
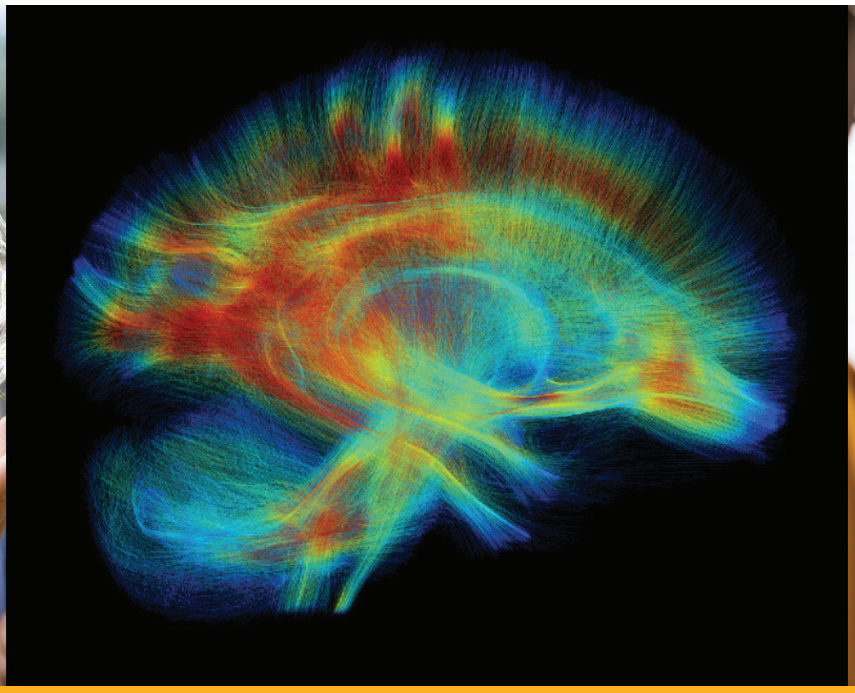


8th Annual

Flux Virtual Congress

September 9 - 12, 2020

Program

flux
CONGRESS

The International Congress
for Integrative Developmental
Cognitive Neuroscience

Program At-A-Glance

West Coast NA	East Coast	London	Paris	GMT	Japan	Sydney	DAY 1 - Pre-Conference Workshops Wednesday, September 9		DAY 1 Thursday, September 10			DAY 2 Friday, September 11			DAY 3 Saturday, September 12		
							Workshop	Workshop	Live Session Plenary	On-demand & Social Events	Poster Hall	Live Session Plenary	On-demand	Poster Hall	Live Session Plenary	On-demand	Poster Hall
PDT	EDT	BST	CEST		JST	AEST											
6:30	9:30	14:30	15:30	13:30	22:30	23:30						Flash Talks 6:25am - 7am PST					
7:00	10:00	15:00	16:00	14:00	23:00	0:00						Poster Session #2 7am - 8:15pm		Poster Session 2	Career Perspectives Panel 7am - 8:15am PST		
7:30	10:30	15:30	16:30	14:30	23:30	0:30											
8:00	11:00	16:00	17:00	15:00	0:00	1:00	FIT'NG together with HBCD and ABCD 8am - 4pm		*Welcome Opening*								
8:30	11:30	16:30	17:30	15:30	0:30	1:30			Stress exposure during pre- and postnatal development – elucidating mechanisms underlying consequences for neurodevelopment Symposium 8:15am - 9:45am PST			Dimensions of Adversity and Neurodevelopment: Translational Approaches Symposium 8:15am - 9:45am PST			Developmental Psychopathology Symposium 8:15am - 9:45am PST		
9:00	12:00	17:00	18:00	16:00	1:00	2:00		AWS Workshop 9am - 1pm Limited 25ppl									
9:30	12:30	17:30	18:30	16:30	1:30	2:30			*BREAK*	Gather.Town Slack Live sessions become available on-demand for 30 days following their initial presentation in the program	Poster Session ALL (on demand)	*BREAK*	Gather.Town Slack Live sessions become available on-demand for 30 days following their initial presentation in the program	Poster Session ALL (on demand)	*BREAK*	Gather.Town Slack Live sessions become available on-demand for 30 days following their initial presentation in the program	Poster Session ALL (on demand)
10:00	13:00	18:00	19:00	17:00	2:00	3:00			Sample Size, Representation, or Both? Current Debates in Developmental Population Neuroscience Symposium 10am - 11:30am PST			Using a developmental cognitive neuroscience approach to understand and predict psychopathology Symposium 10am - 11:30am PST			Elucidating relationships among neurodevelopment in utero and infancy and future childhood behavioral outcomes Symposium 10am - 11:30am PST		
10:30	13:30	18:30	19:30	17:30	2:30	3:30			*BREAK*			*BREAK*			*BREAK*		
11:00	14:00	19:00	20:00	18:00	3:00	4:00			Jacobs Foundation Science of Learning Symposium 11:45am - 12:45pm PST			Young Investigator Award Talk			Trainee Dissertation Talk		
11:30	14:30	19:30	20:30	18:30	3:30	4:30						John Gabrieli Huttenlocher Lecture 12:15pm - 1:15pm PST			Diversity Symposium 12pm - 1pm PST		
12:00	15:00	20:00	21:00	19:00	4:00	5:00			*BREAK*			*BREAK*			*BREAK*		
12:30	15:30	20:30	21:30	19:30	4:30	5:30			Flash Talks 1pm - 1:30pm PST			Flash Talks 1:30pm - 2pm PST			Oh Behave! Individual differences in the development of social behavioral control Symposium 1:15pm - 2:45pm PST		
13:00	16:00	21:00	22:00	20:00	5:00	6:00											
13:30	16:30	21:30	22:30	20:30	5:30	6:30			Poster Session #1 1:30pm - 3pm PST		Poster Session 1	Poster Session #3 2pm - 3:30pm		Poster Session 3	*Closing*		
14:00	17:00	22:00	23:00	21:00	6:00	7:00											
14:30	17:30	22:30	23:30	21:30	6:30	7:30											
15:00	18:00	23:00	0:00	22:00	7:00	8:00			Advances in Analytics for Developmental Cognitive Neuroscience Symposium 3pm - 4:30pm PST		Poster Sessions All (on demand)	Online Games Night		Poster Sessions All (on demand)			
15:30	18:30	23:30	0:30	22:30	7:30	8:30											
16:00	19:00	0:00	1:00	23:00	8:00	9:00											
16:30	19:30	0:30	1:30	23:30	8:30	9:30											

Flux Awards

Huttenlocher Lecturer Award

This award is presented to an outstanding researcher in the field of Developmental Cognitive Neuroscience.

2020 Awardee: **John Gabrieli** | Investigator, McGovern Institute, Grover Hermann Professor, Health Sciences and Technology; Professor, Brain and Cognitive Sciences

John Gabrieli is the director of the Athinoula A. Martinos Imaging Center at the McGovern Institute. He is an investigator at the McGovern Institute, with faculty appointments in the Department of Brain and Cognitive Sciences and the Institute for Medical Engineering & Science, where he holds the Grover Hermann Professorship. He also has appointments in the Department of Psychiatry at Massachusetts General Hospital and the Harvard Graduate School of Education, and is the director of the MIT Integrated Learning Initiative. Prior to joining MIT in 2005, he spent 14 years at Stanford University in the Department of Psychology and Neurosciences Program. He received a PhD in Behavioral Neuroscience in MIT's Department of Brain and Cognitive Sciences and a BA in English from Yale University.

Young Investigator Award

Supported by the Kennedy Krieger Institute

The Young Investigator Award in Cognitive Neuroscience recognizes outstanding contributions by scientists early in their careers. Award recipients have been working in the area of cognitive neuroscience for no more than 10 years involved in active independent research.

Kennedy Krieger Institute
KennedyKrieger.org

2020 Awardee: **Dylan Gee** | Yale University

Dr. Dylan Gee is an Assistant Professor in the Department of Psychology at Yale University where she directs the Clinical Affective Neuroscience and Development Laboratory. She received her B.A. in Psychological and Brain Studies from Dartmouth College and her Ph.D. in clinical psychology from UCLA. Prior to joining the faculty at Yale in 2016, Dr. Gee completed her clinical internship and postdoctoral training at Weill Cornell Medical College. Her research focuses on developmental psychopathology, with primary goals to delineate typical and atypical trajectories of brain development, elucidate how early environments influence sensitive periods in affective development, and translate knowledge of the developing brain to optimize interventions for children and adolescents with anxiety and stress-related disorders. Dr. Gee's research is funded by the National Institutes of Health, the Brain & Behavior Research Foundation, the Jacobs Foundation, and the American Psychological Association. Her research has received broad recognition, including an NIH Director's Early Independence Award, the Janet Taylor Spence Award for Transformative Early Career Contributions from the Association of Psychological Science, and the Society of Clinical Child & Adolescent Psychology's Abidin Early Career Award.

Flux Dissertation Award

Flux is pleased to announce the establishment of the Flux Student Dissertation Award, which recognizes an exceptional, rigorous, and meticulous dissertation by one of the Congress' trainee members.

2020 Awardee: **Denise Werchan** | New York University

Dr. Denise Werchan is currently a Postdoctoral Fellow in the Department of Population Health at the New York University School of Medicine, working with Drs. Clancy Blair, Moriah Thomason, and Natalie Brito. She received her B.S. in Psychology from the University of Arizona. Afterwards, she completed her Ph.D. in Cognitive Science from Brown University, supervised by Dr. Dima Amso. Her dissertation research examined how the prefrontal cortex (PFC) and executive functions support learning and contribute to complexity in thought and action as early as infancy. This work addressed a critical gap in understanding how learning is accomplished in the developing brain in the absence of clear patterns or statistics that guide learning. Her ongoing research explores how developing neural and behavioral systems that support executive functions, learning, and attention are shaped by environmental factors, including maternal health, parenting practices, stress/adversity, and socioeconomic variability. She examines these questions using a combined-methods approach integrating behavioral, eye tracking, physiological, computational, and neuroimaging methods, such as functional near infrared spectroscopy (fNIRS).

Program Contents

About the Flux Congress

The aim of the congress is to provide a forum for developmental cognitive neuroscientists to share their findings on the development of brain processes that support cognition and motivation from an integrative neuroscience perspective. Thus, it provides an opportunity for scientists in the field to expand their knowledge base, and also be better informed of translational approaches.

The Flux Society was launched in June 2014, and has seen growth in its membership each year. To learn more about the Flux Society, please visit **www.fluxsociety.org.**

Welcome
to the eighth meeting of Flux

Dear Fluxers,

Welcome to our 8th meeting of Flux: The Society for Developmental Cognitive Neuroscience, in Virtual Space!

Hope you are all doing well during the pandemic and social unrest. We hope that the Flux meeting will transport you to a place of great scientific inquiry and give you a sense of belonging to our community.

To date we have more than **700 registrations** with more coming in, continuing our yearly increases reflecting the growth in our field. This is especially heartening given the pandemic and hardships that have led to a virtual meeting! **Jessica Church-Lang** (University of Texas, Austin) stepped up to help review the landmark number of poster submissions as well. We also currently have more than 300 members committed to the Flux Society.

We are greatly indebted to our superwoman and Program Chair **Jenn Pfeifer** (University of Oregon) and her program committee including: Ted Satterthwaite (University of Pennsylvania), Katie McLaughlin (Harvard University), Damien Fair (University of Minnesotta), Christian Tamnes (University of Oslo), Kevin Bath (Columbia University), Eveline Crone (Erasmus University Rotterdam), Dylan Gee (Yale University), Deanna Greene (University of California, San Diego), Sarah Whittle (University of Melbourne), Dima Amso (Columbia University), Nikolaus Steinbeis (University College London), and Claudia Buß (Charité – Universitätsmedizin Berlin), for creating an outstanding scientific program. The program committee organized a total of 40 talks including invited and selected Symposiums, Award talks, **19 Flash talks** as well as **263 Posters**. The program committee reviewed a large number of excellent, and extremely competitive, symposium submissions for a precious few available slots. We encourage authors to build upon any unselected submissions, or to generate new ones, to help us plan for future meetings.

Always a peak moment in the Flux program is our **Huttenlocher Award Lecture**. This year, we are thrilled to bestow the 2020 Huttenlocher Award to John Gabrieli (MIT) for his ground-breaking and pioneering work in developmental cognitive neuroscience. John will share his vision of the field and its potential impact going forward, based on his groundbreaking work on the neural basis of thought, emotion, learning, and memory in typical and atypical development, including insights into autism, as well as advances in risk factors for dyslexia that have lead to improvements in learning in the classroom.

Dylan Gee (Yale University) is this year's **Young Investigator Awardee**, who was selected from a highly competitive set of candidates, for her outstanding and highly productive work characterizing typical and atypical brain development with a focus on frontolimbic trajectories, and how early environmental (e.g., early-life stress) and genetic factors influence sensitive periods in neurodevelopment and risk for affective psychopathology in children and adolescents with anxiety and stress-related disorders, to inform clinical interventions for affective psychopathology in childhood and adolescence. We thank the **Kennedy Krieger Institute** for again supporting the YIA!

Congratulations to **Denise Werchan** (New York University) on being this year's recipient of the Flux Dissertation award for her dissertation entitled "Prefrontal Cortex Contributions to Learning in Infancy", with mentor Dima Amso (Columbia University). She examined how prefrontal cortex and executive functions support learning and contribute to complexity in thought and action in infancy.

Each year the **Jacobs Science of Learning Symposium** (SOL) highlights novel connections between Flux society research and the broader field of human learning. This year we feature **Christy Rogers'** work connecting adolescent social learning to changes in connectivity, **Maria Eckstein**'s insights on how combining learning tasks and computational models provides insights into cognitive development from adolescent to adulthood, and **Anna Matejko**'s findings on how reading interventions for children with learning disabilities drive novel insights into relationships between neural networks supporting reading and mathematics. These three talks are followed by a **live** symposium-wide question and answer session (moderated by Bruce McCandliss). We continue to be grateful to the **Jacobs Foundation** for enabling this symposium, as well as support for students to attend this year's Congress. We also thank **Bruce McCandliss** (Stanford University) and **Jenn Pfeifer** for organizing this effort.

We thank **Marisa Spann** (Columbia University) for organizing this year's preconference workshop by **FIT'NG** together with NIH HBCD and ABCD: Important Considerations in the Age of Multisite Early Childhood Imaging Studies and recognize the sponsorship by **Bioimage Suite & Wharton Fund**. We also thank **Tara Madhyastha** (AWS) **& Kate Mills** (University of Oregon) for organizing **Neuropointillist: Flexible Modeling of Neuroimaging Data in R** and recognize the sponsorship **by Amazon Web Services**.

A special thank you to **Deanna Barch** (Washington University in St. Louis) **and Margaret Sheridan** (University of North Carolina) **and the Training Committee**: Kate Nussenbaum (New York University), Mollie Marr (Oregon Health & Science University), João Guassi Moreira (University of California, Los Angeles), Alexandra Cohen (New York University), Michelle Achterberg (Erasmus University), Diego Placido (University of California, Davis), Meriah DeJoseph (University of Minnesota), Na Yeon Kim (Princeton University), Marjolein Barendse (University of Oregon), Zeena Ammar (Emory University), Suzanne van de Groep (Leiden University), and Dana Glenn (University of California, Riverside) for organizing the trainee engagement events, skills exchange, mentoring match, as well as the virtual Flux Fun Event – Video Bingo for free drink tickets at the Flux Paris reception! If you choose to participate, you can download your virtual bingo card through a link sent to all delegates. Bingo will take place through the gather.town app on September 11th at 3:30pm – 4:30pm US PST with Deanna Barch and Bea Luna calling out the numbers. The app gather.town allows groups to hang out and chat and play in groups in various places throughout the virtual spots learn more here - https://fluxsociety.org/virtual-meeting-engagement. In addition, our Whova virtual conference platform provides the "venue" for sharing all the engaging presentations, live Q&A sessions, poster booths while supporting messaging and chatting by text between attendees.

In recognition of the fact that we are all living through a year like none other, we wish to explicitly encourage all Flux members to actively consider, discuss, and collaborate on the consequences that the Global COVID-19 Pandemic and the racial crisis of our time, especially when it comes to child and adolescent cognitive, social, and emotional development. We have appreciated the many such efforts Flux members have already shared, and in addition we should all be mindful of the critical variables affecting development, and potentially helpful approaches to attenuate the many anticipated and unanticipated negative impacts of these cohort specific stressors.

In recognition of the importance of the Black Lives Matter mission for our society, we have formed the **Flux Diversity Workgroup** initiated by **Stefanie Bodison** (University of Southern California) organized with **Jenn Pfeifer** (University of Oregon) and their generous committee members: Theresa Cheng (University of Oregon); Kayla Green (Erasmus University); Camille Phaneuf (New York University); Ines Mürner-Lavanchy (University of Bern); Julia Moser (University of Tübingen); Mollie Marr (Oregon Health & Science University); Michael Gaffrey (Duke University); Charles Geier (Pennsylvania State University); Madison Long (University of Calgary); Cate Hartley (New York University); Kathy Do (University of North Carolina, Chapel Hill); Marjolein Barendse (University of Oregon); Laura Quinones (Washington University in St. Louis); Leehyun Yoon (University of California, Davis); Laya Rajan (Georgetown University); Marybel Robledo Gonzalez (University of Southern California); Simona Ghetti (University of California, Davis); Timothy Brown (University of California, San Diego); Damien Fair (Minnesota University); Meriah DeJoseph (University of Minnesota); Michelle Byrne (University of Oregon); and Bea Luna (University of Pittsburgh). On Saturday, September 12th at noon (PST) we will be initiating an ongoing addition to the structure of this and future Flux meetings – **The Diversity Symposium** – which will provide a platform for all Flux members to listen to, reflect upon, and commit to implementing effective approaches to better understand and increase diversity in our science.

Thank you to **Bruce McCandliss** (Stanford University) and the host committee: Linda Wilbrecht (University of California, Berkeley), Kaustubh Supekar (Stanford University), Russ Poldrack (Stanford University), Daniel Arthur Abrams (Stanford University), Ronald Dahl (University of California, Berkeley), and Weidong Cai (Stanford University) for initiating efforts to have a meeting in Santa Rosa before the pandemic. We anticipate these efforts will lay the groundwork for an even more engaging future Flux meeting in Santa Rosa in 2022.

We are also thankful to **Elsevier** for their continued significant support of Flux and, importantly, publishing **Developmental Cognitive Neuroscience**, the official journal of Flux. Flux leadership would also like to thank Stanford University's Educational Neuroscience Initiative (P.I.: Bruce McCandliss) for generous sponsorship supporting our shift from a local West Coast conference to a virtual conference this year. We are also thankful for the generous support of **Kennedy Krieger Institute**, **Amazon Web Services**, and **Bioimage Suite & The Nathaniel Wharton Fund**.

The **Business Meeting** for Regular Members will take place at 7am PST on Wednesday, September 9th, where the status of the society will be presented and open for feedback and discussion on plans going forward. The content of this meeting will be available to watch on-demand anytime throughout the conference by searching for Business Meeting.

We also want to give a special thank you to **Podium Conference Specialists Marischal DeArmond** and especially **Lauren Moline** who has worked tirelessly organizing every detail supporting the effective execution of our virtual conference. We could not have accomplished this without her!

A warm thank you to the **members of the Flux society and conference participants** for their enthusiasm and making the time to attend the Flux virtual conference! Welcome new Fluxers and a special thank you to those who have been supporting Flux through its maturation, your contributions are noted and greatly appreciated!

A reminder of the bond that brings us together is that **"Flux" is not an acronym (not FLUX)** but rather a term used to highlight that, as developmental cognitive neuroscientists, we are distinct in our investigations of the dynamic nature of cognition through development as stated in the aim of the Flux society ***"To advance the understanding of human brain development by serving as a forum for professional and student scientists, physicians, and educators to: exchange information and educate the next generation of developmental cognitive neuroscience researchers; make widely available scientific research findings on brain development; encourage translational research to clinical populations; promote public information by discussing implications on the fields of education, health, juvenile law, parenting, and mental health, and encourage further progress in the field of developmental cognitive neuroscience."*** The Flux Society strives to support Flux meetings going forward, but also to expand our ability to provide venues for scientific discussion and translational application.

We want to remind you of our ever growing **job bank** where there are postings for every level of career development for those looking for a position and those looking to hire.

We are delighted to invite you to plan on attending **Flux 9, September 8-10th, 2021**, at the prestigious and historically significant **La Sorbonne**, where Piaget did his ground breaking work, in beautiful **Paris, France** hosted by our long-term fluxer and outstanding developmental cognitive neuroscientist **Gregoire Borst**, University of Paris Descartes. The scientific program will be chaired by the prolific neuroscientist, **Nikolaus Steinbeis** from University College London with what promises to be an outstanding meeting. In **2022**, we will 'return' to **Santa Rosa**, wine country, to fulfill our long-standing commitment to distributing our meetings across West Coast, East Coast, and EU venues.

We are looking forward to expanding our understanding of developmental cognitive neuroscience and virtually interacting with attendees and are confident that you will leave with greater understanding, new friends, and enhanced creativity in your approach.

@fluxDCN and **#Flux2020** or **#FluxVirtual**

Sincerely,

Beatriz Luna
President

Brad Schlaggar
Vice-President

Damien Fair
Executive Treasurer

Eveline Crone
Executive Board Member

Bruce McCandliss
Board Member

Nim Tottenham
Board Member

Margaret Sheridan
Board Member

Catherine Hartley
Board Member

Deanna Barch
Board Member

Flux Leadership

Society Executive Committee

Beatriz Luna President	University of Pittsburgh, USA
Brad Schlaggar Vice President	Kennedy Krieger Institute, USA
Bruce McCandliss Executive Treasurer	Stanford University, USA
Eveline Crone	Leiden University, Netherlands
Damien Fair	University of Minnesota, USA
Nim Tottenham	Columbia University, USA
Deanna Barch	Washington University at St. Louis, USA
Catherine Hartley	New York University, USA
Margaret Sheridan	University of North Carolina at Chapel Hill, USA

Congress Scientific Program Committee

Jenn Pfeifer, Chair	University of Oregon
Ted Satterthwaite	University of Pennsylvania
Katie McLaughlin	Harvard University
Damien Fair	University of Minnesota
Bea Luna	University of Pittsburgh
Christian Tamnes	University of Oslo
Kevin Bath	Brown University
Eveline Crone	Leiden University
Dylan Gee	Yale University
Deanna Greene	Washington University, St. Louis
Sarah Whittle	University of Melbourne
Dima Amso	Brown University
Nikolaus Steinbeis	University College London
Claudia Buß	Charité – Universitätsmedizin Berlin

Award Committees

Jenn Pfeifer, Chair	University of Oregon
Ted Satterthwaite	University of Pennsylvania
Katie McLaughlin	Harvard University
Damien Fair	University of Minnesota
Bea Luna	University of Pittsburgh
Christian Tamnes	University of Oslo
Kevin Bath	Brown University
Eveline Crone	Leiden University
Dylan Gee	Yale University
Deanna Greene	Washington University, St. Louis
Sarah Whittle	University of Melbourne
Dima Amso	Brown University
Nikolaus Steinbeis	University College London
Claudia Buß	Charité – Universitätsmedizin Berlin
Charles Geier	Pennsylvania State University
Susan Perlman	University of Pittsburgh

Podium Conference Specialists

Marischal De Armond
Lauren Moline

General Congress Information

Whova Virtual Conference Platform
Whova Event App

Pre-Registration

If you have completed your registration for the virtual congress, please enter the platform through the Flux Society website, and follow the instructions.

Registration

If you wish to register and have not yet done so, please register here [https://www.confmanager.com/main.cfm?cid=2696&tid=32].

Note: Registrations completed after September 5, 2020 will experience a delayed access to the virtual Conference platform.

Code of conduct

By entering the virtual platform and participating in Flux 2020 Virtual Congress you are agreeing to the Flux Code of Conduct. To read the code of conduct, please click here [https://fluxsociety.org/wp-content/uploads/2020/08/Flux-Code-of-Conduct.pdf]

Conference Timelines

Real-time streaming of the Flux Virtual Congress will take place at the following times:

- Sept 9 – Pre-conference workshops from 8am-4pm PDT
- Sept 10 – 8am-4:30pm PDT
- Sept 11 – 6:45am-5:30pm PDT
- Sept 12 – 7am-3pm PDT
- On-demand content until October 12, 2020

Business Meeting

The Society business meeting will be available on-demand to view any time throughout the conference dates, to ensure it is accessible to all. We encourage you to view the business meeting video to be better acquainted with the Flux Society.

Q&A Sessions

With the virtual conference platform, you can as questions via a text chat or in the Q&A Zoom option within the live sessions.

Flux Fun Night

This year's Flux Virtual Fun Night includes games tables and Virtual Bingo called by Deanna Barch and Beatriz Luna on the gather.town program.

Technical help during the virtual conference

If you encounter any technical issues during your virtual experience, please contact the software provider directly by emailing support@whova.com.

