Supplemental Materials for: Neural responses to happy, fearful and angry faces of varying identities in 5- and 7-month-old infants

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Supplemental Results

Exploratory fNIRS results

Differences in oxyHb responses between ages and conditions were tested using a repeated-measures ANOVA at each ROI. No significant interaction terms were found between age and condition, so the interaction term was removed from the models. A significant effect of condition was seen in the dSFG ($F(2, 260)=4.03$, $p=.019$), uncorrected for multiple comparisons over ROIs. Post-hoc paired *t*-tests revealed greater activation to happy as opposed to fearful faces ($t(87)=3.24$, $p=0.002$, Supplementary Figure 3), but no difference between happy and angry faces ($t(87)=1.86$, $p=.066$) or between fearful and angry faces ($t(87)=0.61$, $p=.54$). As reported in the main manuscript, however, this effect did not survive FDR-level correction for multiple comparisons over ROIs. No main effect of age was seen in any ROI.

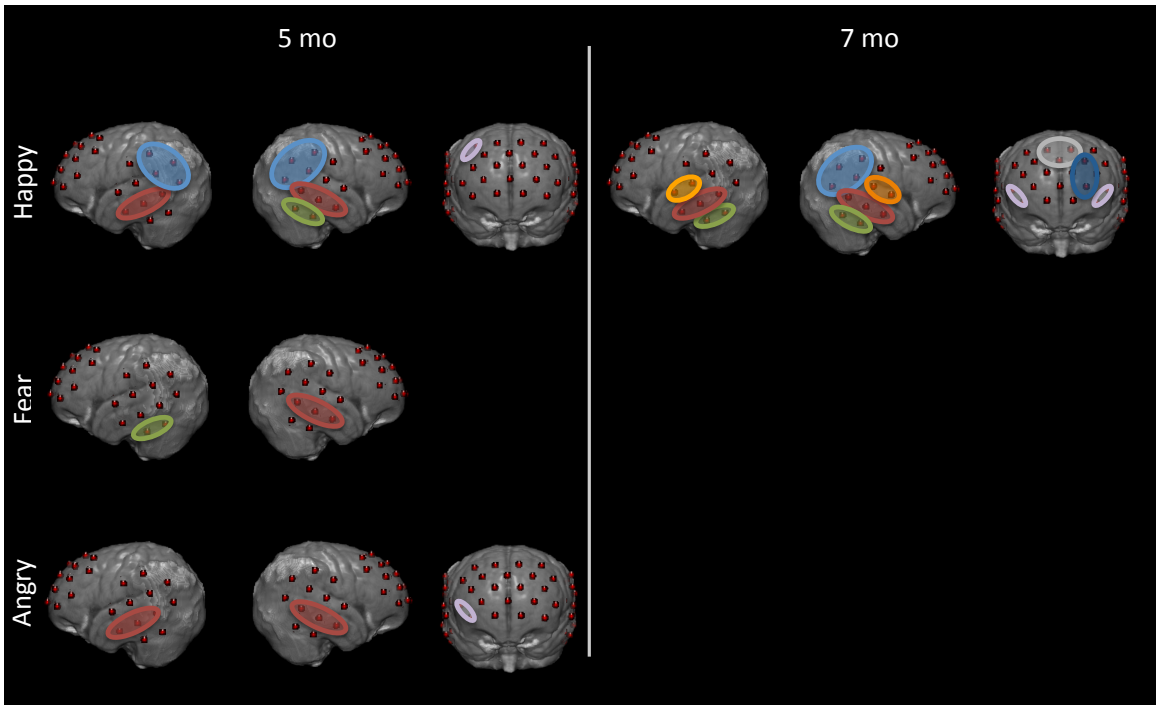
Exploratory combined fNIRS and eye-tracking results

Differences in oxyHb responses based on looking time were tested using repeated-measures ANOVAs in each ROI. The model was estimated separately for eye- and mouth-looking. Fixed effects were condition, looking time to the eyes or mouth, and the interaction between condition and looking time. Exploratory results, uncorrected for multiples comparisons over ROIs, are summarized in **Supplementary Figure 4** and detailed below. None survived FDR correction for multiple comparisons.

