Supplementary Figures and Tables
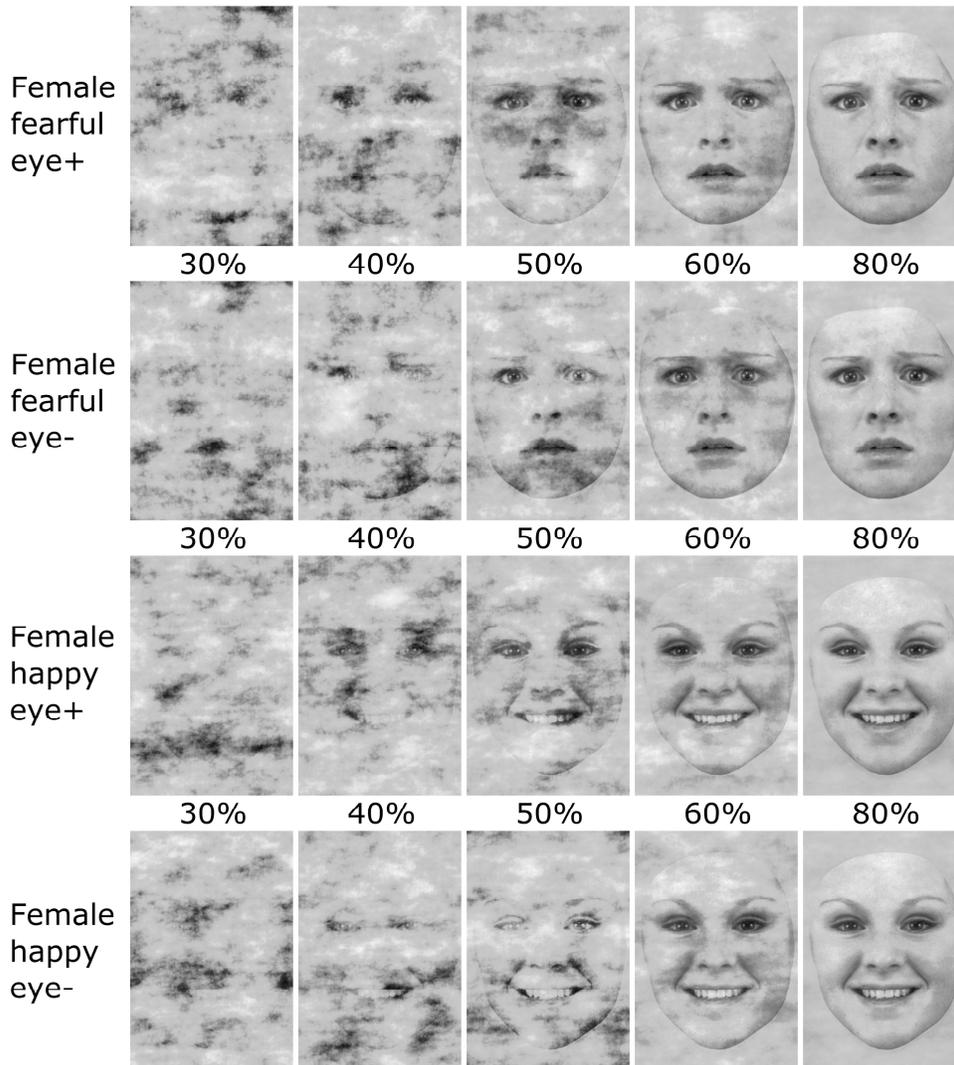
Supplementary Figure 1. Example stimuli at 30-80% signal level, in different experimental conditions: fearful or happy, more visible eyes (eye+) or less visible eyes (eye-). Stimuli were gamma-corrected before display (not shown). Original stimulus was distributed as part of the Karolinska Directed Emotional Faces database [1], whose copyright holder is: Karolinska Institutet, Department of Clinical Neuroscience, Section of Psychology, Stockholm, Sweden.