Flux Congress Program Schedule

Thursday, September 10

08:00–08:15 **Welcome remarks**

Beatriz Luna, *University of Pittsburgh*
Jennifer Pfeifer, *University of Oregon*

08:15–09:45 **Symposium #1: Stress exposure during pre- and postnatal development – Elucidating mechanisms underlying consequences for neurodevelopment**

Chairs: Dima Amso, *Columbia University*
Kevin Bath, *Brown University*
Claudia Buss, *Charité – Universitatsmedizin Berlin*

Biological embedding of prenatal depression: Relevance for neonatal brain structure
Presenting Author: Kieran O'Donnell
Kieran O'Donnell[1]
[1]*Yale University*

Maternal stress influence on placental differentiation and transplacental neurodevelopmental signals
Presenting Author: Tracy Bale
Tracy Bale[1], Kylie Rock[1], Bridget Nugent[1], Qiuying Zhao[2], Alex Bonnin[2]
[1]*University of Maryland School of Medicine,* [2]*University of Southern California*

Sex-dependent impairments in hippocampal plasticity following neonatal paternal deprivation
Presenting Author: Erica R. Glasper
Erica R Glasper[1]
[1]*University of Maryland*

Impact of differing forms of early life adversity on neural and behavioral development in a mouse model
Presenting Author: Kevin Bath
Kevin Bath[1], Camila Demaestri[1]
[1]*Brown University*

09:45–10:00 **Break**

10:00–11:30 **Symposium #2: Sample size, representation, or both? Current debates in developmental population neuroscience**

Chair: Arianna Gard, *University of Maryland*

Population neuroscience: Past, present and future
Presenting Author: Tomas Paus
Tomas Paus[1]
[1]*University of Toronto*

Current methodological practices in human neuroimaging studies: A consideration of sampling
Presenting Author: Arianna Gard
Arianna Gard[1], Luke Hyde[2], Jeffrey Morenoff[2], Colter Mitchell[2]
[1]*University of Maryland, College Park,* [2]*University of Michigan, Ann Arbor*

Selection bias in population-based and nationally-representative samples
Presenting Author: Henning Tiemeier
Henning Tiemeier[1], Lorenza Dall'Aglio[2], Ryan Muetzel[2], Hannah Kim[1]
[1]*Harvard T.H. Chan School of Public Health,* [2]*Erasmus Medical Center*

Flux Congress Program Schedule

Populations and sub-populations
Presenting Author: Hugh Garavan
Hugh Garavan[1]
[1]University of Vermont

11:30–11:45 **Break**

11:45–12:45 **Jacobs Foundation Science of Learning**
Chair: Bruce McCandliss, *Stanford University*
Sponsored by Jacobs Foundation

Directed functional connectivity during adolescent social learning: An example using sibling dyads
Presenting Author: Christy Rogers
Christy Rogers[1], Kathleen Gates[2], Cassidy Fry[3], Tae-Ho Lee[4], Eva Telzer[2]
[1]Texas Tech University, [2]University of North Carolina at Chapel Hill, [3]Pennsylvania State University, [4]Virginia Polytechnic Institute and State University

Are reading and math inter-related in the brain? An fMRI study on reading and math following reading intervention in children with learning disabilities
Presenting Author: Anna Matejko
Anna Matejko[1], Nicole Schlosberg[1], Melanie Lozano[1], Guinevere Eden[1]
[1]Georgetown University

Combining multiple learning tasks and computational models to isolate factors contributing to cognitive development between age 8-30
Presenting Author: Maria Eckstein
Maria Eckstein[1], Liyu Xia[1], Sarah Master[2], Ronald Dahl[1], Linda Wilbrecht[1], Anne Collins[1]
[1]University of California, Berkeley, [2]Max Planck Institute for Biological Cybernetics

12:45–13:00 **Break**

13:00–13:30 **Flash talks 1**

Higher executive control network coherence buffers against puberty-related increases in internalizing symptoms during the COVID-19 pandemic
Presenting Author: Rajpreet Chahal
Rajpreet Chahal[1], Jaclyn Kirshenbaum[1], Jonas Miller[1], Tiffany Ho[2], Ian Gotlib[1]
[1]Stanford University, [2]University of California, San Francisco

What is an adaptive pattern of brain activity? It depends on one's environment
Presenting Author: Monica Ellwood-Lowe
Monica Ellwood-Lowe[1], Susan Whitfield-Gabrieli[2], Silvia Bunge[1]
[1]University of California, Berkeley, [2]Northeastern University

Childhood sleep problems, mental health, and brain structure: Phenotypic and genetic associations in the ABCD baseline cohort
Presenting Author: Leanna Hernandez
Leanna Hernandez[1], Minsoo Kim[1], Cristian Hernandez[1], Wesley Thompson[2], Adriana Galván[1], Mirella Dapretto[1], Susan Bookheimer[1], Andrew Fuligni[1], Michael Gandal[1]
[1]University of California, Los Angeles, [2]University of California, San Diego

Flux Congress Program Schedule

The development of corticostriatal connectivity and goal-directed learning across adolescence
Presenting Author: Gail Rosenbaum
Gail Rosenbaum[1], Pablo Ripolles[1], Catherine Hartley[1]
[1]*New York University*

Complex emotional processing in young children
Presenting Author: M. Catalina Camacho
M. Catalina Camacho[1], Elizabeth Williams[1], Susan Perlman[1]
[1]*Washington University*

Neural predictors of psychosocial outcomes associated with the COVID-19 pandemic in children with autism spectrum disorder
Presenting Author: Celia Romero
Celia Romero[1], Adriana Baez[1], Lauren Kupis[1], Bryce Dirks[1], Meaghan Parlade[1], Michael Alessandri[1], Jason Nomi[1], Lucina Uddin[1]
[1]*University of Miami*

13:30–15:00 **Poster session 1**

13:30–14:15 **Skills exchange 1: Public outreach and citizen science**
Facilitator: Suzanne van de Groep, *Erasmus Universiteit Rotterdam*

13:30–14:15 **Skills exchange 2: Date visualization**
Facilitators: Ilse van de Groep, *Erasmus Universiteit Rotterdam*
Lina van Drunen, *Erasmus Universiteit Rotterdam*

15:00–16:30 **Symposium #3: Advances in analytics for developmental cognitive neuroscience**
Chairs: Ted Satterthwaite, *University of Pennsylvania*
Deanna Greene, *University of California San Diego*

Best practices for reproducible neuroscience
Presenting Author: Russell Poldrack
Russell Poldrack[1]
[1]*Stanford University*

Methods for longitudinal studies of neurodevelopment
Presenting Author: Catherine Lebel
Catherine Lebel[1]
[1]*University of Calgary*

Methodological confounds in developmental neuroimaging
Presenting Author: Jonathan Power
Jonathan Power[1]
[1]*Weill Cornell*

Feasibility of precision functional mapping in developmental samples
Presenting Author: Deanna Greene
Deanna Greene[1]
[1]*University of California San Diego*

Flux Congress Program Schedule

Friday, September 11

06:25 – 07:00

Flash talks 2

Maturational covariance of cortical thickness during puberty
Presenting Author: Nandita Vijayakumar
Nandita Vijayakumar[1], Emma Sciberras[1], Vicki Anderson[2], Daryl Efron[2], Philip Hazell[3], Jan Nicholson[4], Timothy Silk[1]
[1]Deakin University, [2]Murdoch Children's Research Institute, [3]The University of Sydney, [4]La Trobe University

Unraveling the consequences of childhood maltreatment: deviations from typical functional neurodevelopment mediate the relationship between maltreatment history and depressive symptoms
Presenting Author: Divyangana Rakesh
Divyangana Rakesh[1], Clare Kelly[2], Nandita Vijayakumar[3], Andrew Zalesky[1], Nicholas Allen[4], Sarah Whittle[1]
[1]University of Melbourne, [2]Trinity College Dublin, [3]Deakin University, [4]University of Oregon

Executive function behaviours and the developing functional connectome
Presenting Author: Jonathan Jones
Jonathan Jones[1], Duncan Astle[2]
[1]MRC CBU, [2]University of Cambridge

Developmental trajectories of dynamic brain connectivity
Presenting Author: Monica Lopez-Vicente
Monica Lopez-Vicente[1], Oktay Agcaoglu[2], Laura Perez-Crespo[3], Rosa Mulder[1], Fernando Estevez-Lopez[1], John Flournoy[4], Tonya White[1], Anna van Duijvenvoorde[5], Berna Guroglu[5], Vince Calhoun[2], Henning Tiemeier[6], Ryan Muetzel[1]
[1]Erasmus MC, [2]Georgia State University, [3]Barcelona Institute for Global Health (ISGlobal), [4]Harvard University, [5]Leiden University, [6]Harvard T. H. Chan School of Public Health

The emergence of self: Neural analyses and heritability estimates of self-evaluations in middle childhood
Presenting Author: Lina van Drunen
Lina van Drunen[1], Simone Dobbelaar[1], Renske van der Cruijsen[2], Michelle Achterberg[2], Mara van der Meulen[1], Lara M. Wierenga[1], Eveline A. Crone[2]
[1]Leiden University, [2]Erasmus University Rotterdam

Microstructural maturation of language networks in early childhood
Presenting Author: Sila Genc
Sila Genc[1], Derek Jones[1], Catherine Lebel[2]
[1]Cardiff University, [2]University of Calgary

Longitudinal trajectories of cognition and white matter microstructure in adolescents
Presenting Author: Ines Mürner-Lavanchy
Ines Mürner-Lavanchy[1], Julian Koenig[1], Ayaka Ando[2], Romy Henze[3], Susanne Schell[2], Franz Resch[2], Romuald Brunner[4], Michael Kaess[1]
[1]University of Bern, [2]University of Heidelberg, [3]University of Berlin, [4]University of Regensburg

07:00 – 08:15

Poster session 2

Flux Congress Program Schedule

07:00–07:45

Skills exchange 3: Online testing

Facilitator: Kate Nussenbaum, *New York University*

08:15–09:45

Symposium #4: Dimensions of adversity and neurodevelopment: Translational approaches

Chairs: Katie McLaughlin, *Harvard University*
Dylan Gee, *Yale University*

Links between adversity and neurodevelopment the case for a focus on dimensions of experience
Presenting Author: Margaret Sheridan
Margaret Sheridan[1]
[1]University of North Carolina, Chapel Hill

Leveraging a data-driven approach to parsing heterogeneity in the effects of early adversity on brain development
Presenting Author: Lucinda Sisk
Lucinda Sisk[1], Seok-Jun Hong[2], Camila Caballero[1], Anthony Mekhanik[3], Amy Roy[4], Michael Milham[3], Dylan Gee[1]
[1]Yale University, [2]Sungkyunkwan University, [3]Child Mind Institute, [4]Fordham University

Unpredictability, a novel, actionable early-life adversity, impacts neurodevelopment: A cross-species perspective
Presenting Author: Tallie Z. Baram
Tallie Z Baram[1], Elysia Davis[2], Laura Glynn[3], Curt Sandman[1], Mike Yassa[1], Ali Mortazavi[1], Hal Stern[1]
[1]University of California Irvine, [2]Denvier University, [3]Chapman University

Molecules to mechanisms to meaningful impact: The promise of translational neuroscience
Presenting Author: Philip Fisher
Philip Fisher[1]
[1]University of Oregon

09:45–10:00

Break

10:00–11:30

Symposium #5: Using a developmental cognitive neuroscience approach to understand and predict psychopathology

Chair: Nathan Fox, *University of Maryland*

Intrinsic functional architecture predicts progression of future pathology in a community pediatric sample
Presenting Author: Susan Whitfield-Gabrieli
Susan Whitfield-Gabrieli[1], Laurie Cutting[2], Silvia Bunge[3]
[1]Northeastern University, [2]Vanderbilt University, [3]University of California Berkeley

Testosterone and hippocampal trajectories mediate relationship of poverty to emotion dysregulation and depression: A longitudinal study
Presenting Author: Deanna Barch
Deanna Barch[1], Elizabeth Shirtcliff[2], Nourhan Elsayed[1], Diana Whalen[1], Kirsten Gilbert[1], Alecia Vogel-Hammen[1], Rebecca Tillman[1], Joan Luby[1]
[1]Washington University, [2]Iowa State University'

Neural noise at 8-months predicts infant internalizing and externalizing behavior
Presenting Author: Koraly Perez-Edgar
Koraly Perez-Edgar[1], Brendan Ostlund[1], Berenice Anaya[1]
[1]The Pennsylvania State University

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Development of brain mechanisms underlying threat bias: Relations with childhood social reticence and adolescent anxiety
Presenting Author: Anita Harrewijn
Anita Harrewijn[1]
[1]National Institute of Mental Health

11:30–11:45 **Break**

11:45–12:15 **Young Investigator Award Talk**

Chairs: Deanna Barch, *Washington University in St. Louis*
Bradley Schlagger, *Kennedy Krieger Institute*

Sponsored by Kennedy Krieger Institute

Sensitive periods of frontolimbic development: Implications for optimizing interventions for youth
Dylan Gee, *Yale University*

12:15 – 13:15 **Huttenlocher Lecture**

Chair: Silvia Bunge, *University of California, Berkeley*

The neurobiological lottery of child development
John Gabrieli, *Massachusetts Institute of Technology*

13:15–13:30 **Break**

13:30–14:00 **Flash talks 3**

Neurobiological markers of resilience to depression following childhood maltreatment: The role of neural circuits supporting the cognitive control of emotion
Presenting Author: Alexandra Rodman
Alexandra Rodman[1], Jessica Jenness[2], David Weissman[1], Daniel Pine[3], Katie McLaughlin[1]
[1]Harvard University, [2]University of Washington, [3]National Institute of Mental Health

Neural correlates of emotion reactivity and regulation and youth suicidal ideation: Examining cross-sectional and longitudinal links
Presenting Author: Adam Miller
Adam Miller[1], Jessica Jenness[2], Kelly Sambrook[1], Margaret Sheridan[1], Katie McLaughlin[3]
[1]University of North Carolina at Chapel Hill, [2]University of Washington, [3]Harvard University

A person-centered examination of regulation, sensitivity to threat and impulsivity among children and adolescents: An ERP study
Presenting Author: Taylor Heffer
Taylor Heffer[1], Teena Willoughby[1]
[1]Brock University

Inhibitory control circuitry and externalizing psychopathology in a large sample of higher-risk youth
Presenting Author: Rachel Tomlinson
Rachel Tomlinson[1], S. Alexandra Burt[2], Luke Hyde[1]
[1]University of Michigan, [2]Michigan State University

Prefrontal-striatal circuitry supports adaptive memory prioritization across development
Presenting Author: Kate Nussenbaum
Kate Nussenbaum[1], Daphne Valencia[1], Jamie Greer[1], Nora Keathley[1], Catherine Hartley[1]
[1]New York University

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The thriving brain: effects of individual child characteristics and environmental factors on self-regulation and associated neural circuitry
Presenting Author: Bram Gooskens[1],
Bram Gooskens[1], Dienke Bos[1], Pascal Pas[1], Matthijs Vink[1], Bob Oranje[1], Sarah Durston[1]
[1]University Medical Center Utrecht - UMC Utrecht

14:00–15:30 **Poster session 3**

14:00–14:45 **Skills exchange 4: Writing postdoc grants**
Facilitators: Ali Cohen, *New York University*
Rebecca Martin, *New York University*

15:30–17:30 **Flux Fun Night: Virtual Bingo & Games night**

Saturday, September 12

07:00–08:15 **Career perspectives panel**
Moderators: Meriah DeJoseph, *University of Minnesota*
Diego Placido, *University of California Davis*

Panelists: Jamie Hanson, *University of Pittsburgh*
Tara Madhyastha, *Amazon Web Services*
Marisa Spann, *Columbia University*
Anne-Laura van Harmelen, *Leiden University*

08:15–09:45 **Symposium #6: Developmental psychopathology**
Chairs: Sarah Wittle, *University of Melbourne*
Christian K. Tamnes, *University of Oslo*

Furthering understanding of externalizing psychopathologies through richer modeling of developmental process, behavior, and neurobiology
Presenting Author: Jamie Hanson
Jamie Hanson[1]
[1]University of Pittsburgh

Emerging emotional problems across adolescence coincides with trajectories of structural brain development
Presenting Author: Marieke Bos
Marieke Bos[1]
[1]Leiden University

Brain-predicted age associates with psychopathology dimensions in youth
Presenting Author: Vanessa Cropley
Vanessa Cropley[1], Ye Tian[1], Kavisha Fernando[1], Sina Mansour[1], Christos Pantelis[1], Luca Cocchi[2], Andrew Zalesky[1]
[1]The University of Melbourne, [2]QIMR Berghofer Medical Research Institute

Development of the neural correlates of emotion regulation in adolescents with and without conduct disorder
Presenting Author: Nora Maria Raschle
Nora Raschle[1], Lynn Fehlbaum[1], Réka Borbás[1], Christina Stadler[1], FemNAT-CD consortium[1]
[1]Jacobs Center for Productive Youth Development at the University of Zurich

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The impact of parental presence on a neural marker of anxiety (the error-related negativity) in 5 to 7 year-old children
Presenting Author: Alexandria Meyer
Alexandria Meyer[1]
[1]Florida State University

09:45–10:00 **Break**

10:00 – 11:30 **Symposium #7: Elucidating relationships among neurodevelopment in utero and infancy and future childhood behavioral outcomes**
Chair: Mary Phillips, *University of Pittsburgh*

Intrauterine amygdala neural connectivity predicts autism spectrum disorder (ASD) traits in toddlerhood
Presenting Author: Moriah Thomason
Moriah Thomason[1], Christopher Trentacosta[2], S. Alexandra Burt[3], Autumn Austin[1], Natalie Brito[1]
[1]New York University, [2]Wayne State University, [3]Michigan State University

Predictive relationships in infants among emotional regulation white matter and resting state functional connectivity and concurrent and future emotional behavior
Presenting Author: Mary Phillips
Mary Phillips[1], Alison Hipwell[1], Layla Banihashemi[1], Vincent Schmithorst[1], Lindsay Hanford[2], Ashok Panigrahy[1]
[1]University of Pittsburgh, [2]Harvard University

Salience network functional connectivity relates to electrophysiological markers of attention in infancy
Presenting Author: Courtney Filippi
Nathan Fox[1], Courtney Filippi[1], Santiago Morales Pamplona[1], George Buzzell[1], Maya Bracy[1], Sanjana Ravi[1], Stephanie Leach[1], Daniel Pine[2]
[1]University of Maryland, [2]NIMH

The white matter connectome as an early imaging biomarker
Presenting Author: John Gilmore
John Gilmore[1], Maria Bagonis[1], Jared Williams[1], Rebecca Stephens[1], Emil Cornea[1], Martin Styner[1], Brent Munsell[1]
[1]University of North Carolina

11:30–11:45 **Break**

11:45–12:00 **Trainee dissertation award talk**
Chair: Dima Amso, *Columbia University*

Prefontal cortex contributions to learning in infancy
Denise Werchan, *Brown University*

12:00–13:00 **Diversity Symposium**
Sponsored by Bezos Family Foundation

The goal of this inaugural Diversity Symposium is for Flux members to engage with issues of justice and equity in developmental cognitive neuroscience. First, Dr. Stefanie Bodison will provide an overview of systemic racism in science, with a focus on neuroscience. After this broad and essential introduction to ground us, attendees will select from several smaller breakout discussion sections. These sections were developed intentionally to help meet the variety of needs and stages of Flux members in engaging with these issues, including safe and brave spaces.
Chairs: Stefanie Bodison, *University of Southern California*
Beatriz Luna, *University of Pittsburgh*

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13:00–13:15 **Break**

13:15–14:45 **Symposium #8: Oh behave! Individual differences in the development of social behavioral control**

Chair: Michelle Achterberg, *Erasmus University Rotterdam*
Moderator: Eveline Crone, *Erasmus University Rotterdam*

Functional brain networks underlying multiple facets of behavioral control in middle childhood: a within study replication approach
Presenting Author: Michelle Achterberg
Michelle Achterberg[1], Eduard Klapwijk[1], Anna van Duijvenvoorde[2]
[1]Erasmus University Rotterdam, [2]Leiden University

Neural representations of close others and links to social decision preferences in late adolescence
Presenting Author: Joao Guassi Moreira
Joao Guassi Moreira[1], Lisa Johnson[2], Sarah Tashjian[3], Paul Hastings[2], Adriana Galván[1], Jennifer Silvers[1]
[1]University of California, Los Angeles, [2]University of California, Davis, [3]California Institute of Technology

Neural correlates of the impact of reward history on untrained tasks
Presenting Author: Kristin Meyer
Kristin Meyer[1], Joseph Hopfinger[1], Charlotte Boettiger[1], Margaret Sheridan[2]
[1]University of North Carolina, [2]University of North Carolina at Chapel Hill

Distinct functional connectivity patterns for internalizing and externalizing behaviors in youth with and without developmental disorders
Presenting Author: Dienke Bos
Dienke Bos[1], Maaike Oosterling[1], Bob Oranje[1], Sarah Durston[1]
[1]UMC Utrecht Brain Center

14:45–15:00 **Closing remarks**

Flux Congress Oral Presentations

Thursday, September 10

Symposium: Stress exposure during pre- and postnatal development – Elucidating mechanisms underlying consequences for neurodevelopment

Chairs: Dima Amso, *Columbia University*
Kevin Bath, *Brown University*
Claudia Buss, *Charité – Universitatsmedizin Berlin*

Biological embedding of prenatal depression: relevance for neonatal brain structure
Kieran O'Donnell[1]
[1]*Yale University*

BACKGROUND: Maternal prenatal depression produces individual differences in a range of child outcomes, including measures of brain structure and function. We currently lack biomarkers that reflect such individual differences and could be used to identify children at greatest risk for adverse outcomes. We investigated the association between maternal prenatal depression, offspring genome-wide DNA methylation and variation in measures of neonatal brain structure. **METHODS:** We collected data on maternal symptoms of prenatal depression and offspring genome-wide DNA methylation in buccal cells collected at birth and at 12 months of age (n=136). Paired imaging data provided measures of neonatal hippocampal volume (n=86). **RESULTS:** DNAm shows marked change from birth to one year of age at the majority of sites we tested. Maternal prenatal depression predicted DNA methylation at approximately 72,000 sites (unadjusted/nominal $p<0.05$) and 2417 CpGs following adjustment for multiple testing. Prenatal depression associated CpGs were enriched for glucocorticoid sensitive sites (OR = 1.76, $p<0.01$). Maternal prenatal depression associated with a DNA methylation-based biomarker of glucocorticoid exposure, which predicted measures of neonatal hippocampal volume. Conclusions: Maternal prenatal depression associates with stable changes in DNA methylation at a number of glucocorticoid sensitive sites across the genome. Our results further emphasize the importance of maternal mental health for child neurodevelopment and highlight the potential of epigenetic biomarkers to understand individual difference in such effects.

Maternal stress influence on placental differentiation and transplacental neurodevelopmental signals
Tracy Bale[1], Kylie Rock[1], Bridget Nugent[1], Qiuying Zhao[2], Alex Bonnin[2]
[1]*University of Maryland School of Medicine,* [2]*University of Southern California*

BACKGROUND AND AIM: Parental lifetime exposures to perturbations such as stress, infection, malnutrition, and advanced age have been linked with an increased risk for offspring disease, including a strong association with neurodevelopmental disorders. In our mouse model of early prenatal stress (EPS), stress exposure during the first week of gestation imparts long-term developmental programming deficits in male, but not female, offspring resulting in hypersensitivity to stress, cognitive impairments, and alterations in metabolic programming. The placenta reflects fetal sex chromosome complement and acts as an arbitrator between the mother and fetus, providing necessary factors for fetal development. In addition, these transplacental signals provide clues to the developing fetal brain as to the external environment it will be born into. Therefore, identification of cellular mechanisms by which maternal stress alters placental differentiation and maturation and the subsequent production of proteins and metabolites may yield novel insight into factors critical for neurodevelopment. **METHODS:** Using our mouse model of EPS and genetic tools to produce placenta-specific reduction of OGT, we examined the cellular and molecular mechanisms and transplacental signals relayed to the developing fetal brain. Using RNA-sequencing, we also examined the influence of placental OGT on the fetal hypothalamus. In addition, studies in which whole live placentas were perfused ex vivo, we have performed proteomic and transcriptomic analyses on the proteins and extracellular vesicles isolated from the perfusate. **RESULTS:** We identified the X-linked, stress sensitive, nutrient sensor O-linked-N-acetylglucosamine (OGT) as a placental biomarker of prenatal stress. Levels of OGT were significantly higher in female tissue compared to males, and EPS further reduced OGT to very low expression in the male placenta. Genetic placental-specific reduction of OGT recapitulated the developmental and metabolic impairments associated with our EPS mouse model. We found that OGT determined genome-wide sex differences in levels of the histone repressive mark, H3K27me3, in placental trophoblasts, where males have substantially lower levels than females. Further, RNA-Seq of the fetal hypothalamus revealed that genetic reduction of OGT in the female placenta to male levels of expression erased nearly all of the sex differences detected at this stage, suggesting that placental OGT contributes to sex differences in brain development and lasting impacts on hypothalamic function. **CONCLUSIONS:** Overall, these studies demonstrate that OGT is a key regulator of placental cellular mechanisms important in key transplacental signals and impact on neurodevelopment. OGT is altered by maternal stress and maternal glucose, and may therefore offer novel insight into maternal metabolic and environmental influences on offspring disease risk and resilience. Studies were funded by NIMH, NICHD and NIEHS.

Sex-dependent impairments in hippocampal plasticity following neonatal paternal deprivation
Erica R. Glasper[1]
[1]*University of Maryland*

BACKGROUND AND AIM: Early-life adversities, such as trauma, neglect, or abuse, experienced during postnatal development results in disruptions in neuroplasticity, with these effects lasting well into adulthood. Women are twice as likely as men to develop stress-related disorders, like depression and anxiety, as a result of early-life adversity. Most investigations of early-life adversity use uniparental rodent models (e.g., Rattus, Mus) that disrupt mother/offspring interaction (e.g., maternal separation/deprivation models; limited bedding and nesting model); however, these models either depict a vulnerable male phenotype or do not recapitulate the female sex bias in

susceptibility to early-life adversity observed in humans. While less commonly studied, father absence is a high predictor of anxiety in children and also decreases resilience to psychological distress later in life. Empirical studies of disrupted father/offspring interaction suggests that females are more susceptible to father absence, resulting in deficits in stress-related behaviors. **METHODS:** Using the biparental California mouse (Peromyscus californicus), our goal was to replicate the commonly observed sex bias following early-life adversity in humans via the use of a unique early-life adverse experience, namely neonatal paternal deprivation. In a series of experiments, we investigated the effects of neonatal paternal deprivation on sex dependent 1) new neuron survival, 2) microglial proliferation, 3) dentate gyrus volume, 4) stress-axis activation, and 5) pro-inflammatory cytokine concentration in the hippocampus of adult, biparentally-reared or paternally-deprived (i.e., paternal male permanently removed on postnatal day one) mice. Additionally, the relationship between the aforementioned parameters and stress-related behaviors (i.e., anxiety and depression), as well as cognitive and social behaviors, were investigated. **RESULTS:** Collectively, the findings from this series of investigations reveal that paternal deprivation produces a female-specific hippocampal plasticity phenotype that may underlie stress-related behaviors. CONCLUSIONS: Importantly, this paternal deprivation model has the potential to inform sex-selective risk for the development of stress-induced mental illness that is observed in humans.

