Supplementary Information for

Same stimuli, different responses: a pilot study assessing air pollution visibility impacts on emotional well-being in a controlled environment

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Contents:

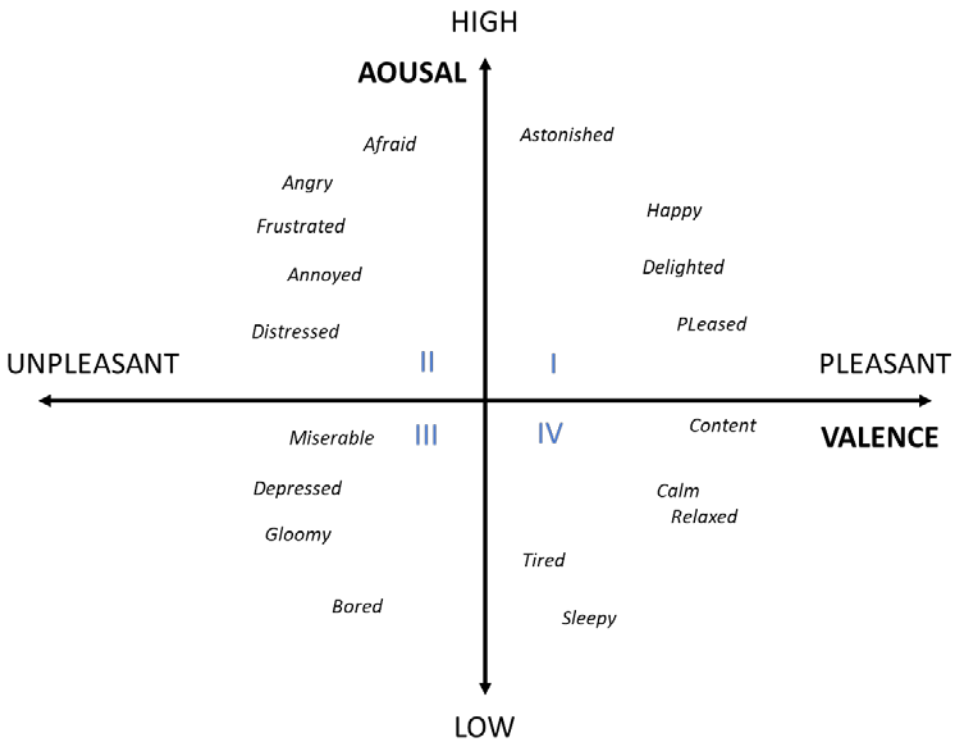

Figure S1 | Two-dimensional model of emotion. Revised from Russell (1980).

The two-dimensional model is useful to classify emotion. It defines emotions on a two-dimensional space – valance and arousal. Valance denotes the polarity of emotions (positive or negative) and arousal denotes the intensity (high or low). As shown in Figure S1, many primary categories of emotion can be positioned on the two-dimensional plot. Emotions in Quadrant I have positive valence and arousal. They usually represent joyful emotions such as happy and delighted. Emotions in Quadrant II have positive arousal but negative valence, such as angry and afraid. Emotions in Quadrant III have both negative valence and low arousal, indicating some low-energized negative mental states, such as depressed and bored. Finally, emotion in Quadrant IV denote some peaceful emotional experience such as calm and relaxed or lethargic states such as sleepy.

