52ND ANNUAL MEETING OF THE ISDP

International Society for Developmental Psychobiology

October 16-18, 2019
Swissôtel Chicago, Chicago, USA

FINAL PROGRAM AND ABSTRACTS

Program Director
Amy Learmonth, *William Paterson University*

Conference Coordinator
Sonia A. Cavigelli, *Pennsylvania State University*

Perinatal Pre-Conference Symposium
Sponsored by the International Perinatal Brain and Behavior Network (IPBBN)

WWW.ISDP.ORG

PROGRAM SCHEDULE AT-A-GLANCE

Program Schedule Wednesday, October 16

12:30-1:30 PM	ISDP Perinatal Pre-Conference Workshop 1:	Gstaad
12:30-1:30 PM	ISDP Perinatal Pre-Conference Workshop 2:	Lucerne I&II
1:30 – 3:00 PM	ISDP PERINATAL PRE-CONFERENCE SYMPOSIUM: Invited Mentor-Mentee talks	Lucerne I&II
3:15 – 4:15 PM	Pre-Conference Flash talks	Lucerne I&II
4:30 – 6:00 PM	Welcome to ISDP 2019, Presidential Symposium	Lucerne I&II
6:00 – 8:00 PM	Poster Session 1 & President's Reception	Lucerne III

Program Schedule Thursday, October 17

7:00 – 9:00 AM	ISDP Board Meeting	Alpine I
7:40 – 8:55 AM	Meeting the Professors Breakfast Workshop	Alpine II
9:00 – 10:30 AM	Symposium 1: Substance Use During Pregnancy: Impact on Behavioral and Neurocognitive Development of Offspring from Infancy to Adulthood	Lucerne I&II
11:00 – 12:00 PM	Oral Session 1: RESILIENCE	Lucerne I&II
12:00 – 1:30 PM	Lunch Workshops Grants	Alpine II
1:30 – 3:00 PM	Symposium 2: Young Investigator Symposium: Enhancing Developmental Psychobiological Research via a Cross-Species Framework	Lucerne I&II
3:30 – 5:20 PM	Oral Session 2: PRENATAL INFLUENCES	Lucerne I&II
5 :30 – 7 :30 PM	Poster Session 2 & Cash Bar Reception	Lucerne III

Program Schedule Friday, October 18

8:00 – 8:30 AM	Travel Awards Distribution & ISDP Business Mtg	Lucerne I&II
8:30 – 10:00 AM	Symposium 3: Developmental Exposure to Stress: Psychobiological Mechanisms, Risk & Resilience Processes	Lucerne I&II
10:30 – 12:00 PM	Symposium 4: Stress Regulation Following Early Adversity: Pathways to Risk and Resilience	Lucerne I&II
12:00 – 1:15 PM	Wiley Editorial Board Meeting/Lunch	Alpine I
1:20 – 2:20 PM	Wiley Distinguished Speaker - Mark Mon Williams	Lucerne I&II
2:30 – 3:30 PM	Oral Session 3: CHILDHOOD/ADOLESCENCE	Lucerne I&II
3:45 – 5:00 PM	Awards Talks & Presentations	Lucerne I&II
5:00 – 6:30 PM	Columbia University in the City of New York sponsored Symposium: To Have and to Hold, for Better or for Worse: Parental Influences on Affect Regulation, and Dysregulation, in Infancy & Childhood	Lucerne I&II

Table of Contents

2018-2019 Board of Directors:

President
Rachel Barr, Georgetown University

President-Elect
Megan R. Gunnar, University of Minnesota

Past President
Nathan Fox, University of Maryland

Secretary
Susanne Brummelte, Wayne State University

Treasurer
Hunter Honeycutt, Bridgewater College

Treasurer-Elect
Bethany Reeb Sutherland,
Florida International University

Conference Coordinator
Sonia A. Cavigelli, Pennsylvania State University

Conference Coordinator-Elect
Julie Campbell, Illinois State University

Program Director
Amy Learmonth, William Paterson University

Pre-Conference Program Director
Marion I. van den Heuvel, Tilburg University
William P. Fifer, Columbia University College of Physicians & Surgeons, Pre-Conference Co-Chair

Board Members
Amanda Tarullo, Boston University
Dima Amso, Brown University
Natalie Brito, New York University

Awards Committee
Amanda Tarullo (Chair)
Dima Amso
Natalie Brito

Student Member Representatives
Bridget Callaghan, Columbia University
Radha Raghuraman, NUS, Singapore

Federation of Associations in Behavioral & Brain Sciences Representative (FABBS)
Dragana Claflin, Wright State University

Editor of Developmental Psychobiology (ex-officio), Michele R. Brumley

Managing Director (ex-officio)
Joan Oefner

2019 ISDP Award Winners:

2019 Awards Committee: Amanda Tarullo, Boston University (Chair); Dima Amso, Brown University; and Natalie Brito, New York University

- **Rovee-Collier Mentor Award**, Joanne Weinberg, University of British Columbia, Vancouver, Canada
- **Senior Investigator Award**, Martha Ann Bell, Professor of Psychology, Virginia Polytechnic Institute and State University
- **Distinguished Service Award**, George F. Michel, Professor, Department of Psychology, The University of North Caroline at Greensboro
- **Sandra G. Wiener Student Investigator Award**, Raha Hassan, Department of Psychology, Neuroscience & Behaviour, McMasters University - Mentor: - Louis Schmidt, PhD
- **David Kucharski Young Investigator Award**, Bridget L. Callaghan, Assistant Professor of Psychology, The University of California, Los Angeles
- **Dissertation Award**, Virginia C. Salo, Postdoctoral Fellow, Stress and Early Adversity Laboratory, Vanderbilt University, Department of Psychology and Human Development, Nashville, Research - Postdoctoral Mentor: Kathryn L. Humphreys, PhD, EdM; Dissertation Mentor: Nathan Fox, PhD

Trainee Awards:

🏆**Student/Postdoc Travel Award Winners:** their presentations are marked with 🏆in the schedule on pages 8-32)

NAME	INSTITUTION	ADVISOR
ISDP Student/Postdoc Travel Awardees		
Nakul Aggarwal	University of Wisconsin-Madison	Ned Kalin
Abdullah Ahmad	Florida International University	Robert Lickliter
Berenice Anaya	Penn State University	Koraly Perez Edgar
Özlü Aran	University of Denver	Elysia P. Davis
Asia Banks	University of Illinois at Urbana Champaign	Joshua Gulley
Mark Bichin	University of British Columbia	Ruth E. Grunau
Emily Blakley	Binghamton University	Peter Gerhardstein
Anna Blomkvist	Stockholm University	Pehr Granqvist
Paul Bloom	Columbia University	Nim Tottenham
Morgan Botdorf	University of Maryland, College Park	Tracy Riggins
Aimee L. Bozeman	Idaho State University	Michele R. Brumley
Kristen R. Breit	San Diego State University	Jennifer D. Thomas
George A Buzzell	University of Maryland, College Park	Nathan A Fox
Marie Camerota	RTI International	Michael Willoughby
Sofia Cardenas	University of Southern California	Darby E. Saxbe
William Joseph Chollman	University of Tennessee	Greg D. Reynolds
Tricia Choy	Columbia University	Nim Tottenham
Nicholas Collins	University of Delaware	Tania Roth
Kaityn Contino	Florida International University	Lorraine Bahrick
Sarai Cortina	Illinois State University	Julie Campbell
Ellen Cullity	The Florey Institute of Neuroscience and Mental Health, Australia	Jee Kim
Cameron J. Davidson	Wayne State University	Scott E. Bowen
Ranjan Debnath	University of Maryland, College Park	Nathan Fox
Camila Demaestri	Brown University	Kevin Bath
Carrie DePasquale	University of Minnesota	Megan Gunnar
Pooja M. Desai	Teachers College, Columbia University	Kimberly Noble
Elizabeth V Edgar	Florida International University	Elizabeth V Edgar

NAME	INSTITUTION	ADVISOR
Cassondra Eng	Carnegie Mellon University	Anna Fisher
Melissa Engel	University of Minnesota	Megan Gunnar
Andrea Fields	Columbia University	Nim Tottenham
Jennifer Figueroa	California State University San Marcos	Kimberly D'Anna-Hernandez
Xiaoxue Fu	Nationwide Children's Hospital	Eric Nelson
Laurel Gabard-Durnam	Boston Children's Hospital, Harvard University	Charles A. Nelson
Diana Garcia	Florida International University	Robert Lickliter
Dea Garic	Florida International University	Anthony S. Dick
Kelsea Gildawie	Northeastern University	Heather Brenhouse
Sandy Gonzalez	Florida International University	Eliza Nelson
Lauren Granata	Northeastern University	Heather Brenhouse
Melissa Grimes	University of North Carolina at Chapel Hill	Cathi Propper
Sunny Guo	University of Calgary	Catherine Lebel/Keith Yeates
Sylvia Harmon-Jones	The University of New South Wales	Rick Richardson
Charlotte Heleniak	Columbia University	Nim Tottenham
Cassandra Hendrix	Emory University	Patricia A. Brennan
Nicholas Heroux	University of Delaware	Mark Stanton
Colin Horgan	University of Delaware	Mark Stanton
Sarah R. Horn	University of Oregon	Philip A. Fisher
Mariann Howland	University of Minnesota, Twin Cities	Megan Gunnar
Landry Goodgame Huffman	University of Georgia	Assaf Oshri
Amirah Hurst	Georgia State University	Anne Z. Murphy
Miriam Kamens	Boston University	Amanda Tarullo
Katherine Knauft	Miami University	Vrinda Kalia
Samantha Lauby	University of Toronto Scarborough	Patrick McGowan
Rebecca Lipschutz	University of Houston	Johanna Bick
Ran Liu	Virginia Tech	Martha Ann Bell
Diana Lopera-Perez	Boston University	Amanda Tarullo,
Maristella Lucchini	Columbia University Medical Center	William P Fifer
Madison Malone	Emory University School of Medicine	Patricia Brennan
Alleyna Martes	Idaho State University	Michele Brumley
Christiana Martin	University of Delaware	Mary Dozier/Tania Roth
Amanda Martinez	Florida International University	Robert Lickliter
Karen Matvienko-Sikar	University College Cork	Patricia Kearney
Kristen McLaurin	University of South Carolina	Charles Mactutus
Mia Mclean	The University of British Columbia	Ruth Grunau
Santiago Morales Pamplona	University of Maryland	Nathan A. Fox
Isabelle Mueller	University of Massachusetts Boston	Ed Tronick
Amanda Noroña	University of Denver	Elysia Davis
Maya Opendak	NYU Langone Medical Center	Regina Sullivan
Rodrigo Orso	Pontifical Catholic University of Rio Grande do Sul	Rodrigo Grassi-Oliveira
Rosemarie Perry	New York University	Clancy Blair
Hannah Phillips	University of British Columbia	Ruth Grunau
Kristie Poole	McMaster University	Louis Schmidt
Natalee Price	Miami University	Vrinda Kalia
Livio Provenzi	Scientific Institute IRCCS E. Medea	Rosario Montirosso
Radha Raghuraman	National University of Singapore	Sajikumar Sreedharan
Michelle Ramos	Florida International University	Bethany Reeb-Sutherland

NAME	INSTITUTION	ADVISOR
Niyantri Ravindran	The Pennsylvania State University	Pamela Cole
Lori Reider	Rutgers University	Vanessa LoBue
Patrese Robinson-Drummer	New York University Medical Center	Regina M. Sullivan
Joscelin Rocha Hidalgo	Georgetown University	Rachel F. Barr
Cynthia Rodriguez	Columbia University Medical Center	William P. Fifer
Naama Rotem-Kohavi	University of British Columbia	Tim Oberlander
Kelly Roth	University of Tennessee Knoxville	Greg Reynolds
Sylvia Rusnak	Georgetown University	Rachel Barr
Lauren Shuffrey	Columbia University Medical Center	William Fifer
Ayushi Shukla	University of Calgary	Catherine Lebel/Keith O. Yeates
Katrina R. Simon	Teachers College, Columbia University	Kimberly G. Noble
Celia Smith	King's College London	Tony Charman
Anthea Stylianakis	University of New South Wales, Sydney	Professor Rick Richardson
Danielle Swales	University of Denver	Elysia Davis
Yukari Tanaka	Kyoto University	Masako Myowa
Alva Tang	University of Maryland, College Park	Nathan Fox
Mary Tarsha	University of Notre Dame	Darcia Narvaez
Shannon Michele Thompson	Miami University	Matthew S. McMurray
Brian Timmerman	Wayne State University	Susanne Brummelte
Emily Towner	University of California, Los Angeles	Jennifer Silvers
Charu Tuladhar	Boston University	Amanda Tarullo
Irene Tung	University of Pittsburgh	Alison E. Hipwell
Joshua Underwood	Washington State University	Maria (Masha) Gartstein
Michelle VanTieghem	Columbia University	Nim Tottenham
Vanessa Vieites	Florida International University	Bethany C. Reeb-Sutherland
Chela Wallin	Wayne State University	Susanne Brummelte
Yueyao Wang	University of Rochester	Joyce Duckles
Ashley L Ware	University of Calgary	Keith Yeates/Catherine Lebel
Anna G. Warner	University of New Orleans	Christopher Harshaw
W.Tang Watanasriyakul	Northern Illinois University	Angela J. Grippo, .
Luis Eduardo Wearick-Silva	Pontifical Catholic University of Rio Grande do Sul	Rodrigo Grassi-Oliveira
Sara Westbrook	University of Illinois Urbana-Champaign	Joshua Gulley
Amanda White	University of Michigan	Jacek Debiec
Giulia Zanni	Children's Hospital of Philadelphia	Gordon A. Barr
Selin Zeytinoglu	University of Maryland	Nathan Fox
Danruo Zhong	Institute of Child Development, University of Minnesota	Megan R. Gunnar
Anna Zhou	Penn State University	Kristin Buss
Kelsey Zimmermann	University of New South Wales	Rick Richardson

POSITIVE SCIENCE Student/Postdoc Travel Awardees

Jessica Burris	Rutgers University	Vanessa LoBue
Brianna Keenan	Tulane University	Julie Markant
Emily Reilly	University of Minnesota, Institute of Child Development	Megan Gunnar

ZERO to THREE (ZTT) Student/Postdoc Travel Awardees

Alana Anderson	Washington State University	Sammy Perone
Ashley Greaves	New York University	Natalie Brito

Sponsors & Exhibitors

Thank you to all of our sponsors, who have generously supported Student & Postdoc ISDP Member Travel Awards as well as selected Symposium Speaker's travel. Funding for these awards was generously provided by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, NIH Office of Behavioral and Social Sciences Research (OBSSR), John Wiley and Sons Publishing, (publishers of the ISDP's official journal, *Developmental Psychobiology*, the Division of Developmental Neuroscience in Psychiatry at Columbia University, the Nurture Science Project at Columbia University, as well as our Industry Sponsors: Philips Neuro, Positive Science and Zero to Three and the members of the ISDP. Thanks to all our generous sponsors and exhibitors!

Funded by grants from the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development and the Office of Behavioral and Social Science Research, both at the National Institutes of Health

COLUMBIA | COLUMBIA UNIVERSITY DEPARTMENT OF PSYCHIATRY

NURTURE SCIENCE PROGRAM
COLUMBIA UNIVERSITY MEDICAL CENTER

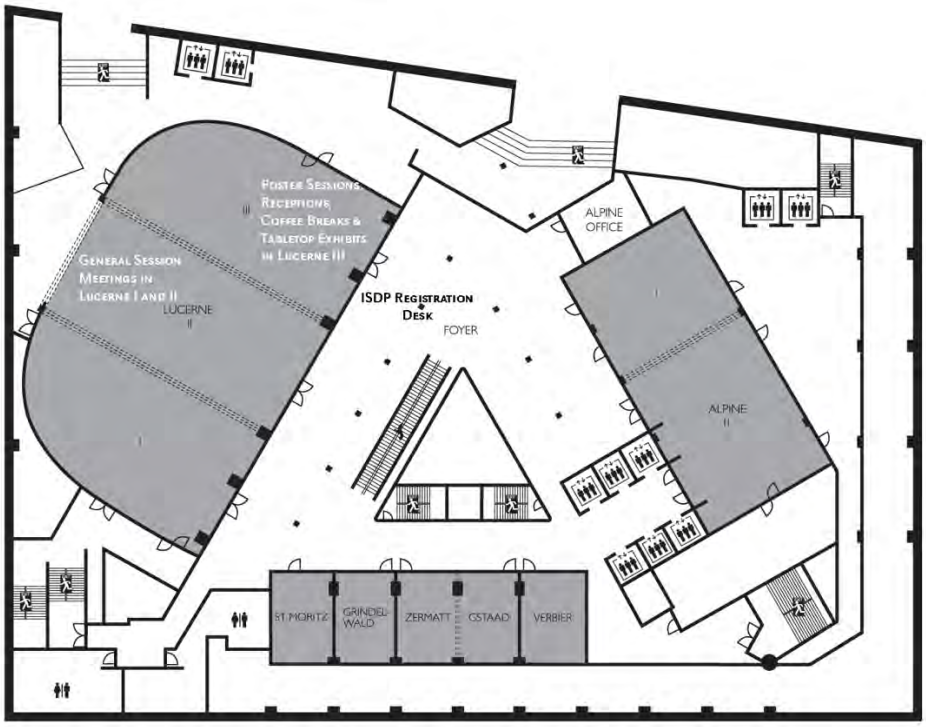
WILEY

PHILIPS

positive science

ZERO TO THREE

Meeting Space Floor Plan



ISDP Membership Information

Dues cover membership from January through December each year. All ISDP Memberships include an ***ONLINE subscription for the journal Developmental Psychobiology***

$140/year Regular Members: ***Regular Membership:*** Dues also include discounted annual meeting registration ***(savings of $175)***, access to the ISDP member listserv, access to the ISDP member directory for use in networking and is a qualifying factor in serving on the board, as an officer of the Society or on various committees.

$105/year Postdoctoral Members: Postdoctoral Membership dues include discounted annual meeting registration ***(savings of $175)***, ***eligibility for ISDP Student/Postdoc Travel Awards***, access to the ISDP member listserv, access to the ISDP member directory for use in networking and is a qualifying factor in serving on the board, as an officer of the Society or on various committees.