Impact of differing forms of early life adversity on neural and behavioral development in a mouse model

Kevin Bath[1], Camila Demaestri[1]
[1]*Brown University*

Early life adversity (ELA) increases risk for negative health outcomes, with sex disparities in prevalence and form of ELA experienced and risk for neuropsychiatric pathology. ELA comes in many forms (e.g. parental neglect/ loss, limited access to resources) but whether disparate forms of ELA have commoneffects on outcomes, and if males and females are equally affected, remains unknown. Epidemiological studies often fail to accurately account for differences in type, timing, and duration of adversity experienced. Rodent models allow precise control of many of these variables. However, differences in the form of ELA, species, strain, housing, and testing paradigms used may contribute to differences in outcomes leading to questions of whether differences are the result of the form of ELA or these other variables. Here, we directly compared two mouse models of ELA, maternal separation (MS) and limited bedding (LB) in males and females on development of the body, motor and visual milestones, stress physiology, and anxiety-like behavior. LB affected timing of early milestones, somatic growth, and stress physiology in both sexes, yet only females showed later anxiety-like behaviors. MS rearing affected males and females similarly in early milestone development, yet only males showed changes in stress physiology and anxiety-like outcomes. These studies provide a platform to directly compare MS and LB models within one lab. The current work advances our understanding of the unique features of ELA that shape early neurodevelopmental events and risk for later pathology, increasing the translational relevance of these ELA models

Symposium: Sample size, representation, or both? Current debates in developmental population neuroscience

Chair: Arianna Gard, *University of Maryland*

Population neuroscience: Past, present and future

Tomas Paus[1]
[1]*University of Toronto*

I will begin this talk by introducing the concept of population neuroscience: an intersection between genetics, epidemiology and neuroscience. I will discuss motivations for using this approach (e.g., complexity requires large n), design features (e.g., breadth vs. depth), and key challenges associated with participant recruitment (e.g., ascertainment), data collection (e.g., time constraints) and their interpretation (e.g., causality). Throughout the talk, I will use examples from various large datasets, such as CHARGE, ENIGMA, ABCD Study, to illustrate potential of this field for generating new knowledge about the human brain, and for identifying forces shaping the brain from conception onwards.

Current methodological practices in human neuroimaging studies: A consideration of sampling

Arianna Gard[1], Luke Hyde[2], Jeffrey Morenoff[2], Colter Mitchell[2]
[1]*University of Maryland, College Park,* [2]*University of Michigan, Ann Arbor*

Structural and functional neuroimaging has become a powerful and widespread tool to study human behavior, particularly in the developmental literature. Ostensibly, this research is intended to study population-level processes - memory formation, language development, the propagation of physiological stress responses. In recent years, developmental neuroscientists have heeded calls for larger sample sizes (Button et al., 2013). But do larger sample sizes alone lead to population-level inference (Falk et al., 2013)? This talk examines issues of sampling and representation in developmental neuroscience. First, the results of a structured review of human neuroimaging studies from top-ranked journals in 2019 that documents current methodological practices in our field will be presented. In addition to describing the proportion of studies that report participant race and ethnicity, gender, age, geographical location, and socioeconomic (dis)advantage, we investigate the extent to which studies report recruitment procedures, MRI inclusion and exclusion criteria, and sources and demographic predictors of data loss. Second, borrowing methods from survey methodology, we investigate the influence of sampling weights on associations between demographic variables and brain structure and function, using two population-based studies of youth brain development. Finally, I conclude with recommendations for future research and discuss how population-based studies can inform the generalizability of developmental neuroscience research.

Flux Congress Oral Presentations

Selection bias in population-based and nationally-representative samples

Henning Tiemeier[1], Dall'Aglio[2], Ryan Muetzel[2], Hannah Kim[1]
[1]Harvard T.H. Chan School of Public Health, [2]Erasmus Medical Center

BACKGROUND AND AIM: Neuroimaging studies are typically not designed within an epidemiological framework. This can impact internal validity and generalizability. In this talk I will illustrate how two important forms of bias, selection bias and confounding, can impact the validity of associations observed between behavioral traits and neuroimaging characteristics. **METHODS:** Data from the population-based Generation R Study and the nationally representative ABCD youth study are used to illustrate the extent of possible bias in imaging analyses. Generation R has a response rate of 61% at baseline in well-defined city limits, it oversampled ethnic minorities by design. Neuroimaging data are available in more than 5000 children aged 9-14 in Generation R and in more than 10,000 children aged 9-11 in ABCD. The present vertex-wise analyses run in QDECR focus on cortical surface area and volume, quantified brain-wide with FreeSurfer. In Generation R, behavioral data were obtained from children, parents and teachers, in ABCD from parents and children using questionnaires. Teacher-reported data of children with missing parent-reported data allowed for an evaluation of the impact of loss to follow-up, while stepwise control for confounding in linear regression, and inverse probability weighting could show the extent of confounding. **RESULTS:** We illustrate selection and confounding bias based on the association of attention problems with cortical surface area and volume. More than 40% of children have been lost to follow-up since the study was initiated (10-year follow-up) in Generation R. The association between attention problems and cortical surface area did not change materially after inverse probability weighting. However, using teacher data to estimate the bias in associations obtained with parental data suggests that selection bias leads to some spurious findings. Stepwise analyses from a sex, age and race/ethnicity adjusted model to a fully adjusted model including socio-economic variables, maternal psychopathology, smoking and cannabis use during pregnancy, showed that the number of significant associations between inattention and surface area decreased about 80% in Generation R and 60% in the ABCD Study. Results for volume followed the same trend although the extent of the associations across the cortex was smaller. Additional adjustments for co-occurring psychiatric problems such as aggression or for IQ suggested that the observed associations are also not very specific to attention problems. **CONCLUSIONS:** Discussions in Population Neuroscience have focused on representativeness of the study sample and size. The present analyses suggest that selection bias during follow-up and, arguably, during inclusion, as well as confounding are key as they can invalidate findings and impact generalizability. To advance our etiological understanding and ultimately public health, neuroimaging studies must address these threats to internal validity carefully.

Populations and sub-populations

Hugh Garavan[1]
[1]University of Vermont

BACKGROUND AND AIM: The existence of large demographically diverse datasets provides many new opportunities including the increased statistical power to detect small, but true, effects and the ability to covary for potential influences that frequently confound human research. However, covariates such as sociodemographic variables need to be applied judiciously as they can chip away at the small effects that large-sample studies are showing to be more reliable than the inflated effects that tend to be detected in smaller studies. Another approach would be to study subgroups separately. A straightforward example would be not to treat sex as a nuisance covariate but instead to assess the effect of interest separately for males and females. With a large and diverse sample, it might be possible to extend this to other pertinent demographic or phenotypic variables leading to stratified analyses. **METHODS:** We offer examples from IMAGEN, a ten-year longitudinal study of approximately 2,000 adolescents and ABCD, a longitudinal study of approximately 12,000 adolescents. **RESULTS:** We show that predictive profiles (of future drug use, of weight gain) differ between boys and girls suggesting differences in etiologies. Beyond demographics, we show that "subtypes" can be identified within large populations based on patterns of brain activity and that analyses run separately for each subtype explain more variance in the outcome of interest than analyses run on the full sample that ignores the subtype distinction. **CONCLUSIONS:** We conclude that a population neuroscience approach encourages us to address the heterogeneity (in causes, in outcomes) that exists beyond small, highly ascertained samples.

Symposium: Jacobs Foundation Science of Learning

Chair: Bruce McCandliss, *Stanford University*

Sponsored by Jacobs Foundation

JACOBS FOUNDATION
Our Promise to Youth

Directed functional connectivity during adolescent social learning: An example using sibling dyads

Christy Rogers[1], Kathleen Gates[2], Cassidy Fry[3], Tae-Ho Lee[4], Eva Telzer[2]
[1]Texas Tech University, [2]University of North Carolina at Chapel Hill, [3]Pennsylvania State University, [4]Virginia Polytechnic Institute and State University

OBJECTIVE: Adolescent risk taking is associated with older sibling risk behaviors (e.g., risky sexual behavior; Whiteman et al., 2014), particularly when dyads are same-sex and closer in age, and when older siblings are perceived as a valuable model and adolescents do not try to differentiate from them. Based on functional brain connectivity during adolescent social cognition (McCormick et al., 2018), we investigated connectivity patterns that may underlie how adolescents learning risky behavior from older siblings based on dyad sex, age spacing, older sibling modeling, and adolescent differentiation. **METHODS:** Participants included 44 adolescents (Mage=12.2 years; 23 females), and their older sibling (Mage=14.6 years; 20 females) who completed a risk-taking task (Op de Macks et al., 2018) while their performance was recorded. During an fMRI scan, adolescents observed their older sibling's performance on the risk-taking task. We used group iterative multiple model estimation (GIMME; Gates & Molenaar, 2012) to examine patterns of directional brain region connectivity that underlie adolescent social learning of risky decision-making. **RESULTS:** Group-level paths included associations

between all bilateral brain regions in the model (i.e., left and right ventral striatum, medial prefrontal cortex. Adolescents who were hypothesized to be more heavily influenced by their older siblings (i.e., same sex dyads, close in age, high older sibling modeling, low differentiation) exhibited connections from the amygdala to the anterior insula (AI), and from the AI to the temporal pole. **CONCLUSION:** These results suggest that the AI, a brain region associated with integrating affective and cognitive processes during decision-making, plays a role in disseminating input during observation of risky social learning in adolescents who are more inclined to engage in social learning. Findings identify pathways specific to adolescents more motivated to engage in social learning.

Are reading and math inter-related in the brain? An fMRI study on reading and math following reading intervention in children with learning disabilities

Anna Matejko[1], Nicole Schlosberg[1], Melanie Lozano[1], Guinevere Eden[1]
[1]Georgetown University

Prior research has shown connections between reading and math: (1) reading and math disability are highly comorbid learning disabilities (LD), and (2) both skills activate inferior parietal and frontal cortices. Determining whether reading and math are bound together at the neural level is important for understanding LD. Here we studied 53 children (age 8-12) with LD before and after a successful reading intervention to test whether behavioral and neural changes underlying reading are yoked to behavioral and neural changes underlying arithmetic (addition and subtraction). If the two are inter-related, one would expect improved reading ability to affect math ability and brain activity during arithmetic. Intervention-related gains in word decoding correlated with fMRI signal decreases during a reading task in the bilateral temporo-parietal cortices, parahippocampal gyri, and cerebellum. Math performance, however, declined during the reading intervention, suggesting that math skills had been neglected or that the intervention was detrimental to math (possibly competing at the neural level). To test the latter, we used the aforementioned regions that correlated with reading gains to examine whether (i) intervention-induced changes in reading and arithmetic (addition or subtraction) activity were correlated, and (ii) whether changes in math performance corresponded to changes in activity during arithmetic (addition or subtraction). Bayesian and frequentist analyses revealed no relationship between intervention-induced changes in reading and arithmetic activity (BF01 1.9-4.7). Further, there were no correlations between math performance and fMRI signal change during either arithmetic task in these regions (BF01 2.3-5.8), nor any other brain region (determined by a whole-brain analysis). These results of independent and unrelated brain-based outcomes after reading intervention indicate that reading and math are not intertwined at the neural level in LD.

Combining multiple learning tasks and computational models to isolate factors contributing to cognitive development between age 8-30

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Computational modeling has the promise to quantitatively isolate the processes that change in human cognitive development. However, early results using computational modeling have been contradictory. This may be driven by typical sample variation as well as the environmental statistics of experimental tasks and the distinct computational models applied. In an effort to understand this variability and reconcile previous findings in the reinforcement learning domain, we conducted a large-scale developmental study on 291 participants aged 8-30 years. Participants completed four learning tasks that varied on two experimental dimensions (stochastic / deterministic feedback, stable/volatile environment). We analyzed behavior and fitted computational models independently on each task, ensuring quantitative and qualitative fit, then compared the results across tasks. We found that performance (accuracy, response times) was highly consistent across tasks, and showed a stereotypical developmental trajectory: Performance increased steeply in the youngest age range 8-12, slowed down around age 12-17, and reached a stable plateau in mid-to-late adolescence/early adulthood ~18-25. This was mirrored by models' noise and forgetting parameters. However, other model parameters showed large variability across tasks: Most notably, the relationship of age and learning rate varied widely across tasks, where we observed stable, increasing, U-shaped, and inverse-U developmental trajectories. We used principal component analysis to identify which common factors underlie developmental differences between tasks, and support vector machines to determine what information different tasks contained about each other. Our research clarifies contradictions in the previous literature by assessing within-participant differences between tasks and models and identifying sources of difference. It also establishes stable across-task developmental factors.

Flash talks 1

Higher executive control network coherence buffers against puberty-related increases in internalizing symptoms during the COVID-19 pandemic

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Early pubertal maturation has been posited to be a biopsychosocial risk factor for the onset of internalizing psychopathology in adolescence; further, early-maturing youth exhibit heightened reactivity to stressful events even in post-puberty. School closures and enforced social distancing, as well as health and financial uncertainties, during the COVID-19 pandemic are expected to adversely affect mental health in youth, particularly adolescents who are already at risk for experiencing emotional difficulties. The executive control network (ECN) supports cognitive processes required to successfully navigate novel challenges and regulate emotions in stressful contexts; it may buffer against stress-related internalizing symptom increases. We examined whether functional coherence of the ECN, measured via resting-state fMRI 5 years before the pandemic (at T1; Mage=11.29), is a neurobiological marker of resilience to increases in the severity of internalizing symptoms during COVID-19 (relative to 3 months prior; Mage=16.54) in adolescents who were in more

advanced stages of puberty at T1 relative to their same-age peers (N=85; 49 F). Covariates included age at both time-points, early life stress, SES, and internalizing symptoms at T1. On average, participants reported an increase in symptoms from the 3 months prior to pandemic to the 2 recent weeks during the pandemic (t(84)=6.00, p<.0001). We found that early-maturing youth exhibited greater increases in internalizing symptoms during the pandemic if their ECN coherence was low (B=0.49, T=3.21, p<.001); in contrast, relative pubertal stage was not associated with changes in internalizing symptoms in adolescents with higher ECN coherence at T1 (B=-0.06, T=-0.49, p=.630). These findings highlight the role of the functional architecture of the brain that supports executive functioning in protecting against risk factors that may exacerbate symptoms of internalizing psychopathology during periods of stress and uncertainty.

What is an adaptive pattern of brain activity? It depends on one's environment

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Prior research indicates that certain patterns of functional connectivity are more adaptive--for example, associated with better cognitive test scores. One such pattern thought to be adaptive is an anti-correlation between lateral frontoparietal network (LFPN; supports executive functions), and Default Mode Network (DMN; supports internally-directed thought). Lower LFPN-DMN connectivity has been linked to higher cognitive test performance, leading to a view that it in order to focus on a cognitively demanding task, the LFPN must operate independently of the DMN. However, most studies are based on non-representative samples of individuals from higher-socioeconomic status backgrounds. Children living in poverty are at the greatest risk of low performance on cognitive tests, yet we know little about the neural underpinnings of success for them. In a pre-registered study, we analyzed 1034 children ages 9.0-10.9y (M=9.9y) living below poverty, identified from a larger sample (ABCD study). We did not find this expected relation. Further testing confirmed an interaction (p=0.003), such that for children in the larger sample living above poverty (N=5805), high test performance was related to lower LFPN-DMN connectivity (B=-1.41, p=0.002), replicating prior studies, whereas for children living below poverty, this relation trended in the opposite direction (B=2.11; p=0.060). Follow-up cross-validated predictive analyses revealed that the relation between LFPN-DMN connectivity and test performance varied systematically depending on children's environments. For children living in dangerous neighborhoods, for example, more positive LFPN-DMN connectivity was linked to better test performance; for children living in safe neighborhoods, this relation was in the expected, negative, direction. This pattern indicates that adaptive brain function depends crucially on adolescents' environments, highlighting the need for more diverse representation in developmental cognitive neuroscience.

Childhood sleep problems, mental health, and brain structure: Phenotypic and genetic associations in the ABCD baseline cohort

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OBJECTIVE: Sleep problems are common in children and may precede the onset of psychiatric disorders. However, little is known about how sleep is related to brain development. Here we examine: 1) how individual variability in sleep disturbances (SDs: insomnia, arousal, breathing, somnolence, hyperhidrosis, sleep-wake transitions) are related to heterogeneity in psychiatric symptoms (PS) and brain structure in 9-10-year-old youth, and 2) the extent to which childhood SDs are heritable and demonstrate shared genetic etiology with PS and brain size. **METHODS:** Data for >10,000 9-to-10-year old youth were obtained from the Adolescent Brain and Cognitive Development study. Linear mixed-effects models were used to examine the relationship between SDs, PS, and MRI measures of brain volume (VOL), surface area (SA), and cortical thickness (CT) in the split-sample for discovery and replication. Genome-wide Complex Trait Analysis was used to compute heritability and genetic correlations. **RESULTS:** SDs broadly predicted higher levels of PS; however, only insomnia showed replicable associations with both PS and brain size. More frequent insomnia was associated with higher PS, and smaller VOL and SA. SNP-heritability was moderate for insomnia (h2=0.16) and sleep-hyperhidrosis (h2=0.16), low-to-moderate for PS (h2=0.03-0.25), and highest for VOL, SA, and CT (h2=0.25-0.37). Insomnia was genetically correlated with multiple PS (i.e., total problems, externalizing, ADHD), but not with brain structure. **CONCLUSIONS:** These findings indicate that, among commonly occurring childhood sleep problems, insomnia is uniquely associated with smaller brain size in middle-childhood. Results further suggest that a moderate proportion of variability in pediatric insomnia is due to genetic factors, and that the genetic influences underlying childhood insomnia and mental health are in-part shared. Longitudinal data is required to elucidate temporal causality between poor sleep and psychiatric symptoms.

The development of corticostriatal connectivity and goal-directed learning across adolescence

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During adolescence, individuals must learn to make autonomous choices that are likely to yield rewarding outcomes. Accordingly, prior work has demonstrated age-related increases in goal-directed learning across adolescence, which involves a "model-based" consideration of the reward structure of the environment. In adults, model-based learning is thought to rely on the caudate nucleus in the striatum, which is a hub with overlapping projections from multiple cortical regions. Further, some have proposed that the degree to which these corticostriatal projections converge may facilitate goal-directed behavior. However, little is known about how patterns of corticostriatal connectivity change over development or how they relate to behavior. In the present study, we examine how age-related changes in the strength and localization of cortical projections to caudate relate to age differences in model-based learning. Participants ages 8-25 underwent a diffusion weighted imaging scan and completed a two-step reinforcement-learning task. Consistent with prior research, engagement in model-based strategies increased with age, reflecting increases in goal-directed choices across adolescence. Although connectivity between medial striatum and ventromedial and dorsolateral prefrontal cortex did not significantly change with

age, increased corticostriatal connectivity predicted model-based learning independently from age. In forthcoming analyses, we will compute DICE coefficients to measure the convergence of cortical projections on caudate. We will subsequently test the hypothesis that cortical projections increasingly overlap on the caudate across adolescence, which may drive age related increases in model-based learning.

Complex emotional processing in young children

M. Catalina Camacho[1], Elizabeth Williams[1], Susan Perlman[1]
[1]*Washington University*

Early childhood is marked by rapid and nonlinear emotional development, however the neurodevelopment that gives rise to this maturation is not understood. Most work in mapping emotional neurodevelopment has relied upon un-naturalistic paradigms, presenting emotional stimuli in the absence of social context. The present study seeks to characterize how young children process complex emotional stimuli--contextualized in social content--and examines how this circuitry may shift across age. Forty-five 4-7-year-old children watched a 21-minute episode of a children's TV show during multi-echo fMRI scanning. An independent cohort of adults rated this episode on a continuous basis for positive and negative content. This regressor was used to examine neural activation in children. Children demonstrated widespread activation in response to each increasing negative and positive content. Of note, in response to increasing negative content, children demonstrated increased activation of the dorsolateral prefrontal cortex (DLPFC) and decreased activation of the inferior parietal lobule (IPL) and orbitofrontal cortex (OFC). In response to increasing positive content, children demonstrated increased subgenual anterior cingulate and medial OFC as well as decreased DLPFC activation. Temporal and precuneus cortex activation during negative content decreased with age. These results suggest frontoparietal, limbic, and default mode network activation in processing complex emotional stimuli, providing insight to how young children process emotional information and how this activation may shift across development. Further analysis of the network dynamics underlying this processing will be conducted.

Neural predictors of psychosocial outcomes associated with the COVID-19 pandemic in children with autism spectrum disorder

Celia Romero[1], Adriana Baez[1], Lauren Kupis[1], Bryce Dirks[1], Meaghan Parlade[1], Michael Alessandri[1], Jason Nomi[1], Lucina Uddin[1]
[1]*University of Miami*

The 2019 novel coronavirus disease (COVID-19) has resulted in significant restrictions of everyday functions and abrupt changes in behavioral patterns. Children with autism spectrum disorder (ASD) have difficulties with flexibility in daily life and are at increased risk for anxiety and depressive symptoms. Children with ASD experiencing disruptions in daily routine and services as a result of shelter-in-place orders are expected to be especially impacted. Here, we aim to explore the neural predictors of quarantine mental health outcomes by examining brain-behavior relationships across a sample of typically developing (TD) children and children with autism. Data collected during quarantine will include behavioral measures of anxiety and depressive symptoms assessed by the Screen for Child Anxiety and Related Emotional Disorders (SCARED) and Mood and Feeling Questionnaire (MFQ) collected from approximately 70 children with ASD and 70 TD children who previously participated in neuroimaging studies in our laboratory. Functional MRI data will consist of 295 volume (TR=2) resting-state scans collected pre-quarantine and preprocessed using the DPABI toolbox. Independent component analysis (ICA) and dual regression in FSL will be used to identify large-scale executive control networks. Within-network functional connectivity (FC) strength will be associated with anxiety and depression outcomes in both ASD and TD children groups. We hypothesize that children with ASD will show negative associations between FC strength and depression/anxiety symptoms within executive control networks compared to TD children as disruptions to routine typically have a greater impact on children with ASD and in those with lower executive control network integrity. Knowledge and understanding of quarantine outcomes in children with autism is crucial to promote community recovery and maximize clinical preparedness to offer additional support for those at increased risk for adverse consequences.

Symposium: Advances in analytics for developmental cognitive neuroscience

Chair: Ted Satterthwaite, *University of Pennsylvania*

Best practices for reproducible neuroscience

Russell Poldrack[1]
[1]*Stanford University*

There is increasing concern that the methods used by many researchers in neuroscience may lead to a high rate of false findings. I will discuss several factors that can drive false results, such as low statistical power and analytic flexibility, and describe a set of practices that can help reduce the likelihood of false discoveries.

Methods for longitudinal studies of neurodevelopment

Catherine Lebel[1]
[1]*University of Calgary*

Longitudinal neuroimaging data allows for measurement of brain development (i.e., changes over time) rather than providing a snapshot of the brain at a single time point. Longitudinal data allows us to detect deviations from typical trajectories within individuals, and thus can be more informative than cross-sectional data. Over the past several years, the number of longitudinal studies has grown considerably, along with publicly available longitudinal data, offering rich possibilities for enhancing our understanding of brain development. However, longitudinal data also provides analysis challenges, especially for growing brains, such as statistically accounting

for repeated measures, appropriately registering images from the same individual, and scanner upgrades. In this talk, I will highlight some of the advantages of longitudinal neuroimaging analysis as well as discuss potential ways to overcome some of the challenges. I will also provide some examples of recent longitudinal neuroimaging analyses that have informed our understanding of both typical and atypical brain development in children and adolescents.

Methodological confounds in developmental neuroimaging

Jonathan Power[1]
[1]*Weill Cornell*

BACKGROUND AND AIM: Functional magnetic resonance imaging (fMRI) is a challenging methodology to use in the best of times, and developmental populations are an especially challenging population to image. In this talk, I will cover some of the main confounds that occur functional neuroimaging, and how these confounds manifest in different acquisition protocols and at different stages of the lifespan. Special attention will be given to head motion, which occurs in multiple forms. Special attention will also be given to breathing effects on cerebral blood flow, which occurs in multiple forms, some of which also display lifespan biases especially early in development. **METHODS:** I will show individual scans across the lifespan illustrating both typical and atypical cases of confounds, and I will also show group results related to the individual scans. **RESULTS:** Several different, known confounds exist in developmental data. **CONCLUSIONS:** A multi-faceted approach to understanding and evaluating confounds is needed in virtually all functional neuroimaging studies. Two of the most influential confounds in imaging are motion and breathing, each of which has different signal characteristics. Different approaches are needed to isolate and control for these different kinds of confound, and further work is needed in this area, especially early in the lifespan.

Feasibility of precision functional mapping in developmental samples

Deanna Greene[1]
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BACKGROUND AND AIM: Capturing individual differences in developmental trajectories is a major goal for developmental cognitive neuroscience. However, much of the brain imaging work in our field relies upon group averaged data. Precision functional mapping is an approach that can delineate an individual's specific functional anatomy by acquiring large amounts of neuroimaging data from an individual participant. Previously, our group used this approach to interrogate functional brain network organization at the individual level in adults. We acquired hours of resting-state fMRI, task fMRI, and structural MRI from 10 healthy young adults across 12 scan sessions per participant, and demonstrated methods for describing each individual's functional anatomy at the level of the cortex, subcortex, and cerebellum. Being able to use this approach in developmental populations would be beneficial for understanding individual variability in typical and atypical brain development. Given the time and effort required to acquire the data needed for precision functional mapping, we aimed to test its feasibility in children. Here, I will discuss our recent endeavor to use this precision functional mapping approach in both typically developing children and children with a neurodevelopmental disorder, namely Tourette syndrome. **METHODS:** We scanned 9 typically developing children (age 9-10 years old) and 3 children with Tourette syndrome (8-12 years old) over 3-12 sessions per child. We acquired 60-298 minutes of resting-state fMRI data and 1-14 T1-weighted structural MRI scans from each child. **RESULTS:** With these data, we have been able to delineate each child's individual functional brain network organization. We demonstrate similar broad network structure across children in addition to clear individual differences. **CONCLUSIONS:** These data demonstrate that precision functional mapping is indeed feasible for studying individual children, and is a promising approach for future work in developmental cognitive neuroscience.

