

# The Emotion Project

*The Emotion Project is a long-term study looking at the development of emotional processing and its relationship to later outcomes.*



## Boston Children's Hospital Laboratories of Cognitive Neuroscience

### About the Emotion Project

The Emotion Project is a longitudinal study focusing on the development of emotional processing in the first seven years of life. Our goal is to look at changes in emotional processing from infancy to middle childhood. We measure these changes by collecting neuroimaging data (such as the brain's electrical activity) and data on cognitive, physiological, and social-emotional development. We are currently conducting our 5- and 7-year follow-ups!

#### This letter features:

- COVID-19 Updates
- Secure Emails
- Recent Publications
- Meet Our Staff
- Moving Update
- Child Activity!

# An Introduction from our Principal Investigators

DR. CHARLES A. NELSON AND DR. MICHELLE BOSQUET ENLOW

Dear Emotion Project Families,

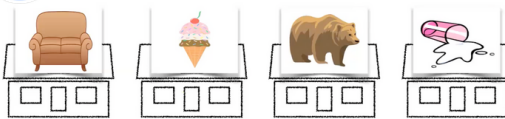
Happy holidays! We first want to thank you for all that you have contributed to our study, whether we have spoken with you recently or met with you prior to the COVID-19 shutdown. We recognize how challenging this past year has been, and we are beyond grateful for your efforts in continuing to participate in this research.

Here on the Emotion Project, we've been busy navigating the difficulties brought on by COVID and working with families to keep up with data collection, even as we've transitioned to conducting this research remotely. While the project may look a little different right now - from monthly COVID questionnaires to virtual visits over Zoom - we remain motivated to continue this important work, and we appreciate your time and flexibility in accommodating these new aspects of the study. Without you, the exciting research findings outlined in this newsletter would not be possible!

We can't believe so much time has passed already: we began seeing participants at 5, 7, and 12 months old, and we're currently working on our 5-year and 7-year follow ups! As the kids get older, the data we collect remain extremely valuable in helping us understand the development of mental health and emotional processing.

We look forward to one day seeing you all in the lab again, and we will do so safely when the time comes. Stay healthy and safe, and enjoy the new year!

Dr. Charles A. Nelson and Dr. Michelle Bosquet Enlow  
Principal Investigators, Emotion Project



## Research During COVID-19

Research over the last few months has looked a little different than in the past. We are now conducting remote virtual visits for our participants, as well as virtual interviews for our parents, all over Zoom!

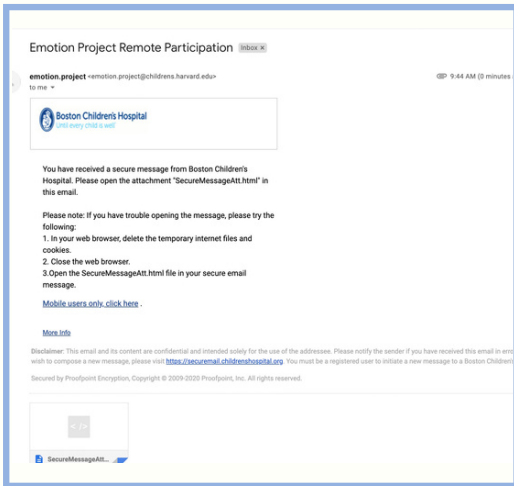
# Update on Lab Re-entry



We are hoping to resume in-person lab visits in the new year. These visits will follow all state-regulated guidelines, as well as Boston Children's Hospital safety precautions.

**Ready to schedule a visit?**

To schedule a visit or ask any questions:  
 call us at 857-218-3660  
 or  
 email us at [emotion\\_project@childrens.harvard.edu](mailto:emotion_project@childrens.harvard.edu)



## ← Secure Emails

If you receive an email that looks like this, it is from us! Per updated hospital guidelines, all email communication between our project and participants must take place through this secure portal, which provides end-to-end encryption as an additional layer of security and privacy protection. Sometimes these messages might go to your spam or trash folder, so please check there! We apologize for the inconvenience, and please let us know if you have any questions about the portal or how to use it.