$75/year Student Members: An application for Student membership shall be sponsored by a Member of the Society, or a faculty or professional member of the institution in which the applicant is situated. Student Member shall be voting members of the Society but may not stand for office in the Society, except for the office of Student Member Representative. Student Membership dues include discounted annual meeting registration ***(savings of $100)***, ***eligibility for ISDP Student/Postdoc Travel Awards***, access to the ISDP member listserv, access to the ISDP member directory for use in networking.

$65/year Retired/Spouse Members: Retired Membership dues also include discounted annual meeting registration ***(savings of $175)***, access to the ISDP member listserv, access to the ISDP member directory for use in networking and is a qualifying factor in serving on the board, as an officer of the Society or on various committees.

If you are not yet an ISDP member, please visit the ISDP website and join soon. All 2020 memberships begin following the 52nd Annual Meeting and are in effect through December 31, 2020. *Membership can be combined with Annual Meeting Registration upon request.*

Wednesday, October 16, 2019

🏆*Denotes Student/Postdoc Travel Award Winner next to author's names in the program*

All meetings in the Lucerne Ballroom I and II– Poster Session is the Lucerne Ballroom III

10:00 – 7:00 PM Lucerne Ballroom Foyer – Registration, Poster Session 1 presenters can set up their posters from 2 PM on in the Lucerne Ballroom III.

Pre-Conference

Sponsored by the International Perinatal Brain and Behavior Network (IPBBN)

Pre-Conference Program Director: Marion I. van den Heuvel, Tilburg University
Co-Director: William (Bill) Fifer, Columbia University Department of Psychiatry

12:30 - 1:30 PM Pre-Conference workshops: (pre-registration required ($15), limited to 10 participants per workshop)

Freely available tools related to perinatal research, developed by early career researcher

Workshop 1: Saige Rutherford: fetal preprocessing pipeline – Gstaad Room

Workshop 2: Laurel Gabard-Durnam: infant EEG pre-processing pipeline (HAPPE) – Lucerne I&II

1:30 – 3:00 PM 01 **ISDP PERINATAL PRE-CONFERENCE SYMPOSIUM**

[13:30-15:00] – (open to all participants of ISDP 2019): Mentor-mentee talks: Mentors and their mentee provide a talk together (25 min total). Mentor starts with introducing the project and their mentee (10 minutes), mentee presents their work (10 minutes), then discussion/questions (5 minutes).

1:30-1:45: Welcome by director IPBBN – Dr. Marion van den Heuvel

1:45-2:10: LIVING TO THE FULL DURING PREGNANCY: A SELF-GUIDED RESILIENCE TRAINING, Dr. Jens Henrichs & Annika Walker

2:10-2:35: DISTINGUISHING THE DEVELOPMENTAL IMPACT OF PRENATAL MOOD DISTURBANCES FROM ANTIDEPRESSANT EXPOSURE USING NEONATAL RESTING STATE FCMRI MEASURES OF FUNCTIONAL CONNECTIVITY, Dr. Tim Oberlander & 🏆Naama Rotem-Kohavi

2:35-3:00: THE ASSOCIATION BETWEEN MATERNAL PRENATAL OBESITY AND HUMAN INTRAUTERINE BRAIN DEVELOPMENT, Dr. Moriah Thomason & Megan Norr

3:15 – 4:15 PM 02 **Pre-Conference Flash talks**: Invited talks based on abstract submissions for ISDP 2019, related to perinatal research

Presentations:

3:15 - 3:22 PM	THE EFFECT OF HEART RATE VARIABILITY BIOFEEDBACK TRAINING ON MENTAL HEALTH OF PREGNANT AND NON-PREGNANT WOMEN: A RANDOMIZED CONTROLLED TRIAL (PC-01) **Anja Huizink,** VU University Amsterdam; Esi van der Zwan, AMC; Wieke de Vente, University of Amsterdam
3:22 - 3:29 PM	TODDLER TEMPERAMENTAL CHARACTERISTICS MEDIATE THE RELATIONSHIP BETWEEN DISASTER-RELATED PRENATAL MATERNAL STRESS ON CHILDHOOD ANXIETY SYMPTOMATOLOGY: THE QF2011 QUEENSLAND FLOOD STUDY (PC-02) 🏆**Mia Mclean**, The University of British Columbia & B.C. Children's Hospital Research Institute; Vanessa Cobham, The University of Queensland; Gabrielle Simcock, Mater Research – The University of Queensland, Australia & Thompson Institute, University of the Sunshine Coast; Sue Kildea, Mater Research - The University of Queensland; Suzanne King, McGill University
3:29 - 3:36 PM	MATERNAL STRESS IN THE FIRST 1000 DAYS AND CHILDHOOD OBESITY RISK (PC-03) 🏆**Karen Matvienko-Sikar**, University College Cork; Jennifer Cooney, University College Cork; Caragh Flannery, University College Cork; Jennifer Murphy, University College Cork; Ali Khashan, University College Cork; Anja Huizink, VU University Amsterdam
3:36 - 3:43 PM	PSYCHOSOCIAL ADVERSITY DURING PREGNANCY AND PATTERNS OF HEART RATE VARIABILITY IN RESPONSE TO ACUTE STRESS (PC-04) 🏆**Irene Tung**, University of Pittsburgh; Meaghan Delcourt, University of Pittsburgh; Alison Hipwell, UPMC; Kathryn Keenan, University of Chicago
3:43 - 3:50 PM	MATERNAL OBESITY AND INFLAMMATION DURING PREGNANCY PREDICT INFANT NEURODEVELOPMENT (PC-05) 🏆**Marie Camerota**, RTI International; Cathi Propper, University of North Carolina at Chapel Hill; Laurie Wideman, University of North Carolina at Greensboro
3:50 - 3:57 PM	EARLY ADVERSITY RISK SCORE ASSOCIATED WITH VISUAL EVOKED POTENTIAL (VEP) DEVELOPMENT DURING THE FIRST YEAR OF LIFE (PC-06) **Lara Justine Pierce,** Boston Children's Hospital/Harvard Medical School; Jang Lee, Boston Children's Hospital/Harvard; Lisa Schlueter, Children's Hospital Los Angeles, Saban Research Institute; Pat Levitt, Children's Hospital Los Angeles; Charles Nelson, Harvard Medical School
3:57 - 4:04 PM	TRANSGENERATIONAL EFFECTS OF MATERNAL STRESS EXPOSURE ON INFANT NEURAL CONNECTIVITY (PC-07) 🏆**Cassandra Hendrix**, Emory University; Daniel D. Dilks, Emory University; Elaine Johnson, Emory Laney Graduate School; Anne Dunlop, Emory University; Elizabeth Corwin, Emory University; Patricia Brennan, Emory University
4:04 - 4:11 PM	A CARETAKER ACUTE STRESS PARADIGM: EFFECTS ON BEHAVIOR AND PHYSIOLOGY OF CARETAKER AND INFANT (PC-08) 🏆**Isabelle Mueller**, University of Massachusetts Boston; Ed Tronick, University of Massachusetts Boston; Jennifer DiCorcia, University of Massachusetts Boston; Nancy Snidman, University of Massachusetts Boston
4:11 - 4:15 PM	Discussion, Q&A

ALL ARE WELCOME TO ATTEND THE PRE-CONFERENCE!

4:15 – 4:30 PM	Coffee Break – Poster Session 1 presenters can setup their posters in the Lucerne Ballroom III.
4:30 – 6:00 PM	03 **Welcome to the 52nd Annual Meeting of the ISDP**, President Rachal Barr: **Presidential Symposium: Fathers are parents too: Exploring the psychological context of early development**
4:30 – 4:32	Welcome & Introductions, Rachel Barr, President, ISDP
4:32 – 4:52 PM	THE PSYCHOBIOLOGY OF FATHER-INFANT RELATIONSHIPS, **Brenda L. Volling, PhD**, Center for Human Growth & Development, University of Michigan, USA This talk will focus on recent findings linking the quality of early father-infant relationships to hormonal changes in father's testosterone in response to stress, in addition to the role of a secure father-infant attachment relationships for infant stress reactivity.
4:52 – 5:12 PM	BECOMING DADS: HOW COMPARATIVE PERSPECTIVES HELP US UNDERSTAND MEN'S HORMONES, BEHAVIOR, AND HEALTH AS FATHERS, **Lee T. Gettler, PhD**, Department of Anthropology, University of Notre Dame Human fathers shape their children's well-being through a range of parenting behaviors. While common for humans, this is rare for mammals. This talk will shed light on how thinking about dads evolutionarily and across cultures helps us understand fathers' roles, biology as parents, and health.
5:12 – 5:32 PM	IMAGING THE NEURAL RESPONSE TO PREDATORY FEAR IN PRAIRIE VOLE FATHERS, **William Kenkel, PhD,** The Kinsey Institute, Indiana University, Bloomington, USA In obligate biparental species mammalian fathers play a complementary role to the mother, and lacking nursing duties, are well-positioned to aid offspring survival by assessing and handling potential threats. This project examines the role of fatherhood in modulating the neural response to predatory life threat in socially monogamous and biparental prairie voles.
5:32 – 5:52 PM	MORE THAN MONEY: FATHERS' CONTRIBUTIONS TO CHILD DEVELOPMENT IN THE EARLY YEARS, **Natasha J. Cabrera, PhD**, Department of Human Development and Quantitative Methodology, University of Maryland Dr. Cabrera will talk about the research she has been doing using observational data of father-child dyads to understand the unique effect that fathers have on their children's cognitive and social development in the early years
5:52 – 6:00 PM	Discussion, Q&A

6:00 - 8:00 PM	P1 **Poster Session 1**: Stress and Models of Disorder & President's Cash Bar Reception in Lucerne Ballroom III

Presenting Authors' Posters:

P1-01 EARLY LIFE STRESS EXPOSURE IMPAIRS SHORT-TERM MEMORY AND DECREASE DRD1 AND DRD2 EXPRESSION IN THE MEDIAL PREFRONTAL CORTEX OF ADOLESCENT MICE
Rodrigo Orso, *Pontifical Catholic University of Rio Grande do Sul, Porto Alegre, Brazil*

P1-02 INVESTIGATING THE RELATIONSHIP BETWEEN ACUTE STRESS AND FUNCTIONAL BRAIN HEMODYNAMICS IN MALE CHILDREN: IMPLICATIONS FOR COGNITIVE FLEXIBILITY
Katherine Knauft, *Miami University, Oxford, United States*

P1-03 FEMALES ARE MORE VULNERABLE TO THE IMPACT OF ACUTE EARLY LIFE STRESS ON SUBSEQUENT STRESS-ENHANCED FEAR LEARNING AND ETHANOL CONSUMPTION
Jennifer Quinn, *Miami University, Oxford, United States*

P1-04 THE RELATION BETWEEN VIOLENCE EXPOSURE, ANXIETY, AND THREAT PROCESSING
Lori Reider, *Rutgers University, Newark, United States*

P1-05 LINKING CHRONIC PHYSIOLOGICAL STRESS IN INFANCY TO SUSTAINED ATTENTION IN TODDLERHOOD AND WORKING MEMORY DEVELOPMENT IN EARLY CHILDHOOD
Annie Brandes-Aitken, *New York University, New York, United States*

P1-06 INVESTIGATION OF HIPPOCAMPAL AREA CA2 DEPENDENT BEHAVIORAL METAPLASTICITY IN ADULT RATS AFFECTED BY JUVENILE STRESS
Radha Raghuraman, *National University of Singapore, Singapore, Singapore*

P1-07 ASSESSING BEHAVIORAL AND PASSIVE VIEWING METHODOLOGIES ACROSS A DIVERSE SAMPLE OF MOTHERS OF INFANTS
Denise Oleas, *Rutgers University, Newark, United States*

P1-08 AGE AND SEX DIFFERENCES IN BEHAVIORS RELEVANT TO SCHIZOPHRENIA AND ADDICTION
Ellen Cullity, *Florey Institute of Neuroscience and Mental Health, University of Melbourne, Melbourne, Australia*

P1-09 IDENTIFYING MEANINGFUL PROFILES OF VISUAL ATTENTION IN CHILDREN WITH AUTISM
Carolyn McCormick, *Purdue University, West Lafayette, United States*

P1-10 VALID STATISTICAL APPROACHES FOR CLUSTERED DATA: A MONTE CARLO SIMULATION STUDY
Kristen McLaurin, *University of South Carolina, Columbia, United States*

P1-11 INFANT VOCALIZATIONS AS A BIOMARKER FOR AUTISM SPECTRUM DISORDER: INITIAL METHODOLOGICAL CONSIDERATIONS
Victoria Petrulla, *Children's Hospital of Philadelphia, Philadelphia, United States*

P1-12 PREDICTION OF AUTISM DIAGNOSES FROM NEONATAL CRY AND NEUROBEHAVIOR
Stephen Sheinkopf, *Brown Center for the Study of Children at Risk, Providence, United States*

P1-13 INVESTIGATING BRAIN ELECTRICAL ACTIVITY AND NETWORK ORGANIZATION IN ADOLESCENTS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER IN ALPHA FREQUENCY BAND
Ranjan Debnath, *University of Maryland, College Park, College park, United States*

P1-14 INDIVIDUAL DIFFERENCES IN RHESUS MONKEYS' EARLY LIFE WHITE MATTER DEVELOPMENT ARE STABLE
Nakul Aggarwal, *University of Wisconsin-Madison, Madison, United States*

P1-15 DEVELOPMENT OF WHITE MATTER MICROSTRUCTURAL CORRELATIONS IN INFANTS AT HIGH RISK FOR DEVELOPING AUTISM
Sooyeon Sung, *University of Minnesota, Minneapolis, United States*

P1-16 WORKING MEMORY ASSOCIATED NEURAL NETWORK ENGAGEMENT DIFFERS IN 8-YEAR-OLDS BORN VERY PRETERM
Mark Bichin, *British Columbia Childrens Hospital Research Institute, Vancouver, Canada*

P1-17 A LAMINAR DISSECTION OF PREFRONTAL FEAR EXTINCTION CIRCUITS ACROSS DEVELOPMENT
Kelsey Zimmermann, *University of New South Wales, Coogee, Australia*

P1-18 ALTERATIONS IN AUTONOMIC REGULATION IN INFANTS OF DIABETIC MOTHERS
Maristella Lucchini, *Columbia University Medical Center, New York, United States*

P1-19 ENHANCED & PERSISTENT CORRUGATOR SUPERCILII ACTIVITY DURING NEGATIVE ANTICIPATION IN PREADOLESCENT GIRLS WITH ANXIETY DISORDERS
Joshua Cruz, *University of Wisconsin-Madison Psychiatry Department, Madison, United States*

P1-20 MATERNAL BUFFERING STRONGLY AFFECTS INFLAMMATION-INDUCED HYPOTHALAMIC GENE EXPRESSION IN MOUSE PUPS
Kiseko Shionoya, *Linkoping University, Linkoping, Sweden*

P1-21 COMBINED PRENATAL EXPOSURE TO ALCOHOL AND THC VIA E-CIGARETTES ALTERS OFFSPRING ACTIVITY LEVELS
Kristen Breit, *Center for Behavioral Teratology at San Diego State University, San Diego, United States*

P1-22 SEX DIFFERENCES IN INFANT PROCESSING OF SOCIAL CUES IN THE VALPROIC ACID-INDUCED AUTISM-LIKE RAT PHENOTYPE
Amanda White, *University of Michigan, Ann Arbor, United States*

P1-23 ANTIPYRETIC EXPOSURE DURING EARLY DEVELOPMENT AND THE EMERGENCE OF SOCIAL BEHAVIOR IN C57BL/6J MICE
Anna Warner, *University of New Orleans, New Orleans, United States*

P1-24 EARLY-LIFE ANTIPYRETIC EXPOSURE AND THE DISPLAY OF ANXIETY AND REPETITIVE PHENOTYPES IN C57BL/6J MICE
Christopher Harshaw, *University of New Orleans, New Orleans, United States*

P1-25 ORAL OXYCODONE SELF-ADMINISTRATION IN THE PREGNANT RAT AFFECTS MATERNAL BEHAVIOR AND RESULTS IN MILD BEHAVIORAL CHANGES IN THE OFFSPRING
Giulia Zanni, *Children's Hospital of Philadelphia, Philadelphia, United States*

P1-26 THE DEVELOPMENTAL INFLUENCE OF ADOLESCENT SOCIAL ISOLATION ON SOCIAL BEHAVIOR AND STRESS REACTIVITY IN FEMALE PRAIRIE VOLES
Marigny Normann, *Northern Illinois University, DeKalb, United States*

P1-27 LIMITED BEDDING AFFECTS COGNITION AND BDNF EXON IV MRNA EXPRESSION IN THE MPFC AND HIPPOCAMPUS DURING ADOLESCENCE WITH NO DIFFERENCES IN TOTAL BDNF PROTEIN LEVELS
Luis Eduardo Wearick-Silva, *Pontifical Catholic University of Rio Grande do Sul, Porto Alegre, Brazil*

P1-28 LONG TERM CONSEQUENCES OF EARLY LIFE OPIOID EXPOSURE ON THE BRAIN
Amirah Hurst, *Georgia State University, East Point, United States*

P1-29 COGNITIVE FUNCTIONS OF WORKING MEMORY AND MATRIX REASONING ARE RELATED TO PERFORMANCE ON MENTAL ROTATION TASK IN 8-YEAR-OLDS BORN VERY PRETERM
Hannah Phillips, *University of British Columbia, BC Children's Hospital Research Institute, Vancouver, Canada*

P1-30 CHARACTERIZING THE BEHAVIORAL PHENOTYPE OF CHILDREN BORN VERY PRETERM AT SCHOOL AGE
Hannah Phillips, *University of British Columbia, BC Children's Hospital Research Institute, Vancouver, Canada*

P1-31 DEPRIVATION, THREAT, AND CHAOS AS LINKS BETWEEN EARLY LIFE SES AND EXECUTIVE FUNCTIONING OUTCOMES
Sarah Vogel, *New York University, New York, United States*

P1-32 TYPICAL VARIATIONS IN STRESS IMPACT HIPPOCAMPAL VOLUME IN YOUNG CHILDREN
Morgan Botdorf, *University of Maryland, College Park, College Park, United States*