Friday, September 11

Flash talks 2

Unraveling the consequences of childhood maltreatment: Deviations from typical functional neurodevelopment mediate the relationship between maltreatment history and depressive symptoms

Divyangana Rakesh[1], Clare Kelly[2], Nandita Vijayakumar[3], Andrew Zalesky[1], Nicholas Allen[4], Sarah Whittle[1]
[1]*University of Melbourne,* [2]*Trinity College Dublin,* [3]*Deakin University,* [4]*University of Oregon*

BACKGROUND: Childhood maltreatment is associated with lifelong psychiatric sequalae. However, our understanding of neurobiological mechanisms responsible for this association is limited. One way childhood maltreatment may confer risk for psychopathology is by altering neurodevelopmental trajectoriesduring childhood and adolescence. However, longitudinal research, which is essential for examining this question, has been limited. **METHODS:** In the current study, associations between childhood maltreatment and the longitudinal development of resting state functional connectivity (rsFC) were examined in 130 community residing adolescents. fMRI data was acquired at age 16 (T1; M age = 16.46 years, SD = 0.52, 66F) and age 19 (T2; mean follow up period: 2.35 years). Childhood maltreatment history was assessed prior to T1 and we used whole-brain functional connectivity analyses to examine maltreatment-associated alterations in the development of neural circuitry. **RESULTS:** We found maltreatment to be associated with widespread longitudinal increases in rsFC, primarily between default mode, dorsal attention, and frontoparietal systems. We also found sex-dependent increased maltreatment-associated rsFC in males in salience and cortical limbic circuits. Cross-sectional analyses revealed a shift in maltreatment-related rsFC alterations, which were localized to subcortical and sensory circuits at T1 to frontal circuits at T2. Finally, longitudinal increases in rsFC connectivity mediated the relationship between childhood maltreatment and

increased depressive symptoms. **CONCLUSIONS:** To our knowledge, this is the first study to longitudinally examine maltreatment-related alterations in rsFC in adolescents. Our findings shed light on the neurodevelopmental consequences of childhood maltreatment, and provide evidence for their role in risk for psychopathology.

Executive function behaviours and the developing functional connectome

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Executive function difficulties manifest as behaviours that are seen as hallmarks of many neurodevelopmental conditions. Although atypical functional connectivity has been observed in these conditions, little is known about how the functional organisation of the brain may underpin variability in these behaviours during childhood. The aim of the current study is to investigate whether and how executive function behaviours are associated with functional brain organisation. Utilising advancements in network science, we propose to use community detection to identify profiles of executive function behaviour in an intentionally heterogeneous sample of 957 children aged 5-15. Functional connectomes will be constructed from resting-state functional Magnetic Resonance Imaging (fMRI) data for 238 children. We then plan to use partial least squares regression, a multivariate dimension reduction technique, to identify components that maximally explain covariance between the behavioural profiles and functional connectomes. The analyses will be conducted at three topological levels of the connectome, including: global graph metrics, connectivity within and between networks, and regional connectivity. Finally, we will examine how functional brain organisation develops with age.

Developmental trajectories of dynamic brain connectivity

Monica Lopez-Vicente[1], Oktay Agcaoglu[2], Laura Perez-Crespo[3], Rosa Mulder[1], Fernando Estevez-Lopez[1], John Flournoy[4], Tonya White[1], Anna van Duijvenvoorde[5], Berna Guroglu[5], Vince Calhoun[2], Henning Tiemeier[6], Ryan Muetzel[1]
[1]Erasmus MC, [2]Georgia State University, [3]Barcelona Institute for Global Health (ISGlobal), [4]Harvard University, [5]Leiden University, [6]Harvard T. H. Chan School of Public Health

Dynamic brain connectivity is a novel functional MRI analysis technique that allows correlation patterns amongst networks to vary over time. Cross-sectional work has shown that these patterns are sensitive to age in children, however few studies used longitudinal designs. Our objective is to characterize the developmental trajectories of dynamic brain connectivity in a population-based pediatric sample. Resting-state MRI data were acquired repeatedly at the ages of 6-to-9 (n=964), 9-to-12 (n=3448), and 12-to-14 years old (n=2048). A spatially constrained group-independent component analysis (ICA) was applied to the second visit data using 51 reference components grouped in 7 networks (Agcaoglu et al., 2019 Hum Brain Mapp). Dynamic functional network connectivity (FNC) between all ICA time courses were computed using a sliding window approach. We used k-means to cluster 171 dynamic FNC windows of 44 seconds in 5 dynamic states. Preliminary cross-sectional results showed that sensorimotor, default-mode, and cognitive control network connections were the most variable. Dynamic states 1, 4 and 5 were modularized connectivity patterns, that is, the components showed intra- and internetwork connectivity. In state-2, the components were heterogeneously connected in a non-modularized pattern. State-3 was a globally disconnected pattern. The next steps are to include the data from the first and third visits into the ICA and dynamic FNC analyses and to conduct multilevel linear mixed-effects regression models to study how dynamic connectivity patterns change as children grow. We hypothesized that variability in connections among networks will increase and children will gradually spend more time in modularized states. Longitudinal analyses will provide individual growth trajectories of dynamic brain connectivity from childhood into adolescence, which is key to understand the influence of the environment on brain development.

The emergence of self: Neural analyses and heritability estimates of self-evaluations in middle childhood

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How the emergence of the concept of self is influenced by environmental versus genetic factors is a long-standing question. We investigated heritability estimates of behavioral and neural underpinnings of self-concept. To do so, a validated fMRI task was applied in a twin sample of 345 (150 complete twin pairs) participants aged between 7-9 years. Participants were asked to indicate to what extent academic and social traits applied to them by responding with 'yes' or 'no' (self-concept condition). In a control-condition, participants were asked to categorize the trait sentences into 'School' or 'Friends'. The fMRI analyses revealed stronger mPFC activation for self than for control conditions. This effect was more pronounced in the social condition. Stronger DLPFC activation was observed for academic self-evaluations versus social self-evaluations. Genetic modeling revealed that variation in academic self-evaluations was explained for 16-27% by genetic factors, whereas social self-evaluations were explained for 0-20% by genetic factors and for 9-24% by shared environmental factors. Moreover, we report differential genetic and environmental influences on mPFC and lateral PFC for academic (genetic and unique environment) and social (genetic, shared environment, and unique environment) self-evaluations. This is the first study demonstrating in a young twin sample that self-concept development depends on both genetic and environmental factors, depending on the specific domain.

Microstructural maturation of language networks in early childhood

Sila Genc[1], Derek Jones[1], Catherine Lebel[2]
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Early childhood is a dynamic period of white matter maturation, with continuous axonal growth and myelination. Developmental patterns of microstructure are generally studied with diffusion magnetic resonance imaging (dMRI) using voxel-based values averaged

over entire fibre pathways. Recent tract-profiling approaches provide a means to study more subtle variations in microstructural properties at distinct points along a pathway. In this study, we quantify age-related profiles of tract development in fibre pathways that are involved in language skills both in childhood and adulthood. We included 322 dMRI scans from 103 participants aged 2-8 years (170M;152F) from the longitudinal Calgary Preschool MRI dataset. Data were pre-processed in MRtrix3, correcting for Gibbs ringing, eddy and motion artefact. Automated subject-specific tractography was performed using TractSeg to delineate three segments of the superior longitudinal fasciculus (SLF_I, SLF_II, SLF_III) and the arcuate fasciculus (AF). Along-tract profiling was performed and fractional anisotropy (FA) values were mapped at 20 equidistant points in each tract and compared across ages in 1-year bins. Evidence for a group difference was determined by non-overlapping 95% confidence intervals. We observed the expected age-related increases in FA for all tracts. However, the left SLF_II, SLF_III and AF showed distinct "jumps" in FA between 4-5 years, rather than smooth development across age groups. These discontinuous patterns may correspond with increased language acquisition during this period of development. Future work will include additional microstructural metrics, model the degree of lateralization, and evaluate longitudinal age- and sex-relationships across tract segments. Overall, our findings suggest that white matter microstructural properties along the length of language-network tracts may develop in a stepwise manner rather than smoothly across early childhood.

Longitudinal trajectories of cognition and white matter microstructure in adolescents

Ines Mürner-Lavanchy[1], Julian Koenig[1], Ayaka Ando[2], Romy Henze[3], Susanne Schell[2], Franz Resch[2], Romuald Brunner[4], Michael Kaess[1]
[1]University of Bern, [2]University of Heidelberg, [3]University of Berlin, [4]University of Regensburg

BACKGROUND AND OBJECTIVES: Important cognitive changes during adolescence coincide with the maturation of white matter microstructure. This study aimed to characterize longitudinal developmental trajectories of inhibition, planning, emotion recognition and risk-taking and their association with white matter maturation in a healthy adolescent sample. **METHODS:** In an accelerated longitudinal cohort design, n = 112 healthy adolescents between ages 9 and 16 underwent cognitive assessment with the Cambridge Neuropsychological Test Automated Battery (CANTAB) and diffusion MRI over three years. Fractional anisotropy (FA) and mean diffusivity (MD) were extracted for major white matter pathways using TRActs Constrained by UnderLying Anatomy (TRACULA), an automatic probabilistic reconstruction technique. Mixed models were used to analyze age trajectories of cognitive performance and white matter microstructure. **RESULTS:** Inhibition, planning and emotion recognition performance improved linearly across adolescence. Risk-taking developed in a quadratic fashion, with relatively stable performance between 9 and 12 and an increase between ages 12 and 16. Including cingulum and superior longitudinal fasciculus FA slightly improved model fit for emotion recognition across age. We found no evidence that FA or MD were related to inhibition, planning or risk-taking across age. **CONCLUSION:** In line with existing studies, we found improvements in inhibition, planning and emotion recognition across adolescence as well as increases in risk-taking in late adolescence. Weak evidence regarding effects of FA and MD challenge the additional value of white matter microstructure to explain neurocognitive development. More longitudinal research with large datasets is needed to identify the potential role of white matter microstructure in cognitive development.

Symposium: Dimensions of adversity and neurodevelopment: Translational approaches

Chair: Katie McLaughlin, *Harvard University*

Links between adversity and neurodevelopment the case for a focus on dimensions of experience

Margaret Sheridan[1]
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BACKGROUND: Childhood adversity is common and associated with a host of negative developmental outcomes. The most common approach to studying adversity in childhood is a cumulative risk score that counts the number of adversities experienced. In contrast, we and others have proposed that different dimensions of adversity influence health through distinct pathways and that these differential associations with developmental outcomes are replicable despite adversity co-occurrence and clustering by socioeconomic status (SES) and minority status. **METHODS:** We demonstrate support for this hypothesis using first hypothesis-driven approaches examining these associations in early childhood and longitudinally and then we determine whether these differential associations emerge from a data-driven clustering analysis in the population-representative Fragile Families study (N=2566). **RESULTS:** Consistent with our predictions, across both hypothesis driven and data-driven methods, threat and deprivation appear to be differentially linked with mediators on the pathway between adversity exposure and psychopathology. These differential associations are sometimes robust to controls for SES and cumulative risk. In our data-driven analysis we observe that inclusion of parental SES and minority status revealed the centrality of these societal variables for increasing adversity exposure, but also that inclusion of these variables did not fundamentally alter network structure. **CONCLUSIONS:** We provide several datapoints indicating the importance of conceptualizing adversity as including dimensions of exposure and of expanding methods of linking adversity to neurodevelopment beyond cumulative risk approaches.

Leveraging a data-driven approach to parsing heterogeneity in the effects of early adversity on brain development

Lucinda Sisk[1], Seok-Jun Hong[2], Camila Caballero[1], Anthony Mekhanik[3], Amy Roy[4], Michael Milham[3], Dylan Gee[1]
[1]Yale University, [2]Sungkyunkwan University, [3]Child Mind Institute, [4]Fordham University

BACKGROUND AND AIM: Early-life experiences play a profound role in conferring risk and resilience for brain and behavioral development. However, there is vast heterogeneity in the nature of early experiences and in child and adolescent outcomes following adversity. Increasingly, dimensional approaches have focused on delineating how specific features of the early environment may differentially shape the developing brain and mental health. **METHODS:** In the current work we applied a data-driven approach to

examine how specific environmental factors and types of adversity were associated with brain structure. Using data collected from 1,000 youth in the Adolescent Brain Cognitive Development Study, we applied a cross-modal integration and clustering approach called Similarity Network Fusion. This approach combined two brain morphometrics (cortical thickness and myelin-surrogate markers) with environmental exposures related to trauma, neighborhood safety, and school and family environments to identify homogeneous subgroups. **RESULTS:** Depending on the subtyping resolution, results of similarity network fusion identified two or five subgroups, each characterized by distinct profiles of co-occurring brain structure and environmental features. Notably, more supportive caregiving and school environments were associated with increased myelination, whereas less supportive caregiving, higher family conflict and psychopathology, and higher perceived neighborhood safety were observed with increased cortical thickness. These subtypes were highly reproducible and predicted externalizing symptoms and overall mental health problems. **CONCLUSIONS:** Our findings highlight substantial heterogeneity in the associations between early experiences and neurodevelopment and support the feasibility of using data-driven approaches to better understand how distinct environmental exposures differentially influence outcomes. Delineating more precise associations between risk factors, protective factors, and brain development may inform approaches to enhance early risk identification and optimize interventions targeting specific profiles of experience.

Unpredictability, a novel, actionable early-life adversity, impacts neurodevelopment: A cross-species perspective

Tallie Z Baram[1], Elysia Davis[2], Laura Glynn[3], Curt Sandman[1], Mike Yassa[1], Ali Mortazavi[1], Hal Stern[1]
[1]University of California Irvine, [2]Denvier University, [3]Chapman University

BACKGROUND AND AIM: Early-life adversities (ELAs or ACEs) have a profound, cumulative impact on cognitive and emotional health. However, the spectrum of ELAs, their direct causal relation to neuropsychiatric outcomes, and the mechanisms by which they may impact the maturation of brain molecules, cells and circuits are not fully understood. **METHODS AND RESULTS:** Employing rodent models of ELA, we have established fragmented and unpredictable patterns of parental care as a key determinant of early-life stress in rat and mouse pups. These chaotic, 'high-entropy' patterns of sensory signals, received during sensitive periods, disrupted synapse pruning and brain circuit maturation, associated with enduring selective and sex-modulated deficits in memory and reward-related behaviors. To determine whether unpredictable sensory signals from the parents and the home environment were important in human neurodevelopment, we quantified unpredictability of maternal care behaviors mathematically, and developed the Questionnaire for Unpredictability in Childhood (QUIC). Unpredictable signals from the mother presaged significant problems in memory, self-control and reward-seeking behaviors in infants, children and adolescents. Importantly, these correlations persisted when factors associated with human ELA including socioeconomic status and maternal depression were considered. Notably, the importance of early-life unpredictability has been established in international cohorts (e.g., in Finland). Ongoing studies to uncover the underlying mechanism for the profound effects of unpredictability on processes of children's brain maturation include longitudinal neuroimaging and intra-individual epigenomic approaches. **CONCLUSIONS:** We conclude that unpredictable patterns of parental and environmental signals constitute a significant ELA. Notably, unlike many other ELAs, unpredictability may be readily mitigated through education and related interventions, providing impetus for uncovering how this novel, actionable ELA impairs brain development and for identifying predictive markers for affected individuals. Supported by P50 MH 096889

Molecules to mechanisms to meaningful impact: The promise of translational neuroscience

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Modern neuroscience provides a multitude of tools for understanding how we learn, sense, feel emotions, and remember experiences. This knowledge can serve a scientific end in itself, and it can also be applied to the development of effective strategies for promoting health and well-being; indeed, this is the domain of translational neuroscience. By identifying specific brain and biological systems that underlie psychological disorders--as well as those associated with resilience in the face of adversity--and by targeting these systems, the potential exists to develop more effective and scalable interventions. Moreover, randomized clinical trials (RCTs) to test interventions that emerge from basic neuroscience research have the potential to go beyond simply program evaluation studies to serve as "mechanism experiments" that can advance theory. In order to achieve this potential, however, it is necessary to specify (and measure) both the mediational pathways by which an intervention is hypothesized to impact outcomes via alterations in underlying neural systems, and to consider potential moderators that help to explain variations in impact. In this presentation, we will elucidate the translational neuroscience process and provide examples from our own and others' work of family-based intervention studies to promote child wellbeing that have employed this approach to achieve social impact.

Symposium: Using a developmental cognitive neuroscience approach to understand and predict psychopathology

Chair: Nathan Fox, *University of Maryland*

Intrinsic functional architecture predicts progression of future pathology in a community pediatric sample

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BACKGROUND: I will describe ways in which the intrinsic functional architecture of the human brain, as elucidated by resting state networks (RSNs), can predict individual developmental trajectories towards behavioral problems as measured by the Childhood Behavioral Checklist's (CBCL) empirically based syndrome scales, which are highly predictive of future psychiatric diagnoses. **METHODS:** First we examined, in a community pediatric sample, whether RSNs can predict individual children's progression of

behavioral problems characteristic of major depression (MDD) such as such as internalization problems (which combine the Anxious/depressed, Withdrawn, and Somatic complaints subscales). Next, we sought to replicate/extend these findings in 1) a familial at-risk for MDD pediatric population and 2) adolescents with and without anxiety/depression. **RESULTS:** Weaker connectivity at age 7 between the subgenual anterior cingulate cortex (sgACC) and dorsolateral prefrontal cortex (DLPFC) predicted the development of internalization problems by age 11. Logistic regression analyses of resting state metrics revealed that RSNs were a more accurate predictor than initial behavioral measures of whether a child would progress to a subclinical CBCL scores. In independent samples, we found that this biomarker predict worsening of CBCL behavioral problems in both children at-risk for MDD and adolescents with diagnosed anxiety/depression. **CONCLUSION:** Such neuroimaging biomarkers are promising for the early identification of vulnerabilities in neural systems and may support preventive treatment of at-risk children prior to the emergence of full-blown psychiatric disorders of MDD.

Testosterone and hippocampal trajectories mediate relationship of poverty to emotion dysregulation and depression: A longitudinal study

Deanna Barch[1], Elizabeth Shirtcliff[2], Nourhan Elsayed[1], Diana Whalen[1], Kirsten Gilbert[1], Alecia Vogel-Hammen[1], Rebecca Tillman[1], Joan Luby[1]
[1]Washington University, [2]Iowa State University

BACKGROUND AND AIM: There is robust evidence that early poverty is associated with poor developmental outcomes, including impaired emotion regulation and depression. However, the specific mechanisms that mediate this risk are less clear. Here we test the hypothesis that one pathway involves hormone mechanisms (testosterone and DHEA) that contribute to disruption of hippocampal brain development, which in turn contribute to perturbed emotion regulation, and subsequent risk for depression. **METHODS:** To do so, we used data from 167 children participating in the Preschool Depression Study, a longitudinal study that followed children from preschool (ages 3 to 5) to late adolescence, and which includes prospective assessments of poverty in preschool, measures of testosterone, DHEA and hippocampal volume across school age and adolescence, and measures of emotion regulation and depression in adolescence. **RESULTS:** Using multilevel modeling and linear regression, we found that early poverty predicted shallower increases of testosterone, but not DHEA, across development, which in turn predicted shallower trajectories of hippocampal development. Further, we found that early poverty predicted both impaired emotion regulation and depression, even when controlling for depression in preschool. The relationship between early poverty and self-reported depression in adolescence was explained by serial mediation through testosterone to hippocampus to emotion dysregulation, while a pathway from hippocampus to testosterone was not significant. There were no significant interactions with sex. **CONCLUSIONS:** These results provide novel evidence about a hormonal pathway by which early poverty may contribute to disrupted brain development and risk for mental health problems later in life. Identification of such pathways provide evidence for potential points of intervention that might help mitigate the impact of early adversity on brain development.

Neural noise at 8-months predicts infant internalizing and externalizing behavior

Koraly Perez-Edgar[1], Brendan Ostlund[1], Berenice Anaya[1]
[1]The Pennsylvania State University

Adaptive information processing depends on efficient communication between neurons and may be disrupted when neuronal networks are synchronized too strongly (overcoupling) or too weakly (undercoupling). Neural noise is thought to serve as a safety mechanism that prevents pathological coupling. A moderate level of noise facilitates information processing, whereas excessively high or low levels may lead to cognitive and behavioral dysfunction by disrupting neuronal synchronization. Low noise may contribute to internalizing disorders; anxiety may, for example, reflect an overcoupling of the default mode network as a result of reinforcement (e.g., rumination). High noise, on the other hand, undercuts neuronal synchronization and is related to age-related cognitive decline, as well as cognitive dysfunction (e.g., ADHD). Neural noise can be measured by the EEG power spectral slope. Computational and animal models demonstrate that the spectral slope is attributable to the balance of synaptic excitation to inhibition in the brain. A flatter slope indicates more random neuronal activity. In this study, we examined how neural noise emerges in the first years of life and associates with childhood psychopathology. We predicted that a steeper spectral slope (less noise) would be related to more internalizing behavior while a flatter spectral slope (more noise) would be related to more externalizing behavior at 18-months of age. Given known developmental shifts in the distribution of spectral power, we also predicted that stable high neural noise (i.e., less decrease) over time would associate with behavior problems. Families were drawn from an ongoing multisite longitudinal study examining infant temperament and attention (N=350). We estimatedspectral slopes from resting EEG via FOOOF. Preliminary data are currently available for infants at 8- (N=124), 12- (N=88), and 18-months (N=72). Mothers reported on infant behavior problems at 18-months via the ITSEA. Latent growth models showed that 8-month neural noise was negatively associated with neural noise trajectories (β=-0.55, p=.01), suggesting that infants with initially lower noise (steeper spectral slopes) were more likely to show stability over time. These infants also showed more internalizing (β=0.23, p=.01) and externalizing behavior (β=0.19, p=.01) at 18-months. These data suggest that less noise (overcoupling) is associated with early childhood psychopathology risk. Changes in neural noise from 8- to 18-months did not predict behavior problems at 18-months (ps>.57). Our preliminary results converge with prior evidence to show individual differences in the shift of spectral power from lower to higher frequencies across early life, as indexed by changes in the spectral slope over time. We also show that disrupted neural communication, as early as the first year, may portend later childhood psychopathology risk, and may be attributable to the balance of inhibition to excitation in the developing brain.

Development of brain mechanisms underlying threat bias: relations with childhood social reticence and adolescent anxiety

Anita Harrewijn[1]
[1]National Institute of Mental Health

Social reticence during childhood predicts the development of anxiety symptoms, which typically emerge during early adolescence. We studied the relation between childhood social reticence and adolescent anxiety symptoms from a developmental cognitive neuroscience perspective. Specifically, we focused on one potential moderator of this relation: the development of brain mechanisms associated with attention bias to threat. Previous research showed that amygdala-prefrontal cortex connectivity during threat bias moderated relations between early-childhood temperament and anxiety symptoms at 10 and 13 years. The current study extends this research by assessing neural correlates of threat bias across adolescence (10-16 years) and testing relations with childhood social reticence and concurrent anxiety symptoms. This study is part of a longitudinal study on behaviorally inhibited temperament and childhood social reticence. Childhood social reticence was measured when children were 2, 3, 4, 5 and 7 years old using behavioral observations and questionnaires. Anxiety symptoms and threat bias were measured when children were 10, 13 and 16 years. Threat bias was measured using the dot-probe task, in which children were shown two faces on the screen (angry-neutral, happy-neutral, or neutral-neutral) and responded to the location of a probe replacing one of the two faces, either in a threat-congruent or threat-incongruent location. Useable fMRI data was collected during the dot-probe task for 69 children at 10 years of age (M=10.57 years, SD=0.45, 42 girls), 83 children at 13 years (M=13.24 years, SD=0.73, 45 girls) and 80 children at 16 years (M=16.26 years, SD=0.67, 39 girls). 57 children had data at 2 time points, 15 children had data at 3 time points. I will focus on amygdala functional connectivity during the threat-congruent and threat-incongruent conditions, assessed with a psychophysiological interaction (PPI) analysis. Relations with childhood social reticence and concurrent anxiety symptoms will be tested with a linear mixed-effects model with the individual-level PPI data as dependent variable, social reticence, concurrent anxiety symptoms, task condition, time and their interactions as independent variables, and subject as random effect. This will test whether development in the neural circuitry related to threat bias is associated with the development of anxiety symptoms in socially reticent children.

Flash talks 3

Neurobiological markers of resilience to depression following childhood maltreatment: The role of neural circuits supporting the cognitive control of emotion

Alexandra Rodman[1], Jessica Jenness[2], David Weissman[1], Daniel Pine[3], Katie McLaughlin[1]
[1]Harvard University, [2]University of Washington, [3]National Institute of Mental Health

Childhood adversity is strongly linked to negative mental health outcomes, including depression and anxiety. Leveraging cognitive neuroscience to identify mechanisms that contribute to resilience in children with a history of maltreatment may provide viable intervention targets for the treatment or prevention of psychopathology. Here, we examined neurobiological mechanisms of resilience to depression and anxiety following childhood adversity. Specifically, we investigated whether neural circuits underlying the cognitive control of emotion may promote resilience, wherein a child's ability to recruit the frontoparietal control network to modulate amygdala reactivity to negative emotional cues--such as during cognitive reappraisal-- buffers risk for internalizing symptoms following exposure to adversity. A longitudinal sample of 151 participants aged 8-17 years with (n=79) and without (n=72) a history of childhood maltreatment completed a cognitive reappraisal task while undergoing fMRI. Among maltreated youth, those who were better able to recruit prefrontal control regions and modulate amygdala reactivity during reappraisal exhibited lower risk for depression over time. By contrast, no association was observed between neural functioning during reappraisal and depression among youth without a history of maltreatment. These preliminary findings support the hypothesis that children who are better able to regulate emotion through recruitment of the frontoparietal network exhibit greater resilience to depression following childhood maltreatment. Interventions targeting cognitive reappraisal and other cognitive emotion regulation strategies may have potential for reducing vulnerability to depression among children exposed to adversity.

Neural correlates of emotion reactivity and regulation and youth suicidal ideation: Examining cross-sectional and longitudinal links

Adam Miller[1], Jessica Jenness[2], Kelly Sambrook[1], Margaret Sheridan[1], Katie McLaughlin[3]
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Prior research links neural responses underlying emotion reactivity and regulation with suicidal ideation (SI) among youth (e.g., Miller et al., 2017). It is unknown if neural correlates of emotion reactivity and regulation predict future SI. Here, we examined cross-sectional and longitudinal associations between neural correlates of emotion reactivity and regulation and SI. Hypotheses: Youth with SI will exhibit reduced activation in prefrontal regions supporting emotion regulation (e.g., dorsolateral prefrontal cortex; dlPFC) during reactivity trials, which will predict presence and severity of SI. Youth (N=151, 8-16, M=12.76) completed a baseline fMRI scan and clinical interview assessing presence and severity of SI. Two years later, 123 youth (81%) completed a follow-up interview. A well-known fMRI task assessed reactivity and regulation (via cognitive reappraisal) to negative stimuli. Whole brain and ROI analyses (dlPFC, anterior cingulate cortex (ACC)) examined associations between SI and neural activation during reactivity and regulation. Models controlled for age, sex, and maltreatment severity. Longitudinal models also controlled for time and past SI. Baseline whole brain analyses revealed a positive association between lifetime SI severity and activation in the posterior insula, postcentral gyrus, and superior and middle temporal gyrus during reactivity. Follow-up whole brain analyses revealed a negative association between presence of SI at follow up and activation in the motor cortex, precuneus, and occipital cortex during regulation trials. Consistent with hypotheses, less activation in the dlPFC ROI during reactivity predicted more severe SI at follow-up, $b = -.24$, $p < .05$. This is among the first studies to longitudinal

link neural correlates with future SI. Results partially support hypotheses suggesting that neural correlates of emotion reactivity and regulation may predict future SI among youth.

