면의 예에는 8 가지 감정이 있습니다. ①두렵다/두려워하다 ②화가 나다 ③화나다/성가시다 ④슬픈 ⑤부드러움 ⑥안심하다 ⑦자랑스럽다 ⑧기쁨/기쁨. 문장이 감정 없이 표현되었다고 생각되면 [중립] 버튼을 선택합니다.

감정의 종류를 결정하는 동안 감정의 강도를 결정해야 합니다. 즉, 한국어 화자가 감정을 얼마나 강하게 느끼는지를 결정해야 합니다. 강한 감정은 조용하고 내향적인 방식으로 표현할 수 있기 때문에 표현 방식이 아닌 감정의 강도 자체에 집중해야 합니다. 화면의 예에서 8 개의 감정 각각은 4 개의 다른 크기의 원을 구성합니다. 원의 크기는 감정의 강도를 나타내며, 큰 원은 강한 강도, 작은 원은 약한 강도를 나타냅니다. 감정의 종류와 정도에 따라 동그라미를 눌러주세요.

필요하다고 느끼시면 하나의 소리에 대해 최대 두 가지 감정을 선택할 수 있습니다. 각 감정의 강도를 고려하십시오. 방금 클릭한 동일한 원을 클릭하면 이 선택이 취소됩니다. 다시 듣고 싶으시면 [다시] 버튼을

눌러주세요. 하지만 첫인상을 더 중요하게 생각하시기 바랍니다. 다음 시도를 시작하려면 선택 후 [다음] 버튼을 눌러주세요.

이제 실습을 시작하겠습니다. 실습 중 궁금한 사항은 무엇이든 물어보세요. 실습이 끝나면 실제 실습이 시작됩니다.

지시 (b)

이제 실험의 두 번째 부분에 대해 설명하겠습니다.

첫 번째 부분에서 했던 것처럼 소리를 듣고 소리가 표현하는 감정을 결정합니다.

처음 부분에서 들은 문장과 똑같은 의미 없는 문장을 다시 듣게 됩니다. 그러나 이때 여러 네덜란드 화자들이 다양한 감정을 표현했습니다. 당신의 임무는 한 번에 하나의 소리를 듣고 화면의 예에서 각 소리가 포함하는 감정을 선택하는 것입니다. 화면의 예에는 8 가지 감정이 있습니다. ①두렵다/두려워하다 ②화가 나다 ③화나다/성가시다 ④슬픈 ⑤부드러움 ⑥안심하다 ⑦자랑스럽다 ⑧기쁨/기쁨. 문장이 감정 없이 표현되었다고 생각되면 [중립] 버튼을 선택합니다.

감정의 종류를 결정하는 동안 감정의 강도를 결정해야 합니다. 즉, 네덜란드 화자가 감정을 얼마나 강하게 느끼는지 결정해야 합니다. 강한 감정은 조용하고 내성적인 방식으로 표현할 수 있기 때문에 표현 방식이 아니라 감정 자체의 강도에 집중해야 합니다. 화면의 예에서 8 개의 감정 각각은 4 개의 다른 크기의 원을 구성합니다. 원의 크기는 감정의 강도를 나타내며, 큰 원은 강한 강도, 작은 원은 약한 강도를 나타냅니다. 감정의 종류와 정도에 따라 동그라미를 눌러주세요.

필요하다고 느끼시면 하나의 소리에 대해 최대 두 가지 감정을 선택할 수 있습니다. 각 감정의 강도를 고려하십시오. 방금 클릭한 동일한 원을 클릭하면 이 선택이 취소됩니다. 다시 듣고 싶으시면 [다시] 버튼을 눌러주세요. 하지만 첫인상을 더욱 중요하게 생각하시기 바랍니다. 다음 시도를 시작하려면 선택 후 [다음] 버튼을 눌러주세요.

이제 실습을 시작하겠습니다. 실습 중 궁금한 사항은 무엇이든 물어보세요. 연습 시도 후 실제 실험이 시작되고 완료됩니다

List of publications

Liang, Y., van Heuven, V., van Hout, R. (Submitted). Recognizing vocal emotions in unfamiliar languages: universal patterns versus cultural and prosodic proximity.

Liang, Y., van Heuven, V., van Hout, R. (Submitted). Classifying emotions cross-linguistically from acoustic parameters.

Liang, Y., van Hout, R., van Heuven, V. (Submitted). Interpreting the intensity of vocal emotions across cultures.

Liang, Y., Goudbeek, M., Konopka, A., & Choi, J., Broersma, M. (2025). Investigating cross-cultural vocal emotion recognition with an affectively and linguistically balanced design. *Language and Speech*.
<https://doi.org/10.1177/00238309251318730>

Liang, Y., Broersma, M., Goudbeek, M., Konopka, A., & Choi, J. (2023). Rhythmic similarity hypothesis for cross-cultural vocal emotion recognition. *Proceedings of the 20th International Congress of Phonetic Sciences*, Prague, 1315–1319.
https://www.internationalphoneticassociation.org/icphs-proceedings/ICPhS2023/full_papers/253.pdf