P1-33 ATYPICAL NEURAL FUNCTION DURING THEORY OF MIND LINKS VIOLENCE EXPOSURE AND EXTERNALIZING SYMPTOMS IN ADOLESCENCE
Charlotte Heleniak, *Columbia University, New York, United States*

P1-34 EFFECTS OF NEONATAL PROCEDURAL PAIN AND REDUCED MATERNAL CARE ON BRAIN DEVELOPMENT AND CELL PROLIFERATION IN MALE AND FEMALE RAT PUPS
Brian Timmerman, *Wayne State University, Ferndale, United States*

P1-35 EARLY ADVERSITY RISK SCORE ASSOCIATED WITH VISUAL EVOKED POTENTIAL (VEP) DEVELOPMENT DURING THE FIRST YEAR OF LIFE
Lara Pierce, *Boston Children's Hospital/Harvard Medical School, Boston, United States*

P1-36 TRANSGENERATIONAL EFFECTS OF MATERNAL STRESS EXPOSURE ON INFANT NEURAL CONNECTIVITY
Cassandra Hendrix, *Emory University, Atlanta, United States*

P1-37 ASSOCIATIONS BETWEEN INSTITUTIONAL REARING AND ADOPTION DURATION WITH EEG PATTERNS IN MIDDLE CHILDHOOD
Rebecca Lipschutz, *University of Houston, Houston, United States*

P1-38 ESTROGEN RECEPTOR ALPHA GENE (ESR1): GENETICS, EPIGENETICS, EARLY LIFE ABUSE AND DEPRESSION IN WOMEN
Madison Malone, *Emory University, Decatur, United States*

P1-39 REPEATED EXPOSURES TO BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENE (BTEX) VAPOR AT ENVIRONMENTAL-LIKE CONCENTRATIONS IN ADOLESCENT SWISS-WEBSTER MICE RESULTS IN ALTERATIONS TO LOCOMOTOR ACTIVITY AND OTHER BEHAVIORAL OUTCOMES
Cameron Davidson, *Wayne State University, Ypsilanti, United States*

P1-40 AMYGDALAR CRF SIGNALING IS INVOLVED IN THE LASTING EFFECTS OF NEONATAL PAIN.
Michael Burman, *University of New England, Biddeford, United States*

P1-41 PUBERTAL RECALIBRATION OF CORTISOL-DHEA COUPLING IN POST-INSTITUTIONALIZED CHILDREN
Mariann Howland, *University of Minnesota, Twin Cities, Minneapolis, United States*

P1-42 INFANT SLEEP AND ITS RELATION TO CHRONIC AND ACUTE CORTISOL FUNCTION
Charu Tuladhar, *Boston University, Boston, United States*

P1-43 PRESENCE OF MOTHER PROMPTS APPARENT ADAPTIVE DISSOCIATION OF NEUROINFLAMMATORY, FEBRILE, AND BEHAVIORAL RESPONSES OF GUINEA PIG PUPS IN A THREATENING ENVIRONMENT
Michael Hennessy, *Wright State University, Dayton, United States*

P1-44 PERCEIVED MATERNAL OVERCONTROL DURING CHILDHOOD: IMPLICATIONS FOR EMOTIONAL AND BIOLOGICAL REGULATION OF STRESS DURING ADULTHOOD
Ashley Loser, *Boston University Dept of Brain and Psychological Sciences, Boston, United States*

P1-45 PREADOLESCENT GIRLS WITH HIGH LEVELS OF ANXIETY DEMONSTRATE INCREASED REACTIVITY AND DELAYED RECOVERY OF PSYCHOLOGICAL DISTRESS IN RESPONSE TO THE TRIER SOCIAL STRESS TEST
Gina Bednarek, *University of Wisconsin - Madison, Madison, United States*

P1-46 PSYCHOSOCIAL RISK IN INFANCY AND SOCIOECONOMIC RISK IN ADOLESCENCE PREDICT GREATER CARDIOMETABOLIC RISK IN YOUNG ADULTHOOD
Jenalee Doom, *University of Denver, Denver, United States*

P1-47 PSYCHOSOCIAL ADVERSITY DURING PREGNANCY AND PATTERNS OF HEART RATE VARIABILITY IN RESPONSE TO ACUTE STRESS
Irene Tung, *University of Pittsburgh, Pittsburgh, United States*

P1-48 PHYSICAL GROWTH FOLLOWING INSTITUTIONAL REARING PREDICTS BEHAVIOR REGULATION
Bonny Donzella, *University of Minnesota Twin Cities, Minneapolis, United States*

P1-49 CHILDHOOD SOCIOECONOMIC DISADVANTAGE PREDICTS MIDLIFE INFLAMMATION
Brianna Natale, *University of Pittsburgh, Wilkinsburg, United States*

P1-50 LIMITED BEDDING AND NESTING MATERIAL CHANGES INDICES OF CELLULAR METABOLISM AND THERMOGENESIS IN LONG-EVANS RATS DURING THE FIRST TWO WEEKS OF LIFE
Hannah Lapp, *University of Massachusetts, Boston, Boston, United States*

P1-51 STRESSFUL LIFE EVENTS AND CHILDREN'S HAIR CORTISOL: MODERATION BY PARENTAL MENTAL HEALTH
Katrina Simon, *Teacher's College, New York, United States*

P1-52 THE ROLE OF SOCIOECONOMIC STATUS IN ASSOCIATION BETWEEN MATERNAL HOSTILITY AND CHILD DIURNAL CORTISOL
Miriam Kamens, *Boston University, Brighton, United States*

P1-53 ASSOCIATIONS BETWEEN UNPREDICTABLE MATERNAL SENSORY SIGNALS AND INFANT HPA AXIS REACTIVITY
Amanda Noroña, *University of Denver, University of Colorado School of Medicine, Denver, United States*

P1-54 PRECURSORS AND CORRELATES OF 4-YEAR SENSORY PROCESSING PROBLEMS IN CHILDREN BORN VERY PRETERM: NEONATAL FACTORS AND CORTISOL
Mia Mclean, *The University of British Columbia & B.C. Children's Hospital Research Institute, Vancouver, Canada*

P1-55 TODDLER TEMPERAMENTAL CHARACTERISTICS MEDIATE THE RELATIONSHIP BETWEEN DISASTER-RELATED PRENATAL MATERNAL STRESS ON CHILDHOOD ANXIETY SYMPTOMATOLOGY: THE QF2011 QUEENSLAND FLOOD STUDY
Mia Mclean, *Mater Research – The University of Queensland, St Lucia, Australia*

P1-56 EEG COHERENCE, BEHAVIORAL INHIBITION, AND RISK FOR ANXIETY IN EARLY ADOLESCENCE
Berenice Anaya, *The Pennsylvania State University, University Park, United States*

P1-57 AGE-DEPENDENT EFFECTS OF EARLY WEANING ON PAVLOVIAN FEAR CONDITIONING IN YOUNG RATS
Kevin Brown, *Drake University, Des Moines, United States*

P1-58 EMOTIONAL EXPRESSIVITY RELATES TO OXYGENATED HEMOGLOBIN IN RIGHT MPFC IN MALE CHILDREN: A FUNCTIONAL NEAR-INFRARED SPECTROSCOPY (FNIRS) INVESTIGATION
Natalee Price, *Miami University, Hamilton, United States*

P1-59 DEVELOPMENTAL TRAJECTORIES OF INFANT ATTENTION TO THREAT-RELATED FACIAL EXPRESSIONS VARY BY MATERNAL STRESS
Emily Reilly, *University of Minnesota, Institute of Child Development, Minneapolis, United States*

P1-60 MATERNAL DEPRESSIVE SYMPTOMATOLOGY AND SES PREDICT INFANT JOINT ATTENTION PERFORMANCE
Emily Reilly, *University of Minnesota, Institute of Child Development, Minneapolis, United States*

P1-61 COGNITIVE EMPATHY FOLLOWING EARLY INSTITUTIONAL CARE: ASSOCIATIONS WITH COGNITIVE CONTROL
Tricia Choy, *University of California, Riverside, Rowland Heights, United States*

P1-62 GENERAL PSYCHOPATHOLOGY (P FACTOR) IN EARLY CHILDHOOD PREDICTS SHORTER TELOMERE LENGTH IN ADOLESCENCE
Selin Zeytinoglu, *University of Maryland, Baltimore, United States*

P1-63 SOCIAL EARLY LIFE STRESS MEDIATES THE EFFECTS OF ECONOMIC FACTORS ON INTERNALIZING SYMPTOMS AND REWARD SENSITIVITY
Marlen Gonzalez, *Cornell University, Ithaca, United States*

P1-64 INFANT NEUROBEHAVIORAL PROCESSING OF THE CAREGIVER: TRANSLATING ACROSS SPECIES DURING TYPICAL AND MALTREATMENT REARING
Maya Opendak, *New York University Langone Medical Center, New York, United States*

P1-65 MATERNAL ANXIETY AND DEPRESSIVE SYMPTOMS DURING PREGNANCY AND CHILD BEHAVIORAL/EMOTIONAL PROBLEMS IN TODDLERHOOD: THE MEDIATING ROLE OF MATERNAL POSTNATAL BONDING. A SECONDARY ANALYSIS OF THE IRIS STUDY
Jens Henrichs, *Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Midwifery Science, AVAG-Amsterdam Public Health, Netherlands, Amsterdam, Netherlands*

P1-66 A CARETAKER ACUTE STRESS PARADIGM: EFFECTS ON BEHAVIOR AND PHYSIOLOGY OF CARETAKER AND INFANT
Isabelle Mueller, *University of Massachusetts Boston, Cambridge, United States*

P1-67 SOCIAL DISORDER MODERATES THE LINK BETWEEN PARENTS' AND THEIR INFANTS' ATTENTION TO THREAT
Jessica Burris, *Rutgers University, Newark, United States*

P1-68 EXPLORING WHICH ADVERSE CHILDHOOD EXPERIENCES ARE INDIRECTLY RELATED TO INTERPERSONAL RELATIONSHIP QUALITY THROUGH SELF-ACCEPTANCE
Christian Mallett, *Howard University, Greenbelt, United States*

P1-69 PHENOTYPING STRESS EXPOSURES RELATED TO PERINATAL HEALTH DISPARITIES
Rimma Ilyumzhinova, *University of Chicago, Chicago, United States*

P1-70 CURRENT PSYCHOSOCIAL STRESS AFFECTS WEIGHT DISTRIBUTION IN YOUTH EXPOSED TO DEPRIVATION EARLY IN LIFE
Danruo Zhong, *Institute of Child Development, University of Minnesota, Minneapolis, United States*

P1-71 EARLY CAREGIVING ADVERSITY INFLUENCES EFFORT-BASED PERSISTENCE BEHAVIOR DURING CHILDHOOD
Michelle VanTieghem, *Columbia University, New York, United States*

P1-72 DISRUPTIONS IN CAREGIVING ASSOCIATED WITH BOTH COGNITIVE CONTROL IMPAIRMENTS AND ENHANCEMENTS IN CHILDHOOD
Andrea Fields, *Columbia University, New York, United States*

P1-73 MATERNAL STRESS IN THE FIRST 1000 DAYS AND CHILDHOOD OBESITY RISK
Karen Matvienko-Sikar, *University College Cork, Cork, Ireland*

P1-74 PREDICTORS OF DELIBERATE SELF HARM IN YOUNG ADULTS WITH HIGH LEVELS OF ADVERSE CHILDHOOD EXPERIENCES
Teresa Rushe, *Queen's University Belfast, Belfast, United Kingdom*

P1-75 ANXIETY-LIKE BEHAVIOR AND PREFRONTAL CORTEX PERINEURONAL NET DYSFUNCTION: IMPACT OF A TWO-HIT MODEL OF DEVELOPMENTAL ADVERSITY IN MALE AND FEMALE RATS
Kelsea Gildawie, *Northeastern University, Boston, United States*

P1-76 PREVIOUS INSTITUTIONALIZATION WORSENS THE RELATIONSHIP BETWEEN CURRENT LIFE STRESS, INTERNALIZING PSYCHOPATHOLOGY, AND ADAPTIVE FUNCTIONING
Emily Towner, *University of California, Los Angeles, Los Angeles, United States*

P1-77 SUPPRESSION OF LEARNED FEAR BY MATERNAL PRESENCE AND DEVELOPMENTAL TRANSITIONS IN PREFRONTAL ACTIVITY
Patrese Robinson-Drummer, *New York University Medical Center, New York, United States*

P1-78 ASSOCIATIONS BETWEEN MATERNAL STRESS, PARENTAL LEAVE, AND INFANT LANGUAGE OUTCOMES
Ashley Greaves, *New York University, New York, United States*

P1-79 MATERNAL DEPRESSIVE SYMPTOMS PREDICT GENERAL AND INTERNALIZING-SPECIFIC LIABILITY IN CHILD PSYCHOPATHOLOGY
Danielle Swales, *University of Denver, Denver, United States*

P1-80 TYPE OF EARLY LIFE ADVERSITY CONFERS DIFFERENTIAL RISK FOR ALTERED TIMING OF DEVELOPMENT
Camila Demaestri, *Brown University, Providence, United States*

P1-81 ACCULTURATIVE STRESS AND INFANT HAIR CORTISOL AS PREDICTORS OF IMPULSIVITY
Jennifer Figueroa, *California State University San Marcos, Perris, United States*

P1-82 MODULATING BEHAVIORAL EFFECTS OF EARLY LIFE ADVERSITY BY TARGETING PREFRONTAL CORTEX NMDA NR2A SUBUNITS IN ADOLESCENT RATS: IMPACT ON INFANT-CARETAKER COMMUNICATION, COGNITION, AND ANXIETY
Lauren Granata, *Northeastern University, Boston, United States*

P1-83 PATHWAYS BETWEEN ADVERSE CHILDHOOD EXPERIENCES (ACES) AND PSYCHOTIC-LIKE EXPERIENCES: THE MEDIATING ROLE OF PARENTAL STYLE.
Tara O'Neill, *Queen's University Belfast, Belfast, United Kingdom*

Thursday, October 17, 2019

7:00 – 9:00 AM	**ISDP Board Meeting in the Alpine I Ballroom**
7:40 – 8:55 AM	**Meeting the Professors Breakfast Workshop in Alpine II Ballroom,** Extra Registration Required - (please note the change in date & time)
8:30 – 9:00 AM	**Continental Breakfast, visit the Posters and Exhibitors**
9:00 – 10:30 AM	04 **Symposium 1: Substance Use During Pregnancy: Impact on Behavioral and Neurocognitive Development of Offspring from Infancy to Adulthood** **Symposium Chair: Xiaoxue Fu,** *Nationwide Children's Hospital, Columbus, United States*

Description: Marijuana use is increasing in a number of populations in the United States, including among pregnant women. However, evidence is beginning to indicate that prenatal exposure to cannabis may have a variety of adverse effects on behavioral development and neuronal maturation. In this symposium, five investigators will examine the impact of prenatal cannabis exposure on developmental outcomes across a number of different points in development in both human and animal models.

Dr. Jao (Brown University) will discuss the effects of co-exposure to both marijuana and tobacco on the newborn stress response and examine the potential impact of drug exposure on glucocorticoid regulation. Dr. Fu (Nationwide Children's Hospital) will explore structural and functional brain differences from a neuroimaging study of seven-year-olds with and without prenatal cannabis exposure (confirmed via urine). She will illustrate

possible biomarkers of exposure-related impairments to executive function. Dr. Tiemeier (Harvard University), will present evidence from a longitudinal study on children's behavioral problems and brain morphology at age 10; and Dr. Gale Richardson (University of Pittsburgh) will present longitudinal evidence indicating that behavioral and cognitive effects of cannabis exposure persist into adulthood. Lastly, Dr. Freels (Washington State University) will present data from a rodent model in which prenatal exposure to cannabis in a controlled setting impaired behavioral flexibility of adult offspring.

We believe this symposium will be particularly impactful because it brings together scientists from a number of different disciplines who cut across a wide span of development to address an issue of growing concern for public health.