A person-centered examination of regulation, sensitivity to threat and impulsivity among children and adolescents: An ERP study

Taylor Heffer[1], Teena Willoughby[1]
[1]*Brock University*

The imbalance model suggests that asynchrony in the maturation of interconnections between the prefrontal cortex (i.e., regulation) and the limbic striatal regions (i.e., socioemotional processing) contributes to adolescents being more sensitive to emotionally salient events than children. Adolescents may be more susceptible than children to bottom-up processing (i.e., impulsivity, IMP; or sensitivity to threat, ST) in emotionally-arousing situations, as their ability to regulate these emotions is not yet fully mature. At the same time, there may be individual differences among adolescents in both bottom-up (IMP & ST) and top-down regulation. Latent class analysis (LCA) was used to identify distinct groups of youth who differ in these processes. We also investigated group differences on the error-related negativity (ERN, an ERP) during an inhibitory control task that requires top-down control over bottom-up responding. The ERN is thought to be associated with motivational significance of errors; IMP has been associated with a smaller ERN, while ST is associated with a larger ERN. Children and adolescents (N=1313, Mage=11, range=7-14 years) completed a survey assessing their dysregulation (DYS), ST, and IMP. A subsample (N=483) also completed a go/no-go task while EEG was recorded. The LCA identified four groups with differential levels of DYS, ST, and IMP. In line with imbalance models, adolescents had greater odds than children of being in the (1) high DYS/ST_lowIMP or (2) moderateDYS/ST_high IMP groups, compared to two other groups that had lower scores on these measures (OR:1.6-2.7). The highDYS/ST_lowIMP group had the largest ERN, while the moderateDYS/ST_highIMP group had the smallest ERN ($p<.05$). Adolescents are more likely to be in groups with greater DYS; at the same time there are differences in whether they have greater IMP or ST. The ERN may be a biomarker that distinguishes between the different types of bottom-up processing that adolescents might use.

Inhibitory control circuitry and externalizing psychopathology in a large sample of higher-risk youth

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Disinhibition has been proposed as a common factor underlying many forms of externalizing psychopathology. Though there is consistent evidence that behavioral response inhibition performance relates to externalizing psychopathology, neuroimaging studies have produced conflicting results. Prior work has frequently used clinical samples or small convenience samples of affluent participants, limiting generalizability of results. Thus, there is a need for additional clarity regarding the relationship between inhibitory circuitry and externalizing, particularly using a large sample of higher risk youth. The present study will examine the relationship between go-no/go-related inhibitory control activation and externalizing behavior, and test whether behavioral measures of inhibitory control mediate this association. We will use data from a sample of 708 twins in 354 families who completed a go/no-go fMRI task as part of the Michigan Twins Neurogenetics Study (MTwiNS), which uses an epidemiologic sampling frame (birth records) to focus directly on families residing in modestly-to-severely disadvantaged neighborhood contexts. We will create an inhibitory control latent factor using go/no-go efficiency, stop-signal reaction time, and the Inhibitory Control subscale of the Early Adolescent Temperament Questionnaire. To isolate inhibition-related inferior frontal gyrus (IFG) activation, we will extract values for the no-go>go contrast from a bilateral anatomical IFG mask. We will quantify externalizing using well-validated parent-, child-, and teacher-report measures of rule breaking, aggression, ADHD, and substance use. We will use structural equation modeling to test for an indirect effect of IFG activation on an externalizing latent factor via a behavioral inhibitory control latent factor while adjusting for the non-independence of the twins. Our findings will have implications regarding inhibitory control circuitry as a potential marker for externalizing psychopathology.

Prefrontal-striatal circuitry supports adaptive memory prioritization across development

Kate Nussenbaum[1], Daphne Valencia[1], Jamie Greer[1], Nora Keathley[1], Catherine Hartley[1]
[1]*New York University*

Previous work has revealed that the ability to strategically encode high-value information may improve gradually over development, as the systems supporting cognitive control processes mature. However, studies of value-directed memory have relied on explicit cues that signal the importance of information, which are rarely present in real-world contexts. Here, using a novel fMRI paradigm, we examined whether individuals across a wide age range (N = 90; ages 8 - 25 years) could learn the relative frequency of items in their environment and prioritize memory for information associated with higher frequency items, which would ultimately enable them to earn more reward. We found that from childhood to early adulthood, individuals improved both at transforming their experiential learning into explicit representations of information value and at using these value estimates to strategically modulate encoding. Memory prioritization for high-value information was supported by increased engagement at both encoding and retrieval of the caudate, putamen, and lateral prefrontal cortex - regions that have been implicated in value processing and the implementation of cognitive control mechanisms. Our results suggest that developmental improvements in the ability to dynamically adjust memory based on the statistics of the environment are supported by a wide network of brain regions that support both the recognition and use of information value to implement strategic control over encoding.

Flux Congress Oral Presentations

The thriving brain: Effects of individual child characteristics and environmental factors on self-regulation and associated neural circuitry

Bram Gooskens[1], Dienke Bos[1], Pascal Pas[1], Matthijs Vink[1], Bob Oranje[1], Sarah Durston[1]
[1]*University Medical Center Utrecht - UMC Utrecht*

Self-regulation is the ability to regulate one's emotions, behavior and social interactions in daily life, including when faced with difficult circumstances. Given the impact that self-regulation has on mental health and behavior, more insight into the factors that drive its development is necessary. In this study we aim to examine whether and how individual child characteristics and environmental factors affect self-regulation and associated neural circuitry. We included a sample of 673 children (age 8-11 years) from the Dutch developmental YOUth (Youth Of Utrecht) cohort study, part of the Consortium on Individual Development (CID). Exploratory Factor Analysis (EFA) performed on questionnaire data yielded six child characteristics factors (externalizing behavior, impulsivity, anxiety, outgoing/socializing behavior, self-esteem, withdrawal) and seven environmental factorscovering parenting style (incompetence, interference, strictness and liberty), stress (conflicts father, conflicts mother) and socio-economic status (SES). All participants performed a Stop-Signal Anticipation Task during fMRI. Increased perception of incompetence in parenting was associated with increased externalizing behavior of the child (r=.41, q=.002), impulsivity (r=.26, q=.002) and anxiety (r=.23, q=.002), and reduced outgoing/ socializing behavior (r=-.13, q=.026) in children. An interfering parenting style was associated with lower self-esteem (r=-.24, q=.006). Externalizing behavior was related positively to a strict- (r=.15, q=.036) and negatively to a liberal parenting style (r=-.14, q=.048). The presence of conflicts in the father's life was associated with child anxiety (r=.15, q=.048). None of the individual child- or environmental factors were associated with stop-signal reaction time. We will present findings on the effect of child characteristics and environmental factors on the neural correlates of self-regulation in a larger, imputed dataset of 1060 children at the meeting.

Saturday, September 12

Symposium: Developmental psychopathology

Chairs: Sarah Wittle, *University of Melbourne*
Christian K. Tamnes, *University of Oslo*

Furthering understanding of externalizing psychopathologies through richer modeling of developmental process, behavior, and neurobiology

Jamie Hanson[1]
[1]*University of Pittsburgh*

Forms of externalizing psychopathology impart a profound impact on individuals, and society more broadly. However, despite the significant impact, progress is somewhat stalled in understanding the developmental trajectories of aggressive behaviors, rule-breaking, substance misuse, and other forms of externalizing problems. Neuroimaging studies have provided some insights, but often past f/MRI investigations have not been firmly anchored in developmental psychopathology frameworks. This may be a significant limitation, as we will need to understand forms of externalizing psychopathology at "multiple levels of analysis", through longitudinal study of adaptation and maladaptation, and with an eye toward other theoretical concepts from developmental psychopathology. Here, we detail promising findings from multiple longitudinal cohorts leveraging Bayesian modeling of decision-processes, item-response theory, and advanced neuroimaging analytics (e.g., structural covariance). Using these approaches and ideas from developmental psychopathology, we find that liability for substance misuse is related to differences in corticostriatal brain structure and structural covariance of related networks. We also find that reward processing relates to risk for these forms of externalizing psychopathology. More broadly, and across this work, we demonstrate how the study of externalizing psychopathology may be advanced by integrating ideas from developmental psychopathology, with state-of-science quantitative techniques, to ultimately reduce the profound impact that externalizing behaviors can exert on individuals and communities.

Emerging emotional problems across adolescence coincides with trajectories of structural brain development

Marieke Bos[1]
[1]*Leiden University*

BACKGROUND AND AIM: Adolescence is a developmental period characterized by heightened emotional reactivity, which for some sets the stage for emotional problems. There is a dramatic increase in prevalence rate of emotional problems across adolescence - such as depression and (social) anxiety, but also externalizing problems like substance abuse and aggression. Adolescent onset of emotional problems is associated with worse expected course of illness and disease burden. Previous cross-sectional studies suggest a relation between aberrant structural brain development and emotional problems. However, to identify whether trajectories of brain development across adolescence relate to the emergence of emotional problems, longitudinal studies are pivotal. Here, I will present data from a longitudinal study examining the relation between structural brain development with depression and externalizing behavior. **METHODS:** The presented studies are part of a large-scale accelerated longitudinal research project, BrainTime. 299 participants were recruited from a community sample that underwent magnetic resonance imaging during three bi-annual waves, spanning 5 years across 8-29 years. Emotional problems were assessed with Beck Depression Inventory and the Child Behavior Checklist. Multilevel models and maturational coupling analyses were used to assess the relation between structural brain development and emotional problems **RESULTS:** The emergence of depressive symptoms was associated with accelerated corticial thinning, specifically in frontal areas. Hippocampal volume was negatively associated with externalizing behavior. Exploratory maturational coupling analyses showed a

relation between externalizing behavior and synchronous development between striatum, limbic system, and prefrontal regions. **CONCLUSIONS**: I will discuss the differential relation between development of cortical thickness and cortical surface area on depressive symptoms and externalizing behavior. Importantly, our data emphasizes that developmental trajectories seem key to gain more detailed understanding of the neurobiological mechanisms related to the emergence of emotional problems during adolescence.

Brain-predicted age associates with psychopathology dimensions in youth

Vanessa Cropley[1], Ye Tian[1], Kavisha Fernando[1], Sina Mansour[1], Christos Pantelis[1], Luca Cocchi[2], Andrew Zalesky[1]
[1]The University of Melbourne, [2]QIMR Berghofer Medical Research Institute

BACKGROUND AND AIM: Psychiatric symptoms in childhood and adolescence have been associated with both delayed and accelerated patterns of grey matter development. This suggests that deviation in brain structure from a normative range of variation for a given age might be important in the emergence of psychopathology. This study investigated whether variation in psychopathology in youth is related to a novel index of neurodevelopment called the brain age gap, and to determine whether these psychopathology constructs share common neurodevelopmental profiles. **METHODS:** Psychiatric symptom ratings from 9312 youths (8-21 years) from the Philadelphia Neurodevelopmental Cohort were parsed into 7 independent dimensions of clinical psychopathology representing conduct, anxiety, obsessive-compulsive, attention, depression, bipolar, and psychosis symptoms. Using a subset of this cohort with structural MRI (n=1313), a normative model of brain morphology was established and the model was then applied to predict the age of youth with clinical symptoms. We investigated whether the deviation of brain-predicted age from true chronological age, called the brain age gap, explained individual variation in each psychopathology dimension. **RESULTS:** Individual variation in the brain age gap significantly associated with clinical dimensions representing psychosis ($t=3.16$, $p=0.0016$), obsessive-compulsive symptoms ($t=2.5$, $p=0.01$), and general psychopathology ($t=4.08$, $p<0.0001$). Greater symptom severity along these dimensions was associated with brain morphology that appeared older than expected for typically developing youth of the same age. Psychopathology dimensions clustered into two modules based on shared brain loci where putative accelerated neurodevelopment was most prominent. Patterns of morphological development were accelerated in frontal cortices for depression, psychosis and conduct symptoms (Module I), whereas acceleration was most evident in the subcortex and insula for the remaining dimensions (Module II). **CONCLUSIONS:** Our findings suggest that increased brain age, particularly in frontal cortex and subcortical nuclei, underpins (sub)clinical psychosis and obsessive-compulsive symptoms in youth. Our results suggest that deviations in normative brain age patterns in youth may contribute to the manifestation of specific psychiatric symptoms of subclinical severity that cut across psychopathology dimensions. Psychopathology dimensions share common neural substrates, despite representing clinically independent symptom profiles.

Development of the neural correlates of emotion regulation in adolescents with and without conduct disorder

Nora Raschle[1], Lynn Fehlbaum[1], Réka Borbás[1], Christina Stadler[1], FemNAT-CD consortium[1]
[1]Jacobs Center for Productive Youth Development at the University of Zurich

BACKGROUND: Conduct disorder (CD) is a psychiatric disorder of childhood and adolescence characterized by severe aggressive and antisocial behavior. Behavioral evidence strongly suggests that emotion processing and regulation deficits are key features of CD. First fMRI evidence indicates alterations in brain regions which form the emotion regulation brain network in CD females compared to typically developing controls (TD). **METHODS:** To date, we employed fMRI during emotion regulation in >200 adolescents (average age 14y; range=9-18y) with a diagnosis of CD (N=94; 70 females) as well as TD controls (N=109; 71 females) as part of the FemNAT-CD project. Additionally, a small subgroup of female CD adolescents further participated in a group-based behavioral skills training (START NOW) and was invited for an MRI session prior to and post treatment. Hypothesis & Preliminary Findings: Preliminary findings based on region of interest analyses for areas associated with emotional reactivity (e.g., limbic brain regions) and emotion regulation (e.g., prefrontal brain regions, angular and temporal gyrus) indicate reduced activation during emotion regulation in adolescents with CD compared to TD controls. Furthermore, we expect regionally specific linear and non-linear functional changes across age. These may differ across sex and diagnosis. Finally, we hypothesize that girls with CD who improved from the START NOW training (therapy responder) showed amelioration in the neuronal correlates of emotion regulation. This may be mirrored by increases in neuronal activation of emotion regulation areas of the brain previously found to be disrupted in CD (e.g., prefrontal cortex and angular gyrus). **SIGNIFICANCE:** An increased understanding of the development and neuronal correlates of emotion regulation across adolescence will complement past neuroimaging work in healthy youths and add to our understanding of affective disorders in childhood and adolescents, such as CD, ultimately informing diagnosis and treatment.

The impact of parental presence on a neural marker of anxiety (the error-related negativity) in 5 to 7 year-old children

Alexandria Meyer[1]
[1]Florida State University

BACKGROUND AND AIM: Anxiety disorders often begin early in life and result in chronic impairment. Thus, there is substantial interest in identifying neural markers that characterize trajectories characterized by anxious outcomes. A neural marker, the error-related negativity (i.e., ERN), has been linked to anxiety and risk for anxiety in adults and children in over 50 studies to date. Thus, there is an increasing interest in identifying environmental factors that may shape the ERN early in development. Previous work suggests that harsh parenting styles may relate to an increased ERN in offspring. However, no study had yet examined the specific mechanism whereby parenting style may impact the ERN in children. We propose that it may be children's repeated exposure to making mistakes in the presence of their caregiver that may lead to an increased ERN. **METHODS:** We test this hypothesis by measuring the ERN in 79 children between the ages of 5 - 7 years old while their parent observed them complete a go/no-go task and then while an experimenter observed them complete a go/no-go task. RESULTS: Results suggest that the presence of parents characterized by a controlling

parenting style potentiated the ERN in their children. Furthermore, the extent to which parents potentiated the ERN in offspring compared to an experimenter, related dimensionally to controlling parenting styles. **CONCLUSIONS:** These findings are important and novel insofar as they highlight the impact of an environmental factor (i.e., parenting) in shaping a neural marker of risk for anxiety in children (i.e., the ERN). Future work should examine whether novel parent-based intervention strategies may reduce the ERN in children early in development, and thus reduce risk for anxiety.

Symposium: Elucidating relationships among neurodevelopment in utero and infancy and future childhood behavioral outcomes

Chair: Mary Phillips, *University of Pittsburgh*

Intrauterine amygdala neural connectivity predicts autism spectrum disorder (ASD) traits in toddlerhood

Moriah Thomason[1], Christopher Trentacosta[2], S. Alexandra Burt[3], Autumn Austin[1], Natalie Brito[1]
[1]New York University, [2]Wayne State University, [3]Michigan State University

Core systems of the brain are established prior to birth and are foundational to infants' emerging developmental competencies. Here, we will address whether prenatal amygdala network connectivity relates to degree of autism spectrum disorder (ASD) symptomology in a neurotypical sample of children. We will further examine sex differences and also prenatal stress as factors that may influence this association. In particular, we hypothesize that ASD dimensions in toddlers will relate to measures of reduced amygdala functional connectivity when they were in the womb. Based on prior literature, we will also test the hypothesis that this relationship will be stronger in females and in children of mothers that report higher levels of perinatal stress. These predictions fit well with a recent report by Lee and colleagues (2020) of amygdala connectivity differences in children with ASD at ages 2-7 years. In fact, the amygdala is widely implicated in the neurobiology of ASD, with reports of increased volume, quantity of neurons, and functional differences in individuals with ASD. Our approach will be to measure resting-state functional connectivity data in more than 100 healthy human fetuses during the second and third trimesters and to subsequently evaluate Brief Infant Toddler Social Emotional Assessment (BITSEA) and the Child Behavior Checklist (CBCL) autism subscales at child age 3. If confirmed, these observations would extend prior longitudinal research back into prenatal brain development and raise exciting new ideas about the advent of risk and the ontogeny of early sex differences.

Predictive relationships in infants among emotional regulation white matter and resting state functional connectivity and concurrent and future emotional behavior

Mary Phillips[1], Alison Hipwell[1], Layla Banihashemi[1], Vincent Schmithorst[1], Lindsay Hanford[2], Ashok Panigrahy[1]
[1]University of Pittsburgh, [2]Harvard University

INTRODUCTION: Dramatic gains in emotion regulation occur in the first years of life. Positive and negative emotionality(PE, NE) can be measured reliably in human infants in the first months, and predict future behavioral and emotional regulation-related impairments: depression, anxiety, suicidal behavior, behavior problems and substance abuse. Elucidating the neural bases of infant PE and NE can elucidate pathophysiologic processes of risk for future problems, and provide objective neural markers to help identify at-risk infants before symptoms emerge. **METHODS:** Study 1: In 20, 3-month infants, we examined white matter in tracts connecting prefrontal and temporal regions supporting emotional regulation: uncinate fasciculus(UF), cingulum bundle(CB) and forceps minor(FM). Penalized and multiple regression (demographic, clinical covariates) examined predictive relationships among tract volume, normalized quantitative anisotropy(NQA), QA and fractional anisotropy(FA) at 3 months and infant PE and NE at 9 months, using independently-coded, filmed infant behaviors. Study 2: In 59, 3-month infants, multiple regression examined relationships among infant wholebrain resting state functional connectivity(rsfc) during sleep (voxelwise mean connectivity strength) and standardized reports (Infant Behavior Questionnaire) of infant PE and NE. Study 3: In 46, 3-month infants, we examined wholebrain rsfc during sleep, using graph theory to examine nodal metrics of neural network function, relationships among these metrics and infant PE and NE, and moderating effects of parental negative, positive and mental state talk(MST) caregiving on these relationships, using independently-coded filmed interactions of infant and caregiving behaviors. **RESULTS:** Study 1: UF NQA(ß=-0.631 p=0.005), FM FA(ß=-0.619,p<0.001), maternal postnatal depression(ß=-0.592,p<0.001), UF volume(ß=0.383,p=0.002) and infant age(ß=0.259,p=0.018) significantly(FDR-corrected) predicted 9-month NE. Study 2: Medial prefrontal cortical mean connectivity strength positively associated with 3-month NE; lateral prefrontal-parietal cortical mean connectivity strength inversely associated with PE(p<0.05,FWE). Study 3: Higher parental MST strengthened relationships among infant PE and prefrontal and occipital cortical nodal metrics(p<0.0001,FDR). **CONCLUSION:** The relationship between 3-month UF structure and 9-month NE highlights the key role of this tract in emotional regulation, and parallels reports of lower UF integrity in mood disorder at risk youth. Wholebrain 3-month rsfc findings suggest compensatory recruitment of emotional regulatory prefrontal cortical regions with NE but not PE, while parental MST strengthens links between emotional regulatory prefrontal cortical neural circuitry and PE. Our findings provide objective neural markers to help identify at-risk infants, and guide and monitor caregiving-based interventions to help reduce risk for future emotional problems in these infants.

Salience network functional connectivity relates to electrophysiological markers of attention in infancy

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The salience network involves brain regions (e.g., insula, anterior cingulate cortex) linked to rapid detection and organized responding to salient stimuli. Salience network function has been involved in temperamental negative affect and increased risk for anxiety. The current study evaluates the link between salience network fMRI connectivity during resting state and electrophysiological responses to

novelty in 4- to 5-month-old infants (Mage=4 months 26 days). In this study, we utilized fMRI to quantify functional connectivity (rs-fc) during natural sleep (n=27; Median data post scrubbing=9 minutes 22 seconds). fMRI data were processed using the CONN toolbox (Whitfield-Gabrieli & Nieto-Castanon, 2012) with adaptations suitable for infants. To isolate activity driven by the salience network, independent components analysis was conducted and the salience network identified. Within two weeks of the fMRI visit (Mtime elapsed=13 days), infants returned to the lab to complete an auditory oddball task while high-density EEG was recorded (n=27). EEG data were processed using a standardized pre- and post-processing pipeline for developmental data (MADE, Debnath et al, 2020). In line with prior work (Marshall et al., 2009), neural responses to deviant stimuli were extracted at a central electrode cluster (Cz) for subsequent analyses. Focal analyses extracted the time series for the salience network and examined connectivity associated with the ERP response (controlling for age). These whole brain voxel-wise analyses were thresholded voxel-wise at p<.001 and cluster corrected at p<.05 using non-parametric permutation method. Results indicated that heightened response to the deviant was associated with increased salience network-medial prefrontal cortex connectivity and decreased salience network-superior frontal cortex connectivity.

The white matter connectome as an early imaging biomarker

John Gilmore[1], Maria Bagonis[1], Jared Williams[1], Rebecca Stephens[1], Emil Cornea[1], Martin Styner[1], Brent Munsell[1]
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BACKGROUND AND AIM: The identification of early imaging biomarkers is important for the identification of children at risk for sub-optimal cognitive and behavioral outcomes. The relationship of region of interest or white matter tract with later outcomes is typically modest. As it is becoming clearer that the brain substrates for cognitive functions and behaviors are widely distributed, whole brain network approaches offer the promise of improved predictive ability. We studied the development of the white matter (WM) connectome from birth to age 6 and its relationship with cognitive development and anxiety and attention problems. **METHODS:** Children from the UNC Early Brain Development Study underwent 3T MRI imaging at birth and at ages 1, 2, 4, 6 years and were assessed with the Stanford Binet and BASC parent report at ages 4 and 8 years. A deep learning model was applied to the WM connectome focusing on hub eigenvector centrality metrics at age 4 years to determine relationships with IQ, and attention and anxiety problems at ages 4 and 8 years for 59 singletons and 80 individual twins. **RESULTS:** Eigenvector centrality for WM hubs is fairly stable from age 1 to age 6 years, and regional eigenvector centrality at 1 year and 6 years is highly correlated (r^2 =0.79). Hub values in the WM connectome at age 4 significantly predicted IQ at both age 4 (mean r^2: singleton 0.82, twin 0.74) and 8 years (mean r^2: singleton 0.79, twin 0.72). 16 of the top 20 hubs important for prediction were the same for IQ at 4 and 8 years. Similar strong results were found for attention and anxiety problems, with mean r^2 ranging from 0.60-0.71. Hubs important for prediction of attention or anxiety problems at age 4 were similar at age 8 as well. **CONCLUSIONS:** Many aspects of the WM connectome are established very early in childhood. The WM connectome at age 4 can predict IQ, attention and anxiety problems at age 8 with fairly high accuracy. The WM connectome in early childhood is a candidate imaging biomarker that deserves further study.

Symposium: Oh behave! Individual differences in the development of social behavioral control

Chair: Michelle Achterberg, *Erasmus University Rotterdam*
Moderator: Eveline Crone, *Erasmus University Rotterdam*

Functional brain networks underlying multiple facets of behavioral control in middle childhood: A within study replication approach

Michelle Achterberg[1], Eduard Klapwijk[1], Anna van Duijvenvoorde[2]
[1]Erasmus University Rotterdam, [2]Leiden University

AIM: Theoretical perspectives have suggested that the increase of executive functions and maturation of the prefrontal cortex during childhood are important mechanisms for developing self-regulation functions in childhood. Most of these studies have focused on 'cool' behavioral control, that is to say self-control in a non-emotional setting. Whether the same 'cool' regulatory control functions are also important for regulation of 'hot' emotional behavior in a social context is far less studied and it is currently unknown whether these rely on similar or distinct brain networks. **METHODS:** In this study we aim to investigate different forms of behavioral control and whether they rely on similar or distinct brain networks. These questions will be examined using data from the L-CID middle childhood cohort (n=512, 7-9 yo children). We focus on three behavioral control facets: "cool" response inhibition; "hot" aggression regulation following social rejection; and general effortful control. **RESULTS:** Behavioral results showed no significant correlation between the 'hot' social aggression regulation and 'cool' response inhibition measure. The general effort control measure showed a significant, but small correlation with response inhibition (r=-.14, p=.002), indicating that the different forms of behavioral control measure distinct behaviors. We are currently conducting independent component analyses using resting-state fMRI to investigate four components of interest: the right and left fronto-parietal networks (FPN), the default mode network (DMN) and the salience network (SN), and their relations to behavioral control. We expect that connectivity in the DMN and the SN is specifically related to 'hot' aggression regulation. Whereas FPNs are expected to relate to effortful control and response inhibition. We aim to replicate our findings in an independent sample of same-aged children (n=360) that used the same study protocols, in order to test the replicability and robustness of our findings.