## Monthly COVID-19 Questionnaires

# THANK YOU

**We would like to thank you for your responses to our questionnaires regarding the new changes brought about by COVID-19. Your responses continue to hold the utmost importance in helping us understand how the pandemic has been impacting children and their families.**

# Publication Updates

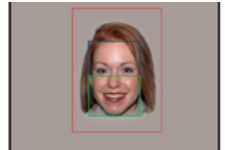
*Interested in reading the full paper? Please email [emotion.project@childrens.harvard.edu](mailto:emotion.project@childrens.harvard.edu) and we will be happy to send you a PDF!*

## RAPID FACE PROCESSING FOR POSITIVE AND NEGATIVE EMOTIONS IN 5-, 7-, AND 12-MONTH-OLD INFANTS: AN EXPLORATORY STUDY

Helga Miguel, Sarah McCormick, Alissa Westerlund, and Charles A. Nelson III

Infants had their first Emotion Project visit at 5, 7, or 12 months of age. During this visit, infants were shown images of female faces portraying happy, angry and fearful emotions. While viewing these images, eye tracking data were collected to study the processing of positive and negative emotions. Our researchers wanted to examine the developmental trajectory of fear processing, since previous studies have found that infants look longer at fearful faces starting at around 7 months of age. Therefore, Dr. Helga Miguel looked at 5-month, 7-month and 12-month-olds separately.

In this study, there were two areas of interest (AOIs). AOIs help link the eye tracking data to a specific part of the stimulus. In this study, one AOI was the top half of the female face (including forehead and eyes), and the other was the bottom half (including the mouth and chin).



The results showed that infants across all three age groups looked the longest at fearful faces, a finding that has been replicated many times. Additionally, all three groups looked longer at the top half of the face for angry and fearful faces, but at the bottom half for happy faces. In general, 12-month-olds looked longer at the bottom of the faces compared to 5-month-olds.

These results are important because they suggest infants may develop a bias towards fearful stimuli earlier than 7 months. This study also showed a developmental shift where older infants looked at the mouth region longer, perhaps because they were looking for speech cues.

*Published in the [British Journal of Developmental Psychology](#), 37 (4), in 2019*

## PATHWAYS TO SOCIAL-EMOTIONAL FUNCTIONING IN THE PRESCHOOL PERIOD: THE ROLE OF CHILD TEMPERAMENT AND MATERNAL ANXIETY IN BOYS AND GIRLS

Hannah F. Behrendt, Mark Wade, Laurie Bayet, Charles A. Nelson III, and Michelle Bosquet Enlow

The goal of this study was to identify risk factors that impact social and emotional functioning in early childhood. Dr. Hannah Behrendt looked at whether child temperament (a group of traits marked by children's level of activity, emotionality and sociability) and maternal anxiety at both infancy and age 2 were associated with children's behavior at age 3. Maternal anxiety has been shown to influence social-emotional development early in life, and Dr. Behrendt wanted to study temperament because it manifests early in life and remains stable across time.

### TEMPERAMENT MEASUREMENTS

**SURGERY-** POSITIVE EMOTIONALITY, ACTIVITY LEVEL, IMPULSIVITY, AND RISK-TAKING

**NEGATIVE AFFECT-** NEGATIVE EMOTIONS SUCH AS FEAR, ANGER, OR SADNESS

**EFFORTFUL CONTROL-** ATTENTION SHIFTING AND FOCUSING, SELF REGULATION OF EMOTIONAL REACTIVITY

Temperament was measured at each of these ages using parent-report questionnaires, maternal anxiety was based on self-reports of anxiety symptoms, and child internalizing and externalizing behaviors were based on a parent-report questionnaire.

