

BIOGRAPHICAL SKETCH

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NAME: Nim Tottenham, Ph.D.

eRA COMMONS USER NAME (credential, e.g., agency login): TOTTENHAM2

POSITION TITLE: Professor of Psychology, Columbia University (2014-present)

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
Barnard College of Columbia University New York, NY	B.A.	05/96	Psychology
University of Minnesota Minneapolis, MN	Ph.D	07/05	Developmental Psychology & Neuroscience
Weill Cornell Medical College New York, NY	Postdoctoral	02/06	Neuroscience & Neuroimaging

A. Personal Statement

I have devoted my career to studying the role of experience in the neurodevelopment associated with affective and cognitive development. By collecting large developmental samples using accelerated longitudinal designs, I have examined this topic both behaviorally, using computerized tasks, laboratory behavior, and parent reports, and at the neurobiological and physiological level, using structural and functional magnetic resonance imaging, physiological and hormonal assays, both in typical developmental samples (including scanning awake children as young as 4-years-old) and following early life adversity. My program of research has focused on human subcortical regions (e.g., amygdala, hippocampus, ventral striatum) and developing connections with cortical regions (e.g., prefrontal cortex). With substantial support from federal and foundational grants, I have examined the developmental construction of limbic-cortical connections and associated emotional behaviors during childhood and adolescence, conducting large, longitudinal and cross-sectional studies on emotional and cognitive development in children and adolescents.

B. Positions and Honors**Positions and Employment**

2018- Professor, Columbia University, Department of Psychology
 2014-2018 Associate Professor, Columbia University, Department of Psychology
 2014- Faculty, Sackler Institute for Developmental Psychobiology, Columbia University
 2013-2014 Associate Professor, UCLA, Department of Psychology
 Developmental and Behavioral Neuroscience Areas
 2008-2013 Assistant Professor, UCLA, Department of Psychology
 Developmental and Behavioral Neuroscience Areas
 2010-2014 Faculty, UCLA IDP Neuroscience Program
 2010-2014 Faculty, UCLA Neuroimaging training program (NITP)
 2009-2014 Faculty, UCLA Brain Research Institute
 2009-2014 Faculty, UCLA Tarjan Center, Intellectual and Developmental Disabilities Research Center
 2009- Faculty, Sackler Institute for Developmental Psychobiology, Weill Cornell Medical College
 2008-2014 Faculty, UCLA Center for Culture, Brain and Development
 2006-2008 Assistant Professor of Psychology in Psychiatry, Weill Cornell Medical College

Honors

2018 Fellow of the Association for Psychological Science
 2017- Member, Dana Alliance for Brain Initiatives (DABI)
 2017 Irene Jakob Memorial Lecture Award, U of Pittsburgh
 2015 2015 American Psychological Association (APA) *Distinguished Scientific Award for Early Career Contribution to Psychology*

- 2013 Distinguished Teaching Award – UCLA Psychology
- 2013 “CEHD 23” Rising Alumni Award, U of Minnesota, College of Educ & Human Development
- 2012 Young Scholar, La Fondation des Treilles
- 2012 UCLA Alpha Epsilon Delta Faculty Award
- 2011 NIMH BRAINS R01 Award Recipient
- 2010 *Developmental Science* Early Career Researcher Prize

Other Experience and Professional Memberships

- 2017-2021 Society for Research in Child Development (co-Program Chair)
- 2019- External Advisory Board of Conte Center (PI: Tallie Baram)
- 2019 Flux Congress for Developmental Cognitive Neuroscience (Local Program Chair)
- 2019 Minnesota Symposium on Child Development (co-Program Chair)
- 2018 Board Member: Child Mind Institute
- 2017-2021 U of Minnesota NIMH T32 training grant in Developmental Psychopathology
- 2017- Board Member: Flux Congress
- 2017- Advisory Council for the Center on the Developing Adolescent
- 2017 Flux Congress for Developmental Cognitive Neuroscience (Program Chair)
- 2016- Scientific Advisory Board: Leipzig Research Center for Early Child Development
- 2016 Ernst Strüngmann Forum, Frankfurt Germany
- 2015- NSF Grant Review Panel
- 2015- Board of Directors, Society for Social Neuroscience (S4SN)
- 2014 Harvard’s Center on the Developing Child Research Consortium on Toxic Stress and Health
- 2014 Max Planck Institute Workshop (Leipzig, Germany)
- 2014 Grant Review: NSF “College of Reviewers”
- 2013-2015 International Society for Developmental Psychobiology (Board Member)
- 2013- Grant Review: NIMH (ad hoc)
- 2013- Grant Review: NSF (ad hoc)
- 2012-2014 Flux Congress for Developmental Cognitive Neuroscience (Scientific Program Committee)
- 2013 Guest Editor for Special Issue on Development in Biology of Mood & Anxiety Disorders
- 2012 Grant Reviewer: Medical Research Council (UK)
- 2011-2014 Early Experience, Stress & Neurobehavioral Development Center (PI: Megan Gunnar)
- 2011 Young Scholar, Bronfenbrenner Conference on the Neuroscience of Risky Decision Making Conference, Cornell University
- 2011 Grant Review: U.S Department of Health and Human Services
- 2011- Consulting Editor, *Emotion*
- 2010- Review Editor, *Frontiers in Developmental Psychology*
- 2010- Editorial Board, *Biology of Mood & Anxiety Disorders*
- 2007- Member, Cognitive Developmental Society
- 2005 Co-Director, John Merck Fund Summer Institute for Developmental Disabilities

