Supplementary Materials

for

Visual Processing and Emotion Perception

from Ingroup and Outgroup Facial Expressions

Method

Power analysis

Based on prior work on the Other Race Effect (ORE), we estimated the effect sizes for H1 (i.e., differences on looking time between ingroup and outgroup faces) to be larger than that of H2 (the relationship between visual processing and the ORE. Therefore, to determine the sample size, we conducted a priori power analyses using effect sizes obtained from studies investigating the relationship between visual processing and the ORE (Brielmann et al., 2013; Kawakami et al., 2013). To achieve 0.8 power based on an effect size of $d = 0.3$, we would need 71 participants. Because previous studies on face perception have reported varying effect sizes and it is unclear to what extent they are applicable to the context of emotion perception in the current study, we sampled with some margin to limit the chance of being underpowered. A total of 101 participants were eventually recruited within the planned period of the study.

Stimuli selection

The expressions were selected according to the following criteria: 1) Only the face (no hand or body clues) was shown. 2) Faces must be oriented to the camera (although no direct gaze was mandatory). 3) Posers must fit in with Dutch and Chinese racial prototypes (i.e., White and Asian) to ensure the appropriate cross-racial comparison. 4) A clear view of the eye and mouth regions was required. A semi-random selection from all the expressions that fit the inclusion criteria was done to ensure that equal numbers of stimuli were drawn from each emotion and, whenever possible, without repetition of expresser identity. The full list of all the stimuli with the corresponding emotion and expresser characteristics can be found in our OSF project folder: https://osf.io/5qcnd/?view_only=441d92931db34dc0b1b015fe87850a0a

Overview of Stimuli

	Stimuli Type	*N* Stimuli		*N* Expressers	
		Ingroup	Outgroup	Ingroup	Outgroup
Block 1	Standardized posed	30	30	6	6
Block 2	Unstandardized posed	32	32	28	27
Block 3	Unstandardized spontaneous	32	32	26	25

Results

1. Findings for H1 summarized in a table

Summary Statistics of Looking Time at each Area of Interest

AOI	Mean Looking Time (*SD*) in *ms*		*p* value		
	Ingroup	Outgroup	First half	Second half	All Data
Eyes	301.28 (436.76)	290.87 (424.19)	0.803	0.006	0.071
Eye Area	1167.19 (833.98)	1124.69 (788.31)	0.148	< 0.001*	< 0.001*
Nose	893.09 (748.31)	870.29 (710.04)	0.057	0.072	0.009*
Mouth	277.56 (366.78)	328.90 (391.21)	< 0.001*	*p* < .001*	Not tested

Note. Means and Standard deviations (SDs) of looking time at each AOI for ingroup and outgroup faces. Asterisks indicate significant differences between ingroup and outgroup faces.

2. Testing H1 with Block included as a fixed effect

To test whether the looking time at each AOI differed between ingroup and outgroup faces per stimuli type, we included Block as a fixed effect predictor next to Group in the Linear Mixed Models (LMMs). Ingroup was always the baseline level for Group and Block one was always the baseline level for Block. Emotion and Participant were included as random effects in these models. We tested these models on the entire dataset and report the results per AOI below.

Eyes

There was a significant effect of Block on looking time at the Eyes. Specifically, looking time at the Eyes was less in Block 2, $t(16917) = -24.71$, $p < 0.001$ and block 3, $t(16917) = -18.97$, $p < 0.001$, ,compared to Block 1. There was no significant effect of Group on looking time at the Eyes, $t(16917) = -1.77$, $p = 0.077$.

Eye Area

There were significant effects of Group and Block on looking time at the Eye Area. Perceivers spent less time looking at the Eye Area of outgroup faces compared to ingroup faces, $t(16917) = -4.353$, $p < 0.001$. Looking time at the Eye Area was less in Block 2, $t(16917) = -12.291$, $p < 0.001$, and Block 3, $t(16917) = -14.119$, $p < 0.001$, compared to Block 1.

Nose

There were significant effects of Group and Block on looking time at the Nose. Perceivers spent less time looking at the Nose of outgroup faces compared to ingroup faces, $t(16917) = -2.52$, $p = 0.012$. Looking time at the Nose was longer in Block 2, $t(16917) = 5.33$, $p < 0.001$, and Block 3, $t(16917) = 17.33$, $p < 0.001$, compared to Block 1.

Mouth

There were significant effects of Group and Block on looking time at the Mouth. Perceivers spent more time looking at the Mouth of outgroup faces compared to ingroup faces, $t(16917) = 10.52$, $p < 0.001$. Looking time at the Mouth was shorter in Block 2, $t(16917) = -3.36$, $p <$ compared to Block 1, while looking time at the mouth in Block 3 did not significantly differ from Block 1, $t(16917) = 0.64$, $p = 0.522$.

3. Testing H2 with Block included as a fixed effect

To test whether emotion recognition accuracy is affected by different looking strategies, we performed a Generalized Linear Mixed Model (GLMM), with recognition accuracy as outcome variable, looking time at the AOI (scaled) that differed between ingroup and outgroup faces (i.e., Eye Area, Nose and Mouth) as a fixed effect predictor. Here, we included Block as an additional fixed effect predictor, while Participant and Emotion were included as random effect predictors.

Consistent with the analyses reported in the main manuscript, for Eye Area and Nose, looking time at the AOI did not have a significant effect on emotion recognition accuracy. Looking time at the Mouth did have a significant effect on emotion recognition accuracy, with longer looking time at the Mouth associated with less accurate emotion recognition. Additionally, Block always had a significant effect on emotion recognition accuracy. Specifically, emotion recognition accuracy was lower in Block 2 and 3 compared to Block 1.

The analyses scripts of all supplementary results reported here can be found on our OSF project page.

References

Brielmann, A. A., Bülthoff, I., & Armann, R. (2014). Looking at faces from different angles: Europeans fixate different features in Asian and Caucasian faces. *Vision research*, *100*, 105-112.

Kawakami, K., Williams, A., Sidhu, D., Choma, B. L., Rodriguez-Bailón, R., Cañadas, E., Chung, D. & Hugenberg, K. (2014a). An Eye for the I: Preferential Attention to the Eyes of Ingroup Members. *Journal of Personality and Social Psychology*, *107*(1), 1–20.