9:00 - 9:15 AM	PRENATAL TOBACCO AND MARIJUANA CO-USE: SEX SPECIFIC INFLUENCES ON INFANT CORTISOL STRESS RESPONSE (S1-01) Laura Stroud, Brown Medical School; George Papandonatos, Brown University School of Public Health; Meaghan McCallum, The Miriam Hospital; Chrystal Vergara-Lopez, Brown Medical School; Katelyn Borba, The Miriam Hospital; Hannah Dalglish, The Miriam Hospital; Samantha Goldman, The Miriam Hospital; Amy Salisbury, Women & Infants Hospital; Carmen Marsit, Emory University; **Nancy Jao**, Brown Medical School
9:15 - 9:30 AM	A PROSPECTIVE NEURODEVELOPMENTAL STUDY OF CHILDREN PRENATALLY EXPOSED TO CANNABIS WITH 10 YEAR FOLLOW-UP (S1-02) **Henning Tiemeier**, Harvard TH Chan School of Public Health; Hanan El Marroun, Erasmus Medical Center
9:30 - 9:45 AM	MATERNAL CANNABIS VAPOR EXPOSURE DOSE-DEPENDENTLY IMPAIRS BEHAVIORAL FLEXIBILITY IN ADULT OFFSPRING (S1-03) **Timothy Freels**, Washington State University; Hayden Wright, Washington State University; Collin Warrick, Washington State University; Jacqulyn Kuyat, Washington State University; Joshua Rodriguez, Washington State University; Janelle Lugo, Washington State University; Ryan McLaughlin, Washington State University
9:45 - 10:00 AM	LONG-TERM DEVELOPMENTAL EFFECTS OF PRENATAL MARIJUANA EXPOSURE (S1-04) **Gale A. Richardson**, University of Pittsburgh; Natacha De Genna, University of Pittsburgh
10:00 - 10:15 AM	PRENATAL MARIJUANA EXPOSURE: EFFECTS ON BRAIN MORPHOLOGY AND EXECUTIVE FUNCTIONS IN YOUNG CHILDREN (S1-05) 🏆**Xiaoxue Fu**, Nationwide Children's Hospital; Jackie Sullivan, Nationwide Children's Hospital; Holly Blei, Nationwide Children's Hospital; Sarah Keim, Nationwide Children's Hospital; Mark Klebanoff, Nationwide Children's Hospital; Eric Nelson, Nationwide Children's Hospital
10:15 - 10:30 AM	Discussion, Q&A
10:30 – 11:00 AM	**Coffee Break - Visit the Exhibitors & Posters**
11:00 – 12:00 PM	05 **Oral Session 1: Short talks from the submitted abstracts RESILIENCE**
11:00 - 11:15 AM	COGNITIVE-NEURAL RISK MARKERS ASSOCIATED WITH TEMPERAMENTAL ANXIETY AND SENSITIVITY TO INTERVENTION (O1-01) **Koraly Perez-Edgar**, The Pennsylvania State University; Alicia Vallorani, The Pennsylvania State University; Berenice Anaya, The Pennsylvania State University; Pan Liu, Western University
11:15 - 11:30 AM	A RELATIONSHIP BETWEEN FORGETTING IN INFANCY AND RESILIENCE THROUGHOUT DEVELOPMENT (O1-02) 🏆**Sylvia Kay Harmon-Jones**, The University of New South Wales; Caitlin Cowan, University College Cork; Nadia Shnier, The University of Sydney; Rick Richardson, University of New South Wales

11:30 - 11:45 AM	THE EFFECTS OF EARLY-LIFE TEMPERATURE EXPOSURE AND SUPPLEMENTAL TACTILE STIMULATION ON THYROID HORMONE SIGNALING AND DNA METHYLTRANSFERASE 3A GENE EXPRESSION IN THE FEMALE NEONATAL RAT (O1-03) 🏆**Samantha Christine Lauby**, University of Toronto Scarborough; Patrick McGowan, University of Toronto
11:45 AM -12:00 PM	INVESTIGATING HOW THE TIMING OF REMOVAL FROM INSTITUTIONAL CARE AND PLACEMENT WITH FOSTER-CARE FAMILIES INFLUENCES BRAIN OSCILLATION PATTERNS (O1-04) 🏆**George A. Buzzell**, University of Maryland; Sonya Troller-Renfree, Teachers College, Columbia University; Mark Wade, Harvard Medical School; Ranjan Debnath, University of Maryland, College Park; Santiago Morales Pamplona, University of Maryland; Charles Zeanah, Tulane University; Charles Nelson, Harvard Medical School; Nathan A. Fox, University of Maryland
12:00 - 1:30 PM	**Lunch Workshops Grants - The Basics of Writing a <u>Successful</u> Application** Extra Registration Required – Space is Limited – Alpine II

Presenter: Kathy Mann Koepke, PhD, NIH/NICHD/DER/CDBB
ISDP's Grants Workshops gives young investigators the opportunity to meet with PI's and Full Professors, as well as representatives from the NIH and other granting institutions to discuss strategies for grant writing.

Summary of Presentation: Having a great research question that you are passionate about is just the first step! Learn how to operationalize, plan for & prepare your next/first grant or fellowship application. Whether you are searching for graduate, post-doctoral, or new faculty funding, Program Officers/Directors want to help you be successful. This session will walk you through the basics (i.e., minimum requirements common to most federal agencies) of how to write a successful grant application. NIH Program Director will answer your specific application questions.

12:00 – 1:30 PM	Lunch on Own for those not registered for the Workshop

1:30 – 3:00 PM	06 **Symposium 2: Young Investigator Symposium: Enhancing Developmental Psychobiological Research via a Cross-Species Framework** **Symposium Chair: Rosemarie Perry,** *New York University, United States***;** **Symposium Moderator/Discussant: Bridget Callaghan,** *The University of California, Los Angeles, United States*

Description: Research in the field of developmental psychobiology occurs in both human and non-human animals. Yet, most developmental psychobiologists perform their research within a particular species. While researchers may occasionally read papers from the 'other side', human and animal work remains predominantly siloed. As such, there remains a vast amount of information that researchers on each side of the divide could utilize. This symposium will use the experience of researchers who regularly cross the species divide, to facilitate the consumption, understanding, performance, and promotion of cross-species research. To begin, the moderator, Bridget Callaghan, will take 2 minutes to introduce the topic. A framework developed by the speakers, highlighting a heuristic for understanding cross-species research, will also be shown. Stephen Braren, followed by Rose Perry, will present data from a cross-species human/rodent study on mechanisms of cognitive development in contexts of scarcity-adversity. Laurel Gabard-Durnam will discuss how novel neuroimaging measures of sensitive period dynamics may translate animal model findings to provide mechanistic accounts of human neurodevelopment and behavior in the context of Autism Spectrum Disorder. Tyson Barker will discuss how to leverage mechanistic processes from animal literature to develop and test a theory of change for interventions, increasing potential for positive impacts. Audience members will be invited to enter a dialogue with speakers about their experiences and thoughts on cross-species research. In sum, we will demonstrate a bidirectional, translational process between human and animal research, and highlight this approach's potential to enable advancement of knowledge/interventions related to child development.

1:30 - 1:32 PM	Introduction, Moderator/Discussant: Bridget Callaghan, Columbia University
1:32 - 1:52 PM	Part 1 of a Cross-species Study: Social Competence through later Executive Functions Longitudinally Mediates Effects of Early-Life Socioeconomic Risk on Academic Achievement (S2-01) **Stephen Braren**, New York University; Rosemarie Perry, New York University; Clancy Blair, NYU
1:52 - 2:12 PM	PART 2 OF A CROSS-SPECIES STUDY: A SOCIAL COMPETENCE INTERVENTION RESCUES COGNITIVE NEUROBEHAVIORAL DEFICITS IN A RODENT MODEL OF SCARCITY-ADVERSITY (S2-02) 🏆**Rosemarie Perry**, New York University; Stephen Braren, New York University; Annie Brandes-Aitken, New York University; Cristina Alberini, New York University; Regina Marie Sullivan, Nathan Kline Institute & NYU School Medicine; Clancy Blair, NYU
2:12 - 2:32 PM	FROM MECHANISMS TO INTERVENTIONS: A FRAMEWORK TO SUPPORT INTERVENTIONS FOR CHILDREN AND FAMILIES FACING ADVERSITY (S2-03) **Tyson Barker**, University of Oregon; Philip Fisher, University of Oregon
2:32 - 2:52 PM	A CROSS-SPECIES BIOMARKER OF SENSITIVE PERIOD ONSET (S2-04) 🏆**Laurel Joy Gabard-Durnam**, Boston Children's Hospital; Takao Hensch, Harvard University; Helen Tager-Flusberg, Boston University; Charles Nelson, Harvard Medical School
2:52 - 3:00 PM	Discussion/Q&A
3:00 – 3:30 PM	**Coffee Break – Visit the Exhibitors & Posters**
3:30 – 5:20 PM	07 **Oral Session 2: Flash talks from the submitted abstracts** **PRENATAL INFLUENCES**
3:30 - 3:40 PM	UTILIZING BRAIN NETWORK PERSPECTIVE FOR STUDYING THE DEVELOPMENTAL IMPACT OF INFANT EXPOSURE TO PRENATAL MOOD DISTURBANCES (O2-01) 🏆**Naama Rotem-Kohavi**, University of British Columbia; Lynne Williams, BC children's hospital; Angela Muller, University of British Columbia; Hervé Abdi, The University of Texas at Dallas; Naznin Virji-Babul, University of British Columbia; Bruce Bjornson, University of British Columbia; Ursual Brain, BC children's hospital; Janet F. Werker, University of British Columbia; Ruth Grunau, University of British Columbia; Steven Miller, Hospital of Sick Kids; Tim Oberlander, University of British Columbia
3:40 - 3:50 PM	NEUROANATOMICAL ABNORMALITIES IN A NON-HUMAN PRIMATE MODEL OF ZIKA INFECTION (O2-02) **Adele Seelke**, University of California, Davis; Danielle Beckmann, University of California, Davis; Paige Nicole Dougherty, University of California, Davis; John H. Morrison, University of California, Davis; Eliza Bliss-Moreau, University of California, Davis
3:50 - 4:00 PM	PRENATAL MATERNAL IMMUNE ACTIVATION IS ASSOCIATED WITH BRAIN MICROSTRUCTURAL TISSUE ORGANIZATION AND METABOLITES IN NEONATES (O2-03) **Marisa N. Spann**, Columbia University Irving Medical Center; Ravi Bansal, Children's Hospital of Los Angeles; Catherine Monk, Columbia University; Bradley Peterson, University of Southern California/Children's Hospital of Los Angeles

4:00 - 4:10 PM THE EFFECT OF HEART RATE VARIABILITY BIOFEEDBACK TRAINING ON MENTAL HEALTH OF PREGNANT AND NON-PREGNANT WOMEN: A RANDOMIZED CONTROLLED TRIAL (O2-04) **Anja Huizink**, VU University Amsterdam; Esi van der Zwan, AMC; Wieke de Vente, University of Amsterdam

4:10 - 4:20 PM ASSOCIATIONS BETWEEN PRENATAL RISK FACTORS, NEWBORN BRAIN ACTIVITY, AND TODDLER NEURODEVELOPMENTAL PHENOTYPE (O2-05) 🏆**Lauren C. Shuffrey**, Columbia University Medical Center; Natalie Hiromi Brito, New York University; Mandy Potter, Stellenbosch University; Priscilla E. Springer, Stellenbosch University; Hein Odendaal, Stellenbosch University; Lucy Brink, Stellenbosch University; Maristella Lucchini, Columbia University Medical Center; Timothy Ochoa, Columbia University Medical Center; Ayesha Sania, Columbia University Medical Center; michael Morgan Myers, New York State Psychiatric Institute; Joseph R. Isler, Columbia University; William Fifer, Columbia University

4:20 - 4:30 PM BUPRENORPHINE EXPOSURE DURING GESTATION RESULTS IN DOSE-DEPENDENT CONSEQUENCES FOR THE DAM AND HER LITTER IN A TRANSLATIONAL MODEL OF OPIOID-MAINTENANCE THERAPY (O2-06) 🏆**Chela M. Wallin**, Wayne State University; Chelsea Roberge, Wayne State University; Scott E. Bowen, Wayne State University; Susanne Brummelte, Wayne State University

4:30 - 4:40 PM PRENATAL DISTRESS: MULTIPLE MEASURES ARE ASSOCIATED WITH SHARED AND UNIQUE ASPECTS OF HIPPOCAMPAL FUNCTIONAL CONNECTIVITY OF NEONATES (O2-07) **Dustin Scheinost**, Yale School of Medicine; Marisa N. Spann, Columbia University Irving Medical Center; Bradley Peterson, University of Southern California/Children's Hospital of Los Angeles; Catherine Monk, Columbia University

4:40 - 4:50 PM ACCELERATED MATURATION OF FETAL AMYGDALA FUNCTIONAL CONNECTIVITY AFTER MATERNAL CHILDHOOD TRAUMA EXPOSURE (O2-08) **Marion I. van den Heuvel**, Tilburg University; Catherine Monk, Columbia University; Jamine Leah Hect, Wayne State University; Seonjoo Lee, Columbia University; Tianshu Feng, Columbia University; Moriah E. Thomason, New York University

4:50 - 5:00 PM EVERY WEEK COUNTS: A POPULATION-BASED STUDY OF GESTATIONAL AGE AT BIRTH AND BRAIN MOPHOLOGY IN CHILDREN AT 10 YEARS (O2-09) **Hanan El Marroun**, Erasmus Medical Center; Henning Tiemeier, Harvard TH Chan School of Public Health

5:00 - 5:10 PM MATERNAL STRESS AND DEPRESSION ARE ASSOCIATED WITH INFANT SUBCORTICAL VOLUME (O2-10) **Kathryn Leigh Humphreys**, Vanderbilt University

5:10 - 5:20 PM MULTIPLE TIME SCALES OF BRAIN-TO-BRAIN SYNCHRONIZATION (O2-11) **Sammy Perone**, Washington State University; Maria Amy Gartstein, Washington State University; Alana J. Anderson, Washington State University

5:30 – 7:30 PM	P2 **Poster Session 2**: Cognitive, Socio-Emotional and Neurodevelopmental Processes, Cash Bar Reception

P2-01 SEND ME A SCREENSHOT: CAPTURING CHILD MEDIA EXPOSURE IN THE DIGITAL AGE
Rachel Barr, *Georgetown University, Washington, United States*

P2-02 PREVENTING ABERRANT DNA METHYLATION ASSOCIATED WITH ADVERSE EXPERIENCES IN EARLY LIFE
🏆**Nicholas Collins,** *University of Delaware, Newark, United States*

P2-03 ESTROUS CYCLE IMPACTS FEAR EXTINCTION IN FEMALE ADOLESCENT RATS
Kathryn Baker, *UNSW Sydney, UNSW Sydney, Australia*

P2-04 DEVELOPMENTAL DISSOCIATION IN AMOUNT OF CONTEXT EXPOSURE NECESSARY TO SUPPORT ACQUISITION OF CONTEXTUAL FEAR IN RATS
🏆**Colin Horgan,** *University of Delaware Department of Psychological and Brain Sciences, Newark, United States*

P2-05 RELEVANT DISTRACTION CAN IMPROVE STEM LEARNING IN PRESCHOOL CHILDREN WITH POOR SELECTIVE ATTENTION
Jill King, *Tulane University, New Orleans, United States*

P2-06 DO THE ROBOT: USING THE ROBOTS IMITATION TASK TO MEASURE MEMORY FLEXIBILITY AND WORKING MEMORY IN PRESCHOOLERS
🏆**Sylvia Rusnak,** *Georgetown University, Washington, United States*

P2-07 WHEN THE NEW GETS IN THE WAY OF THE OLD: TESTING RETROACTIVE MEMORY INTERFERENCE IN TODDLERS
🏆**Joscelin Rocha Hidalgo,** *Georgetown University, Washington, United States*

P2-08 ONTOGENY OF BEHAVIORAL PERFORMANCE AND REGIONAL IMMEDIATE EARLY GENE EXPRESSION ACROSS VARIANTS OF CONTEXTUAL FEAR CONDITIONING IN THE RAT
🏆**Nicholas Heroux,** *University of Delaware, Newark, United States*

P2-09 DEVELOPMENTAL TRAJECTORIES OF TEMPORAL MEMORY AND HIPPOCAMPAL SUBREGIONS
Kelsey Canada, *University of Maryland, College Park, United States*

P2-10 ROLE OF NR2B FUNCTION IN EXTINCTION CONSOLIDATION FOLLOWING ADOLESCENT- OR ADULT-ONSET METHAMPHETAMINE SELF-ADMINISTRATION IN RATS OF BOTH SEXES
🏆**Sara Westbrook,** *University of Illinois Urbana-Champaign, Champaign, United States*

P2-11 10-MONTH PREDICTORS OF 12-MONTH COGNITIVE INHIBITORY CONTROL PERFORMANCE
Martha Ann Bell, *Virginia Tech, Blacksburg, United States*

P2-12 EFFECTS OF ORAL DELTA-9-TETRAHYDROCANNIBINOL (THC) SELF-ADMINISTRATION ON MOTOR ACTIVITY AND ANXIETY-LIKE BEHAVIOR IN ADOLESCENT AND ADULT SPRAGUE-DAWLEY RATS OF BOTH SEXES
🏆**Asia Banks,** *University of Illinois at Urbana Champaign, Champaign, United States*

P2-13 THE MEDIATING EFFECTS OF WAYFINDING ANXIETY AND CHILDHOOD WAYFINDING EXPERIENCE ON GENDER DIFFERENCES IN WAYFINDING STRATEGIES AND AFFECT IN ADULTS
🏆**Vanessa Vieites,** *Florida International University, Miami, United States*

P2-14 EXAMINATION OF PARTICIPANT FACTORS THAT CONTRIBUTE TO MRI MOTION ARTIFACT IN CHILDREN WITH MILD TRAUMATIC BRAIN OR ORTHOPEDIC INJURY
Sunny Guo, *University of Calgary, Calgary, Canada*

P2-15 WHITE MATTER MICROSTRUCTURE IN CHILDREN WITH MILD TRAUMATIC BRAIN OR ORTHOPEDIC INJURY COMPARED TO TYPICAL DEVELOPMENT
Ashley Ware, *University of Calgary, Calgary, Canada*

P2-16 MULTIVERSE ANALYSIS STRATEGIES FOR DEVELOPMENTAL FMRI
Paul Bloom, *Columbia University, New York, United States*

P2-17 STUDYING WHITE MATTER VULNERABILITY IN PEDIATRIC MILD TRAUMATIC BRAIN INJURY
Ayushi Shukla, *University of Calgary, Calgary, Canada*

P2-18 PRESCHOOL GIRLS HAVE HIGHER INTRAHEMISPHERIC EEG COHERENCE THAN PRESCHOOL BOYS
Diana Lopera-Perez, *Boston University, Universidad del Norte, Boston, United States*

P2-20 BILATERAL FRONTAL ASLANT TRACT DEVELOPMENT AND ITS RELATION TO INHIBITORY CONTROL IN 4- TO 7-YEAR-OLD CHILDREN.
Dea Garic, *Florida International University, Miami, United States*

P2-20 CHARACTERIZING NEURAL RESPONSES DURING A PROBABLISTIC REVERSAL LEARNING TASK IN CHILDREN
Michelle Ramos, *Florida International University, Miami, United States*

P2-20 EFFECTS OF COGNITIVE-MOTOR TRAINING ON EXECUTIVE FUNCTION AND RESTING PREFRONTAL CORTEX CONNECTIVITY IN PRESCHOOL CHILDREN: AN FNIRS STUDY
Cassondra Eng, *Carnegie Mellon University, Pittsburgh, United States*

P2-20 MATERNAL INTELLIGENCE AND EXECUTIVE FUNCTION INFLUENCE NEONATAL BRAIN MORPHOLOGY
Kristiana Barbato, *Columbia University Irving Medical Center, NY, United States*

P2-24 THE IMPACT OF PRENATAL MARIJUANA EXPOSURE ON BRAIN STRUCTURAL DEVELOPMENT IN YOUNG CHILDREN
Jackie Sullivan, *Nationwide Children's Hospital, Columbus, United States*

P2-26 THE EFFECT OF PRENATAL LIGHT EXPOSURE DURATION AND PRESENTATION PATTERN ON BODY COMPOSITION AND GAIT PERFORMANCE IN BOBWHITE QUAIL CHICKS
Diana Garcia, *Florida International University, Miami, United States*