Neural representations of close others and links to social decision preferences in late adolescence

Joao Guassi Moreira[1], Lisa Johnson[2], Sarah Tashjian[3], Paul Hastings[2], Adriana Galván[1], Jennifer Silvers[1]
[1]University of California, Los Angeles, [2]University of California, Davis, [3]California Institute of Technology

Social goal pursuit over the course of adolescence often requires that individuals navigate trade-offs. One such particularly salient type of trade-off involves making decisions that have opposing consequences for different people. Recent work has indicated that

adolescents are likely to prioritize parents over peers in social decision-making scenarios. While we know who adolescents prioritize during social decision-making, it is unclear why. One hypothesis is that neural representations of parents and friends are differentially encoded as neural signatures of value, suggesting that accessing said representations during social decision-making relies on spontaneous and intrinsic value-based calculations that in turn guide behavior. To test this possibility, we scanned a sample of 47 late adolescents (ages 18-19) with fMRI. Participants viewed custom stimuli related to a parent and friend in order to elicit neural representations of each close other. Next, they completed a reward task in the scanner to help build a sensitive and specific neural signature of value. Finally, participants completed an out-of-scanner social decision-making task that pit parent and friend outcomes against one another. Preliminary findings indicate that the parent/friend representation and reward tasks were successful in eliciting the desired neural activity. Behavioral results replicate prior findings showing a preference to favor parents over friends. Pattern expression analyses in conjunction with multilevel logistic regression will be used next to determine the extent to which value-based neural representations influence social decision preferences.

Neural correlates of the impact of reward history on untrained tasks

Kristin Meyer[1], Joseph Hopfinger[1], Charlotte Boettiger[1], Margaret Sheridan[2]
[1]University of North Carolina, [2]University of North Carolina at Chapel Hill

BACKGROUND: The ability to guide behaviors and allocate cognitive resources in service of goals or rules, termed cognitive control, is an integral part of daily activities. Cognitive control in "cold" contexts has been well-researched and has wide-reaching implications for a range of risk-taking behaviors and psycho-pathology. However, the cognitive control exhibited across risk-taking and psychopathology is often in a motivationally salient context, which is much less well understood. This is in large part due to a dearth of studies that investigate the specific impact of motivational history on cognitive control abilities. The present study aims to address this gap by manipulating motivational history of otherwise neutral stimuli and then testing the impact of this manipulation on attentional control, a well-researched form of cognitive control. **METHODS:** Adults (N = 27, Ages 22 - 40) underwent fMRI scanning during both the reward-association phase and the unrewarded testing phase. This study is the first of its kind to examine how individual variation in reward response, as measured by striatal activity, predicts both the effects of reward history on cognitive control performance and on neural activity while engaging cognitive control. We find that striatal activity during reward association predicts the degree to which attentional control is later disrupted by reward history and the neural response to reward history in visual cortical and attentional control regions. Furthermore, we examine differences in this predictive power when bias due to reward history and cognitive control align or are at-odds. **RESULTS:** This study provides preliminary support that reward history of a stimulus is associated with changes in activation of the vmPFC during the novel testing task where no reward is present. Taken together this study suggests that reward history does bias attentional control through learning-induced changes in visual and parietal activity. **DISCUSSION:** Furthermore, overcoming this bias may require both instantaneous top-down suppression to filter a distractor associated with reward history along with value updating over time to re-establish the stimulus with a reward history as once again neutral and reduce automatic biasing. Elucidating the neural correlates of reward history's impact on neural and cognitive recruitment in an untrained task informs our understanding of previously rewarding cues, such as in the case of addiction.

Distinct functional connectivity patterns for internalizing and externalizing behaviors in youth with and without developmental disorders

Dienke Bos[1], Maaike Oosterling[1], Bob Oranje[1], Sarah Durston[1]
[1]UMC Utrecht Brain Center

BACKGROUND AND AIM: Autism Spectrum Disorder (ASD) and Attention Deficit/Hyperactivity Disorder (ADHD) are the two most common developmental disorders and are characterized by high rates of co-occurrence, both in terms of symptoms and self-regulation. Previous behavioral work showed context-specific individual differences in self-regulation towards social or non-social stimuli in children with ASD and/or ADHD. These problems in self-regulation may arise through differences in salience processing and behavioral control, and their interaction. Here we investigate these abilities in children with ASD and ADHD, in relation to the brain networks that support them. METHODS: 313 Children (ages 6-18 years) with ASD and/or ADHD or without any history of developmental disorders participated in a 10-minute resting-state fMRI session and parents completed symptom rating questionnaires (Child Behavior Checklist (CBCL) and Repetitive Behavior Scale - revised version (RBS-r). We used Sparse Canonical Correlation Analysis (sCCA) to investigate the relation between severity of psychiatric symptoms and whole-brain functional connectivity (264-node parcellation). Further behavioral and developmental effects were assessed in a mixed cross-sectional and longitudinal design. **RESULTS:** Results showed two canonical variates that showed distinct associations between psychiatric symptoms and resting-state functional connectivity. First, internalizing, social and anxious/depressed problems were related to hypoconnectivity within DMN, and connectivity changes between DMN and dorsal attention network regions. Second, externalizing, inattentive and aggressive behavior was associated with increased connectivity within DMN, and between DMN and salience-, frontoparietal executive control- and ventral attention network regions. **CONCLUSIONS:** The findings showed distinct patterns of functional connectivity in DMN and the salience network, associated with social and non-social self-regulation problems that cut across diagnostic categories in children with and without developmental disorders. Due to COVID19-related delays, behavioral and developmental findings will only be presented at the meeting.

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Poster presenters will be at their poster booth during their assigned poster time but the posters are available to review throughout the congress.

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- A Executive Functioning
- B Socioemotional Processing
- C Learning
- D Rewards/Motivation
- E Education
- F Memory
- G Environment (Stress, SES)
- H Brain Structure
- I Networks
- J Mechanisms (hormones, neurotransmitters, physiology)
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Poster Session 1
Thursday, September 10, 2020

A – Executive functioning

1-A-1 Longitudinal analysis of Stop Signal Task performance in late adolescence and early adulthood

Hannah Weiss[1], Paul Collins[1], Brandon Almy[1], Monica Luciana[1]

[1]University of Minnesota Twin Cities

B – Socioemotional processing

1-B-2 Anxiety and neural responses to ambiguous social stimuli during the transition to college

Natalie Saragosa-Harris[1], Joao Guassi Moreira[1], Yael Waizman[1], Anna Sedykin[1], Tara Peris[1], Jennifer Silvers[1]

[1]University of California, Los Angeles

1-B-3 Neural systems supporting cognitive emotional regulation by young children in fMRI using a novel EEG-based task paradigm

Amanda Mitchell[1], Helen Milojevich[1], Tracy Dennis-Tiwary[2], Margaret Sheridan[1]

[1]University of North Carolina at Chapel Hill, [2]Hunter College of the City University of New York

1-B-4 An ERP investigation of pubertal development, age, and emotional reactivity among children and adolescents

Hamnah Shahid[1], Teena Willoughby[1]

[1]Brock University

1-B-5 Age-related changes in negative affective experience in childhood and adolescence

Katherine Grisanzio[1], Patrick Mair[1], HCP-D Consortium[2], Leah Somerville[1]

[1]Harvard University, [2]Washington University in St. Louis

1-B-7 Examining neural and behavioral correlates of negative self and social evaluation in adolescent girls

Theemeshni Govender[1], Samantha Chavez[1], Theresa Cheng[1], John Flournoy[2], Sarah Donaldson[1], Olivia Kim[1], Nicholas Allen[1], Jennifer Pfeifer[1], Michelle Byrne[1]

[1]University of Oregon, [2]Harvard University

1-B-8 Motor functioning in childhood differentially predicts externalizing and internalizing outcomes in girls and boys

Carolyn Koch[1], Keri Rosch[2], Karen Seymour[3], Alyssa Deronda[1], Alyssa Tiedemann[1], Stewart Mostofsky[1]

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1-B-9 Context matters: Developmental changes in threat representation in perceptual and affective neural circuitry

Dana Glenn[1], Daniel Pine[2], Megan Peters[3], Kalina Michalska[1]

[1]University of California, Riverside, [2]National Institute of Mental Health, [3]University of California, Irvine

C - Learning

1-C-10 Developmental differences in model-based learning and abstract reasoning: An online replication study

Maximilian Scheuplein[1], Kate Nussenbaum[1], Camille Phaneuf[1], Michael Evans[1], Catherine Hartley[1]

[1]New York University

1-C-11 Understanding the roles of novelty and uncertainty in exploration across development

Rebecca Martin[1], Catherine Hartley[1]

[1]New York University

D – Rewards/Motivation

1-D-13 Dynamic neural integration and risky decision-making across development

João Guassi Moreira[1], Adriana Méndez Leal[1], Natalie Saragosa-Harris[1], Yael Waizman[1], Emilia Ninova[1], Jennifer Silvers[1]

[1]University of California, Los Angeles

1-D-14 Rewards drive reconfiguration of whole brain networks in children

Mackenzie Mitchell[1], Teague Henry[1], Cheyenne Bricken[1], Kelly Eom[1], Cleanthis Michael[1], Margaret Sheridan[1], Jessica Cohen[1]

[1]University of North Carolina at Chapel Hill

1-D-15 The influence of reward-motivated memories on learning across development

Camille Phaneuf[1], Alexandra Cohen[1], Morgan Glover[1], Kristen Avallone[1], Xinxu Shen[2], Catherine Hartley[1]

[1]New York University, [2]Temple University

1-D-16 Learning under uncertainty changes during adolescence

Liyu Xia[1], Sarah Master[2], Maria Eckstein[1], Linda Wilbrecht[1], Anne Collins[1]

[1]University of California, Berkeley, [2]Max Planck Institute for Biological Cybernetics

1-D-17 Probabilistic reward learning in adolescents across anxiety continuum

Namita Tanya Padgaonkar[1], Amanda Baker[1], Tara Peris[1], Adriana Galván[1]

[1]University of California, Los Angeles

1-D-18 Behavioral and psychiatric correlates of the brain's response to social feedback

Brent Rappaport[1], Autumn Kujawa[2], Joan Luby[3], Deanna Barch[1]

[1]Washington University in St. Louis, [2]Vanderbilt University, [3]Washington University School of Medicine

1-D-19 Combining multiple learning tasks and computational models to isolate factors contributing to cognitive development between age 8-30

Maria Eckstein[1], Liyu Xia[1], Sarah Master[2], Ronald Dahl[1], Linda Wilbrecht[1], Anne Collins[1]

[1]University of California, Berkeley, [2]Max Planck Institute for Biological Cybernetics

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1-D-20 Susceptibility to family context in predicting adolescent externalizing behaviors: Moderation by social motivational neural sensitivity

Caitlin Turpyn[1], Nathan Jorgensen[1], Mitchell Prinstein[1], Kristen Lindquist[1], Eva Telzer[1]

[1]University of North Carolina at Chapel Hill

1-D-21 When is my effort worthwhile? Learned efficacy influences how adolescents allocate cognitive control

Mahalia Prater Fahey[1], Ivan Grahek[1], Carolyn Dean Wolf[1], Diego Placido[2], Arden Orwicz[1], Dima Amso[1], Amitai Shenhav[1]

[1]Brown University, [2]University of California Davis

1-D-22 Subjective valuation of agency is influenced by its utility across development

Perri Katzman[1], Catherine Hartley[1]

[1]New York University

1-D-23 Divergence of liking vs. wanting of rewards is associated with patience differently for hungry and non-hungry adolescents and adults

Sarah Edelson[1], Valerie Reyna[1], David Garavito[1], Rebecca Weldon[2], Yuval Erez[3]

[1]Cornell University, [2]SUNY Polytechnic Institute, [3]Lehigh University

E - Education

1-E-24 Brain activity in cognitive control systems is related to academic skill in English Learners

Tehila Nugiel[1], Mackenzie Mitchell[2], Damion Demeter[1], Jenifer Juranek[3], Jessica Church[1]

[1]University of Texas at Austin, [2]University of North Carolina at Chapel Hill, [3]University of Texas Health Science Center at Houston

F - Memory

1-F-25 Influences of reward motivation on behavioral and neural memory processes across age

Alexandra Cohen[1], Morgan Glover[1], Xinxu Shen[2], Kristen Avallone[1], Camille Phaneuf[1], Lila Davachi[3], Catherine Hartley[1]

[1]New York University, [2]Temple University, [3]Columbia University

1-F-26 Relation between hippocampal neurite density and trace eyeblink conditioning in four- to six-year-old children

Anthony Dick[1], Vanessa Vieites[1], Mandy Renfro[1], Hannah Bowley[1], Melanie Rengel[1], Aaron Mattfeld[1], Timothy Hayes[1], Bethany Reeb-Sutherland[1], Shannon Pruden[1]

[1]Florida International University

G – Environment (Stress, SES)

1-G-27 Early childhood cognitive and academic performance: Associations with developing singing abilities and socioeconomic status

Naomi Lin[1], Sarah Dowling[1], Shana Cohen[1], Amanda Datnow[1], Matt Doyle[2], John Iverson[1], Terry Jernigan[1], Monica Molgaard[1], Margie Orem[1], Jessica Trejos[1], Alison Wishard-Guerra[1], Tim Brown[1]

[1]University of California, San Diego, [2]Vista Unified School District

1-G-28 Late childhood stress and neurocognitive development: Exploring the role of school-based threat

Spencer Dudley[1]

[1]University of Colorado at Boulder

1-G-29 Hippocampal structure as mechanism linking violence exposure with impaired associative memory in young children: A preregistration

Rachel Martino[1], Maya Rosen[1], Lucy Lurie[1], Kelly Sambrook[1], Andrew Meltzoff[2], Katie McLaughlin[1]

[1]Harvard University, [2]University of Washington

1-G-30 Deprivation, but not threat, as a mechanism linking socioeconomic status to working memory: A preregistered fMRI study

Maya Rosen[1], Margaret Sheridan[2], Laura Machlin[3], Liliana Lengua[4], Katie McLaughlin[1]

[1]Harvard University, [2]University of North Carolina at Chapel Hill, [3]University of Washington / Harvard, [4]University of Washington

1-G-31 Characterizing heterogeneity in psychopathology among children exposed to early caregiving adversity

Anna Vannucci[1], Ian Douglas[1], Andrea Fields[1], Aki Nikolaidis[2], Charlotte Heleniak[1], Paul Bloom[1], Michelle VanTieghem[3], Lisa Gibson[1], Syntia Hadis[1], Nicolas Camacho[1], Tricia Choy[4], Michael Milham[2], Nim Tottenham[1]

[1]Columbia University, [2]Child Mind Institute, [3]New York University, [4]University of California, Los Angeles

1-G-32 Generalization of learned fear in children exposed to early caregiving adversity

Andrea Fields[1], Paul Alexander Bloom[1], Ayumi Tachida[1], Anna Vannucci[1], Ian Douglas[1], Nicolas L Camacho[1], Lisa Gibson[1], Syntia Hadis[1], Tricia Choy[2], Charlotte Heleniak[1], Nim Tottenham[1]

[1]Columbia University, [2]University of California, Riverside

1-G-33 Effects of emotion regulation strategy usage on internalizing symptoms following early institutional care

Yael Waizman[1], Adriana Méndez Leal[1], João Guassi Moreira[1], Natalie Saragosa-Harris[1], Emilia Ninova[1], Jennifer Silvers[1]

[1]University of California, Los Angeles

1-G-34 Family functioning and adolescent behavioral problems: The moderating roles of the amygdalar and hippocampal responses during emotional processing

Sihong Liu[1], Assaf Oshri[1]

[1]University of Georgia

1-G-35 Fear learning predicts posttraumatic stress disorder symptoms in children after Hurricane Florence

Allison Naude[1], Laura Machlin[1], Margaret Sheridan[1]

[1]University of North Carolina at Chapel Hill

1-G-36 Neural and behavioral correlates of inhibitory control as mediators between childhood adversity and externalizing problems

Zehua Cui[1], Landry Huffman[1], Assaf Oshri[1]

[1]University of Georgia

1-G-37 Early life stress is associated with accelerated dental development

Cassidy McDermott[1], Katherine Hilton[1], Muralidhar Mupparapu[1], Austin Boroshok[1], Anne Park[1], Ursula Tooley[1], Lourdes Delgado Reyes[1], Julia Leonard[1], Allyson Mackey[1]

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1-G-38 Associations between childhood trauma exposure and the neural correlates of safety cue learning in development

Sahana Kribakaran[1], Paola Odriozola[1], Emily Cohodes[1], Sadie Zacharek[1], Sarah McCauley[1], Hopewell Rogers[1], Jason Haberman[1], Camila Caballero[1], Emma Goodman[1], Cristian Hernandez[2], Beatriz Rios[1], Dylan Gee[1]

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1-G-39 Childhood maltreatment and explore-exploit decision making in early adolescence

Yuyan Xu[1], Madeline Harms[2], Seth Pollak[1]

[1]University of Wisconsin-Madison, [2]Macalester College

1-G-40 MindHive: A citizen neuroscience platform for adolescent brain & behavior research and education

Suzanne Dikker[1], Rebecca Martin[1], Sushmita Sadhukha[1], Yury Shevchenko[2], Veena Vasudevan[1], Engin Bumbacher[3], Kimberly Burgas, Kim Chaloner[4], Ido Davidesco[1], Camillia Matuk[1]

[1]New York University, [2]University of Konstanz, [3]Stanford University, [4]Grace Church School

1-G-41 Characterizing relationships between the environment and aspects of youth cognition

Wesley Meredith[1], Carlos Cardenas-Iniguez[1], Marc Berman[1], Monica Rosenberg[1]

[1]University of Chicago

1-G-42 Examining the mediating effect of brain resting-state functional connectivity in the relationship between adolescent peer victimization and subsequent psychopathology

Hanie Edalati[1], Mohammad Afzali[1], Sean Spinney[1], Josiane Bourque[2], Rachel Sharkey[3], Alain Dagher[1], Patricia Conrod[1]

[1]University of Montreal, [2]Perelman School of Medicine, University of Pennsylvania, [3]McGill University

1-G-43 Self-reported screen time and risk-taking in the transition into adolescence

Lucy Whitmore[1], Kate Mills[1]

[1]University of Oregon

1-G-44 Socioeconomic status and neural mechanisms during statistical learning in preschool children: A fNIRS investigation

Shutian Shen[1], Xinge Li[1], Rebecca Lipschutz[1], Brian Biekman[1], Johanna Bick[1]

[1]University of Houston

1-G-45 Associations between variations in caregiving and infant brain activity

Melissa Giebler[1], Sonya Troller-Renfree[1], Benjamin Bravo[1], Kimberly Noble[1]

[1]Teachers College, Columbia University

H – Brain structure

1-H-46 Poverty, cognition, and changes in white matter integrity in adolescence

Nourhan Elsayed[1], Deanna Barch[1]

[1]Washington University in St. Louis

1-H-47 Subjective neurodevelopmental risk is more robustly associated with cortical structure than objective measures of executive function in the ABCD Study sample

Kelly Cosgrove[1], Matthew Mosconi[2], Florence Breslin[3], Martin Paulus[3], Amanda Morris[4], Robin Aupperle[1]

[1]University of Tulsa, [2]University of Kansas, [3]Laureate Institute for Brain Research, [4]Oklahoma State University

1-H-48 Relationships between gray matter structure and reading ability in a large, diverse sample: Testing age- and sex-specific effects

Meaghan Perdue[1], Xing Su[2], Nabin Koirala[2], Vishakha Agrawal[2], Nicole Landi[1]

[1]University of Connecticut; Haskins Laboratories, [2]Haskins Laboratories

1-H-49 Childhood sleep problems, mental health, and brain structure: Phenotypic and genetic associations in the ABCD baseline cohort

Leanna Hernandez[1], Minsoo Kim[1], Cristian Hernandez[1], Wesley Thompson[2], Adriana Galván[1], Mirella Dapretto[1], Susan Bookheimer[1], Andrew Fuligni[1], Michael Gandal[1]

[1]University of California, Los Angeles, [2]University of California, San Diego

1-H-50 Distinct associations of deprivation and threat with alterations in brain structure in early childhood

Laura Machlin[1], Helen Egger, Cheryl Stein, Kimberly Carpenter, Srishti Goel, Kinjal Patel[1], William Copeland, Margaret Sheridan[1]

[1]University of North Carolina at Chapel Hill

1-H-51 Examining associations between stressful life events and hippocampal subfield volumes using the ABCD cohort

Morgan Botdorf[1], Lea Dougherty[1], Tracy Riggins[1]

[1]University of Maryland, College Park

1-H-52 Hippocampal structure and memory for spatio-temporal context in toddlers

Lindsey Mooney[1], Elliott Johnson[1], Simona Ghetti[1]

[1]University of California Davis

1-H-53 Differential patterns of delayed emotion circuit maturation related to childhood abuse and psychiatric risk

Taylor Keding[1], Sara Heyn[1], Justin Russell[1], Xiaojin Zhu[2], Josh Cisler[1], Katie McLaughlin[3], Ryan Herringa[1]

[1]University of Wisconsin School of Medicine & Public Health, [2]University of Wisconsin-Madison, [3]Harvard University

1-H-54 Prenatal cannabis exposure and brain surface morphometry in neonates

Alexander Dufford[1], Sun Hyung Kim[2], Erika Iisa[3], Elaine Stickrath[3], Christine Conageski[3], Jocelyn Phipers[4], Peter Fried[5], Martin Styner[2], Pilyoung Kim[1], Tessa Crume[3]

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1-H-55 Stress in early and late childhood interact to predict structural brain development in adolescence: Evidence for the mismatch stress hypothesis

Jonas Miller[1], Emily Dennis[2], Tiffany Ho[3], Rajpreet Chahal[1], Ian Gotlib[1]

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1-H-56 Brain maturation and aging on early-onset consumption of cocaine: Neurophysiological patterns extracted by deep regression convolutional neural networks (CNNs) from t1-weighted MRI images.

Alethia de la Fuente[1], Mauro Namias[2], Enzo Tagliazucchi[3]

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1-H-57 Is habitual nap status related to memory, sleep physiology, and hippocampal volumes during early childhood?

Tamara Allard[1], Lena Meredith[1], Sanna Lokhandwala[2], Arcadia Ewell[1], Benjamin Weinberg[1], Rebecca Spencer[2], Tracy Riggins[1]

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1-H-58 The development of corticostriatal connectivity and goal-directed learning across adolescence

Gail Rosenbaum[1], Pablo Ripolles[1], Catherine Hartley[1]

[1]New York University

1-H-59 Sex differences in pediatric regional cerebellar volumes

Rebecca Rochowiak[1], Micah Plotkin[1], Kaala Harrilal[1], Stewart Mostofsky[1], Deana Crocetti[1]

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1-H-60 Family social function impacts hippocampal CA subfield structure

Eliya Ben-Asher[1], Christine Coughlin[1], Hannah Roome[1], Nicole Varga[1], Alison Preston[1], Michelle Moreau[1], Lauren Schneider[1]

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1-H-61 Associations between executive function performance and prefrontal cortex volume in youths with a history of early deprivation

Romulus Castelo[1], Raquel Cowell[1], Amanda Hodel[1], Ruskin Hunt[1], Megan Gunnar[1], Kathleen Thomas[1]

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1-H-62 No association was observed between SES and the relative volume of the amygdala and the hippocampus

Weiqi Zhao[1], Marybel Gonzalez[1], Terry Jernigan[1]

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1-H-63 Examination of regional cerebellar volumes in boys and girls with autism spectrum Disorder (ASD)

Micah Plotkin[1], Rebecca Rochowiak[1], Kaala Harrilal[1], Julia Bernal, Stewart Mostofsky[1], Deana Crocetti[1]

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1-H-64 Developmental changes in intracortical myelination are associated with ventral striatal dopamine

Samuel Elliott[1], Ashley Parr[1], Kevin Dowling[1], Bart Larsen[2], Will Foran[1], Finnegan Calabro[1], Beatriz Luna[1]

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1-H-65 Intergenerational impact of maternal history of depression on brain structure and child psychopathology

Anna Seraikas[1], David Pagliaccio[1], Katherine Durham[1], Martine Fontaine[1], Marisa Spann[1], Catherine Monk[1], Rachel Marsh[1]

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1-H-66 Developmental changes in restricted diffusion across early adolescence in 9,137 children from the ABCD Study

Clare Palmer[1], Diliana Pecheva[2], Chun Chieh Fan[2], Wesley Thompson[2], John Iversen[2], Tim Brown[2], Don Hagler[2], Anders Dale[2], Terry Jernigan[2]

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1-H-67 Typical subcortical development is regionally heterogeneous from ages 2-8 years

Madison Long[1], Jessica Reynolds[2], Jing Zheng[1], Yuankai Huo[3], Bennett Landman[3], Karthik Ramadass[3], Catherine Lebel[1]

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1-H-68 Sensitive periods for the effects of poverty on hippocampal and amygdala volumes at age eight years: Environmental mediators and moderators

Bruce Ramphal[1], David Pagliaccio[1], Julie Herbstman[1], Amy Margolis[1]

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1-H-69 Sulcal depth in lateral prefrontal cortex predicts working memory in childhood

Jewelia Yao[1], Willa Voorhies[1], Jacob Miller[1], Silvia Bunge[1], Kevin Weiner[1]

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1-H-70 A data driven approach to examining relationships among environmental experience, hippocampal volume, and externalizing problems

Debbie Bitran[1], Timothy Verstynen[2], Nicholas Buser[1], Jamie Hanson[1]

[1]University of Pittsburgh, [2]Carnegie Mellon University

1-H-71 Developmental trajectories of cortical thickness and surface area and the role of socioeconomic status

Ashley Sanders[1], Michael Harms[1], Leah Somerville[2], Patrick Mair[2], Susan Bookheimer[3], Randy Buckner[2], Mirella Dapretto[3], Kathleen Thomas[4], David Van Essen[1], Roger Woods[3], Essa Yacoub[4], Deanna Barch[1]

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1-H-72 Waves of intracortical myelination and cognitive development during adolescence

Graham Baum, John Flournoy[1], Michael Harms[2], Erik Kastman[1], Patrick Mair[1], David Van Essen[2], Deanna Barch[2], Randy Buckner[1], HCP-D Consortium[2], Leah Somerville[1]

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1-H-73 Sulcal morphology of the lateral prefrontal cortex predicts individual variability in cognitive development

Willa Voorhies[1], Jacob Miller[1], Jewelia Yao[1], Ishana Raghuram[1], Silvia Bunge[1], Kevin Weiner[1]

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1-H-74 Microstructural and morphometric associations with body mass index in subcortical grey and white matter in 8201 9-10 year olds from the ABCD study

Diliana Pecheva[1], Clare Palmer[1], Chun Fan[1], Donald Hagler[1], Wesley Thompson[1], Terry Jernigan[1], Anders Dale[1]

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I - Networks

1-I-75 Whole-brain patterns of resting-state functional connectivity following childhood maltreatment

Max Herzberg[1], Kelly Jedd McKenzie, Ruskin Hunt[1], Bryon Mueller[1], Dante Cicchetti[1], Kathleen Thomas[1]

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1-I-76 Reconfiguration of functional brain networks from resting-state to task during childhood is associated with motor learning and working memory

Mackenzie Woodburn[1], Margaret Sheridan[1], Cheyenne Bricken[1], Weili Lin[1], Jessica Cohen[1]

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1-I-77 Neural systems underlying RDoC social constructs: An activation likelihood estimation meta-analysis

Rosario Pintos Lobo[1], Afra Toma[2], Katherine Bottenhorn[1], Megan Hare[1], Donisha Smith[1], Alexandra Moor[1], Isis Cowan[3], Javier Valdes[1], Erica Musser[1], Angela Laird[1]

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J – Mechanisms (hormones, neurotransmitters, physiology)

1-J-78 Paternal parenting influences psychobiological indicators of safety learning in daughters

Jordan Mullins[1], Elayne Zhou[1], Dana Glenn[1], Elizabeth Moroney[2], Steve Lee[2], Kalina Michalska[1]

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1-J-79 Association between changes in GABA and Glutamate through adolescence and age-related change in brain activity underlying working memory

Maria Perica[1], Finnegan Calabro[1], Will Foran[1], Victor Yushmanov[1], Hoby Hetherington[1], Beatriz Luna[1]

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1-J-80 Androgen receptor genotype is associated with amygdala composition in adolescent females, but not males

Claire Campbell[1], Adam Mezher[1], Sandrah Eckel[1], J. Michael Tyszka[2], Wolfgang Pauli[2], Bonnie Nagel[3], Megan Herting[1]

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1-J-81 EEG-derived spectral processing and the development of working memory through adolescence

Shane McKeon[1], Finnegan Calabro[1], Beatriz Luna[1]

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1-J-82 Maternal free fatty acid concentration during pregnancy is associated with mean diffusivity in the newborn hypothalamus

Jerod Rasmussen[1], Gyllenhammer Lauren[1], Karen Lindsay[1], Alice Graham[2], Damien Fair[3], Thomas O'Connor[4], Sonja Entringer[5], Pathik Wadhwa[1], Claudia Buss[5]

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1-J-83 Testing multiple risk factors associated with maternal prenatal inflammation and infant birth and neurodevelopmental outcomes.