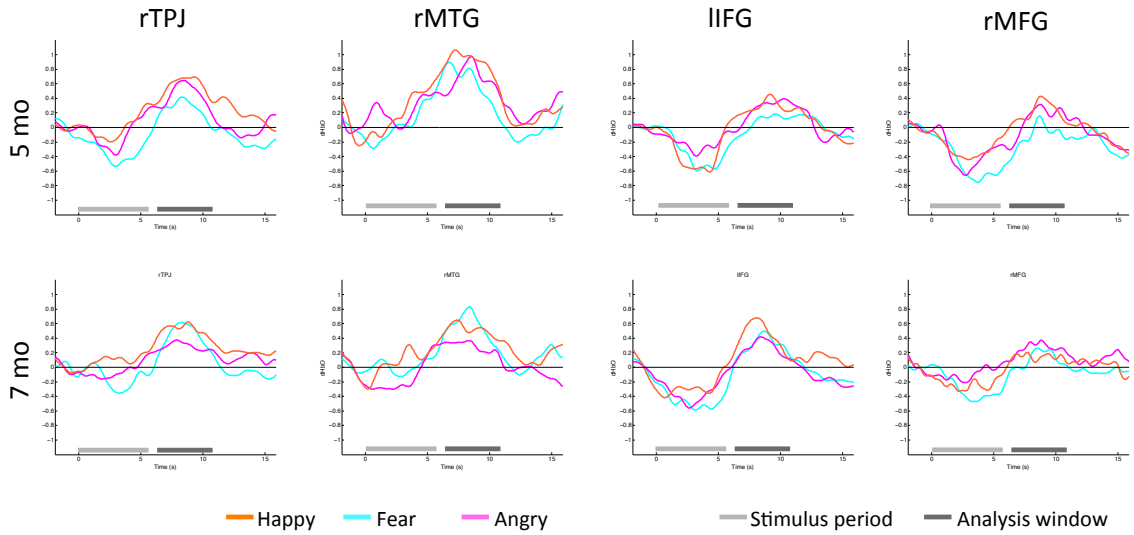
For eye-looking, a significant interaction between condition and looking time was seen on brain activation in the rSTG ($F(2, 167)=4.04$, $p=.019$). Post-hoc regressions for each condition separately showed a significant negative relationship between looking to the eyes and brain activity in the rSTG for angry faces ($F(1, 55)=6.26$, $p=.015$) but not for happy faces ($F(1, 55)=.007$, $p=.93$) or fearful faces ($F(1, 55)=2.04$, $p=.16$). A condition-independent relationship between looking time and brain activity was seen in the dSFG, where eye looking had a negative relationship with activation magnitude ($F(1, 185)=5.19$, $p=.024$).

For mouth-looking, a significant interaction between condition and looking time was seen in the lTPJ ($F(2, 206)=3.22$, $p=.042$). Post-hoc regressions for each condition separately showed a significant positive relationship between looking to the mouth and brain activity in the lTPJ for happy faces ($F(1, 68)=5.71$, $p=.020$, Figure 5), but not for angry faces ($F(1, 68)=.22$, $p=.64$,) or fearful faces ($F(1, 68)=.63$, $p=.43$). A condition-independent relationship between looking time to the mouth and brain activity was seen in the dSFG and rIFG, where mouth looking had a positive relationship with activation magnitude (dSFG: $F(1, 185)=6.09$, $p=.015$, rIFG: $F(1, 194)=5.66$, $p=.018$). The relationship between mouth looking and the oxyHb response is shown in **Supplementary Figure 5**.

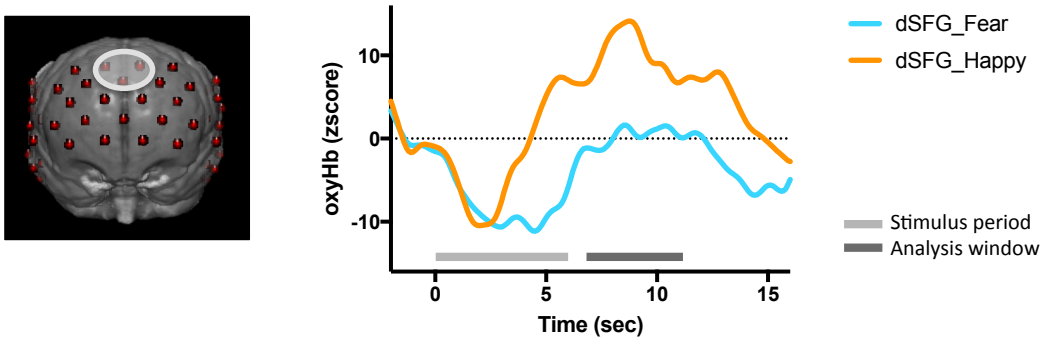
Supplemental Figure 1. *Significant oxyHb activations for each emotional category and age after correcting for multiple comparisons displayed on a 7.5-month-old MRI atlas.*