P2-27 ENHANCEMENT OF MOTHERS' POSITIVE EMOTIONS THROUGH NEW DIAPER TECHNOLOGY: EFFECT VERIFICATION BY ELECTROENCEPHALOGRAM MEASUREMENT
Yukari Tanaka, *Kyoto University, Kyoto, Japan*

P2-28 MEASURING PROXIMITY AS A WINDOW INTO CAREGIVER–CHILD INTERACTION PATTERNS
Virginia Salo, *Vanderbilt University, Nashville, United States*

P2-29 EXAMINING LINKS BETWEEN MATERNAL RESPONSIVENESS AND TASK-RELATED EMOTION LATERALIZATION.
Joshua Underwood, *Washington State University, Pullman, United States*

P2-30 A DESCRIPTION OF MOTHER SOCIAL AND OBJECT PLAY DURING A DYADIC PLAY EXPERIENCE WITH INFANTS
Julie Campbell, *Illinois State University, Macomb, United States*

P2-31 CAN CHILDREN SUPPRESS ATTENTIONAL CAPTURE BY SALIENT DISTRACTORS?
Emily Blakley, *Binghamton University, Binghamton, United States*

P2-32 INFANTS DEMONSTRATE BIASED SELECTIVE ATTENTION TO OWN-SPECIES BUT NOT OWN-RACE FACES AT 6- AND 11-MONTHS OF AGE
Brianna Keenan, *Tulane University, New Orleans, United States*

P2-33 THE RELATION BETWEEN INTERSENSORY PROCESSING & DIVERSITY OF CHILD WORD PRODUCTION IS MODERATED BY SOCIOECONOMIC STATUS
Elizabeth Edgar, *Florida International University, Miami, United States*

P2-34 INTERSENSORY PROCESSING SKILLS AT 12 MONTHS PREDICTS GROWTH IN WORD PRODUCTION BETWEEN 18 AND 24 MONTHS
Kaityn Contino, *Florida International University, Homestead, United States*

P2-35 THE EFFECTS OF INITIAL LEARNING CONDITIONS ON OTHER-SPECIES FACE PROCESSING IN INFANCY
William Chollman, *University of Tennessee Knoxville, Knoxville, United States*

P2-36 NEURAL CORRELATES OF SUBORDINATE-LEVEL CATEGORIZATION OF OTHER-RACE FACES IN INFANCY
Kelly Roth, *University of Tennessee Knoxville, Knoxville, United States*

P2-37 PREVALENCE OF ASPECTS RELATED TO BRAIN, BEHAVIOR AND COGNITION IN PATIENTS UNDERGOING BARIATRIC SURGERY IN THE EXTREME NORTH OF BRAZIL
Nilza Araujo, *Universidade Federal de Roraima, Boa Vista, Brazil*

P2-38 MATERNAL OBESITY AND INFLAMMATION DURING PREGNANCY PREDICT INFANT NEURODEVELOPMENT
Marie Camerota, *RTI International, Research Triangle Park, United States*

P2-39 ADOLESCENT CONSUMPTION OF CAFFEINATED ALCOHOL AFFECTS RNA EXPRESSION AND REWARD PROCESSING
Shannon Thompson, *Miami University, Oxford, United States*

P2-40 SEX DIFFERENCES IN THE DEVELOPMENT OF FRONTAL ELECTROENCEPHALOGRAM (EEG) ASYMMETRY
Maria Gartstein, *Washington State University, Pullman, United States*

P2-41 EFFECTS OF GENDER AFFIRMING HORMONE TREATMENT ON WHITE MATTER ORGANIZATION IN GENDER DYSPHORIC YOUTH
Meika Travis, *Nationwide Children's Hopsital, Columbus, United States*

P2-42 ELECTROPHYSIOLOGICAL CORRELATES OF INHIBITORY CONTROL IN YOUNG CHILDREN
Santiago Morales Pamplona, *University of Maryland, College Park, United States*

P2-43 BEHAVIORAL INHIBITION AND TELOMERE LENGTH: THE MODERATING ROLE OF INHIBITORY CONTROL
Santiago Morales Pamplona, *University of Maryland, College Park, United States*

P2-44 THE RELATIONSHIP BETWEEN CAREGIVING AND ADOLESCENT OFFSPRINGS' OXIDATIVE STRESS: A PRELIMINARY STUDY
Sarah Horn, *University of Oregon, Eugene, United States*

P2-45 RESPIRATORY SINUS ARRHYTHMIA, NEGATIVE AFFECT, AND DYADIC CONFLICT IN PARENTS AND PRESCHOOLERS
Daniel Choe, *UC Davis, Davis, United States*

P2-46 DELAYED MATURATION OF VISUAL EVOKED POTENTIALS IN NEWBORNS OF GESTATIONAL DIABETIC MOTHERS
Cynthia Rodriguez, *Columbia University Medical Center, New York, United States*

P2-47 DELTA BRUSH RATE OF OCCURRENCE IN FULL-TERM INFANT ELECTROENCEPHALOGRAM
J. David Nugent, *New York State Psychiatric Institute, New York, United States*

P2-48 RELATIONS BETWEEN SLEEP, MEMORY CONSOLIDATION, AND HIPPOCAMPAL DEVELOPMENT IN EARLY CHILDHOOD
Tamara Allard, *University of Maryland, College Park, United States*

P2-49 WHILE A SHY CHILD WAITS: AUTONOMIC AND AFFECTIVE RESPONSES DURING ANTICIPATION OF A SPEECH
Kristie Poole, *McMaster University, Hamilton, Canada*

P2-50 ASSOCIATIONS BETWEEN TODDLERS' EXTERNALIZING BEHAVIORS AND TRAJECTORIES OF BASELINE RSA DURING EARLY CHILDHOOD
Anna Zhou, *Penn State University, University Park, United States*

P2-51 IDENTIFYING A NEURAL MARKER OF INTERNALIZING PROBLEMS IN EARLY CHILDHOOD: THE LATE POSITIVE POTENTIAL (LPP)
Mia Mclean, *The University of British Columbia & B.C. Children's Hospital Research Institute, Vancouver, Canada*

P2-52 THE EVOLVED NEST AND SELF-REGULATION: LINKING FREEPLAY WITH VAGAL TONE IN YOUNG CHILDREN
Mary Tarsha, *University of Notre Dame, Notre Dame, United States*

P2-53 DYNAMIC FLUCTUATIONS IN CHILDREN'S RSA AT SLOW AND FAST TIMESCALES
Niyantri Ravindran, *The Pennsylvania State University, University Park, United States*

P2-54 PARENTING & PREADOLESCENT FUTURE ORIENTATION: THE MODERATING ROLE OF SYMPATHETIC REACTIVITY
Landry Huffman, *University of Georgia, Athens, United States*

P2-55 FAMILY NURTURE INTERVENTION IN THE NICU INCREASES AUTONOMIC REGULATION IN MOTHERS AND CHILDREN AT 4-5 YEARS OF AGE
Martha Welch, *Columbia University Medical Center, New York, United States*

P2-56 COVARIATION OF SPONTANEOUS MOVEMENTS AND VOCALIZATIONS IN EARLY INFANT CRYING: INVESTIGATING TNE ROLE OF AUTONOMIC STATE
Yuta Shinya, *The University of Tokyo, Tokyo, Japan*

P2-57 DOES HAND PREFERENCE FOR ACQUISITION INFLUENCE THE ABILITY TO PERFORM ROLE-DIFFERENTIATED BIMANUAL MANIPULATION?
Sarai Cortina, *Illinois State University, Normal, United States*

P2-58 NEONATAL BUPRENORPHINE EXPOSURE AND SPINAL CORD INJURY: I. DEVELOPMENTAL EFFECTS ON SPONTANEOUS LOCOMOTION AND GROWTH PARAMETERS
Aimee Bozeman, *Idaho State University, Pocatello, United States*

P2-59 NEONATAL BUPRENORPHINE EXPOSURE AND SPINAL CORD INJURY: II. EFFECTS ON SENSORIMOTOR DEVELOPMENT
Alleyna Martes, *Idaho State University, Pocatello, United States*

P2-60 TODDLER HAND PREFERENCE TRAJECTORIES PREDICT 5 YEAR LANGUAGE OUTCOME
Sandy Gonzalez, *Florida International University, Miami, United States*

P2-61 DEVELOPMENTS IN MOTOR AND SENSORY FUNCTION BEFORE AND AFTER NEUROREHABILITATION PROGRAM IN BABIES WITH NEUROLOGICAL RISK FACTOR
Averi Giudicessi, *Benemérita Universidad Autónoma de Puebla, Tlaxcalancingo, Mexico*

P2-62 AN EXAMINATION OF SLEEP INSTABILITY IN INFANCY
Melissa Grimes, *University of North Carolina at Chapel Hill, Chapel Hill, United States*

P2-63 COMPARING THE PHYSIOLOGY AND MEMORY BENEFITS OF MORNING AND AFTERNOON NAPS FOR 9-MONTH-OLDS UNDER TYPICAL AND NAP-RESTRICTED CONDITIONS
Gina Mason, *University of Massachusetts, Amherst, Amherst, United States*

P2-64 SLEEP HEALTH IS ASSOCIATED WITH OBSERVED CLASSROOM BEHAVIOR AND ACADEMIC ACHIEVEMENT AMONG CHILDREN OF COLOR LIVING IN HISTORICALLY DISINVESTED NEIGHBORHOODS
Alexandra Ursache, *NYU School of Medicine, New York, United States*

P2-67 RESPIRATORY SINUS ARRYTHMIA (RSA) DURING AN EXECUTIVE FUNCTIONING TASK: ASSOCIATIONS WITH CHILDREN'S FEARFUL TEMPERAMENT AND FAMILY ENVIRONMENT
Andrea Cordero, *The Pennsylvania State University, University Park, United States*

P2-68 NURSING BEHAVIOR AND PROACTIVE COPING PREDICT RESISTANCE TO DIARRHEAL ILLNESS IN YOUNG RHESUS MACAQUES
Jessica Vandeleest, *University of California-Davis, Davis, United States*

P2-69 LEFT FRONTAL ALPHA ASYMMETRY AND ATTENTION TO SOCIAL REWARD RELATED TO EXTERNALIZING SYMPTOMS IN YOUNG CHILDREN
Briana Ermanni, *The Pennsylvania State University, University Park, United States*

P2-71 DNA METHYLATION AND EARLY ADVERSITY: TRANSITION FROM INSTITUTIONAL TO FAMILY-BASED CARE
Christiana Martin, *University of Delaware, Newark, United States*

P2-72 TEMPERAMENTAL APPROACH AND REWARD-RESPONSIVENESS HAVE DIFFERENTIAL ASSOCIATIONS WITH HOT AND COOL EXECUTIVE FUNCTIONS IN PRESCHOOL-AGED CHILDREN
Lauren Bryant, *College of the Holy Cross, Cheshire, United States*

P2-73 THE ROLE OF NEGATIVITY IN THE RELATION BETWEEN INTERNALIZING BEHAVIORS AND THE BRAIN: A MEDIATION MODEL
Arcadia Ewell, *University of Maryland, College Park, United States*

P2-74 THREAT DYNAMICS IN YOUTH: A GAME ENVIRONMENT TO PROBE NEURAL CORRELATES
Michael Crowley, *Yale School of Medicine, New Haven, United States*

P2-75 FRONTAL ASYMMETRY IN PARENT-INFANT PLAY: LINKS TO OBJECT EXPLORATION AND PARENT REPORT
Alana Anderson, *Washington State University, Pullman, United States*

P2-76 TRAIT BOREDOM AND RISKY CHOICES IN ADOLESCENTS AND EMERGING ADULTS: AN EVENT-RELATED POTENTIAL STUDY
Alana Anderson, *Washington State University, Pullman, United States*

P2-77 DO 7-MONTH-OLD INFANTS DISCRIMINATE BETWEEN EMOTION FACES?
Özlü Aran, *University of Denver, Denver, United States*

P2-78 PRENATAL TEMPERATURE INFLUENCES SOCIAL MOTIVATION IN ONE-DAY-OLD BOBWHITE QUAIL CHICKS
Abdullah Ahmad, *Florida International University, Davie, United States*

P2-79 AMOUNT OF LATE INCUBATION LIGHT EXPOSURE INFLUENCES SOCIAL MOTIVATION IN BOBWHITE QUAIL NEONATES
Amanda Martinez, *Florida International University, Miami, United States*

P2-80 EEG FRONTAL ASYMMETRY CHANGES DURING EMOTION-ELICITING TASKS AFFECT PARENT-CHILD INTERACTION DYNAMICS
Haven Warwick, *Washington State University, Pullman, United States*

P2-81 THEORY OF MIND TASK PERFORMANCE IN EXPECTANT FATHERS: LINKS WITH PRENATAL ATTACHMENT
Sofia Cárdenas, *University of Southern California, PLAYA DEL REY, United States*

P2-82 ABUSIVE CAREGIVERS ARE NOT A SECURE BASE FOR THEIR INFANT: UNDERSTANDING THE NEUROBIOLOGY USING A RODENT MODEL
Anna Blomkvist, *Stockholm University, Stockholm, Sweden*

P2-83 DOG TEMPERAMENT AND VETERINARY CONSULTATION -POODLE OWNERS CONSULT MORE THAN SHIH TZU OWNERS
Miki Kakinuma, *Nippon Veterinary and Life Science University, Musashino-shi, Japan*

P2-84 ADOLESCENTS' EXPECTATIONS AND JUDGEMENTS OF LG PEER IDENTITY DISCLOSURE OUTCOMES
Yueyao Wang, *University of Rochester, Rochester, United States*

Friday, October 18, 2019

7:30 – 8:30 AM	**Continental Breakfast**
8:00 – 8:15 AM	**Student/Postdoc Travel Awards Distribution in Lucerne I&II**
8:15 - 8:30 AM	**ISDP Business Meeting, all ISDP Members and others interested in joining are encouraged to attend, Lucerne I&II**

8:30 – 10:00 AM 08 **Symposium 3: Developmental Exposure to Stress: Psychobiological Mechanisms, Risk and Resilience Processes**
Symposium Chair: Alva Tang, *University of Maryland, College Park, United States*

Description: Stress exposure during development is associated with alterations in multiple domains of functioning. This symposium examines biological correlates, mechanisms, and outcomes linked to stress through neural, peripheral, and autonomic measures, including EEG, neuroendocrine, and ECG, and questions that span several stages of development and species. Moreover, we address whether positive social relationships and social buffering might remediate negative consequences associated with stress. The first study examined the association between mothers' stress physiology and infant brain development and found that higher cortisol levels in mothers were related to a pattern of delayed brain maturation, reflected in higher theta and lower alpha EEG power, in 9-month-old infants. Using a maltreatment paradigm, the second study showed that rat pups showed reduced interactions with mothers, elevated corticosterone levels, and altered structure and function of the hippocampus and amygdala. Additionally, changes in social behaviors and the amygdala were dependent on both elevated stress hormones and the presence of the maltreating mother, whereas changes in the hippocampus were similar in either conditions. The third study examined social-behavioral consequences of acute laboratory stress induction in 9-to-10-year-old children, and the role of parental buffering. Children in the most stressful condition and children with moderate levels of baseline respiratory sinus arrhythmia displayed more altruistic behaviors. Using a peer rejection task, the fourth study showed that previously institutionalized adolescents showed blunted sympathetic reactivity to rejection feedback at age 12, which mediated more internalizing and externalizing behaviors at age 16; however, high-quality adolescent friendships attenuated these associations.

8:30 - 8:50 AM CHRONIC ENVIRONMENTAL STRESS IS RELATED TO A MATURATIONAL LAG IN INFANT BRAIN ACTIVITY BY 9 MONTHS OF AGE (S3-01) **Pooja M. Desai**, Teachers College; Sonya Troller-Renfree, Teachers College, Columbia University; Natalie Hiromi Brito, New York University; Jerrold Meyer, University of Massachusetts; Kimberly Noble, Teachers College, Columbia University

8:50 - 9:10 AM WHAT HAPPENS TO THE INFANT DURING MALTREATMENT? STRESS TARGETS HIPPOCAMPUS BUT STRESS WITH MOTHER TARGETS AMYGDALA AND SOCIAL BEHAVIOR (S3-02) **Regina Marie Sullivan**, Nathan Kline Institute & NYU School Medicine; Charlis Raineki, University of British Columbia; Maya Opendak, New York University Langone Medical Center

9:10 - 9:30 AM TEND-AND-BEFRIEND TENDENCIES IN CHILDREN FOLLOWING ACUTE STRESS: THE ROLE OF RESPIRATORY SINUS ARRHYTHMIA IN ALTRUISM (S3-03) **Camelia E. Hostinar**, University of California, Davis; Nicholas V. Alen, University of California, Davis; LillyBelle K. Deer, University of California, Davis

9:30 - 9:50 AM AUTONOMIC REACTIVITY TO SOCIAL REJECTION, PSYCHOPATHOLOGY AND THE BUFFERING EFFECTS OF ADOLESCENT FRIENDSHIPS FOLLOWING EARLY PSYCHOSOCIAL DEPRIVATION (S3-04) **Alva Tang**, University of Maryland; Katie A. McLaughlin, University of Washington, Seattle; Margaret A. Sheridan, Harvard Medical School; Charles Nelson, Harvard Medical School; Charles Zeanah, Tulane University; Nathan A. Fox, University of Maryland

9:50 - 10:00 AM Discussion/Q&A

10:00 – 10:30 AM **Coffee Break - Visit the Exhibitors**

10:30 AM – 12:00 PM 09 **Symposium 4: Stress Regulation Following Early Adversity: Pathways to Risk and Resilience**
Symposium Chairs: Ruth Grunau, *University of British Columbia, Canada*
Livio Provenzi, *Scientific Institute IRCCS E. Medea, Italy*

Description:
Early adversity impacts trajectories of dysregulated behavioral development. Research in rodents established the role of both altered programming of the hypothalamic-pituitary-adrenal (HPA) axis and of epigenetic changes, as well as maternal/infant co-regulation as critical pathways underlying this process. In humans, infants born very preterm (2 to 4 months early) are exposed to stressors including pain, maternal separation, as well as multiple factors such as opioid medications. While children born very preterm are at high risk of behavioral problems, pathways involved are not well understood. In this symposium we will explore biobehavioral mechanisms underlying pathways of risk and resilience. From an epigenetic perspective, Dr. Livio Provenzi will present on the role of telomere regulation in linking pain-related stress in the neonatal intensive care unit (NICU) to cortisol reactivity in very preterm infants. Dr. Mia McLean will address how this stress contributes to various patterns of cortisol expression across early childhood, is related to internalizing (anxiety/depressive) behaviors, and the extent to which sensitive mother interaction can modify this process. In a translational approach, Dr. Susanne Brummelte will present rodent studies addressing how early pain, reduced maternal care, and medication exposure induce sex-specific effects on HPA function. Dr. Martha Welch will present an early intervention that promotes resilience through physiological co-regulation. This symposium uses a variety of approaches to elicit insights into pathways of long-term effects of early adversity as well as maternal factors to promote resilience.

