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kids through  
research



HARVARD MEDICAL SCHOOL  
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# The Emotion Project Winter 2015 Newsletter

## *Introduction from our Principal Investigator, Dr. Charles Nelson*

At the Boston Children's Hospital Laboratories of Cognitive Neuroscience, we are interested in furthering our understanding of brain and cognitive development in typically developing infants and children, as well as children diagnosed with or at risk for various developmental disorders. In gaining a better understanding of these processes, our goal is to contribute to the healthy growth and development of our children.



One of our main areas of focus is the development of the ability to recognize faces and facial emotions. Faces convey a great deal of information in our everyday lives, and the ability to interpret them successfully is essential to navigating our social world. In particular, we focus on how these abilities come "on-line" in the first years of life. To investigate this, we recruit families like you from the Boston area who are interested to come in to our lab and participate in our research.

Thank you all for your contribution to our research studies - without you, none of this would be possible. We genuinely appreciate the time taken to participate at our lab with your children. Together, we have gained new insight into the developing brain and how infants process emotions during the first year of life. Some of our recent findings are summarized in this newsletter.

We look forward to staying in touch and keeping you updated as we continue the project.

Happy Holidays!

Dr. Charles Nelson  
Principal Investigator



### About the Emotion Project

The purpose of this study is to investigate the development of emotion processing in the first three years of life. Specifically, we are interested in how babies recognize, process, and respond to faces expressing different emotions. To learn about this, we have been measuring brain activity, eye movements and physiological responses while babies view pictures of human or animal faces displaying different emotions. We will also be following up with some families when their child turns 3 for another fun, interactive visit!

Currently, we have had around **700** families participate, and around **75** families have come back for the 3 year follow-up! We love seeing how our participants have grown up!



Meet Kaitlyn! Kaitlyn recently participated in our 3-year follow-up, and we were so excited to see her come back to the lab!

Please contact us at  
**857-218-3660**

[emotion.project@childrens.harvard.edu](mailto:emotion.project@childrens.harvard.edu)

if you are interested in participating and have an infant who  
will be 5 or 12 months of age!

Or sign up for our [participant registry](#) today!

## Publication Updates

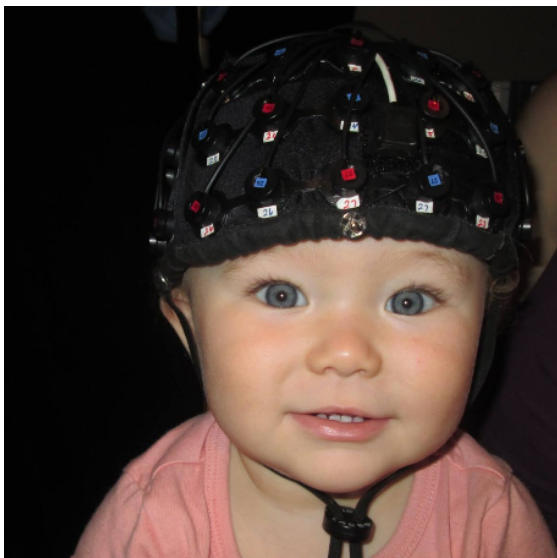
Interested in reading the full paper? Please email  
[emotion.project@childrens.harvard.edu](mailto:emotion.project@childrens.harvard.edu) and we will be happy to send you a PDF!

**Looking to the eyes influences the  
processing of emotion on face-  
sensitive event-related potentials in**

## 7-month-old infants.

Vanderwert, R. E., Westerlund, A., Montoya, L., McCormick, S. A., Miguel, H. O., & Nelson, C. A. (2014). Looking to the eyes influences the processing of emotion on face-sensitive event-related potentials in 7-month-old infants. *Developmental Neurobiology*, 75 (10), 1154–1163.

