Supplementary materials

Early modulations of neural oscillations during the processing of emotional body language

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Supplemental methods:

Characteristics of visual stimuli

All the visual stimuli used in the experiment were taken from a validated database (see Figure S1, panel A) (Borgomaneri et al., 2012; Botta et al., 2021). In the following tables (Table S1 and Table S2) are shown RGB values, perceived luminance, contrast and edge density (as an indicator of image complexity).

Perceived luminance was computed via the following formula (International Telecommunication Union Recommendation, 2011):

$$L_P = (0.299 \text{ x } R + 0.587 \text{ x } G + 0.114 \text{ x } B)$$

Here, L_P represents the Perceived Luminance, and R, G, B denote the red, green, and blue channels, respectively. The luminance results are dimensionless, being the outcome of a numerical computation method.

For assessing contrast, we measured the difference between the luminance of the image background and the luminance of the model depicted in the picture.

A

B

Figure S1: Panel A: Examples of the EBL pictures used in the study, from the original work by Borgomaneri et al., 2012. On the left it is shown an example of fearful EBL, while on the right it is possible to observe a neutral EBL example. Panel B: Example of edge detection via the 'Canny edge detector' plugin.

Furthermore, image complexity was evaluated based on the concept of 'edge density' (Machado et al., 2015). Edges in an image depend on various factors, including the number of subjects, illumination, and depth. The perceived complexity of an image is determined by the quantity of edges and their distribution (Machado et al., 2015; Madan et al., 2018). Borders were identified through the 'Canny edge detector' plugin of the open source software ImageJ v.1.53 (see Figure S1, panel B). We then measured the amount of pixels composing the edges of each image, obtaining a numerical, comparable value of the image complexity (see Table S1 and Table S2).

	Red	Green	Blue	Luminance	Contrast	Edge density (pixels)
Fear_1	161.14	124.16	106.23	133.19	121.81	6284.663
Fear_2	174.66	135.69	114.38	144.92	110.08	8236.617
Fear_3	152.85	115.67	94.49	124.38	130.62	3355.912
Fear_4	170.86	147.75	132.84	152.97	102.03	6906.878
Fear_5	166.30	145.54	132.72	150.29	104.71	7115.294
Fear_6	178.09	128.39	90.43	138.94	116.07	8012.689
Fear_7	181.62	152.75	134.14	159.27	95.73	4263.656
Fear_8	172.83	150.88	136.02	155.76	99.24	7733.184
Fear_9	180.48	158.69	144.11	163.55	91.45	7507.211
Fear_10	169.71	117.28	73.36	127.96	127.04	7006.487
Fear_11	179.89	128.46	90.17	139.49	115.52	4213.032
Fear_12	178.17	128.49	107.13	140.91	114.09	7331.183
Fear_13	176.80	138.51	119.79	147.84	107.16	4425.615
Fear_14	169.08	128.04	108.68	138.12	116.88	7243.245
Fear_15	167.49	125.22	108.37	135.95	119.05	4190.678

Table S1: Image parameters for fearful EBL

	Red	Green	Blue	Luminance	Contrast	Edge density (pixels)
Neutral_1	143.12	96.84	73.99	108.09	146.91	6865.99
Neutral_2	156.61	119.05	99.49	128.06	126.95	4591.373
Neutral_3	147.85	109.31	87.01	118.30	136.70	8088.127
Neutral_4	160.69	129.13	110.55	136.46	118.54	9393.184
Neutral_5	187.58	144.47	114.65	153.97	101.03	7374.993
Neutral_6	173.69	131.14	103.35	140.71	114.29	6251.408
Neutral_7	151.12	124.38	109.03	130.64	124.36	4606.36
Neutral_8	174.89	143.71	121.54	150.52	104.48	4803.826
Neutral_9	183.02	156.48	139.58	162.50	92.50	7932.944
Neutral_10	179.10	153.17	136.46	159.03	95.97	5450.193
Neutral_11	187.65	160.77	141.95	166.68	88.33	5708.181
Neutral_12	175.37	127.24	88.54	137.23	117.77	6895.145
Neutral_13	183.44	130.16	89.58	141.48	113.52	7724.534
Neutral_14	171.45	122.43	83.16	132.63	122.37	3534.439
Neutral_15	176.96	128.53	89.58	138.58	116.42	7038.657

Table S2: Image parameters for neutral EBL

All image parameters were compared via a paired T-test comparing the two sets of images (Fear and Neutral). Results showed no significant differences between sets, showing an equivalence in terms of image properties and complexity (numerical results are observable in table S3).

	Red	Green	Blue	Luminance	Contrast	Edge density (pixels)
Fear (mean ± st.dev.)	172.00± 7.68	135.03± 12.89	112.86± 19.73	143.57± 10.96	111.43± 10.96	6255.09± 1607.95
Neutral (mean ± st.dev.)	170.17± 14.16	131.79± 16.90	105.90± 20.81	140.32± 15,67	114.68± 15,67	6417.29± 1557.35
p-value (Fear vs. Neutral)	0.600	0.498	0.360	0.454	0.454	0.809

Table S3: Statistical analysis results. All values are reported as mean ± standard deviation

Supplemental References:

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