10:30 - 10:32 AM Introduction

10:32 - 10:52 AM NICU-RELATED STRESS, TELOMERE LENGTH EROSION AND HPA AXIS DYSREGULATION IN PRETERM INFANTS (S4-01) 🏆**Livio Provenzi**, Scientific Institute IRCCS E. Medea; Roberto Giorda, Scientific Institute IRCCS E. Medea; Monica Fumagalli, University of Milan; Francesco Morandi, Fatebenefratelli Hospital; Rosario Montirosso, Scientific Institute IRCCS E. Medea

10:52 - 11:12 AM PATTERNS OF CORTISOL EXPRESSION AND INTERNALIZING BEHAVIORS IN CHILDREN BORN VERY PRETERM: MODERATING ROLE OF MATERNAL PARENTING (S4-02) **Mia Mclean**, The University of British Columbia & B.C. Children's Hospital Research Institute; Cecil MY Chau, BC Children's Hospital Research Institute; Joanne Weinberg, University of British Columbia; Anne R. Synnes, British Columbia Childrens Hospital Research Institute; Steven Miller, Hospital of Sick Kids; Ruth Grunau, University of British Columbia

11:12 - 11:32 AM TRANSLATIONAL MODELS OF EARLY-LIFE STRESS AND THE IMPACT ON HPA AXIS FUNCTION AND BEHAVIOR IN MALES AND FEMALES (S4-03) **Susanne Brummelte**, Wayne State University; Sean Mooney-Leber, Penn State University; Chela M. Wallin, Wayne State University; Scott E. Bowen, Wayne State University

11:32 - 11:52 AM	MODIFYING PRETERM INFANT RISK AND RESILIENCE: APPLICATION OF DEVELOPMENTAL PSYCHOBIOLOGICAL PRINCIPLES (S4-04) **Martha G. Welch**, Columbia University Medical Center; Joseph Barone, Columbia University Medical Center; Stephen W. Porges, Indiana University; Amie Hane, Williams College; Katie Kwon, Columbia University Medical Center; Robert Ludwig, Columbia University Medical Center; Raymond Stark, Columbia University Medical Center; Amanda Surman, Columbia University; Jacek Kolacz, Indiana University; michael Morgan Myers, New York State Psychiatric Institute
11:52 - 12:00 PM	Discussion/Q&A
12:00 – 1:30 PM	**Wiley Editorial Board Meeting/Lunch, Alpine I**
12:00 – 1:20 PM	Lunch on Own for those not on the Editorial Board
1:20 – 2:20 PM	10 **Wiley Distinguished Speaker - Mark Mon Williams:** Professor of Cognitive Psychology- University of Leeds: SENSORIMOTOR MATTERS IN CHILDHOOD DEVELOPMENT, AND HOW PSYCHOBIOLOGY CAN SAVE LIVES
2:30 – 3:30 PM –	11 **Oral Session 3: Short talks from the submitted abstracts CHILDHOOD/ADOLESCENCE**
2:30 - 2:42 PM	PRAIRIE VOLE OFFSPRING RAISED BY CHRONICALLY STRESSED PARENTS EXHIBIT BEHAVIORAL DYSFUNCTION AS JUVENILES AND ADULTS: POTENTIAL MEDIATION BY OXYTOCIN (O3-01) 🏆**W. Tang Watanasriyakul**, Northern Illinois University; Marigny C. Normann, Northern Illinois University; Reilly Mitchell, Northern Illinois University; Kal Nastek, Northern Illinois University; Angela J. Grippo, Northern Illinois University
2:42 - 2:54 PM	PUBERTY ALLOWS REVERSIBILITY OF THE EFFECTS OF EARLY LIFE DEPRIVATION FOR POST-INSTITUTIONALIZED CHILDREN (O3-02) 🏆**Carrie DePasquale**, Institute of Child Development; Brie Marie Reid, University of Minnesota; Bonny Donzella, University of Minnesota Twin Cities; KALSEA J. KOSS, University of Georgia; Megan Gunnar, University of Minnesota
2:54 - 3:06 PM	7,8-DHF IMPROVES EXTINCTION RETENTION AND REDUCES RELAPSE IN NON-STRESSED AND STRESSED ADOLESCENT RATS (O3-03) 🏆**Anthea Aphrodite Stylianakis**, UNSW Sydney; Kathryn Baker, UNSW Sydney; Rick Richardson, University of New South Wales
3:06 - 3:18 PM	FRONTAL EEG ASYMMETRY MODERATES THE ASSOCIATIONS BETWEEN NEGATIVE TEMPERAMENT AND BEHAVIORAL PROBLEMS DURING MIDDLE CHILDHOOD. (O3-04) 🏆**Ran Liu**, Virginia Tech; Martha Ann Bell, Virginia Tech
3:18 - 3:30 PM	EVIDENCE FOR SELECTIVE INFLAMMATORY PROPENSITIES IN ADOLESCENTS REMOVED FROM EARLY LIFE ADVERSITY (O3-05) 🏆**Melissa Engel**, University of Minnesota; Brie Marie Reid, University of Minnesota; Bonny Donzella, University of Minnesota Twin Cities; Chris L. Coe, University of Wisconsin; Megan Gunnar, University of Minnesota
3:30 – 3:45 PM	**Coffee Break - Visit the Exhibitors**

3:45 – 5:00 PM	12 **Awards Talks & Presentations, Co-Chairs: 2019 Awards Committee:** Amanda Tarullo, *Boston University* (Chair); Dima Amso, *Brown University*; and Natalie Brito, *New York University*
3:45 - 4:00 PM	2019 ISDP Sandra G. Wiener Student Investigator Award: TRAJECTORIES OF BEHAVIORAL AVOIDANCE IN REAL TIME IN PRESCHOOLERS: INFLUENCE OF TEMPERAMENTAL SHYNESS AND PHYSIOLOGICAL DYSREGULATION **Raha Hassan**, McMaster University; Louis Schmidt, McMaster Univ
4:00 - 4:15 PM	2019 ISDP Dissertation Award Presentation: MU RHYTHM DESYNCHRONIZATION MEDIATES THE RELATION BETWEEN GESTURE EXPERIENCE AND LANGUAGE DEVELOPMENT IN INFANCY **Virginia Salo**, Vanderbilt University
4:15 - 4:30 PM	2019 ISDP Senior Investigator Award: INFANT FOUNDATIONS OF COGNITIVE DEVELOPMENT **Martha Ann Bell**, Virginia Tech
4:30 - 4:45 PM	David Kucharski Young Investigator Award: THE EFFECT OF OUR EARLY EXPERIENCES ON THE DEVELOPMENT OF THE MIND, BRAIN, AND BODY **Bridget Callaghan**, The University of California, Los Angeles
4:45 - 4:50 PM	Rovee-Collier Mentor Award, TBD
4:50 - 4:55 PM	Distinguished Service Award, TBD
4:55 - 5:00 PM	Hennessy-Smotherman-Wiley Best Student Paper Award, To Be Announced at the Meeting

5:00 – 6:30 PM	13 **Columbia University in the City of New York sponsored Symposium: To Have and to Hold, for Better or for Worse: Parental Influences on Affect Regulation, and Dysregulation, in Infancy & Childhood** **Symposium Chair: Sam Wass,** *University of East London, London, United Kingdom*

Description: The majority of our early life is spent in close proximity to an adult caregiver. We know that parents and children dynamically adapt, and respond to each other, moment by moment. But what is the difference between 'good' processes of dynamic adaptation and 'bad'? As a parent, is it better to be more responsive to physiological and affective changes in your child, or less? And do children who are more physiologically responsive to their parents show better outcomes?

This symposium, from an international team (4 of whom are early career), adopts diverse cutting-edge methods to examine these questions – including lab-based and naturalistic recordings, and studies with typical and clinical cohorts (anxiety and depression).

Talks 1-3 examine the diverse mechanisms through which parental responsivity associates with child outcomes. Talk 1 (Mason) examines how parents' behavioral responsivity affects children's attention via the mediating influence of arousal; Talk 2 (Wass) examines parents' physiological responsivity, and suggests that parents dynamically upregulate their own arousal to downregulate their child's. Talk 3 (DeLoretta) explores how behavioral measures of parental responsiveness relate to children's physiological reactivity.

Talk 4 (Smith) examines the obverse: whether parents can be over-responsive to their children. It suggests that parents with higher anxiety can over-respond to small-scale affective fluctuations in their child.

Whereas talks 1-4 examine parental responsivity to children, Talk 5 (Gueron-Sela) explores a complementary question: whether children can be over-responsive to their parents. It suggests that child RSA moderates the relationship of maternal depression to infant attention.

5:00 - 5:05 PM Introduction, Sam Wass, University of East London

5:05 - 5:20 PM DYADIC SOCIAL INTERACTIONS DETERMINE INFANT SOCIAL ATTENTION AND VIGILANCE (S5-01) **Gina Marie Mason**, University of Massachusetts, Amherst; Jennifer Schwade, Cornell University; Michael Goldstein, Cornell University

5:20 - 5:35 PM GOTTA GOTTA GET UP, TO GET DOWN: PARENTS DYNAMICALLY CHANGE THEIR OWN AROUSAL TO HELP CO-REGULATE THEIR CHILD'S AROUSAL (S5-02) **Sam Wass**, University of East London; Kaili Clackson, University of Cambridge; Caitlin Gibb, University of East London; Joan Eitzenberger, University of East London; Farhan Umar Mirza, University of Plymouth; Celia Smith, King's College London

5:35 - 5:50 PM COHERENCE AND DIVERGENCE IN PARENTS' REPORTED AND ENACTED REACTIONS TO CHILDREN'S DISAPPOINTMENT PREDICT PSYCHOPHYSIOLOGICAL FUNCTIONING (S5-03) **Laura Catherine DeLoretta**, University of California Riverside; Emily W. Shih, University of California Riverside; Elizabeth L. Davis, University of California Riverside

5:50 - 6:05 PM ANXIOUS PARENTS SHOW HIGHER PHYSIOLOGICAL SYNCHRONY WITH THEIR INFANTS (S5-04) 🏆**Celia Smith**, King's College London; Sam Wass, University of East London; Emily J. H. Jones, Birkbeck, University of London; Tony Charman, King's College London; Kaili Clackson, University of Cambridge; Farhan Umar Mirza, University of Plymouth

6:05 - 6:20 PM MATERNAL DEPRESSIVE SYMPTOMS AND INFANT ATTENTION: MODERATION BY RESTING RESPIRATORY SINUS ARRHYTHMIA (S5-05) **Noa Gueron-Sela**, Ben-Gurion Univeristy; Marie Camerota, RTI International; Cathi Propper, University of North Carolina at Chapel Hill

6:20 - 6:30 PM Discussion/Q&A

6:30 PM ISDP 2019 Adjourns, Invitation to ISDP 2020 in Washington DC (Bethesda)

P1-14 INDIVIDUAL DIFFERENCES IN RHESUS MONKEYS' EARLY LIFE WHITE MATTER DEVELOPMENT ARE STABLE, **Nakul Aggarwal,** *University of Wisconsin-Madison, Madison, United States*
E-mail: naggarwal5@wisc.edu

Nakul Aggarwal, University of Wisconsin-Madison; Jason Moody, University of Wisconsin-Madison; Douglas Dean, University of Wisconsin-Madison; Do Tromp, University of Wisconsin-Madison; Marissa Riedel, University of Wisconsin-Madison; Steven Kecskemeti, University of Wisconsin-Madison; Andrew Alexander, University of Wisconsin-Madison; Ned Kalin, University of Wisconsin-Madison

Understanding the factors that influence individual differences in postnatal brain development is important for providing insights into neurodevelopmental and psychiatric disorders. While studies performed in human infants are informative, non-human primate (NHP) models can be used to investigate these factors in greater depth. The development of myelinated white matter (WM) is of particular interest due to its role in modulating signal transmission. We have demonstrated homologies between WM tracts in rhesus monkeys and humans, focusing on altered WM in relation to early life anxiety. To understand the earliest stages of postnatal WM development, we examined whole-brain and tract-specific maturation of WM microstructure in a longitudinal study of rhesus macaques from birth to one year. Thirty-five NHPs (11 male, 24 female) were imaged with single-shell DTI in a 3T-scanner, at 2, 7, 13, 26, and 52 weeks postnatally. Fractional anisotropy (FA) was used to assess maturation of WM microstructure. Average FA at the whole-brain level and in multiple specific tracts (e.g. uncinate fasciculus, corpus callosum, internal capsule) exhibited robust logarithmic growth with age ($R2 = 0.65\text{-}0.79$, $p\ \rho = 0.52\text{-}0.75$, $p < 0\ .005$). Our results demonstrate rapid maturation of WM FA across the first year of life in NHPs. Importantly, individual differences in FA as early as 2 weeks of age predict FA at 1 year. Future studies will focus on understanding the factors that modulate the early life interactions between WM pathways, behavior, and psychopathology.

P2-78 PRENATAL TEMPERATURE INFLUENCES SOCIAL MOTIVATION IN ONE-DAY-OLD BOBWHITE QUAIL CHICKS, **Abdullah Ahmad,** *Florida International University, Davie, United States* E-mail: aahma022@fiu.edu

Abdullah Ahmad, Florida International University; Starlie Belnap, Flordia International University; Robert Lickliter, Florida International University

Under naturally occurring conditions, precocial avian embryos are exposed to changes in temperature each time the mother leaves and returns to the nest. Previous research in chickens suggests prenatal temperature can play an important role in the development of emotional reactivity and social motivation in precocial birds. In this study we investigated if prenatal temperature can influence social motivation in one-day old bobwhite chicks. Bobwhite quail (Colinus virginianus) eggs were exposed to four days of either high (38.1°C), low (36.9°C), or normal (37.5°C) incubation temperatures beginning on embryonic day eight. After the four day manipulation period all temperature groups were returned to 37.5°C. Following hatching, chicks' social motivation was assessed by measuring the number of attempts to gain access to an isolated same-aged chick. Pecking, jumping, and attempting to go through or under the wire-mesh barrier containing the social stimulus were considered measures of social motivation. Results revealed chicks receiving the normal and low prenatal temperature treatment attempted to gain access to the social stimulus significantly more than high treatment chicks. Further, high treatment chicks were more likely to peck and jump at the wall opposite the social stimulus, indicating a reduction in social motivation. The effect of prenatal temperature exposure on chicks' social motivation level provides evidence of the importance of maternally regulated prenatal experience on subsequent behavioral development and emphasizes the often non-obvious links between prenatal and postnatal development.

P2-48 RELATIONS BETWEEN SLEEP, MEMORY CONSOLIDATION, AND HIPPOCAMPAL DEVELOPMENT IN EARLY CHILDHOOD, Tamara Allard, *University of Maryland, College Park, United States* E-mail: tallard@terpmail.umd.edu

Tamara Allard, University of Maryland; Tracy Riggins, University of Maryland; Arcadia Ewell, University of Maryland; Morgan Botdorf, University of Maryland, College Park; Sanna Lokhandwala, University of Massachusetts; Benjamin Weinberg, University of Maryland ; Rebecca Spencer, University of Massachusetts

During sleep, memories undergo consolidation, leaving them less vulnerable to interference. This process is thought to reflect hippocampal-neocortical “transfer” of memories. Previous behavioral research has demonstrated that naps benefit memory in young children. This nap-benefit is associated with sleep spindles recorded during sleep. However, it remains unclear which regions of the brain are related to this nap-benefit for memory. The purpose of this investigation is to examine relations between sleep spindle density and volume of memory-related brain regions, such as the hippocampus.

Participants are part of an ongoing longitudinal study. Preliminary analyses included 18 participants (Mage= 3.87 years, 9 female), however, not all participants provided data for each measure. Participants completed a visuospatial memory task before separate wake and nap periods and then again after the wake or nap periods. Sleep physiology was assessed during the nap via polysomnography. T1-weighted scans (.9mm3) were used to extract hippocampal subregions volumes and intracranial volume (ICV) using a combination of automated and manual processing tools.

Preliminary results showed that the predicted nap-benefit on memory was also associated with sleep spindle density, $r(10) = .47$, $p = .12$. Although this fails to reach conventional levels of statistical significance, it is consistent with previous findings. Results also showed negative relations between sleep spindle density and left (β=-1.1x10^3, p=0.002) and right hippocampal body (β=-9.2x10^2, p=0.04) controlling for ICV and age. This suggests that sleep spindle density may be associated with a more mature hippocampal structure. Data collection is ongoing. Future analyses will include a larger sample.

P1-56 EEG Coherence, Behavioral Inhibition, and Risk for Anxiety in Early Adolescence, Berenice Anaya, *The Pennsylvania State University, University Park, United States* E-mail: bua25@psu.edu

Berenice Anaya, The Pennsylvania State University; Koraly Perez-Edgar, The Pennsylvania State University; Samantha Licata, Penn State

Electroencephalograph (EEG) coherence reflects co-activation between scalp locations, and captures the organization of underlying neural networks (Thatcher, 1986). EEG coherence increases during task-induced rumination (Anderson et al., 2009), compared to neutral states, but associations between coherence and trait anxiety are less consistent. Some studies find that coherence increases after anxiety interventions (Travis & Arenander, 2005), yet others find that increased coherence within and across regions may indicate over controlling states associated with anxiety (Xing et al., 2017). These studies have been limited to small adult samples, without considering individuals' temperament risk for anxiety, leaving to question how coherence patterns map onto anxiety for different age groups and temperamental risk for anxiety. The present study examined associations between frontal alpha coherence and anxiety in children (Mage = 10.8, SD = 0.9) oversampled for behavioral inhibition (BI=67, non-BI= 89), a temperament profile associated with anxiety. Regression analyses for left and right coherence, controlling for sex and age, showed the expected positive association between BI and anxiety. Left and right coherence were positively associated with anxiety (β_{left} = .97, p = .001; β_{right} = .67, p = .02), but the association was stronger for left coherence (t = 14.4, p = .001). BI interacted with left coherence to predict anxiety (β = -0.84, p = .001). Regions of significance analyses showed that the positive relation between BI and anxiety decreased and became non-significant for participants with the highest coherence values. We discuss these findings in light of how neural organization may impact individuals' risk to predict anxiety.