Would infants be able to recognize the emotion “fear” if displayed by a human face as easily as if displayed by an animal face? To examine this question, we presented 7-month-olds with pictures of animals and pictures of faces rated as expressing the emotions of happy, anger, and fear, and recorded brain activity (electroencephalography; EEG). We observed that infants had greater brain responses when presented with angry animals compared to happy or fearful animals; no such differences were obtained for human faces. Eye-tracking data highlighted the importance of the eye region in processing emotional human faces. Infants that spent more time looking to the eye region of human faces showing fearful or angry expressions had greater brain responses. This suggests that the brain can differentiate between anger and fear at around 7 months of age.



## Infants' neural responses to facial emotion in the prefrontal cortex are correlated with temperament: a functional near-infrared spectroscopy study.

Ravicz, M. M., Perdue, K. L., Westerlund, A., Vanderwert, R. E., & Nelson, C. A. (2015). Infants' neural responses to facial emotion in the prefrontal cortex are correlated with temperament: A functional near-infrared spectroscopy study. *Frontiers in Psychology*, 6, 922.

We examined differences in brain responses in the processing of emotional faces and how individual differences in these responses might be linked to infant temperament. Seven-month-old infants were shown photographs of women portraying happy expressions, and neural activity was recorded using functional near-infrared spectroscopy (fNIRS). Temperament data were collected using parent questionnaires. Results show that different parts of the brain are more active than others when babies process happy faces. We also observed that brain responses to happy face stimuli were negatively correlated with certain infant temperament factors. This suggests that

individual differences in emotion processing may partly be due to infant temperament.

## Recent Poster Presentations



### **Age-dependence of emotional face processing in infants as measured with functional near-infrared spectroscopy.**

Perdue, K.L., Westerlund, A, McCormick, S.A., Ravicz, M.M., Nelson, C.A. (June 2015). Presented at the Organization for Human Brain Mapping Annual Meeting, Honolulu HI.

5-month-olds showed similar brain responses to fearful and angry faces, but not happy faces when measured using functional near-infrared spectroscopy (fNIRS). However, we found that 7-month-olds showed different brain responses to fearful and angry faces, which suggests that 7-month-olds process these emotions differently from 5-month-olds.

### **Discrimination of Negative and Positive Emotions in the First Year of Life: An ERP Study.**

McCormick, S.A., Westerlund, A., Vanderwert, R.E., Dinardo, P.B., & Nelson, C.A. (March 2015). Presented at the Society for Research in Child Development Biennial Meeting, Philadelphia PA.

This study aimed to examine the neural mechanisms underlying infants' ability to discriminate emotions across the first year of life. Specifically, we examined the association between looking behavior and neural activity in response to emotional faces. For 7-month-olds, looking to the eyes influences the processing of negative emotions. Results demonstrate that



across all age groups, infants' neural responses discriminate between fear and anger, highlighting the sensitivity of event-related potentials in the study of infant social cognitive development, as well as the influence of gaze direction on neural activity.

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## Meet the Emotion Project Team!





Charles Nelson, Ph.D  
Principal Investigator

Favorite Candy:  
Chuckles



Alissa Westerlund  
Program Manager

Favorite Candy:  
Sour Patch Kids



Michelle Bosquet, Ph.D  
Psychologist

Favorite Candy:  
Anything with chocolate  
and caramel



Sarah McCormick  
Project Coordinator

Favorite Candy:  
Peanut Butter Cups



Katherine Perdue, Ph.D  
Research Fellow

Favorite Candy:  
Dark Chocolate



Lindsay Bowman, Ph.D  
Research Fellow

Favorite Candy:  
Salt Water Taffy



Perry Dinaro  
Research Assistant

Favorite Candy:  
Sour Patch Watermelon  
(or anything cinnamon!)



Anna Zhou  
Research Assistant

Favorite Candy:  
Toblerone



Julia Cataldo  
Research Assistant

Favorite Candy:  
Kit Kats

**Additional thanks to our wonderful team of undergraduate students:  
Cailin Daley, Mir Lim, Halie Olson and Emma Satterthwaite Muresianu!**

For more information on the Labs of Cognitive Neuroscience,  
visit us at:

[Website](#) [Facebook](#)

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