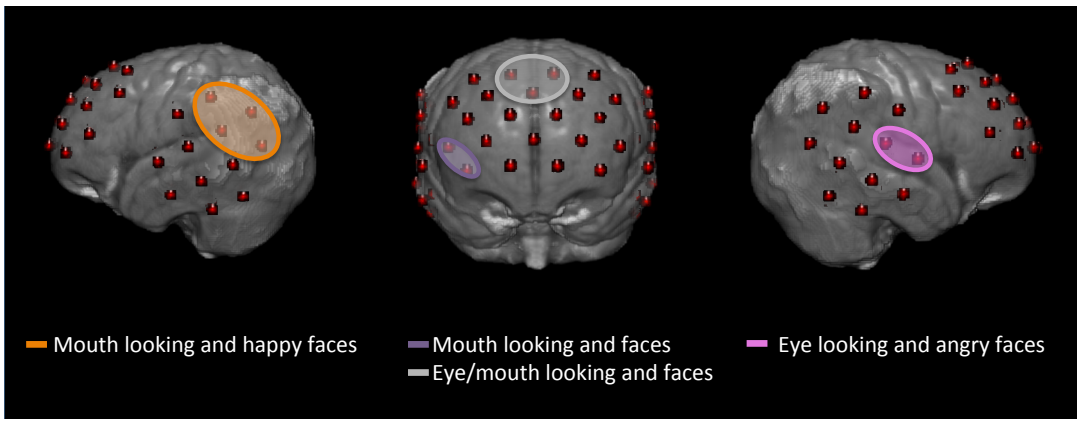
Supplemental Figure 2. *Example time-courses of the oxyHb response by condition and age for rTPJ, rMTG, lIFG, rMFG*



Supplemental Figure 3. *OxyHb response to happy and fearful faces in the dSFG ROI*

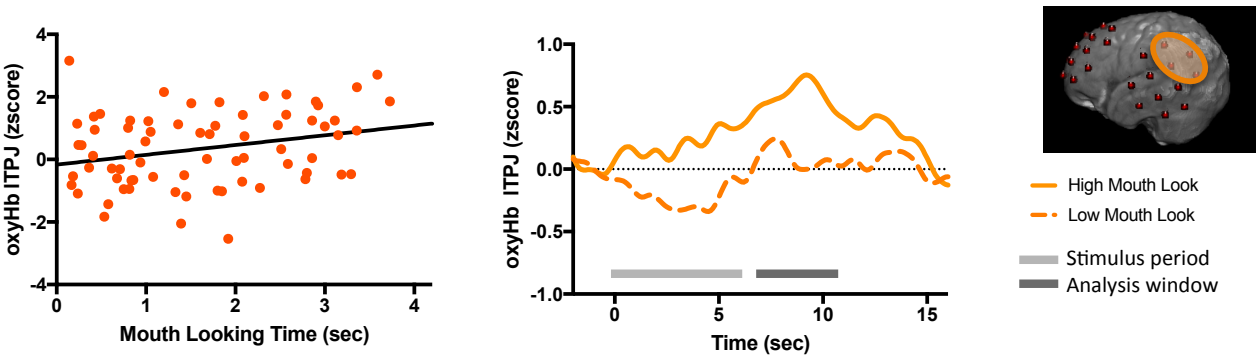


Supplemental Figure 4. *Significant relationships between looking time and oxyHb responses, uncorrected for multiple comparisons over ROIs.*



Supplemental Figure 5

Left. Correlation between the oxyHb response in the lTPJ and looking time to the mouth for happy faces. Right. OxyHb response in the lTPJ for infants with long and short mouth looking (median split)



Supplemental Table 1: ROIs with significant activation in 5-month-old cohort

	ROI	Uncorrected *p*-value			Corrected *p*-value		
		Happy	Fear	Angry	Happy	Fear	Angry
oxyHb							
Frontal	vSFG	.049					
	dSFG	.041					
	lMFG			.033			
	rIFG			.0087			.046
	lIFG			.049			
	rdMFG	.0097			.026		
Temporal	rMTG	.0011	.0013	.0012	.0089	.011	.0094
	lMTG	<.001	.027	<.001	.026		.0049
	rSTG						
	rTPJ	<.001		.041	.0018		
	lTPJ	.0032		.030	.009		
	rITG	<.001	.017	.046	.026		
	lITG		.001	.025		.011	
deoxyHb							
Frontal	lIFG	.032					
Temporal	lMTG	.010	.022				
	rTPJ			.017			
	lTPJ			.0085			

Supplemental Table 2: ROIs with significant activation in the 7-month-old cohort

	ROI	Uncorrected *p*-value			Corrected *p*-value		
		Happy	Fear	Angry	Happy	Fear	Angry
oxyHb							
Frontal	vSFG			.043			
	dSFG	.0027			.0088		
	rMFG		.041				
	lMFG	.0082			.017		
	rIFG	.0025		.042	.0088		
	lIFG	<.001	.0035	.021	.0019		
	ldMFG						
	rdMFG	.039					
Temporal	rMTG	<.001	.0045		.0019		
	lMTG	.0019	.036	.013	.0088		
	rSTG	.028			.043		
	lSTG	.030					
	rTPJ	.0083	.0071		.017		
	lTPJ		.024				
	rITG	.0086			.017		
	lITG	.028			.043		
deoxyHb							
Frontal	vSFG	.		.048			
	rMFG	.025					
	lIFG	.0035					
Temporal	rMTG	.048		.039			
	lMTG		.038	.012			
	lSTG	.032					
	rlITG	.012					