P2-75 FRONTAL ASYMMETRY IN PARENT-INFANT PLAY: LINKS TO OBJECT EXPLORATION AND PARENT REPORT, **Alana Anderson,** *Washington State University, Pullman, United States* E-mail: alana.anderson@wsu.edu

Alana Anderson, Washington State University ; Allegra Campagna, Washington State University; Sammy Perone, Washington State University; Maria Gartstein, Washington State University; Lura Potter, Washington State University; Joshua Underwood, Washington State University

Frontal EEG asymmetry (FEA) is a neural measure of approach and avoidance. Infants with higher right FEA are rated as more shy or avoidant, while infants with higher left FEA show more approach behaviors and prefer novel stimuli (Fox et al., 2001). FEA has also been viewed as a dynamic process that reflects regulation in a specific context (Coan et al., 2006).

We used FEA to examine infant neural correlates of approach and avoidance in 55 infants (6-12 months) while completing a baseline task, and during 90s of play with their mothers. Because FEA reflects regulation to a specific task context, we expected that an infant's approach motivation during parent-infant play, relative to baseline, would be related to the infant's object exploration during play, and parent-rated behaviors measured via the Infant Behavior Questionnaire-Revised (Gartstein & Rothbart, 2003).

Using multiple regression, we found that parent rated behaviors of approach toward social and novel experiences significantly (all p-values <.05) predicted the infant's change in FEA. Infants who shifted toward left FEA from baseline had been rated as more cuddly $\beta = .28$, and more approach oriented $\beta = .40$, by their mothers. A bivariate regression shows that the infants who moved toward left FEA also explored the object more during that period of play ($\beta = .34$). These findings demonstrate that changes between contexts is related to parent ratings of infant's behaviors, and their exploratory behavior at that moment. These results highlights the importance of studying changes in brain activity between contexts.

P2-76 TRAIT BOREDOM AND RISKY CHOICES IN ADOLESCENTS AND EMERGING ADULTS: AN EVENT-RELATED POTENTIAL STUDY, **Alana Anderson,** *Washington State University, Pullman, United States* E-mail: alana.anderson@wsu.edu

Alana Anderson, Washington State University ; Sammy Perone, Washington State University; Elizabeth Weybright, Washington State University

Boredom is a prevalent emotional state that can diminish feelings of motivation and meaningfulness (van Tilburg & Igou, 2011; Vogel-Walcutt et al., 2012). Individuals high in boredom susceptibility experience boredom more frequently in daily life and are more likely to experience aggression, depression, anxiety and substance use (Mercer-Lynn et al., 2011). Individual differences in trait boredom may be linked to neural processes underlying risky decision making. These processes may take root during adolescence, a transitional period during which the brain and decision-making undergo rapid change and set the stage for unhealthy outcomes.

We examined how trait boredom and underlying neural signatures of decision-making processes measured via event-related potential (ERP) are related to risk-taking in the Balloon Analogue Risk Task (BART) and self-reported substance use for adolescents and emerging adults. Two ERP components were examined. Feedback related negativity (FRN) which is a negative deflection indicating the experience of negative (vs positive) feedback and P300 ERP components which reflects the cognitive resources used to update after feedback.

One key finding was emerging adults high in boredom susceptibility took more risks during BART and reported more tobacco and alcohol use over the past year. These individuals showed no significant difference in FRN, but had a smaller P300 amplitude in response to negative feedback than people low in boredom ($F = 6.676$, $p = .01$) suggesting that individuals with high boredom susceptibility allocate fewer neural resources to updating future responses based on negative feedback. Adolescent data will be presented alongside these emerging adult findings.

P2-77 Do 7-month-old infants discriminate between emotion faces?, Özlü Aran, *University of Denver, Denver, United States* E-mail: ozlu.aran@du.edu

Özlü Aran, University of Denver; Sarah Garcia, University of Denver; Valeriia Vlasenko, University of Denver; Naitra Ramchander, University of Denver; Elysia Davis, University of Denver

Research with event-related potentials (ERPs) suggests that human infants discriminate between emotion face pairs by 7 months. This literature has provided conflicting information about the relation between different emotion expressions. To address this discrepancy in the literature, it is critical to include multiple types of negative emotion expressions in one paradigm. Therefore, this study aims to extend the literature by examining amplitude differences in infants' negative central (Nc) responses to happy, fearful, and angry faces. The Nc component indicates allocation of attentional resources to stimuli and is a marker of discrimination between stimuli. Participants were 68 7-month-old infants. They viewed happy, fearful, and angry faces during an ERP task. After inspecting data and excluding trials containing EEG artifact, Nc amplitudes were averaged across trials within each emotion per participant. The entire sample will be processed by the time of the meeting in October. Here we present results from 20 infants whose data have been processed. Mean Nc amplitudes to fearful, angry, and happy faces were as follows: Mfear = -11.66 (SD = 5.34), Mangry = -11.51 (SD = 5.81), Mhappy = -8.93 (SD = 8.81). Preliminary findings suggest trend-level mean differences between responses to happy and fearful and angry faces (tfearful-happy = 1.89, p = .07; tangry-happy = 1.86, p = .08). However, Nc amplitude was not different between different expressions communicating threat (tfearful-angry = -.18, p = .86). Our findings suggest 7-month-olds may not yet discriminate between negative emotion cues but rather process threat cues in a global manner.

P2-37 Prevalence of aspects related to brain, behavior and cognition in patients undergoing bariatric surgery in the extreme north of Brazil, Nilza Araujo, *Universidade Federal de Roraima, Boa Vista, Brazil* E-mail: nilza.araujo@ufrr.br

Nilza Araujo, Universidade Federal de Roraima

The medical speech highlights that obesity is a chronic disease which requires treatment. In case of severe or morbid obesity that did not obtain results with clinical treatments, bariatric surgery is indicated. In cases of severe or morbid obesity that did not obtain results with clinical treatments bariatric surgery is indicated. In this context, the present work has proposed to investigate the weight regain in the State of Roraima. The main objective was to identify the prevalence of cognitive and behavorial characteristics in patients with weight regimens after bariatric surgery. There were 12 participants in the survey, who during the three-month period of data collection were able to access the following information from the operated patients: age, sex, surgery time, physical activity, IMC and weight regimen, besides the application of scales and neuropsychological tests to investigate aspects related to the purpose of this study. These data were presented through graphs and tables, which showed that there was a greater number of women operated. With the discussion of the results, we conclude that different factors contribute to the occurrence of weight regain, being the sugery time the factor that most evidenced among them and that a surgical intervention does not guarantee a change in the relation that the patient establishes with the food and the obesity. Aspects related to cognitive and behaviorial issues in conjunction with the biological study of brain mechanisms may help to understand the behavorial parameters of feeding and weight gain. Not having multidisciplinary follow-up post-surgery and associated comorbidities has relevance with weight regain.

P2-03 ESTROUS CYCLE IMPACTS FEAR EXTINCTION IN FEMALE ADOLESCENT RATS, Kathryn Baker, *UNSW Sydney, UNSW Sydney, Australia* E-mail: k.baker@unsw.edu.au

Kathryn Baker, UNSW Sydney; August Gable, UNSW Sydney; Rick Richardson, University of New South Wales

Adolescence is a vulnerable developmental window in which male rodents and humans have impairments extinguishing fear. We investigated if female adolescent rats show similar extinction retention and renewal (a form of relapse) of fear as males. Previous work has shown that naturally cycling adult female rats have enhanced extinction retention when extinction training occurs in a high-estradiol phase (i.e., proestrus) relative to a low-estradiol phase (i.e., metestrus). To assess extinction around the onset of puberty, which coincides with the beginning of estrous cycling, female adolescents received fear conditioning on the day of pubertal onset and extinction training the following day. Peri-pubertal females showed comparable levels of freezing during extinction training (most were in metestrus) and extinction retention as age-matched males. We then extinguished animals across different stages of the second estrous cycle after puberty. Female rats extinguished in proestrus, but not metestrus, had lower freezing during extinction training and the extinction retention test compared to age-matched males. Serum estradiol levels in females were also tested at time points matching those when extinction occurred. We confirmed that estradiol levels were higher in proestrus than in metestrus and on the first two days after pubertal onset (i.e., when conditioning and extinction occurred in the first experiment). In addition, we found that sex differences in renewal emerge only after puberty. Our findings suggest that fear extinction fluctuates across the estrous cycle in adolescence and that estradiol may have a protective effect in females against impairments in fear extinction retention during this developmental period.

P2-12 EFFECTS OF ORAL DELTA-9-TETRAHYDROCANNIBINOL (THC) SELF-ADMINISTRATION ON MOTOR ACTIVITY AND ANXIETY-LIKE BEHAVIOR IN ADOLESCENT AND ADULT SPRAGUE-DAWLEY RATS OF BOTH SEXES, **Asia Banks,** *University of Illinois at Urbana Champaign, Champaign, United States*
E-mail: asiab2@illinois.edu

Asia Banks, University of Illinois at Urbana Champaign ; Erika Carlson, University of Illinois at Urbana-Champaign; Kathryn Hamblen, University of Illinois at Urbana-Champaign; Alexis Chambers , University of Illinois at Urbana Champaign; Aditi Das, University of Illinois at Urbana Champaign; Nu-Chu Liang , University of Illinois at Urbana Champaign; Joshua Gulley, University of Illinois Urbana-Champaign

Cannabis is one of the most commonly used recreational drugs among adolescents and young adults. Exposure to cannabis and its primary psychoactive component delta-9-tetrahydrocannabinol (THC) may induce modifications in neural circuitry that in turn lead to adverse consequences on behavior. Previous literature has suggested that intraperitoneal or subcutaneous administration of THC may produce an anxiogenic effect and reduce locomotor activity in rats, but it is unclear if this also occurs following volitional oral intake of THC. Here, we used adolescent and adult rats of both sexes to determine if oral THC would alter locomotor activity in an open-field arena (OFA) and anxiety-like behavior on an elevated plus maze (EPM). Subjects (n=12/group) received vehicle- or THC-impregnated crackers (3.0, 5.0, and 10.0 mg/kg) starting on either P35-37 for adolescent-onset groups or P79-81 for adult-onset groups 90 minutes prior to each behavioral test. Following the EPM, rats were sacrificed for collection of trunk blood and brain tissue that was used for subsequent analysis of THC and its metabolites using LC-MS/MS. Preliminary data suggest THC induced a dose- dependent decrease in locomotor activity in the OFA accompanied by a decrease in exploration of open arms in the EPM. These effects appear to be dependent on sex as males exhibited a relatively greater sensitivity to the effects of THC compared to females. Furthermore, these results suggest that rats will intentionally consume oral THC at doses that influence locomotor activity and anxiety-related behavior.

P2-20 MATERNAL INTELLIGENCE AND EXECUTIVE FUNCTION INFLUENCE NEONATAL BRAIN MORPHOLOGY, **Kristiana Barbato,** *Columbia University Irving Medical Center, NY, United States* E-mail: kb3131@cumc.columbia.edu

Kristiana Barbato, Columbia University Irving Medical Center; Bradley Peterson, University of Southern California/Children's Hospital of Los Angeles; Marisa Spann, Columbia University Irving Medical Center; Xuejun Hao, Columbia University; Tove Rosen, Columbia University; Ravi Bansal, Children's Hospital of Los Angeles

Identifying reliable brain predictors of intelligence prior to age three has been a challenge. For example, while birth head circumference as a proxy for brain volume is a predictor of preschool intelligence, the association does not persist at school age. Prior studies suggest that maternal cognition as indexed by education and intellectual quotient (IQ) are predictors of child intelligence at school age. As such, relating these factors to the offspring brain could establish early cognitive markers. This study aims to determine the association between maternal cognition as measured by IQ and education, as well as maternal inhibitory control (an index of executive function), which has not yet been examined, with neonatal brain morphology. The sample consisted of 37 healthy pregnant women who participated in cognitive and psychological assessments during the 3rd trimester. Their neonates underwent an MRI scan. An anatomical T2-weighted image was acquired and surface-based analysis was applied. The findings demonstrate a significant association between higher maternal education and decreased local volume of the right occipital lobe. Higher maternal IQ was associated with decreased local volume of the parieto-occipital region, bilaterally. Higher maternal inhibitory control was associated with widespread bilateral volume decrease across the temporo-parieto-occipital junction. Maternal inhibitory control and IQ have robust and unique associations with neonatal brain morphology, suggesting that they are potential indices of familial transmission of cognition. Further, identifying neonatal brain regions that are associated with maternal cognitive functions can serve as predictors of intelligence and can provide information about relevant cognitive capacities for intervention.

S2-03 FROM MECHANISMS TO INTERVENTIONS: A FRAMEWORK TO SUPPORT INTERVENTIONS FOR CHILDREN AND FAMILIES FACING ADVERSITY, **Tyson Barker,** *University of Oregon, Eugene, United States* E-mail: tysonb@uoregon.edu

Tyson Barker, University of Oregon; Philip Fisher, University of Oregon

Decades of research in early childhood have demonstrated the efficacy of psychosocial interventions for children and families facing adversity. However, intervention impacts are modest at best. One reason for the limited impact is an overemphasis on average programmatic outcomes at the cost of understanding how and why an intervention works (i.e., a lack of a theory-based mechanism of change), which limits innovation and continuous quality improvement. In contrast to the limited theory-driven work in psychosocial interventions, research using animal models has traditionally emphasized an understanding of mechanisms of behavior, yielding valuable insights into how environmental factors influence caregiving behavior and subsequent offspring development. Leveraging processes from the animal literature, we present an overview of a framework for early childhood program development, implementation, and evaluation that emphasizes precision measurement linked to theories of change. We then utilize findings from animal models of caregiving to illustrate how an understanding of the impacts of stress on various aspects of caregiving behavior in rodents (e.g., offspring salience and caregiving reward), can be used to inform intervention development for caregivers and young children. Finally, we present initial attempts at mapping neural indicators of caregiving behavior in humans to findings from the animal literature, and discuss the potential for a greater collaboration between researchers and practitioners to create higher impact programs for families facing adversity.

P2-01 SEND ME A SCREENSHOT: CAPTURING CHILD MEDIA EXPOSURE IN THE DIGITAL AGE, Rachel Barr, *Georgetown University, Washington, United States* E-mail: rfb5@georgetown.edu

Rachel Barr, Georgetown University; Heather Kirkorian, University of Wisconsin-Madison; Deborah Nichols, Purdue University; Jenny Radesky, University of Michigan ; Sarah Coyne, Brigham Young University; Laura Stockdale, Brigham Young University; Rosa Ball, University of Michigan ; Olivia Blanchfield, Georgetown University; Jok Durnez, OpenLattice inc; Mollie Epstein, Georgetown University

The Comprehensive Assessment of Family Media Exposure (CAFE) Consortium has developed a novel tool to measure household media use through a web-based survey, time use diary, and passive sensing app installed on family mobile devices. CAFE captures the content and context of early media exposure and addresses the limitations of prior media measurement approaches while being standardized, scalable, and cost-effective. Consortium collaborators have collected data using this measure at 5 sites across the US, as well as in Germany, the Czech Republic, Sweden, Italy, the Netherlands, Australia, and Zambia.

The data streams have been integrated into a shared visualization platform. Analysis of data collected from ~500 parents of children 0 to 5 years from a 24-hour detailed time diary revealed an average of 1.89 hours of foreground television per day and 1.33 hours of background television. Consistent with other recent reports, parents with lower income and less education reported more background television use. Older parents reported their children were exposed to less foreground media, including television viewing and smartphone use, but more book reading. Preliminary analyses also show that higher rates of a child's screen time in the hour prior to bedtime are associated with decreased frequency of parental media viewing restriction, $p < .05$, and that parenting stress is weakly positively associated with household media usage. We also collected child language and parental mediation of media use. We will present additional data from infants, toddlers, and preschoolers and consider sleep and language outcomes associated with early media use.

P1-45 PREADOLESCENT GIRLS WITH HIGH LEVELS OF ANXIETY DEMONSTRATE INCREASED REACTIVITY AND DELAYED RECOVERY OF PSYCHOLOGICAL DISTRESS IN RESPONSE TO THE TRIER SOCIAL STRESS TEST, **Gina Bednarek,** *University of Wisconsin - Madison, Madison, United States*
E-mail: gbednarek@wisc.edu

Gina Bednarek, University of Wisconsin - Madison; Ned Kalin, University of Wisconsin-Madison; Lisa Williams, University of Wisconsin - Madison

Anxiety disorders (ADs) are common and debilitating, with symptoms often emerging during childhood. Girls are at increased risk to develop anxiety and depression after the transition from childhood to adolescence. To examine the biological, behavioral, and clinical trajectory of anxiety symptoms during preadolescence, we are studying 9-11-year-old girls that range from little or no anxiety (controls), to sub-clinical symptoms (at-risk), to ADs. 135 preadolescent girls (38 AD, 65 at-risk, 32 controls) completed the Trier Social Stress Test for Children (TSST-C), a social stressor comprised of: acclimation period, 10-minute speech in front of judges, and 1-hour recovery period. Blood pressure, heart rate, salivary cortisol, and self-report ratings of anxiety, irritation, and sadness were assessed. All measures increased in response to the speech stressor (p's 0.30). However, AD girls reported higher levels of anxious arousal and distress relative to controls in reaction to the stressor; this difference was maintained into the recovery period (p's < 0 .05). At-risk girls showed intermediate responses. These data demonstrate enhanced levels of psychological distress during social stress in young AD girls, characterized by increased reactivity and prolonged emotional recovery after stressor offset. While not as pronounced, at-risk girls displayed similar responses. In contrast, physiological responses did not differ between AD, at-risk, and control girls. These data underscore the importance of assessing subjective emotional responses during the TSST-C and suggest that "real-world" distress in girls with anxiety is due to alterations in their ability to regulate stress-induced negative affect.