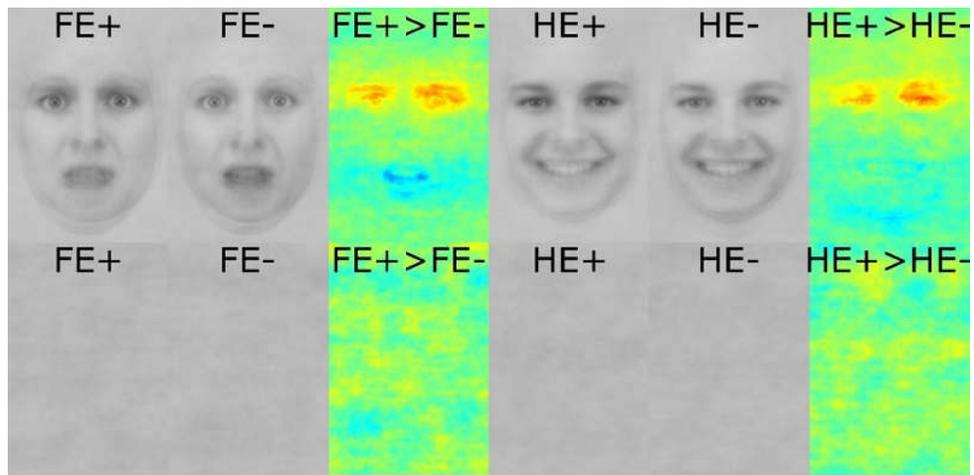
Supplementary Figure 2. Average face (top) and pure noise (bottom) stimuli. Averages taken from all trials with face signal levels 30-80% for conditions Fearful eye+ (FE+), Fearful eye- (FE-), Happy eye+ (HE+), and Happy eye- (HE-).
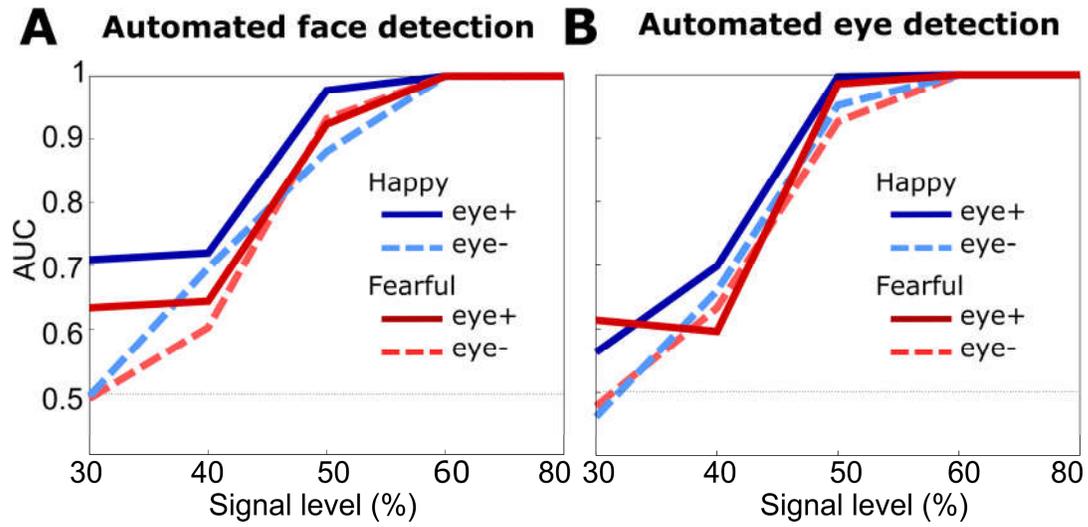
Supplementary Figure 3. Control analysis: Automated detection of face and eyes. Automated (A) face and (B) eye detection [2] applied to all face-noise stimulus pairs. AUC, Area Under the Curve. Chance level is 0.5, an AUC of 1 indicates perfect performance.