C. Contribution to Science

1. Development of neurobiology underlying emotion regulation behaviors. Regulatory connections between the amygdala and medial prefrontal cortex form the basis of mature emotion generation and regulation. Over the past three decades, significant progress has been made in characterizing the structure and function of this circuitry in adult samples. The work from our laboratory has focused on characterizing the normative development of this circuitry in healthy children and adolescents. These publications have shown that the adult-state of the circuitry is slow to develop, with a notable difference in childhood. Children show evidence of immature amygdala-prefrontal cortex connectivity, which is associated with child-like appraisals of negative information. This work provides information about the timing and nature of normative events in neuroaffective circuitry. I served as primary investigator in all of these studies.
 - a. Gabard-Durnam, L. *, Gee, D.G*, Goff, B., Flannery, J., Telzer, E; Humphreys, K; Lumian, D; Fareri, DS; Caldera, C; Tottenham, N. (2017). Stimulus-elicited connectivity influences resting-state connectivity years later in human development: a prospective study. **Journal of Neuroscience**, 36(17), 4771-4784. PMC4846673. *authors contributed equally.
 - b. Gabard-Durnam, L., Flannery, J., Goff, B., Gee, D.G., Humphreys, K.L., Telzer, E.H., Hare, T.A., & Tottenham, N. (2014). The development of human amygdala functional connectivity at rest from 4 to 23 Years: a cross-sectional study. **Neuroimage**, 95, 193-207. PMC4305511

- c. Gee, D.G., Humphreys, K.L., Flannery, J., Goff, B., Telzer, E.H., Shapiro, M., Hare, T.A., Bookheimer, S.Y., Tottenham, N. (2013). A Developmental Shift from Positive to Negative Connectivity in Human Amygdala-Prefrontal Circuitry. **Journal of Neuroscience**, 33(10)4584-4593. PMC3670947
- d. Tottenham, N., Phuong, J., Flannery, J., Gabard-Durnam L., Goff, B. (2013). A Negativity Bias for Ambiguous Facial Expression Valence during Childhood: Converging Evidence from Behavior and Facial Corrugator Muscle Responses. **Emotion**. PMC4006094

2. Brain development following early caregiving adversity. The link between early adversity and later emotional phenotypes has been well established in the literature. Our laboratory has focused on characterizing the neural mechanisms underlying this link. Specifically, we have been examining the development of amygdala-prefrontal cortex circuitry in children and adolescents with a history of early institutional caregiving. These publications show that the circuitry develops differently following the absence of early parental care, possibly reflecting an accelerated closure of developmental sensitive periods, and these differences seem to be reflections of ontogenetic adaptations in response to cues in the early environment. This work has helped form bridges with the non-human work on early adversity and provide novel models for understanding the effects of early adversity. I served as either primary investigator or trainee (under BJ Casey) on all of these projects.