This study had many findings. First, researchers found that temperament and maternal anxiety were moderately stable across all three time points. Second, children high in negative affect were more likely to exhibit internalizing behaviors (e.g., depression, withdrawal, anxiety), and children high in surgency were more likely to exhibit externalizing

behaviors (e.g., impulsivity, aggression, defiance). Third, there was evidence that mothers' emotions and children's behaviors influenced each other over time. That is, mothers not only influence their children's behaviors, but children's behaviors influence their mother's emotions.

These findings expand our understanding of the roles of both specific temperamental domains and postnatal maternal anxiety in a range of social-emotional outcomes in the preschool period.

Published in *Development and Psychopathology*, 32(3) in 2020

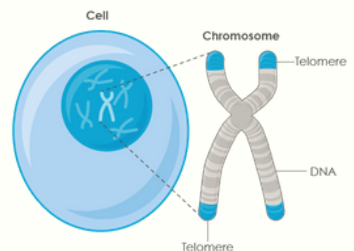
## PATTERNS OF CHANGE IN TELOMERE LENGTH OVER THE FIRST THREE YEARS OF LIFE IN HEALTHY CHILDREN

Michelle Bosquet Enlow, Finola Kane-Grade, Immaculata De Vivo, Carter R. Petty, and Charles A. Nelson III

Telomeres are protective caps at the ends of chromosomes (most individuals have two X chromosomes or an X and a Y chromosome) that help prevent the chromosomes from deteriorating. Telomeres normally shorten as part of the aging process. When a cell's telomeres become too short, the cell goes to sleep or dies. Short telomeres and accelerated telomere erosion appears to be associated with decreased immune functioning, the development of chronic diseases, and earlier mortality in adults. However, there is little research about telomere erosion early in life.

Dr. Michelle Bosquet Enlow aimed to fill this gap in telomere research by examining the relative telomere length and rate of attrition (the gradual loss of these protective caps) in our sample of young children. Telomere length was assessed from DNA in saliva samples that were collected at the infancy, 2-year, and 3-year timepoints.

The results showed that telomere length decreased from infancy to 2 years but remained relatively stable from 2 to 3 years.



DeFlyme. (n.d.). Telomeres & Telomerase explained. [Infographic]. Retrieved November 17th, 2020, from <https://deflyme.com/telomeres-telomerase/>

These findings confirmed hypotheses that telomere attrition is not uniform across development, with periods of relatively rapid erosion and periods of relative stability. This was the first study to show this pattern in a longitudinal sample of healthy children. This information is important for understanding normative versus unhealthy patterns of telomere shortening.

Published in *Psychoneuroendocrinology*, 115 in 2020

## THE INFLUENCE OF MATERNAL ANXIETY AND DEPRESSION SYMPTOMS ON FNIRS BRAIN RESPONSES TO EMOTIONAL FACES IN 5- AND 7-MONTH-OLD INFANTS

Juliana A. Porto, Johanna Bick, Katherine L. Perdue, John E. Richards, Magda L. Nunes, and Charles A. Nelson III

At the infant visit, half of our participants wore fNIRS caps while viewing different emotional faces, and the other half wore EEG nets. fNIRS (short for functional near-infrared spectroscopy) is a brain imaging technique that measures the oxygenated and de-oxygenated blood flowing through the brain. Because more active brain areas use more oxygen (and need more oxygenated blood), fNIRS can help us investigate how children's brains respond to the emotional faces. In this study, Dr. Juliana Porto used fNIRS to look at responses in the frontal cortex, a brain region that has been associated with cognitive functions, such as the processing of facial emotions.

Specifically, Dr. Porto wanted to examine whether maternal anxiety and depression influenced children's frontal cortex activation. She found that infants of mothers with higher levels of depression showed greater activation in the left inferior frontal gyrus, a region that may be involved in emotional communication.

fNIRS is an exciting new tool for neuroscientists, and we will continue to use it at future

Emotion Project follow-ups.