Supplementary Table 1

Summary Statistics of Signal Quantity in Eye+ and Eye- Stimuli

Measure	Eye visibility	mean	median	min	max	$F(1,959)$	p
SSIM face	eye+	0.77	0.76	0.55	0.98	0.66	0.415 NS
	eye-	0.77	0.75	0.53	0.98		
PSNR face	eye+	23.41	21.16	15.89	35.75	0.33	0.564 NS
	eye-	23.18	21.08	15.00	35.66		
SSIM eyes	eye+	0.75	0.78	0.34	0.99	4.67	0.031 *
	eye-	0.73	0.74	0.26	0.99		
PSNR eyes	eye+	19.53	17.00	9.95	34.60	23.46	<0.001 *
	eye-	17.24	14.60	7.91	33.03		

F-statistics and *p*-values provided for the effect of eye visibility manipulation (eye+ versus eye-) on each measure of signal.

Supplementary Table 2

Multivariate Prediction of the Face Side from Infant Looking Behavior

Predictor	β	SE	t	p
Intercept	0.04	0.09	0.48	0.629
PTLT to the left side *	- 1.09	0.16	- 6.70	< 0.001
Duration of first look to the left side *	- 0.28	0.14	- 2.01	0.044
Duration of first look to the right side *	0.59	0.13	4.68	< 0.001
Median duration of looks to the left side *	- 0.63	0.15	- 4.10	< 0.001
Median duration of looks to the right side *	0.47	0.14	3.34	0.001

Note. The side of the face was coded as 0 (left) or 1 (right) and predicted by the infant's looking behavior using logistic regression. Three additional measures (number of looks to the right side, number of looks to the left side, and direction of first look) were rejected during forward feature selection and are not included in the table. Degrees of freedom in the error: 1037. Significant predictors of the face side ($\alpha = 5\%$) are marked by an asterisk. The intercept is not statistically distinguishable from 0, reflecting the fact that the side of presentation of the face was counterbalanced across trials. See also Figure 2 in the main paper.

Supplementary Table 3

Psychometric Curve Modeling of Face versus Noise Visual Preference: Fearful eye+ versus

Others

Parameter	*Notation*	*β*	*SE*	*t*	*2.5% CI*	*97.5% CI*
Asymptote at 0% signal	Y_0	0.01	0.09	0.07	- 0.165	0.178
Asymptote at 100% signal: Fearful *	Y_F	1.25	0.08	15.76	1.091	1.401
Asymptote at 100% signal: Happy vs. Fearful	dY_H	- 0.13	0.10	- 1.25	- 0.332	0.073
Slope *	*a*	26.53	8.41	3.15	10.039	43.014
Threshold: Fearful eye+ *	x_{0FE}	0.44	0.02	22.49	0.405	0.483
Threshold: Happy eye- vs. Fearful eye+ *	dx_{0HM}	0.05	0.03	1.99	0.001	0.103
Threshold: Fearful eye- vs. Fearful eye+	dx_{0FM}	0.01	0.03	0.48	- 0.039	0.064
Threshold: Happy eye+ vs. Fearful eye+	dx_{0HE}	0.00	0.03	0.08	- 0.055	0.060

Note. The logit-transformed visual preference for the face side was fitted as a function of signal level with a standard psychometric curve formula. Parameters significantly different from 0 (Wald confidence intervals, $\alpha = 5\%$) are marked by an asterisk. Notations refer to the model equation (see Method). See also Figure 4.

Supplementary Table 4

Psychometric Curve Modeling of Multivariate Face versus Noise Discrimination: Fearful

eye+ versus Others

Parameter	Notation	β	SE	t	2.5% CI	97.5% CI
Asymptote at 0% signal *	Y_0	0.39	0.11	3.49	0.173	0.617
Asymptote at 100% signal: Fearful *	Y_F	2.09	0.11	19.12	1.873	2.301
Asymptote at 100% signal: Happy vs. Fearful	dY_H	0.00	0.15	0.01	-0.301	0.303
Slope *	a	36.70	15.31	2.40	6.690	66.714
Threshold: Fearful eye+ *	x_{0FE}	0.44	0.02	20.56	0.399	0.483
Threshold: Happy eye- vs. Fearful eye+ *	dx_{0HM}	0.08	0.03	3.14	0.030	0.128
Threshold: Fearful eye- vs. Fearful eye+	dx_{0FM}	- 0.01	0.03	- 0.20	- 0.058	0.048
Threshold: Happy eye+ vs. Fearful eye+	dx_{0HE}	0.04	0.03	1.16	- 0.026	0.100

Note. Face versus noise discrimination evidences (correct log-odds) were fitted with a standard psychometric curve formula. Parameters significantly different from 0 (Wald confidence intervals, α = 5%) are marked by an asterisk. Notations refer to the model equation (see Method). See also Figure 4 and Supplementary Tables 5, 7.

Supplementary Table 5

Psychometric Curve Modeling of Face versus Noise Visual Preference: Fearful eye- versus

Others

Parameter	β	SE	t	2.5% CI	97.5% CI
Asymptote at 0% signal	0.02	0.08	0.27	- 0.138	0.182
Asymptote at 100% signal: Fearful *	1.22	0.08	15.80	1.069	1.372
Asymptote at 100% signal: Happy vs. Fearful	- 0.13	0.10	- 1.28	- 0.332	0.070
Slope *	28.72	9.05	3.17	10.980	46.455
Threshold: Fearful eye- *	0.46	0.02	19.90	0.417	0.508
Threshold: Happy eye- vs. Fearful eye-	0.03	0.03	1.18	-0.022	0.087
Threshold: Fearful eye+ vs. Fearful eye-	-0.02	0.03	-0.58	- 0.069	0.037
Threshold: Happy eye+ vs. Fearful eye-	-0.02	0.03	-0.73	- 0.087	0.040

Note. The logit-transformed visual preference for the face side was fitted as a function of

signal level with a standard psychometric curve formula. Parameters significantly different

from 0 (Wald confidence intervals, $\alpha = 5\%$) are marked by an asterisk. See also Figure 4 and

Supplementary Tables 2, 6.