- a. Green, S., Goff, B., Gee, D. G., Gabard-Durnam, L., Flannery, J., Telzer, E., Humphreys, K.L., Louie, J., & Tottenham, N. (2016). Discrimination of amygdala response predicts future separation anxiety in youth with early deprivation. **Journal of Child Psychology and Psychiatry**, 57(10),1135-44
PMC5030125
- b. Silvers, J.A., Lumian, D. Gabard-Durnam, L., Gee, D.G., Goff, B., Fareri, D., Caldera, C., Flannery, J., Telzer, E.H., Humphreys, K., & Tottenham, N. (2016) Previous institutionalization is followed by broader amygdala-hippocampal-PFC network connectivity during aversive learning in human development. **Journal of Neuroscience**, 36(24), 6420-30. PMC5015779
- c. Gee, D.G., Gabard-Durnam, L., Flannery, J., Goff, B., Humphreys, K.L., Telzer, E.H., Hare, T.A., Bookheimer, S.Y., Tottenham, N. (2013). Early Developmental Emergence of Human Amygdala-PFC Connectivity after Maternal Deprivation. **Proceedings of the National Academy of Sciences**, 110(39), 15638-15643. PMC3785723
- d. Tottenham, N., Hare, T., Quinn, B., Nurse, M., McCarry, T., Gilhooly, T., Millner, A., Galvan, A., Davidson, M., Elgsti, I.M., Thomas, K.M., Gunnar, M., & Casey, B.J., (2010) Prolonged Institutional Rearing is Associated with Larger Amygdala Volume and Emotional Regulation Difficulties. **Developmental Science**, 13(1), 46-61. PMC2817950 **Awarded Developmental Science 2010 **EARLY CAREER RESEARCHER PRIZE** for the best original scientific paper or report to appear in the journal *Developmental Science*.

3. Parental Influences on brain development. Across various theoretical perspectives, the importance of parents on emotional development has been noted. However, the neural mechanisms by which parents exert these profound influences have not been characterized. The work presented in our papers show that access to a parental stimulus modulates amygdala-prefrontal circuitry in a phasic manner to modulate approach-avoid behaviors. Importantly, this modulatory influence of the parent is only observable during childhood, suggesting a sensitive period for parental influence. This work forms the basis of a testable model of parental influence on emotional development and provides insight into neurodevelopment in children who experience parental neglect. I served primary investigator on these papers.

- a. Tottenham, N., Shapiro, M., Flannery, J., Caldera, C., & Sullivan, R. M. (2019). Parental presence switches avoidance to attraction learning in children. **Nature Human Behaviour**.
- b. Callaghan*, B., Gee*, D.G., Gabard-Durnam*, L., & Tottenham, N. (2019). Decreased amygdala reactivity to parent cues protects against anxiety following early adversity: an examination across 3-years. **Biological Psychiatry: Cognitive Neuroscience and Neuroimaging**.
- c. Gee, D.G.*, Gabard-Durnam, L.*, Telzer, E.H., Humphreys, K.L., Goff, B., Shapiro, M., Flannery, J., Lumian, D.S., Fareri, D.S., Caldera, C., & Tottenham, N. (2014). Maternal buffering of human amygdala–prefrontal circuitry during childhood. **Psychological Science**, 25(11), 2067-2078.
- d. Olsavsky, A., Telzer, E.H., Shapiro, M., Humphreys, K.L., Flannery, J., Goff, B., & Tottenham, N. (2013). Indiscriminate amygdala response to mothers and strangers following early maternal deprivation. **Biological Psychiatry**, 74(11), 853-860. PMC3818506

4. Developmental change in the “Social Brain”. In addition to the contributions describes above, our laboratory has examined how social information processing changes over development and is influenced by developmental social contexts. These studies show that the amygdala responds strongly to different social categories (e.g., ethnicity, sex) depending on the developmental stage of the subject. This responding is a reflection of the perceived salience of the social dimension and is shaped by experiences with a particular social category. To facilitate this work, I have also developed a stimulus set (the NimStim Set of Facial Expressions) that has been used widely by scientific colleagues to examine facial affect processing. I served primary investigator on these papers.
- Fareri* D.S., Gabard-Durnam* L, Goff* B, Flannery* J, Gee* DG, Lumian* DS, Caldera* C, & Tottenham, N. (2017). Altered ventral striatal–medial prefrontal cortex resting-state connectivity mediates adolescent social problems after early institutional care. **Development and Psychopathology**, 29, 1865-1876. PMID: PMC5957481
 - Telzer, E.H., Flannery, J., Humphreys, K.L., Goff, B., Gabard-Durnam, L., Gee, D.G., & Tottenham, N. (2015). “The Cooties Effect”: Amygdala reactivity to opposite- versus same-sex faces declines from childhood to adolescence. **Journal of Cognitive Neuroscience**, 27(9):1685-96.
 - Telzer, E.H., Flannery, J., Shapiro, M., Humphreys, K., Goff, B., Gabard-Durman, L., Gee, D.G., & Tottenham, N. (2013). Early experience shapes amygdala sensitivity to race: An international adoption design. **Journal of Neuroscience**, 33(33) 13484-8. PMC3742934
 - Telzer, E.H., Humphreys, K., Shapiro, M., & Tottenham, N. (2013). Amygdala sensitivity to race is not present in childhood but emerges over adolescence. **Journal of Cognitive Neuroscience**, 25(2), 234-244. PMC3628780