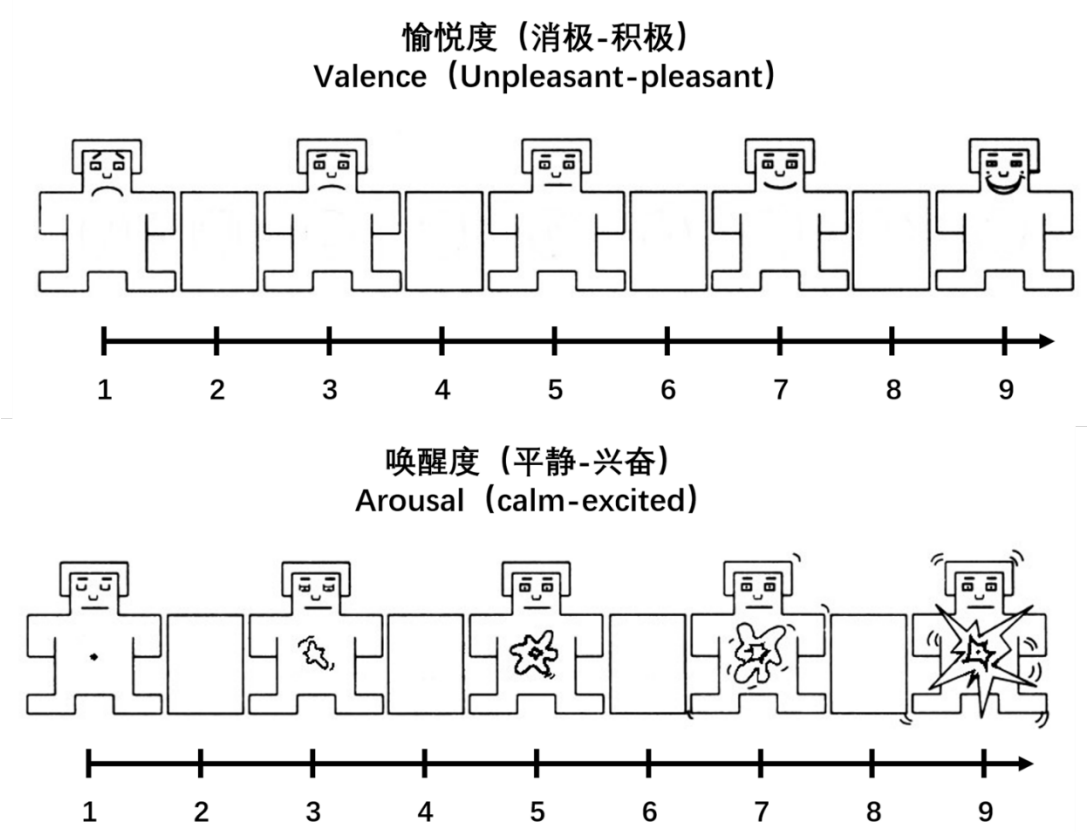

Figure S2 | The Self-Assessment Manikin (SAM) used to measure emotion. Revised from Bradley and Lang (1994)

The Self-Assessment Manikin (SAM) constructed by Bradley and Lang (1994) is the most widely used pictorial technique to measure the pleasure and arousal with a person's affective reactions to stimuli. As illustrated in Figure S2, each panel has a 9-point scale and graphic depiction along each dimension of emotion. SAM ranges from a smiling, happy figure to a frowning, unhappy figure when representing the pleasure dimension, and ranges from an excited, wide-eyed figure to a relaxed, sleepy figure for the arousal dimension. For valence, the participants were asked to report how pleased they feel. For arousal, the participants were asked to report how aroused they feel. Participants used a numeric keyboard to rate valence and arousal. Lower valence and arousal scores indicate that the emotion is less pleased and less excited.

Table S1 | Description of variables in the logistical regression models that predict emotional bias.

Acronym	Variable explanation	Variable type	Value distribution
NE_P	Negativity bias to a pollution image	Categorical	Yes 295 (24%)
			No 931 (76%)
PO_P	Positivity offset to a pollution image	Categorical	Yes 382 (31%)
			No 841 (69%)
GE	Gender	Categorical	Male 13 (32%)
			Female 28 (68%)
PE	Pollution exposure experience	Continuous	51.91 (±14.35) μg/m^3
RT	Response time	Continuous	1924 (±1012) ms
NE_C	Indicator of negativity bias to clean air	Continuous	10.31 (±8.27)
PO_C	Indicator of positivity offset to clean air	Continuous	5.95 (±6.63)
PM	$PM_{2.5}$ concentrations	Continuous	120 to 260 μg/m^3
BL	Block	Continuous	1 to 6

Table S2 | Results of regression model between valance rating and $PM_{2.5}$ concentration.

Coefficient	β Estimate
Intercept	9.9751***
$Log_{10}(PM_{2.5})$	−3.2608***
Adjusted R-Squared	0.4877
F-statistic	2799
P value	<2.2e-16

Significance codes for β coefficient: *** P < 0.001.

Table S3 | Self-rated scores for the 12 climate change images.

Climate change image content	Mean valence	Mean Arousal	Mean valence response time (ms)	Mean arousal response time (ms)	S.D. of valence	S.D. of arousal	S.D. of valence response time (ms)	S.D. of arousal response time (ms)
Children at Arid Areas	2.76	5.23	3080.99	3139.43	1.41	2.14	2929.53	2929.53
Climate Change Conference	5.68	4.40	2541.20	2700.61	1.29	2.25	2120.34	2120.34
Electric Vehicle	6.18	4.49	2533.13	2574.70	1.35	2.33	2022.35	2022.35
Energy Consumption Emission	2.31	5.82	2618.48	2940.71	1.32	2.25	2104.38	2104.38
Heat Stress	3.32	5.00	3147.55	2879.61	1.57	2.26	2889.28	2889.28
Nuclear Power	4.96	4.41	2788.69	2735.85	1.56	2.14	2529.10	2529.10
Polar Bear	4.22	5.35	2965.08	3154.13	2.17	2.22	2664.88	2664.88
Snow Melting	3.65	5.04	3239.60	3419.52	1.79	2.09	2859.28	2859.28
Solar Power	6.03	4.61	2820.49	2875.01	1.53	2.29	2951.23	2951.23
Typhoon	2.64	5.90	3065.40	2986.51	1.52	2.27	2736.77	2736.77
Urban Flood	2.93	5.12	2899.39	3239.48	1.32	2.14	2546.67	2546.67
Wildfire	2.11	6.68	2510.56	2527.11	1.39	2.25	2234.12	2234.12

Supplementary References

Bradley, M.M., Lang, P.J. (1994) Measuring emotion: The self-assessment manikin and the semantic differential. Journal of Behavior Therapy and Experimental Psychiatry 25, 49-59.
Russell, J.A. (1980) A circumplex model of affect. Journal of Personality and Social Psychology 39, 1161-1178.