Published in *Infant Behavior & Development*, 59 in 2020

# Meet our Research Staff!



**Caroline Kelsey**

*Postdoctoral Research Fellow*

**EDUCATION:**

Undergraduate degrees in Biology and Psychology from the Pennsylvania State University. Master's in Psychology from The College of William & Mary. PhD in Developmental Psychology from University of Virginia.

**HOMETOWN:**

Greenwich, CT

**FUN FACT:**

I was born with a congenital heart defect, and it was actually a cardiologist from Boston Children's Hospital who came to NYC to perform the surgery. I am very excited to be back at the place that has had a special place in my heart from Day 1!



**Wanze Xie**

*Postdoctoral Research Fellow*

**EDUCATION:**

Undergraduate degree from East Tennessee State University. PhD in Experimental Psychology from University of South Carolina.

**HOMETOWN:**

Weifang, China

**FUN FACT:**

I have been a huge soccer fan since I was a kid!



**Kelsey Quigley**

*Postdoctoral Research Fellow*

**EDUCATION:**

Undergraduate degree from Harvard University. PhD in Clinical Psychology at the Pennsylvania State University.

**HOMETOWN:**

I grew up as a fac brat on the campus of a boarding school north of Boston

**FUN FACT:**

Before coming to psychology, I worked in early childhood public policy!



**Jeb Taylor**

*Project Coordinator*

**EDUCATION:**

BA in Psychology and Philosophy from Temple University.

**HOMETOWN:**

Mohnton, PA

**FUN FACT:**

Growing up, my family had a flock of pet chickens all named Tina!



**Katie Vincent**

*Project Coordinator*

**EDUCATION:**

AB in Psychology from Harvard University.

**HOMETOWN:**

Chapel Hill, NC

**FUN FACT:**

I am most recently from Chapel Hill, North Carolina, but I was born in Boston and spent a lot of my childhood in sunny San Diego, California!



**Rachel Kwon**

*Research Data Manager*

**EDUCATION:**

BA in Cognitive and Linguistic Sciences from Wellesley College. MEd in Mind, Brain, Education from Harvard Graduate School of Education.

**HOMETOWN:**

Knoxville, TN

**FUN FACT:**

I enjoy spending time at a digital fabrication studio to create art and designs using the laser cutting machine & CNC mill!



**Maggie Modico**

*Research Assistant*

**EDUCATION:**

BS in Psychology, minor in Human Development from the University of Maryland.

**HOMETOWN:**

Rockville Centre, NY

**FUN FACT:**

My younger sister is deaf, and I know sign language!



**Lauren Steele**

*Research Assistant*

**EDUCATION:**

BS in Biology and Psychology with a concentration in Neuroscience from Williams College.

**HOMETOWN:**

Worcester, MA

**FUN FACT:**

I have perfect pitch!

## Undergraduate Research Assistants

Special thanks to our undergraduate research assistants, Alex Kim and Carly Tiras!



# We're Moving!

Did you know that the Labs of Cognitive Neuroscience are moving? In the Spring of 2021, we will be relocating to Brookline Place in Brookline, MA into a newly renovated laboratory! We are so excited for you to see our new space!

Check it out!



# Hey Kids!!!

P Y S M J U X H H E K Y Y W N  
 R H H C X V O U W U D R U O S  
 T S G A A N D V A P U O I E E  
 Z A R Y U R R G J M X T X R X  
 V W H V N B E E K V O A E T X  
 S C I E N C E D T M P R H C D  
 R Q V X V B X X E M L O G O M  
 S O I N V S Q H N A D B C S D  
 H X P A U B F C P H J A D A M  
 A Q X P R Y U G L Z G L E U V  
 P F E A Q Y H W V Z P B J H C  
 P K I V M A F A K A G A D U G  
 Y N I N X H I T Y M Z E S G U  
 Q W J A S V M C I Q B J U Q E  
 A V Q Z I Z C B B H Z G E D E

Can you find the following words in our word search puzzle?

- BRAIN
- EMOTION
- HAPPY
- HAT
- LABORATORY
- MAD
- SCARED
- SCIENCE