Complete List of Published Work in MyBibliography:

<http://www.ncbi.nlm.nih.gov/pubmed?term=tottenham%20n%5BAuthor%5D&cmd=DetailsSearch>

D. Research Support

Ongoing Research Support

NIMH 2R01MH091864 Tottenham/Milham (PI) 07/01/2017-06/30/2022
Predicting Heterogeneous Neurodevelopmental Outcomes in School-aged Children with Early Caregiving Adversities

This project aims to predict heterogeneous brain-behavior outcomes in school-age children exposed to caregiving adversities.
 Role: co-PI

NIMH 2R01MH074374 Dozier/Tottenham (PI) 02/01/2006-05/31/2024
Intervening Early with Neglected Children: Key Behavioral and Neurobiological Outcomes in Adolescence

This project aims to examine the causal effect of an early parent intervention on children’s subsequent brain development.
 Role: co-PI

NIA R01 AG058683-01A1 Widom (PI) 01/01/2019-12/31/2023
Child Maltreatment and Risk for Mild Cognitive Impairment and Alzheimer's Disease

Role: Co-I

NIMH 1R01MH111682 Jovanovic (PI) 9/23/2016-9/22/2021
Impact of Trauma Exposure on Critical Periods in Brain Development

The purpose of this grant is to longitudinally assess the impact of early and on-going trauma during development on fear-related neurocircuitry.
 Role: Co-I

NIMH 1R01MH111640-01A1 Neta (PI) 11/01/2016-10/30/2020
Functional Brain Networks Mediating Individual Differences in Valence Bias

The goal of this grant is to identify neural correlates associated with developmental changes in valence biases.
 Role: Co-I

Columbia's Center for Population Research 07/01/2017-06/30/2019
(PI: Tottenham/Champagne)
Biological Plasticity and Childhood Academic Resilience following Early-life Adversity
Role: co-PI

Presidential Scholars in Society and Neuroscience 07/01/2017-06/31/2019
Faculty Seed Grants for Interdisciplinary Projects in Society and Neuroscience
(PIs: Goldman, Tottenham, Myers, Young)
Role of Music on Electrocortical and Autonomic Functions in Boys and Girls with Autism Spectrum Disorder
Role: co-PI

Completed

R01MH091864 Tottenham (PI) 09/01/10-06/30/15

NIMH BRAINS Award

Longitudinal Examination of Human Amygdala-vmPFC Development

The goal of this study is to characterize developmental change in amygdala-prefrontal cortex circuitry under normative conditions as well as following early adversity.

Role: PI

Dana Foundation Tottenham (PI) 10/01/12-12/31/16

Epigenetic Restructuring of Human DNA following Early-Life Stress

This project examines patterns of DNA methylation in children with a history of early-life stress.

Role: PI

National Science Foundation Gunnar (PI) 10/01/14-10/31/17

[Workshop Grant]

The Neurodevelopment of Social Buffering and Fear Learning: Integration and Crosstalk

Annual multi-disciplinary workshops targeting the neurobiology of social buffering and fear learning.

Role: Co-I

Columbia University - Provost's Grant Program Tottenham (PI) 01/01/15-12/30/16

Critical Periods for Intergenerational Fear Transmission in Humans

The goal of this project is to examine how fear associations are learned from parents.

Role: PI

Frontiers of Innovation - Harvard Center for the Developing Child Tottenham (PI) 06/01/14-05/01/15

Using Safety Signals To Reduce Anxiety Following Early-Life Stress

Examine conditioned inhibition to effectively reduce fear in children and adolescents.

Role: PI

P50MH078105 (Subaward A000285207) Tottenham (PI) 02/01/13-02/31/14

NIMH Early Experience, Stress, & Neurodevelopment Center Seed Funds

A Pilot Study on Early Adversity-Induced Acceleration of a Human Sensitive Period for Emotion Regulation

Role: PI

Seed Funds from NIA U24AG047867 Reversibility Network 08/01/2017-07/31/2018

(PI: Hensch/Fuligni/Tottenham)

Early Life Stress and Adolescent Sleep

Role: co-PI