Supplementary Table 6

Psychometric Curve Modeling of Multivariate Face versus Noise Discrimination: Fearful eye- versus Others

Parameter	*β*	*SE*	*t*	*2.5% CI*	*97.5% CI*
Asymptote at 0% signal *	0.39	0.12	3.39	0.166	0.62
Asymptote at 100% signal: Fearful *	2.09	0.11	18.94	1.874	2.306
Asymptote at 100% signal: Happy vs. Fearful	-0.00	0.16	-0.00	-0.305	0.304
Slope *	36.12	14.96	2.41	6.795	65.438
Threshold: Fearful eye- *	0.44	0.02	20.26	0.394	0.478
Threshold: Happy eye- vs. Fearful eye- *	0.08	0.03	3.28	0.034	0.133
Threshold: Fearful eye+ vs. Fearful eye-	0.01	0.03	0.21	- 0.047	0.059
Threshold: Happy eye+ vs. Fearful eye-	0.04	0.03	1.31	- 0.021	0.106

Note. Face versus noise discrimination evidences (correct log-odds) were fitted with a standard psychometric curve formula. Parameters significantly different from 0 (Wald confidence intervals, $\alpha = 5\%$) are marked by an asterisk. See also Figure 4 and Supplementary Tables 3, 7.

Supplementary Table 7

Psychometric Curve Modeling of Face versus Noise Visual Preference: Happy eye+ versus

Others

Parameter	β	*SE*	*t*	2.5% *CI*	97.5% *CI*
Asymptote at 0% signal	0.03	0.08	0.43	- 0.121	0.189
Asymptote at 100% signal: Fearful *	1.22	0.08	15.87	1.070	1.372
Asymptote at 100% signal: Happy vs. Fearful	- 0.13	0.10	- 1.27	- 0.328	0.070
Slope *	30.67	10.56	2.90	9.970	51.362
Threshold: Happy eye+ *	0.44	0.02	18.00	0.388	0.483
Threshold: Fearful eye- vs. Happy eye+	0.03	0.03	0.92	-0.035	0.096
Threshold: Fearful eye+ vs. Happy eye+	0.01	0.03	0.44	- 0.046	0.073
Threshold: Happy eye- vs. Happy eye+ *	0.06	0.03	2.22	0.008	0.120

Note. The logit-transformed visual preference for the face side was fitted as a function of

signal level with a standard psychometric curve formula. Parameters significantly different

from 0 (Wald confidence intervals, $\alpha = 5\%$) are marked by an asterisk. See also Figure 4 and

Supplementary Tables 2, 4.

Supplementary Table 8

Psychometric Curve Modeling of Multivariate Face versus Noise Discrimination: Happy eye+ versus Others

Parameter	β	*SE*	*t*	*2.5% CI*	*97.5% CI*
Asymptote at 0% signal *	0.39	0.12	3.41	0.167	0.620
Asymptote at 100% signal: Fearful *	2.09	0.11	19.01	1.875	2.305
Asymptote at 100% signal: Happy vs. Fearful	-0.00	0.16	-0.00	-0.305	0.304
Slope *	36.12	14.71	2.46	7.279	64.951
Threshold: Happy eye+ *	0.48	0.02	20.53	0.433	0.524
Threshold: Fearful eye- vs. Happy eye+	-0.04	0.03	-1.32	-0.105	0.021
Threshold: Fearful eye+ vs. Happy eye+	-0.04	0.03	- 1.16	-0.099	0.025
Threshold: Happy eye- vs. Happy eye+	0.04	0.03	1.58	-0.010	0.092

Note. Face versus noise discrimination evidences (correct log-odds) were fitted with a standard psychometric curve formula. Parameters significantly different from 0 (Wald confidence intervals, α = 5%) are marked by an asterisk. See also Figure 4, and Supplementary Tables 3, 5.

References

1.   Lundqvist, D., Flykt, A. & Öhman, A. 1998 The Karolinska directed emotional faces. *Stock. Sweden Karolinska Inst.*

2.   Viola, P. & Jones, M. 2001 Rapid object detection using a boosted cascade of simple features. In *Conference on Computer Vision and Pattern Recognition (CVPR)*, (doi:10.1109/CVPR.2001.990517)