Amanda Wylie[1], Guan Wang[1], Xiaoxu Rong[2], Cathi Propper[1], Sarah Short[2]

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1-J-84 Depression moderates the association between pollution burden and cortical levels of ascorbate in adolescents

Giana Teresi[1], Jillian Segarra[1], Jonas Miller[1], Matthew Sacchet[2], Tiffany Ho[3], Ian Gotlib[1]

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1-J-85 Environmental influences on adrenarchal hormones

Austin Boroshok[1], Anne Park[1], Ursula Tooley[1], Cassidy McDermott[1], Lourdes Delgado Reyes[1], Julia Leonard[1], Allyson Mackey[1]

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1-J-86 Developmental changes in dopamine function support the enhancing effects of incentives on adolescent inhibitory control

Ashley Parr[1], Finnegan Calabro[1], Will Foran[1], Beatriz Luna[1]

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K - Attention

1-K-88 Parents' negative verbalizations are related to adolescents' emotion reactivity and regulation

Kara Kerr[1], Kelly Cosgrove[2], Erin Ratliff[1], Andrew Moore[3], Margaret Johnson[2], Masaya Misaki[3], Danielle DeVille[2], Robin Aupperle[2], W. Kyle Simmons[1], Jerzy Bodurka[4], Amanda Morris[1]

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1-K-89 Measurement matters: A factor analytic method for capturing socioculturally- and developmentally-valid measures of children's early environments

Meriah DeJoseph[1], Robin Sifre[1], Max Herzberg[1], Cybele Raver[2], Clancy Blair[2], Kathleen Thomas[1], Daniel Berry[1]

[1]University of Minnesota, [2]New York University

1-K-90 Hippocampal subfields in a developmental population: Assessing the reliability of fully-automated segmentation

Kelsey Canada[1], Morgan Botdorf[1], Tracy Riggins[1]

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1-K-91 Cortical neurite density and orientation predict executive function in children with and without ADHD

Dea Garic[1], Paulo Graziano[1], Anthony Dick[1]

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1-K-92 Network-based statistics for longitudinal (unbalanced) samples: NBR, an R package

Zeus Gracia Tabuenca[1], Sarael Alcauter[1]

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1-K-93 Precision functional brain mapping of individual children

Carolina Badke D'Andrea[1], Scott Marek[1], Ryland Miller[1], Jacqueline Hampton[1], Bradley Schlaggar[2], Steven Petersen[1], Nico U. F. Dosenbach[1], Deanna Greene[1]

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N - Language

1-N-94 Parent input and the neural mechanisms of language development in infants at risk of Autism

Rachel Romeo[1], April Choi[1], Laurel Gabard-Durnam[1], Carol Wilkinson[1], April Levin[1], Helen Tager-Flusberg[2], Charles Nelson[1]

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O – Brain function

1-O-95 Investigating whether dissociable types of hubs integrate brain function in infants

Ashley Nielsen[1], Caterina Gratton[1], Cynthia Rogers[2], Chris Smyser[2], Lauren Wakschlag[1], Elizabeth Norton[1]

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1-O-96 Complex emotional processing in young children

M. Catalina Camacho[1], Elizabeth Williams[1], Susan Perlman[1]

[1]Washington University

P – Brain connectivity

1-P-97 Evaluation of common brain atlases used in the a priori identification of primary functional networks

Nessa Bryce[1], Kelly Sambrook[1], Katie McLaughlin[1]

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1-P-98 Time-varying lateralization of major white matter tracts in the developing infant brain

Aiden Ford[1], Zeena Ammar[1], Sarah Shultz[1], Longchuan Li[1]

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1-P-99 Neural predictors of psychosocial outcomes associated with the COVID-19 pandemic in children with autism spectrum disorder

Celia Romero[1], Adriana Baez[1], Lauren Kupis[1], Bryce Dirks[1], Meaghan Parlade[1], Michael Alessandri[1], Jason Nomi[1], Lucina Uddin[1]

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Q - Other

1-Q-101 Gut feelings: What the gut-brain axis may reveal about depressive symptomatology during adolescence

Jessica Flannery[1], Kathryn Mills[1], Thomas Sharpton[2], Philip Fisher[1], Nicholas Allen[1], Jennifer Pfeifer[1]

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1-Q-102 Parent-adolescent cross-brain connectivity during an fMRI hyperscanning task is associated with adolescent emotion regulation

Erin Ratliff[1], Masaya Misaki[2], Kara Kerr[1], Kelly Cosgrove[2], Andrew Moore[2], Margaret Johnson[2], Danielle Deville[2], Jennifer Silk[3], Kyle Simmons[1], Jerzy Bodurka[4], Amanda Morris[1]

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1-Q-103 The influence of cognition and affect aggression following social rejection in adolescent girls

Athena Vafiadis[1], Megan Quarmley[1], Johanna Jarcho[1]

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1-Q-104 Effects of violence exposure on fear conditioning and extinction differ by sex during childhood

Mariam Reda[1], Anaïs Stenson[1], John France[1], Charis Wiltshire[1], Cassandra Wanna[1], Sean Minton[2], Tanja Jovanovic[3]

[1]Wayne State University, [2]Emory University, [3]Wayne State Dept. of Psychiatry & Behavioral Neurosciences

1-Q-105 Higher executive control network coherence buffers against puberty-related increases in internalizing symptoms during the COVID-19 pandemic

Rajpreet Chahal[1], Jaclyn Kirshenbaum[1], Jonas Miller[1], Tiffany Ho[2], Ian Gotlib[1]

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Poster Session 2
Friday, September 11, 2020

A – Executive functioning

2-A-106 Cardiorespiratory fitness and scholastic performance in 8-12 year olds: an investigation of the mediating role of executive functions

Marc Yangüez[1], Benoit Bediou[1], Charles Hillman[2], Daphne Bavelier[1], Julien Chanal[1]

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B – Socioemotional processing

2-B-107 Social media use and the not-so-imaginary audience: Behavioral and neural mechanisms of the influence on self-concept

Sabine Peters[1], Renske Van der Cruijsen[1], Laura Van der Aar[1], Jochem Spaans[1], Becht Andrik[1], Eveline Crone[1]

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2-B-108 Developmental and trait anxiety differences in interference from emotional distractors

Iroise Dumontheil[1]

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2-B-109 Internalising in early adolescence predicts later executive function, not the other way around

Georgina Donati[1], Emma Meaburn[1], Iroise Dumontheil[1]

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D – Rewards/Motivation

2-D-110 Delay discounting for self and friend in adolescence: An fMRI study

Suzanne van de Groep[1], Sophie Sweijen[1], Eveline Crone[1]

[1]Erasmus University Rotterdam

2-D-111 Information about others' choices selectively alters risk tolerance and medial prefrontal cortex activation across adolescence and young adulthood

Barbara Braams[1], Juliet Davidow[2], Leah Somerville[3]

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2-D-112 Emotional and intellectual capacities in adolescent risky decision-making and problem behavior

Dmitry Lomakin[1], Ayrat Ibragimov[2]

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F - Memory

2-F-113 Prenatal learning and stimulus recognition in newborns using hdEEG, ECG and videography

Manuel Schabus[1], Peter Ott[1], Renata Del Giudice[1], Adelheid Lang[1]

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2-F-114 Effects of spatial boundary on episodic memory in children

Yujin Rah[1], Sang Ah Lee[1]

[1]Korea Advanced Institute of Science and Technology

2-F-115 EEG oscillations distinguish age-invariant subsequent memory effects of shallow encoding of perceptual features and distinct signatures of deep semantic encoding in young and older elementary-school children and young adults

Daniela Czernochowski[1], Ann-Kathrin Beck[2]

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G – Environment (Stress, SES)

2-G-116 Do different early environmental risk factors predict different kinds of outcomes in adolescence? Evaluating cumulative and specific risk factors

Giacomo Bignardi[1], Edwin Dalmaijer[1], Duncan Astle[1]

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2-G-117 Assessing the development of visual working memory in a global context: The INDIA Project

Samuel Forbes[1], Sobanawartiny Wijeakumar[2], Lourdes Delgado Reyes[3], Vincent Magnotta[4], Aarti Kumar[5], John Spencer[1]

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H – Brain structure

2-H-118 Longitudinal trajectories of cognition and white matter microstructure in adolescents

Ines Mürner-Lavanchy[1], Julian Koenig[1], Ayaka Ando[2], Romy Henze[3], Susanne Schell[2], Franz Resch[2], Romuald Brunner[4], Michael Kaess[1]

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2-H-119 Growth of corticolimbic regions and anxiety disorders in children born very preterm

Courtney Gilchrist[1], Deanne Thompson[2], Bonnie Alexander[2], Claire Kelly[2], Karli Treyvaud[2], Lillian Matthews[3], Leona Pascoe[2], Mary Tolcos[1], Jeanie Cheong[2], Terrie Inder[3], Lex Doyle[2], Angela Cumberland[1], Peter Anderson[2]

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2-H-120 Adverse events in pregnancy and childhood and their relationships with pre-adolescent brain morphology: A population-based study

Andrea Cortes Hidalgo[1], Marian Bakermans-Kranenburg[2], Marinus van IJzendoorn[3], Henning Tiemeier[4], Tonya White[1]

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2-H-121 The relations between reading and executive functions challenges in children with developmental dyslexia: A diffusion tensor imaging study

Noam Glukhovsky[1], Rola Farah[1], Tzipi Horowitz-Kraus[1]

[1]Technion - Israel Institute of Technology

2-H-122 Myelin development and neurodevelopmental outcomes in very preterm and typically developing children

Deanne Thompson[1], Joseph Yang[2], Jian Chen[1], Claire Kelly[1], Chris Adamson[1], Bonnie Alexander[1], Lillian Matthews[3], Katherine Lee[1], Rod Hunt[2], Jeanie Cheong[4], Megan Spencer-Smith[5], Marc Seal[1], Terrie Inder[3], Lex Doyle[6], Peter Anderson[5]

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2-H-123 Integrating multiple data types to identify novel brain-behaviour subgroups in very preterm born children

Laila Hadaya[1], Konstantina Dimitrakopoulou[2], Diliana Pecheva[1], Dana Kanel[1], A David Edwards[1], Serena J Counsell[1], Mansoor Saqi[2], Dafnis Batalle[1], Chiara Nosarti[1]

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2-H-124 The use of Fixel-Based Analyses to investigate white matter micro- and macro-structure in school-aged preterm children

Dana Kanel[1], Laila Hadaya[1], Alice Davidson[1], Diliana Pecheva[1], Daan Christiaens[1], Maximillian Pietsch[1], Jacques-Donald Tournier[1], David Edwards[1], Serena Counsell[1], Chiara Nosarti[1]

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2-H-125 Microstructural maturation of language networks in early childhood

Sila Genc[1], Derek Jones[1], Catherine Lebel[2]

[1]Cardiff University, [2]University of Calgary

2-H-126 The influence of stressful life events on trajectories of subcortical structural brain development from adolescence to early adulthood - A latent curve model approach

Lea Backhausen[1], Juliane Fröhner[2], Michael Smolka[2], Nora Vetter[1]

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K - Methods

2-K-127 The longitudinal dynamics between neurobiological correlates of self-referential processing and daily identity formation processes across adolescence

Andrik Becht[1], Eduard Klapwijk[2], Lara Wierenga[3], Renske van der Cruijsen[2], Jochem Spaans[2], Laura van der Aar[2], Sabine Peters[3], Susan Branje[4], Wim Meeus[4], Eveline Crone[2]

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L – Clinical populations

2-L-128 Neurobiological correlates of antisocial behavior across adolescence: A multi-sample, multi-method study

Neeltje Blankenstein[1], Mark de Rooij[2], Joost Van Ginkel[2], Tom Wilderjans[2], Esther de Ruigh[1], Helena Oldenhof[1], Josjan Zijlmans[1], Tijs Jambroes[1], Evelien Platje[3], Marjan De Vries-Bouw[4], Susan Branje[5], Wim Meeus[5], Robert Vermeiren[6], Arne Popma[1], Lucres Naut

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2-L-129 Development of brain white matter and maths performance in children born very preterm and full-term

Simonne Collins[1], Alice Burnett[2], Claire Kelly[2], Joseph Y.M Yang[3], Terrie Inder[4], Lex Doyle[5], Jeanie LY Cheong[2], Deanne Thompson[2], Peter Anderson[1]

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2-L-130 Social influence on impulsive choice in adolescents and young adults with attention deficit/ hyperactivity disorder

Jorien van Hoorn[1], Erik de Water[2], Tycho Dekkers[3], Hilde Huizenga[3], Arne Popma[4], Anna van Duijvenvoorde[1]

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2-L-131 Residual hippocampal subregions disrupt spatial perception and recall in developmental amnesia

Loic Chareyron[1], Filipa Bastos[1], Sarah Buck[1], Richard Saunders[2], Mortimer Mishkin[2], David Gadian[1], Faraneh Vargha-Khadem[1]

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2-L-132 White matter fiber density and morphology are associated with poor motor performance in children with and without ADHD

Ian Fuelscher[1], Christian Hyde[1], Keri Rosch[2], Joshua Robinson[2], Karen Seymour[2], Deana Crocetti[2], Stewart Mostofsky[2]

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M - Attention

2-M-133 Development of attention networks from childhood to young adulthood

Rune Bøen[1], Lia Ferschmann[1], Nandita Vijayakumar[2], Knut Overbye[1], Kristine Walhovd[1], Anders Fjell[1], Thomas Espeseth[1], Christian Tamnes[1]

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N - Language

2-N-134 Grey matter volume changes following early intervention in pre-readers at risk for dyslexia

Maria Economou[1], Jolijn Vanderauwera[2], Pol Ghesquière[1], Jan Wouters[1], Maaike Vandermosten[1]

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2-N-135 Language exposure and brain structure in early childhood

Laia Fibla[1], Samuel Forbes[1], Larissa Samuelson[1], Vincent Magnotta[2], Sean Deoni[3], John Spencer[1]

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2-N-136 The fetal auditory response to maternal voice

Katrin Sippel[1], Franziska Schleger[2], Magdalene Weiss[1], Julia Moser[2], Hubert Preissl[2]

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O – Brain function

2-O-137 Neural correlates of fetal learning of second-order regularities over the course of gestation

Julia Moser[1], Franziska Schleger[1], Magdalene Weiss[2], Katrin Sippel[1], Hubert Preissl[1]

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2-O-138 A replication study of neural correlates of aggression following social feedback in middle childhood

Simone Dobbelaar[1], Michelle Achterberg[2], Lina van Drunen[1], Anna C.K. van Duijvenvoorde[1], Eveline Crone[2]

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2-O-139 Global motion evoked potentials in autistic and dyslexic children: A cross-syndrome approach

Catherine Manning[1], Lisa Toffoli[2], Margaret Snowling[1], Anthony Norcia[3], Gaia Scerif[1]

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2-O-140 The emergence of self: Neural analyses and heritability estimates of self-evaluations in middle childhood

Lina van Drunen[1], Simone Dobbelaar[1], Renske van der Cruijsen[2], Michelle Achterberg[2], Mara van der Meulen[1], Lara M. Wierenga[1], Eveline A. Crone[2]

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2-O-141 Longitudinal development of self-concept in adolescence: Domain differentiation, internalization of perceived peers' opinions and underlying neural activation

Renske van der Cruijsen[1], Sabine Peters[2], Eveline Crone[3]

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2-O-142 The neural correlates of self-evaluations and self-regulation following social feedback in young adulthood

Ilse van de Groep[1], Marieke G.N. Bos[2], Lucres Nauta-Jansen[3], Michelle Achterberg[1], Arne Popma[1], Eveline Crone[1]

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2-O-143 Validating valence effects of an emotional go/nogo fMRI task in children

Stepheni Uh[1], Roma Siugzdaite[1], Edwin Dalmaijer[1], Alexander Anwyl-Irvine[1], Giacomo Bignardi[1], Tess Smith[1], the RED team[1], Duncan Astle[1]

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2-O-144 Happy for us not them: Neural processing of vicarious rewards for parents and strangers and its links with prosocial behaviors

Philip Brandner[1]

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P – Brain connectivity

2-P-145 What is an adaptive pattern of brain activity? It depends on one's environment

Monica Ellwood-Lowe[1], Susan Whitfield-Gabrieli[2], Silvia Bunge[1]

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2-P-147 Metacognition using child-parent perspectives scale: The cortical thickness and functional MRI connectivity contribution

Kelssy Kawata[1], Akiko Uematsu[1], Yuko Nakamura[1], Takuya Ishida[1], Naohiro Okada[1], Kiyoto Kasai[1], Shinsuke Koike[1]

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2-P-148 Connecting the dots: Linking peer connections in the classroom to white matter connections in the brain

Rosa Mulder[1], Mónica López-Vicente[1], Lisa Steenkamp[1], Berna Güroglu[2], Henning Tiemeier[1], Ryan Muetzel[1]

[1]Erasmus MC, [2]Leiden University

2-P-149 Unraveling the consequences of childhood maltreatment: Deviations from typical functional neurodevelopment mediate the relationship between maltreatment history and depressive symptoms

Divyangana Rakesh[1], Clare Kelly[2], Nandita Vijayakumar[3], Andrew Zalesky[1], Nicholas Allen[4], Sarah Whittle[1]

[1]University of Melbourne, [2]Trinity College Dublin, [3]Deakin University, [4]University of Oregon

2-P-150 Developmental trajectories of dynamic brain connectivity

Monica Lopez-Vicente[1], Oktay Agcaoglu[2], Laura Perez-Crespo[3], Rosa Mulder[1], Fernando Estevez-Lopez[1], John Flournoy[4], Tonya White[1], Anna van Duijvenvoorde[5], Berna Guroglu[5], Vince Calhoun[2], Henning Tiemeier[6], Ryan Muetzel[1]

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2-P-151 Executive function behaviours and the developing functional connectome

Jonathan Jones[1], Duncan Astle[2]

[1]MRC CBU, [2]University of Cambridge

2-P-152 Sex dimorphic adolescent brain network development is co-located with imaging and transcriptomic phenotypes of depression

Lena Dorfschmidt[1], Richard A Bethlehem[1], Jakob Seidlitz[2], Frantisek Vása[3], Simon White[1], Rafael Romero-García[1], Manfred Kitzbichler[1], Athina Aruldass[1], Petra Vértes[1], Edward Bullmore[1]

[1]University of Cambridge, [2]University of Pennsylvania, [3]King's College London

2-P-153 Communities in the brain structural network moderates the link between environment and cognitive outcomes

Roma Siugzdaite[1], Danyal Akarca[1], Amy Johnson[1], Edwin Dalmaijer[1], Giacomo Bignardi[1], Alexander Anwyl-Irvine[1], Tess Smith[1], Stepheni Uh[1], Duncan Astle[1]

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2-P-154 Pre-reading differences along white matter tracts in children at risk for dyslexia

Lauren Blockmans[1], Fumiko Hoeft[2], Jan Wouters[1], Pol Ghesquière[1], Maaike Vandermosten[1]

[1]KU Leuven, [2]University of Connecticut

Q - Other

2-Q-155 Individual alpha frequency not related to IQ in healthy primary school children: A bayesian linear mixed models analysis

Kate Riggall[1], Mark Kohler[2], Sally Brinkman[3], Phil Kavanagh[4], Kim Cornish[5], Ina Bornkessel-Schlesewsky[1]

[1]University of South Australia, [2]University of Adelaide, [3]Telethon Kids Institute, [4]University of Canberra, [5]Monash University

2-Q-156 Are children genetically predisposed to poor sleep? A polygenic risk score study in the general pediatric population

Desi Kocevska[1], Rosa Mulder[2], Henning Tiemeier[3], Eus van Someren[1]

[1]Netherlands Institute for Neuroscience, [2]Erasmus University Medical Centre, [3]Harvard TH Chan School of Public Health

2-Q-157 Explaining brain research with children to children

Laura Bell[1], Vanessa Reindl[1], Jana Kruppa[1], Alexandra Niephaus[1], Simon Kohl[2], Kerstin Konrad[2]

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Poster Session 3

Friday, September 11, 2020

3-D-158 A person-centered examination of regulation, sensitivity to threat and impulsivity among children and adolescents: An ERP study

Taylor Heffer[1], Teena Willoughby[1]

[1]Brock University

F - Memory

3-F-159 Prefrontal-striatal circuitry supports adaptive memory prioritization across development

Kate Nussenbaum[1], Daphne Valencia[1], Jamie Greer[1], Nora Keathley[1], Catherine Hartley[1]

[1]New York University

J – Mechanisms (hormones, neurotransmitters, physiology)

3-J-160 Maturational covariance of cortical thickness during puberty

Nandita Vijayakumar[1], Emma Sciberras[1], Vicki Anderson[2], Daryl Efron[2], Philip Hazell[3], Jan Nicholson[4], Timothy Silk[1]

[1]Deakin University, [2]Murdoch Children's Research Institute, [3]The University of Sydney, [4]La Trobe University

L – Clinical populations

3-L-161 Identifying sensitive markers of myelination in adolescent depression

Artenisa Kulla[1], Lucinda Sisk[2], Tiffany Ho[3], Ian Gotlib[1]

[1]Stanford University, [2]Yale University, [3]University of California, San Francisco

3-L-162 Microstructure of the dorsal anterior cingulum bundle in very preterm neonates predicts the preterm behavioral phenotype at 5 years

Rebecca Brenner[1], Christopher Smyser[1], Rachel Lean[1], Jeanette Kenley[1], Tara Smyser[1], Peppar Cyr[1], Joshua Shimony[1], Deanna Barch[1], Cynthia Rogers[1]

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3-L-163 Inhibitory control circuitry and externalizing psychopathology in a large sample of higher-risk youth

Rachel Tomlinson[1], S. Alexandra Burt[2], Luke Hyde[1]

[1]University of Michigan, [2]Michigan State University

3-L-164 Neural correlates of emotion reactivity and regulation and youth suicidal ideation: Examining cross-sectional and longitudinal links

Adam Miller[1], Jessica Jenness[2], Kelly Sambrook[1], Margaret Sheridan[1], Katie McLaughlin[3]

[1]University of North Carolina at Chapel Hill, [2]University of Washington, [3]Harvard University

3-L-165 Neural correlates of risky decision-making in youth at risk for anxiety

Amanda Baker[1], Namita Padgaonkar[1], Tara Peris[1], Adriana Galván[1]

[1]University of California, Los Angeles

3-L-166 Neural correlates underlying irritability and emotion dysregulation in children with and without ADHD

Nicholas Fogleman[1], Teague Henry[1], Cleanthis Michael[1], Jessica Cohen[1]

[1]University of North Carolina at Chapel Hill

3-L-167 The effects of methylphenidate on the functional controllability of the brain in children with ADHD

Teague Henry[1], Nicholas Fogleman[1], Jessica Cohen[1]

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3-L-168 Disrupted brain network reconfiguration between resting and cognitive control states across changing cognitive demands in children with attention-deficit/hyperactivity disorder

Cleanthis Michael[1], Mackenzie Mitchell[1], Teague Henry[2], Keri Rosch[3], Karen Seymour[3], Stewart Mostofsky[3], Jessica Cohen[1]

[1]University of North Carolina at Chapel Hill, [2]University of Pittsburgh, [3]Kennedy Krieger Institute/Johns Hopkins University

3-L-169 Altered maturation of gray and white matter following preterm birth: Longitudinal data from children 5 to 7 years of age

Julia Anna Adrian[1], Carolyn Sawyer[1], Natacha Akshoomoff[1]

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3-L-170 Behavioral and structural neural correlates of non-suicidal self-injury in adolescent girls

Kinjal Patel[1], Margaret Sheridan[1], Madeline Robertson[1], Adrienne Bonar[1], Matteo Giletta[2], Paul Hastings[3], Matthew Nock[4], Karen Rudolph[5], George Slavich[6], Leah Somerville[4], Mitchell Prinstein[1], Adam Miller[1]

[1]University of North Carolina at Chapel Hill, [2]Ghent University, [3]University of California, Davis, [4]Harvard University, [5]University of Illinois at Urbana-Champaign, [6]University of California, Los Angeles

3-L-171 Bariatric surgery alters cortical thickness in adolescents with severe obesity

Laya Rajan[1], Cameron McKay[1], Alaina Pearce[2], Gabriel Santos Malavé[1], Eleanor Mackey[3], Evan Nadler[3], Chandan Vaidya[1]

[1]Georgetown University, [2]Pennsylvania State University, [3]Children's National Health System

3-L-172 The relationship between greater depression symptom severity and reduced whole brain volume in preschool age children is driven by reduced lateral OFC surface area

Carina Fowler[1], Michael Gaffrey[1]

[1]Duke University

3-L-173 Brain white matter after pediatric mild traumatic brain injury: A diffusion tensor and neurite orientation and dispersion imaging study

Ayushi Shukla[1], Ashley Ware[1], Bradley Goodyear[1], Antonia Stang[1], Stephen Freedman[1], Keith Yeates[1], Catherine Lebel[1]

[1]University of Calgary

3-L-174 Neural correlates of ADHD and exposure to adversity: A resting state EEG study

Sarah Furlong[1], Madeline Robertson[1], Jenna Snyder, Kelly Kehm, Marcus Way, Katrina Goines, Laura Machlin[1], Margaret Sheridan[1]

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3-L-175 Impaired response control in childhood predicts adolescent ADHD symptoms in boys, but not girls, with ADHD

Alyssa DeRonda[1], Karen Seymour[2], Yi Zhao[3], Carolyn Koch[1], Alyssa Tiedemann[1], Stewart Mostofsky[1], Keri Rosch[4]

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3-L-176 Behavioral and neural mechanisms of trauma symptomatology in Autism Spectrum Disorder in the ABCD Study

Jillian Melbourne[1], Emily Wood[1], Shulamite Green[1], Susan Bookheimer[1], Mirella Dapretto[1]

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3-L-177 Predictive modeling of ADHD diagnostic category using cognitive and neurobiological measures of executive function

Ilke Oztekin[1], Mark Finlayson[1], Paulo Graziano[1], Anthony Dick[1]

[1]Florida International University

3-L-178 Examining the impact of adversity on adolescent psychopathology and the role of cognitive control and reward learning interactions

Anais Rodriguez-Thompson[1], Adam Bryant Miller[1], Laura Machlin[1], Adrienne Bonar[1], Kinjal Patel[1], Matteo Gilleta[2], Paul Hastings[3], Matthew Nock[4], Karen Rudolph[5], George Slavich[6], Leah Somerville[4], Mitchell Prinstein[1], Margaret Sheridan[1]

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3-L-179 Sexually-dimorphic patterns of anomalous brain anatomy in ADHD spanning childhood and adolescence: Findings from a mixed cross-sectional/longitudinal cohort

Stewart Mostofsky[1], Deana Crocetti[1], Yi Zhao[2], Keri Rosch[3], Aki Nikolaidis[4], Joanne Beer[5], Xiaoning He[4], Christine Chen[1], Amira Herstic[1], Karen Seymour[6]

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3-L-180 Underlying biological mechanisms of sensory over-responsivity in youth with autism and anxiety disorders

Jiwon Jung[1], Tomislav Zbozinek[2], Kaitlin Cummings[1], Frank Wilhelm[1], Mirella Dapretto[1], Michelle Craske[1], Susan Bookheimer[1], Shulamite Green[1]

[1]University of California, Los Angeles, [2]California Institute of Technology

3-L-181 Social support in a pandemic (COVID-19): Pregnant women and new mothers

Autumn Austin[1], Michelle VanTieghem[1], Carly Lenniger Lenniger[1], Claudia Espinoza-Heredia[1], Tessa Valataro[1], Natalie Brito[1], Moriah Thomason[1]

[1]New York University

3-L-182 Altered network organization and screen media use in childhood Attention-Deficit/Hyperactivity Disorder (ADHD)

Elizabeth Hawkey[1], Katherine Lopez[1], Sridhar Kandala[1], Scott Marek[1], Deanna Barch[1]

[1]Washington University in St. Louis

3-L-183 Associations between COVID-19 lifestyle impact and maternal perinatal depression

Carly Lenniger[1], Michelle VanTieghem[2], Claudia Espinoza-Heredia[2], Tessa Vatalaro[1], Autumn Austin[2], Moriah Thomason[2]

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3-L-184 Default mode network coherence is associated with implicit suicidal ideation in adolescents

Johanna Walker[1], Artenisa Kulla[1], Anthony Gifuni[1], Ian Gotlib[1], Tiffany Ho[1]

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3-L-185 Marijuana use in adolescents and young adults with ADHD and neural activation for working memory

Prerona Mukherjee[1], Julie Schweitzer[1], Ian Farnsworth[2]

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M - Attention

3-M-186 Nonverbal behavior predicts social rejection elicited aggression in late adolescents

Megan Quarmley[1], Zhibo Yang[2], Shahrukh Athar[2], Tessa Clarkson[1], Dimitris Samaras[2], Gregory Zelinsky[2], Johanna Jarcho[1]

[1]Temple University, [2]Stony Brook University

3-M-187 Identifying early risk of impulsivity: Evidence of sign-tracking behaviors in children

Janna Colaizzi[1], Grace Clark[1], Erika Schaecher[1], Jennifer Coronado[1], Shelly Flagel[2], Martin Paulus[1]

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3-M-188 Affect influences social attention captured via mobile eye-tracking during dyadic play in young children

Alicia Vallorani[1], Kayla Brown[1], Xiaoxue Fu[2], Kelley Gunther[1], Leigha MacNeill[3], Briana Ermanni[1], Michael Hallquist[3], Koraly Pérez-Edgar[1]

[1]Pennsylvania State University, [2]University of South Carolina, [3]University of North Carolina

3-M-189 Rhythmic properties of attention across development

Ivette Planell-Mendez[1], Myrthe Ottenhoff[1], Sabine Kastner[1]

[1]Princeton University

3-M-190 Early emergence of EF using neural and behavioral measures

Lourdes Delgado Reyes[1], Samuel Forbes[2], Vincent Magnotta[3], John Spencer[2]

[1]University of Pennsylvania, [2]University of East Anglia, [3]University of Iowa

3-M-191 Preliminary analysis of basal ganglia tissue-iron concentration in children with attention deficit/ hyperactivity disorder

Ronit Shvarzman[1], Xu Li[2], Joshua Robinson[1], Stewart Mostofsky[1], Deana Crocetti[1]

[1]Kennedy Krieger Institute, [2]Johns Hopkins University School of Medicine

3-M-192 Linking fronto-amygdala functional connectivity to in vivo attentional biases towards social threat in adolescence

Stefanie Sequeira[1], Dana Rosen[1], Jennifer Silk[1], Cecile Ladouceur[1]

[1]University of Pittsburgh

N - Language

3-N-193 Social communication in adolescence: Linguistic features of internalizing symptoms

Elizabeth McNeilly[1], Kathryn Mills[1], Lauren Kahn[1], Ryann Crowley[1], Hanna Nadel[1], Jennifer Pfeifer[1], Nicholas Allen[1]

[1]University of Oregon

3-N-194 Gray matter volume differences in bilingual compared to monolingual children

Alison Schug[1], K. Breana Downey[1], Edith Brignoni-Perez[1], Nasheed Jamal[1], Guinevere Eden[1]

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3-N-195 Environmental noise, language skills, and language-related brain structure in childhood

Katrina Simon[1], Emily Merz[2], Xiaofu He[3], Kimberly Noble[1]

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O – Brain function

3-O-196 Associations of violence exposure with behavioral and neural indices of in-group bias in young children: A preregistration

Steven Kasparek[1], Maya Rosen[1], Lucy Lurie[1], Dario Cvencek[2], Andrew Meltzoff[2], Katie McLaughlin[1]

[1]Harvard University, [2]University of Washington

3-O-197 Evoked and intrinsic brain network dynamics in children with autism spectrum disorder

Lauren Kupis[1], Celia Romero[1], Bryce Dirks[1], Stephanie Hoang[1], Meaghan Parlade[1], Amy Beaumont[1], Sandra Cardona[1], Michael Alessandri[1], Catie Chang[2], Jason Nomi[1], Lucina Uddin[1]

[1]University of Miami, [2]Vanderbilt University

3-O-198 Charting trajectories of neural noise across the first two years of life

Brendan Ostlund[1], Berenice Anaya[1], Vanessa LoBue[2], Kristin Buss[1], Koraly Pérez-Edgar[1]

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3-O-199 Adolescent pleasure and novelty seeking is associated with greater neural response in reward and control circuitry during evaluation of greater risk and reward

Amanda Del Giacco[1], Angelica Morales[1], Scott Jones[1], Dakota Kliamovich[1], Bonnie Nagel[1]

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3-O-200 Stress in "Quaranteens": The role of frontolimbic connectivity in emotion and stress during the COVID-19 pandemic

Anthony Gifuni[1], Lauren Borchers[1], Jaclyn Kirshenbaum[1], Tiffany Ho[2], Ian Gotlib[1]

[1]Stanford University, [2]University of California, San Francisco

3-O-201 Social cognition in expectant fathers: Does prenatal neural activity during theory of mind and action perception reflect preparation for fatherhood?

Sofia Cardenas[1], Sarah Stoycos[1], Pia Sellery[1], Narcis Marshall[1], Hannah Khoddam[1], Darby Saxbe[1]

[1]University of Southern California

3-O-202 Reward- and threat-related neural activity associated with risk and presence of depression in adolescents in a middle-income country

Leehyun Yoon[1], Fernanda Rohrsetzer[2], Lucas Battel[3], Mauricio Anes[4], Pedro Manfro[2], Luis Rohde[2], Anna Viduani[2], Zuzanna Zajkowska[5], Valeria Mondelli[5], Christian Kieling[2], Johnna Swartz[1]

[1]University of California, Davis, [2]Universidade Federal do Rio Grande do Sul, [3]University at Buffalo, [4]Hospital de Clínicas de Porto Alegre, [5]Institute of Psychiatry, King's College London

3-O-203 Delayed development of prefrontal regulation in Autism Spectrum Disorder during aversive sensory exposure

Kaitlin Cummings[1], Jiwon Jung[1], Nana Okada[1], Genevieve Patterson[1], Susan Bookheimer[1], Mirella Dapretto[1], Shulamite Green[1]

[1]University of California, Los Angeles

3-O-204 Age-related change in stimulus-elicited amygdala-prefrontal circuitry: A longitudinal multiverse approach

Paul Bloom[1], Michelle VanTieghem[1], Laurel Gabard-Durnam[2], Dylan Gee[3], Jessica Flannery[4], Christina Caldera[5], Bonnie Goff[5], Eva Telzer[6], Kathryn Humphreys[7], Mor Shapiro[8], Niall Bolger[1], Mariam Aly[1], Nim Tottenham[1]

[1]Columbia University, [2]Harvard University, [3]Yale University, [4]Seattle Children's Hospital, [5]University of California, Los Angeles, [6]University of North Carolina at Chapel Hill, [7]Vanderbilt University, [8]Kaiser Foundation

3-O-205 Disentangling being correct from social reward: Investigating age group differences

Camille Johnston[1], Megan Quarmley[1], Yvette Karvay[1], Brady Nelson[2], Johanna Jarcho[1]

[1]Temple University, [2]Stony Brook University

3-O-206 C-reactive protein levels and frontocingulate activation to emotional faces in adolescents

Justin Yuan[1], Natalie Colich[2], Tiffany Ho[3], Anthony Gifuni[1], Ian Gotlib[1]

[1]Stanford University, [2]University of Washington, Seattle, [3]University of California, San Francisco

3-O-207 The development of neural responses to faces in infancy

Stefania Conte[1], John Richards[1]

[1]University of South Carolina Columbia

3-O-208 Neurobiological markers of resilience to depression following childhood maltreatment: The role of neural circuits supporting the cognitive control of emotion

Alexandra Rodman[1], Jessica Jenness[2], David Weissman[1], Daniel Pine[3], Katie McLaughlin[1]

[1]Harvard University, [2]University of Washington, [3]National Institute of Mental Health

3-O-209 Test-retest reliability of adolescent brain response during cognitive conflict and error processing in the Eriksen Flanker task

Ashley Smith[1], Simona Haller[1], Elise Cardinale[1], Dominque Phillips[2], Jessica Bezek[1], Melissa Brotman[1], Ellen Leibenluft[1], Daniel Pine[1]

[1]National Institute of Mental Health, [2]University of Miami

3-O-210 Event representations become more stable and predictive with age

Samantha Cohen[1], Christopher Baldassano[1]

[1]Columbia University

3-O-211 Converging neural mechanisms of social and non-social threat monitoring: A multimodal approach

Tessa Clarkson[1], Megan Quarmley[1], Yvette Karvay[1], Johanna Jarcho[1]

[1]Temple University

3-O-212 Individual differences and developmental changes in perspective-taking in adolescent girls*: Evidence from brain and behavior

Victoria Williamson[1], Marjolein Barendse[1], Michelle Byrne[1], Samantha Chavez[1], Theresa Cheng[1], Danielle Cosme[2], Jennifer Pfeifer[1]

[1]University of Oregon, [2]University of Pennsylvania

3-O-213 Brain function in the dorsal visual stream during visual motion processing in children with and without math disability

Marissa Laws[1], Guinevere Eden[1]

[1]Georgetown University

3-O-214 Longitudinal associations between pubertal development and inhibitory control

Orma Ravindranath[1], William Foran[1], Finnegan Calabro[1], Beatriz Luna[1]

[1]University of Pittsburgh

3-O-215 Examining associations between the gut microbiome and brain development in infancy

Sarah Vogel[1], Annie Brandes-Aitken[1], Bridget Callaghan[2], Natalie Brito[1]

[1]New York University, [2]University of California, Los Angeles

3-O-216 Association between neighborhood socioeconomic status and executive system activation in youth

Kristin Murtha[1], Bart Larsen[1], Tyler Moore[1], Azeez Adebimpe[1], Aaron Alexander-Bloch[1], Monica Calkins[1], Diego Dávila[1], Allyson Mackey[1], David Roalf[1], J. Cobb Scott[1], Daniel Wolf[1], Ruben Gur[1], Raquel Gur[1], Ran Barzilay[2], Theodore Satterthwaite[1]

[1]University of Pennsylvania, [2]Children's Hospital of Philadelphia

3-O-217 The neurodevelopment of prosocial behavior in adolescence

Maira Karan[1], Lee Lazar[1], Macrina Cooper-White[1], Naomi Eisenberger[1], Adriana Galván[1], Carrianne Leschak[1], Eva Telzer[1], Jessica Uy[1], Andrew Fuligni[1]

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3-O-218 Not all adversity is created equal: Differential associations of adversity profiles with adolescent cognitive control and psychopathology

Alexis Brieant[1], Kirby Deater-Deckard[2], Thomas Ollendick[3], Tae-Ho Lee[3], Jacob Lee[4], Brooks King-Casas[4], Jungmeen Kim-Spoon[3]

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3-O-219 A sensitive period for visual cortex plasticity: naturalistic auditory narratives synchronize "visual" cortices in congenitally blind but not late blind or sighted people

Elizabeth Musz[1], Rita Loiotile[1], Janice Chen[1], Marina Bedny[1]

[1]Johns Hopkins University

3-O-220 Parent-child relationship quality is associated with brain and endocrine responses to stress

Zachary Miller[1], Max Herzberg[1], Bonny Donzella[1], Megan Gunnar[1], Kathleen Thomas[1]

[1]University of Minnesota

3-O-221 The thriving brain: Effects of individual child characteristics and environmental factors on self-regulation and associated neural circuitry

Bram Gooskens[1], Dienke Bos[1], Pascal Pas[1], Matthijs Vink[1], Bob Oranje[1], Sarah Durston[1]

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3-O-222 Identification and validation of distinct latent neurodevelopmental profiles in the Adolescent Brain and Cognitive Development study

Sarah Lichenstein[1], Corey Roos[1], Brian Kiluk[1], Kathleen Carroll[1], Patrick Worhunsky[1], Katie Witkiewitz[2], Sarah Yip[1]

[1]Yale School of Medicine, [2]University of New Mexico

3-O-223 Reward processes during early stages of pubertal development and the association with internalizing symptoms in 9 and 10 year olds in the ABCD Study

Elizabeth McNeilly[1], Natalie Saragosa-Harris[2], Kathryn Mills[1], Ronald Dahl[3], Lucía Magis-Weinberg[3]

[1]University of Oregon, [2]University of California, Los Angeles, [3]University of California, Berkeley

3-O-224 Infant sleep patterns moderate the association between socioeconomic status and frontal alpha brain activity

Ashley Greaves[1], Sarah Vogel[1], Annie Aitken[1], Natalie Brito[1]

[1]New York University

3-O-225 Examining the neural correlates of engagement: A simultaneous eye-tracking/fMRI study

Sanju Koirala[1], Jordan Pincus[1], Longchuan Li[1], Ami Klin[1], Warren Jones[1], Sarah Shultz[1]

[1]Emory University

3-O-226 Are reading and math inter-related in the brain? An fMRI study on reading and math following reading intervention in children with learning disabilities

Anna Matejko[1], Nicole Schlosberg[1], Melanie Lozano[1], Guinevere Eden[1]

[1]Georgetown University

3-O-227 Maternal relationship conflict and quality predicts neural response to peer influence during adolescence

Joseph Venticinque[1], Rajpreet Chahal[2], Sarah Beard[1], Richard Robins[1], Paul Hastings[1], Amanda Guyer[1]

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3-O-228 Neural activation to naturalistic emotional events in young children

Anne Park[1], Julia Leonard[1], Ursula Tooley[1], Hilary Richardson, Adrian Ke[1], M. Dylan Tisdall[1], J. Christopher Edgar[2], Allyson Mackey[1]

[1]University of Pennsylvania, [2]Children's Hospital of Philadelphia

3-O-229 Altered neural activation in response to native language in 1.5-month-old infants at high risk for autism

Nana Okada[1], Lauren Wagner[1], Tawny Tsang, Janelle Liu[2], Erin Nosco[1], Kaitlin Cummings[1], Jiwon Jung[1], Genevieve Patterson[1], Susan Bookheimer[1], Shafali Jeste[1], Mirella Dapretto[1]

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3-O-230 Characterizing the neural mechanisms of sensory processing in previously institutionalized youth

Adriana Méndez Leal[1], João Guassi Moreira[1], Yael Waizman[1], Natalie Saragosa-Harris[1], Emilia Ninova[1], Jennifer Silvers[1]

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P – Brain connectivity

3-P-231 Differential developmental effects of material hardship on adolescent regulatory white matter connectivity

Felicia Hardi[1], Leigh Goetchius[1], Melissa Peckins[2], Jaime Munoz-Velazquez[1], Sara McLanahan[3], Jeanne Brooks-Gunn[4], Nestor Lopez-Duran[1], Colter Mitchell[1], Luke Hyde[1], Christopher Monk[1]

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3-P-232 Associations between peripheral inflammation and resting state functional connectivity in adolescents

Johnna Swartz[1], Angelica Carranza[1], Laura Tully[1], Annchen Knodt[2], Janina Jiang[3], Michael Irwin[3], Camelia Hostinar[1]

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3-P-233 Adolescent functional connectivity as a mediator between environmental factors and change in behavior

Michael Galvan[1], Eva Telzer[2], Christina Rogers[1]

[1]Texas Tech University, [2]University of North Carolina at Chapel Hill

3-P-234 Positive parenting and parental involvement are associated with adolescents' amygdala activity and amygdala-mPFC connectivity to angry faces

Angelica Carranza[1], Leehyun Yoon[1], Annchen Knodt[2], Johnna Swartz[1]

[1]University of California, Davis, [2]Duke University

3-P-235 Longer screen vs. reading time is related to greater functional connections between the salience network and cognitive control regions in children with reading difficulties

Tzipi Horowitz-Kraus[1], Mark DiFrancesco[2], Paige Greenwood[2], John Hutton[2], Jonathan Dudley[2], Rola Farah[3]

[1]Technion and Cincinnati Children's Hospital, [2]Cincinnati Children's Hospital, [3]Technion

3-P-237 White matter properties underlying language and reading abilities in 8-year-old children

Edith Brignoni Perez[1], Michal Ben-Shachar[2], Aviv Mezer[3], Heidi Feldman[1], Katherine Travis[1]

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3-P-238 Increased interhemispheric somatomotor network functional connectivity and mirror overflow movements in children with ADHD

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3-P-239 Searching for a neuromarker of spatial attention bias in school-aged children

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3-P-240 Deprivation & threat, resting-state functional connectivity, and psychopathology within the ABCD sample

Landry Huffman[1], Zehua Cui[1], Assaf Oshri[1]

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3-P-241 Mapping longitudinal development of cortical functional connectivity in the healthy mouse and a mouse model of Rett Syndrome

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3-P-242 Parsing heterogeneity in the effects of stress on frontolimbic circuitry

Emily Cohodes[1], Sarah McCauley[1], Jasmyne Pierre[1], Hopewell Rogers[1], Jeffrey Mandell[1], Sadie Zacharek[1], Jason Haberman[1], Paola Odriozola[1], Sahana Kribakaran[1], Dylan Gee[1]

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3-P-243 Family conflict and youth adjustment: The moderating role of default mode network resting-state functional connectivity (DMN RS-FC)

Assaf Oshri[1], Zehua Cui[1], Landry Huffman[1]

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3-P-244 Using connectome-based predictive modelling to determine the relation between resting-state functional brain connectivity and functional outcomes after pediatric mild traumatic brain injury: A pre-registration

Stephanie Deighton[1], Keith Yeates[1], Miriam Beauchamp[2], William Craig[3], Quynh Doan[4], Roger Zemek[5], Jocelyn Gravel[2], Bradley Goodyear[1], Filomeno Cortese[1], Kirk Graff[1], Adrian Onicas[1], Signe Bray[1]

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3-P-245 A data-driven approach to examine the specificity of anomalous motor system functional connectivity in children with Autism Spectrum Disorder

Daniel Lidstone[1], Rebecca Rochowiak[1], Stewart Mostofsky[1], Mary Beth Nebel[1]

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3-P-246 Sensitivity to early life stress predicts change in amygdala-ventromedial prefrontal cortex functional connectivity across adolescence: A longitudinal investigation

Agata Kelman[1], Johanna Walker[1], Rachel Weisenburger[1], Artenisa Kulla[1], Jaclyn Kirshenbaum[1], Rajpreet Chahal[1], Tiffany Ho[2], Ian Gotlib[1]

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3-P-247 Mapping alterations in resting-state functional connectivity profiles to dimensions of childhood adversity

Stephanie DeCross[1], Katherine Grisanzio[1], John Flournoy[1], Katie McLaughlin[1]

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3-P-248 Independent contributions of premature birth on executive function task performance and implicated brain structures and networks

Rita Taylor[1], Deanna Barch[1], Cynthia Rogers[1]

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3-P-249 Examining inhibitory control as a moderator between childhood resting state fronto-limbic connectivity and anxiety.

Kelley Gunther[1], Daniel Petrie[1], Alaina Pearce[1], Bari Fuchs[1], Kathleen Keller[1], Charles Geier[1]

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3-P-251 Developmental abnormalities in frontal-striatal functional connectivity as a biomarker for ADHD

Aki Nikolaidis[1], Xiaoning He[1], Mary Beth Nebel[2], Yi Zhao[3], Joanne Beer[4], Jessica Cohen[5], Karen Seymour[2], Keri Rosch[2], James Pekar[2], Stewart Mostofsky[6]

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3-P-252 Brain network organization and cognitive performance during childhood

Cheyenne Bricken[1], Margaret Sheridan[1], Mackenzie Woodburn[1], Weili Lin[1], Jessica Cohen[1]

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3-P-253 The application of covariance regression to identify functional brain networks related to age, ADHD, sex, and cognitive response control

Yi Zhao[1], Mary Beth Nebel[2], Karen Seymour[2], Brian Caffo[2], Stewart Mostofsky[2], Keri Rosch[2]

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3-P-254 Accounting for motion in fMRI: What part of the spectrum are we characterizing in autism and ADHD?

Mary Beth Nebel[1], Liwei Wang[2], Stewart Mostofsky[1], Benjamin Risk[2]

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3-P-255 Brain connectomics in early adolescence predict suicidal ideation severity in later adolescence

Jaclyn Kirshenbaum[1], Rajpreet Chahal[1], Tiffany Ho[2], Lucy King[1], Anthony Gifuni[1], Dana Mastrovito[1], Saché Coury[1], Rachel Weisenburger[1], Ian Gotlib[1]

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3-P-256 Pavlovian-to-instrumental transfer and outcome devaluation: A cross-validation study of tasks assessing the interplay between goal-directed and habitual responding in adolescents and young adults

Daniel Petrie[1], Charles Geier[1]

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3-P-257 Age-related effects of racial and ethnic discrimination on striatal functional connectivity

Logan Leathem[1], NAPLS Consortium, Carrie Bearden[1], Katherine Karlsgodt[1]

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3-P-258 The impact of prenatal alcohol exposure on sensory processing in the PASS cohort

Stefanie Bodison[1], Kristina Uban[2], Elizabeth Sowell[1]

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3-Q-259 Loss of control-eating in children is associated with altered cortical and subcortical grey matter volume

Alaina Pearce[1], Larual English[2], Shana Adise[3], Travis Masterson[1], Nicole Fearnbach[4], Wendy Hagigi[1], Marion Tanofsky-Draff[5], Kathleen Keller[1]

[1]Pennsylvania State University, [2]The Panum Group, [3]University of Vermont, [4]Pennington Biomedical Research Center, [5]Uniformed Services University

3-Q-260 Mechanisms of selective attention in reading

Mahalakshmi Ramamurthy[1], Alex White[2], Megumi Takada[2], Jason Yeatman[2]

[1]Stanford University, [2]School of Medicine, Stanford University

3-Q-261 Maternal mind-mindedness in infancy: Neuroanatomical outcomes in late childhood

Yu Tong Guo[1], Élizabel Leblanc[1], Miriam Beauchamp[1], Annie Bernier[1]

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3-Q-262 Pubertal timing and the development of self-evaluative behavior and neural processing

Marjolein Barendse[1], Jessica Flannery[2], Theemeshni Govender[1], Jennifer Pfeifer[1]

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3-Q-263 The association between perceived stress and sleep disturbances: The moderating role of stress mindset

Rachel Weisenburger[1], Jaclyn Kirschenbaum[1], Saché Coury[1], Alia Crum[1], Rachel Manber[1], Ian Gotlib[1]

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