Senior Investigator Award 2019 ISDP Senior Investigator Award: INFANT FOUNDATIONS OF COGNITIVE DEVELOPMENT, Martha Ann Bell, *Virginia Tech, Blacksburg, United States* E-mail: mabell@vt.edu

Martha Ann Bell, Virginia Tech

From infancy to middle childhood, nearly all children show dramatic improvements in their cognitive development. The developmental processes associated with individual differences in cognition are poorly understood, however. The reason we know so little about individual differences may be that the study of early cognitive behavior requires a complex, rather than simple, approach. In this talk, I will highlight results from our longitudinal study on the infant foundations of early executive processes. By focusing on the biological and social contexts involved in the development of executive functions, I emphasize our team's psychobiological approach that provides a multilevel conceptualization of infant and child cognitive development.

P2-11 10-MONTH PREDICTORS OF 12-MONTH COGNITIVE INHIBITORY CONTROL PERFORMANCE,
Martha Ann Bell, *Virginia Tech, Blacksburg, United States* E-mail: mabell@vt.edu

Martha Ann Bell, Virginia Tech; Leslie Patton, Virginia Tech; Ran Liu, Virginia Tech; Tatiana Garcia-Meza, Virginia Tech

Inhibitory control (IC) abilities in early development predict cognitive, academic, and socio-emotional outcomes in childhood and adolescence (Blair & Razza, 2007), as well as adulthood (Moffitt et al., 2011). Although there is disagreement as to the specific nature of IC (Munakata et al., 2011), its value for optimal development is undisputed. Diamond (2013) proposed a framework for IC during early development that includes three subtypes. Here we focus on the cognitive inhibition subtype, which is the suppression of previously acquired information and memories and involves the frontal-parietal network. Given the critical nature of IC for developmental outcomes, we examined individual differences in early cognitive IC. Forty-two infants and parents visited the research lab at 10 and 12 months as part of a larger study involving monthly examination of subtypes of IC during the first year. The looking A-not-B task assessed cognitive IC (Bell, 2012; Cuevas et al., 2012). We used IBQ-r to assess Effortful Control, the regulatory component of temperament that includes global IC and attentional control (Putnam et al., 2014). We used MCDI to assess Early Gestures because of links between infant gesture and early childhood executive function, including IC (Kuhn et al., 2014). Controlling for IC performance at 10 months, Effortful Control and Early Gestures predicted 18 percent of the variance in 12-month cognitive IC ($F = 3.28$, $p = .05$), with Early Gestures contributing unique variance (beta = .32, $p = .04$). This finding provides evidence for links between language and cognitive IC during infancy.

P1-16 Working Memory Associated Neural Network Engagement Differs in 8-Year-Olds Born Very Preterm, **Mark Bichin,** *British Columbia Childrens Hospital Research Institute, Vancouver, Canada* E-mail: mbichin@bcchr.ca

Mark Bichin, British Columbia Childrens Hospital Research Institute; Cecil Chau, BC Children's Hospital Research Institute; Urs Ribary, Behavioural and Cognitive Neuroscience Institute, Simon Fraser University; Sam Doesburg, Simon Fraser University; Ruth Grunau, University of British Columbia

Introduction: Children born very preterm (24-32 weeks gestational age [GA]) have poorer working memory (WM) than born full-term. Previously, in 8-year-olds born very preterm, we found greater neonatal pain-related stress was related to reduced regional brain cortical thickness, in turn was associated with poorer WM. Furthermore, very preterm children had altered brain oscillatory synchrony during WM using Magnetoencephalography (MEG). Relationships between engagement of neural networks and cognitive performance in this population remains unknown.

Hypothesis: Network engagement will differ between children born very preterm versus full-term, across WM phases.

Methods: Children age 8, N = 109 (29 extremely low GA [ELGA; born 24-28 weeks GA], 40 very low GA [VLGA; 29-32 weeks], and 40 full-term [FT; ≥38 weeks]). Exclusions: major brain injury, a sensory/motor/cognitive impairment. MEG recording during phases (Encoding, Retention, Retrieval) of WM task: sensor-spaced time frequency analysis of oscillatory power in canonical bands. Cognitive assessment WISC-IV FSIQ. Constrained principle component analysis isolated neural network engagement during WM task. General estimated equation modelling tested whether neural engagement differed with FSIQ and/or group during each WM phase.

Results: ELGA, VLGA and FT groups differed in neural network engagement. Higher FSIQ was related to greater engagement during Retrieval for ELGA, (p = .013) and Encoding for VLGA, (p = .033). FT had no relationship between FSIQ and engagement.

Conclusion: Children born at different gestational ages differ in neural network engagement during WM. Alternate utilization of resources may reflect compensation, neural plasticity resulting from subtle early brain insult, or a greater cognitive load.

P2-31 CAN CHILDREN SUPPRESS ATTENTIONAL CAPTURE BY SALIENT DISTRACTORS?, Emily Blakley, *Binghamton University, Binghamton, United States* E-mail: eblakle1@binghamton.edu

Emily Blakley, Binghamton University; Nicholas Duggan, Binghamton University; Peter Gerhardstein, Binghamton University; Kayden Stockwell, Binghamton University-SUNY; Nicholas Gaspelin, Binghamton University-SUNY

A key debate is whether physically salient objects, such as brightly colored items, have an automatic ability to "capture" visual attention. There is growing evidence that adults are able to suppress attentional capture by salient singletons in favor of the target object (Gaspelin & Luck, 2018). However, the developmental trajectory of this ability is unclear. In children, reaction time has been used to measure the cost of orienting attention towards a distractor instead of the target. Studies of classroom distractions, visual search, task switching, and attentional surround suppression found that children under age nine are unable to successfully inhibit distractors; a reaction time cost is present when distractors are present versus absent (Cepeda et al., 2001; Gaspelin et al, 2015; Hanley et al. 2016; Rodrigues et al. 2018; Wong-Kee-You et al., 2018). However, negative priming studies, in which targets that were previously distractors elicited slower reaction time, suggest that children as young as four are able to actively suppress distractors (Pritchard & Neumann, 2009). The present study investigates whether 5-year-olds are able to suppress bottom-up attentional capture by a salient distractor. Children searched for a specific target shape amongst different distractor shapes of the same color, and were instructed to ignore a salient color singleton. We will use eye movements to measure attentional capture versus inhibition. This approach has received little use in developmental attentional studies and provides a more direct index of attentional allocation. Children, unlike adults, are expected to be unable to suppress overt attention to the salient singleton.

P2-82 ABUSIVE CAREGIVERS ARE NOT A SECURE BASE FOR THEIR INFANT: UNDERSTANDING THE NEUROBIOLOGY USING A RODENT MODEL, **Anna Blomkvist,** *Stockholm University, Stockholm, Sweden*
E-mail: anna.blomkvist@psychology.su.se

Anna Blomkvist, Stockholm University; Maya Opendak, New York University Langone Medical Center; Donald Wilson, NKI and NYU School of Medicine; Regina Sullivan, Nathan Kline Institute & NYU School Medicine

Early life experiences are essential for a healthy development according to both human and animal research. From the attachment literature the primary caregiver has always been the center of attention in predicating outcomes in later development of the child.

The attachment literature also highlights two functions that the caregiver implicit activate, the safe haven and the secure base functions. Safe haven function is when the infant can depend on the caregiver for comfort and relief if stressed. The secure base function is described as when the caregiver works as a platform for the child to explore. This latter function has the intent to describe the infant's balance between two behaviours; exploration and proximity seeking.

In this study we are linking the described attachment behaviour system with a neurobiological approach of measuring cortical local field potential (LFP) oscillations in rat pups. By using an experimental setting with both measures of behaviour and LFP where the pup interacts with the mother and a stranger we evaluate the secure base function. In addition, we are applying the Scarcity-Adversity Model of maltreatment to disentangle critical attachment disruptions. We are discovering differences in the two different groups of rat pups (control and maltreatment) and are reflecting on these results both on an attachment behavioral and neurobiological developmental level.

P2-16 MULTIVERSE ANALYSIS STRATEGIES FOR DEVELOPMENTAL FMRI, Paul Bloom, *Columbia University, New York, United States* E-mail: pab2163@columbia.edu

Paul Bloom, Columbia University; Michelle VanTieghem, Columbia University; Laurel Gabard-Durnam, Boston Children's Hospital; Dylan Gee, Yale University; Jessica Flannery, University of Oregon; Christina Caldera, UCLA; Bonnie Goff, UCLA; Eva Telzer, UNC Chapel Hill ; Kathryn Humphreys, Vanderbilt University; Mor Shapiro, Kaiser Permanente Woodland Hills; Nim Tottenham, Columbia University

Research using fMRI faces the problem of “forking paths," or an enormous number of potential analyses methodologies for making inference using brain imaging data. This problem may be particularly troublesome in developmental fMRI because many standard analysis tools and guidelines for best practices are created primarily for use with adult, but not child samples. Additionally, developmental imaging data may be relatively more prone to artifacts resulting from analysis decisions, as high amounts of motion in children and shorter tasks often result in lower data quality. As a result, the sensitivity of developmental imaging findings to changes in software or analysis decisions (such as motion correction, registration, and spatial smoothing) presents a serious concern. As a potential approach to this problem, we present a “multiverse” strategy in which many analysis pipelines from a forking decision tree of possible analyses are conducted simultaneously and examined for consensus. Here, we apply multiverse analyses to a longitudinal imaging study (N = 176, 328 total scans across 3 study waves, ages ranging from 4-22) using an event-related model of participants’ responses to fearful and neutral faces during an emotion discrimination task. Across many analytical forks using a variety of software packages we find that although individual-level results are highly sensitive to analysis decisions, we are able to identify consistent group-level patterns through consensus across forks. In particular, we find an age-related decrease in amygdala reactivity to faces at the group level. Finally, we discuss potential uses for multiverse analysis strategies in future research.

P1-32 TYPICAL VARIATIONS IN STRESS IMPACT HIPPOCAMPAL VOLUME IN YOUNG CHILDREN,
Morgan Botdorf, *University of Maryland, College Park, College Park, United States* E-mail: mbotdorf@terpmail.umd.edu

Morgan Botdorf, University of Maryland, College Park; Emma Chad-Friedman, University of Maryland, College Park; Lea Dougherty, University of Maryland, College Park; Tracy Riggins, University of Maryland

Severe early life stress exerts vast impacts on brain development, especially on the hippocampus (HPC; Belsky & de Haan, 2011). However, most research has focused on extreme stress (e.g., maltreatment), whereas only limited research has focused on how the accumulation of more typical stressful events (i.e., parental divorce) relates to HPC development in early childhood.

The present study examined relations between typical variations in stress and HPC volume in a longitudinal sample of 58 children. At Time 1, children were 4-6 years old and at Time 2, 6-8 years old. At both visits, parents completed the Stressful Life Events checklist to provide an index of the number of stressful events that occurred in the child's life over the previous year and children completed a structural MRI scan.

Preliminary analyses explored associations between Time 1 stress and Time 2 HPC volume. Results from a regression analysis controlling for effects of age, intracranial volume, and Time 2 stress showed a significant interaction between the number of stressful events the child experienced and sex ($b = -260.64$, $SE = 100.08$, $p = .012$). Specifically, more stressful events were associated with smaller HPC volume for females, but not males.

These findings suggest that typical variations in stressful events may impact the HPC in a similar way to extreme events and that females may be differentially impacted by the accumulation of stressful events. Future analyses will take into account hippocampal structure at both time points and specificity of results by examining hippocampal subfields.

P2-58 NEONATAL BUPRENORPHINE EXPOSURE AND SPINAL CORD INJURY: I. DEVELOPMENTAL EFFECTS ON SPONTANEOUS LOCOMOTION AND GROWTH PARAMETERS, **Aimee Bozeman,** *Idaho State University, Pocatello, United States* E-mail: bozeaime@isu.edu

Aimee Bozeman, Idaho State University; Alleyna Martes, Idaho State University; Makenzie Kohler, Idaho State University; Bryn Kennell, 1996; Michele Brumley, Idaho State University

Following spinal cord injury (SCI) in neonatal rats, weight-bearing locomotion in the hindlimbs decreases compared to age-matched controls. Additionally, research has shown that adult rats with SCI lose weight as a result of the injury. Buprenorphine (buprenex), a partial opioid receptor agonist, is often used as an analgesic following surgical procedures in laboratory animals. It has been shown to decrease body weight and locomotion in adult rats. The purpose of this study is to investigate the developmental effects of neonatal SCI and buprenorphine exposure on spontaneous locomotion and growth parameters in infant rats. On postnatal day 1 (P1), rats received a low-thoracic spinal cord transection (T8-T10), sham surgery, or no treatment. Subjects that received a transection or sham surgery were subcutaneously administered 0.04 mg/kg buprenorphine immediately after surgery and once or twice daily for 2 additional days. On P5 or P10, subjects were tested in an open field to assess spontaneous locomotion, and body mass and length were measured. Findings suggest that P10 rats show more locomotion and greater growth parameters compared to P5s, and that the buprenorphine dosing schedules used did not affect growth and locomotion. This study will inform future studies on analgesic dosing schedules for neonatal rats following a significant surgical procedure, and provide important baseline information on growth and motor development in infant rats following low-dose buprenorphine exposure.

P1-05 Linking Chronic Physiological Stress in Infancy to Sustained Attention in Toddlerhood and Working Memory Development in Early Childhood, Annie Brandes-Aitken, *New York University, New York, United States* E-mail: aitkenannie@gmail.com

Annie Brandes-Aitken, New York University; Stephen Braren, New York University; Rosemarie Perry, New York University; Sarah Vogel, New York University; Clancy Blair, NYU

Exposure to chronic early life physiological stress is thought to disrupt childhood cognitive development. The glucocorticoid hormone cortisol has been linked to variability in working memory in childhood and adolescence. However, research has yet to identify developmental mechanisms by which early-life exposure to cortisol impacts later working memory. Given that sustained attention is an early emergent higher-order cognitive process on which working memory depends, we hypothesize that one possible mechanism by which cortisol in infancy is associated with working memory in early childhood is through sustained attention in toddlerhood. To test this hypothesis, we used data from a large, longitudinal sample (N=1,292) of children and their parents living in rural poverty. Using longitudinal path modeling, we assessed whether observed sustained attention behavior at 24-months of age mediated the relationship between chronic infant cortisol levels at age 6, 15, and 24 months and a direct assessment of working memory at 58-months of age. Results first suggested that chronic cortisol levels in infancy were negatively associated with sustained attention in toddlerhood and working memory in early childhood. Further, the association between chronic cortisol and working memory was longitudinally mediated by sustained attention. These results provide support for a developmental model in which chronically elevated cortisol contributes to disparities in sustained attention, which in turn affects the development of working memory in early childhood.

S2-01 Part 1 of a Cross-species Study: Social Competence through later Executive Functions Longitudinally Mediates Effects of Early-Life Socioeconomic Risk on Academic Achievement, Stephen Braren, *New York University, Brooklyn, United States* E-mail: stephen.braren@gmail.com

Stephen Braren, New York University; Rosemarie Perry, New York University; Clancy Blair, NYU

Children living in poverty face a multitude of risks which can impact the acquisition of core cognitive and social-emotional skills that are central to school readiness. Many studies have provided evidence that both executive functions (EF) and social competence serve as potential mechanisms by which poverty-related risks can influence school readiness and academic outcomes. However, the specific contributions of EF and social competence, and potential reciprocal relations between them in the prediction of early school achievement have not been previously examined. This study examined mediational processes involving children's EF skills at 58 months and Grade 1 (G1) and social competence in Kindergarten (K) and G1, as potential pathways by which early-life poverty-related risks influence Grade 2 (G2) math and reading achievement. Data came from the Family Life Project, a prospective longitudinal study of 1,292 children followed from birth in primarily low-income, non-urban counties. Autoregressive cross-lagged mediation analyses indicated that EF at 58 months through EF at G1 mediated negative associations between cumulative risk exposure and academic skills, with this pathway mediating 36% of the total effect. Furthermore, social competence at K through EF at G1 mediated negative associations between early-life cumulative socioeconomic risk and academic skills, mediating 16% of the total effect. These results provide support for the premise that social competence through EF is a pathway by which poverty-related risk predicts early academic competence. Furthermore, these findings provide preliminary evidence that EF development in high risk environments might be facilitated in part via targeting the development of social skills.

P1-21 Combined Prenatal Exposure to Alcohol and THC via E-Cigarettes Alters Offspring Activity Levels, Kristen Breit, *Center for Behavioral Teratology at San Diego State University, San Diego, United States* E-mail: kbreit@mail.sdsu.edu

Kristen Breit, Center for Behavioral Teratology at San Diego State University; Jennifer Thomas, San Diego State University

Reports reveal that pregnant women believe consuming cannabis via electronic cigarettes is safer than traditional smoking; thus, women are increasingly more likely to consume cannabis via vaping. Importantly, over half of pregnant women who report consuming cannabis also consume alcohol, but the combined effects of these drugs on a developing fetus are still largely unknown. We aimed to establish a model of vapor inhalation for combined tetrahydrocannabinol (THC) and ethanol (EtOH) exposure during gestation to examine how the combination may affect offspring brain and behavioral development. Pregnant Sprague-Dawley rats were exposed to vaporized THC via e-cigarette (100mg/mL/day), EtOH (68mL/hr/day), or the combination from gestational days 5-20. Vaporized THC exposure significantly lowered rectal temperatures in pregnant dams; moreover, co-exposure to THC and EtOH increased blood alcohol concentrations (BAC) compared to EtOH alone, particularly after repeated exposures. Following birth, the activity levels of one sex pair per litter were measured using open-field activity chambers from postnatal days 30-34 (adolescence). Prenatal EtOH exposure increased the total distance (inches) traveled in the chambers; however, the combination of EtOH and THC vapor specifically increased the distance traveled, time spent, and entries into the center of the chamber, particularly among males. These data suggest that prenatal vapor THC exposure alone may exert physiological effects in the mother, and that the consumption of THC combined with alcohol may raise maternal BAC, potentially further affecting fetal development. These data also illustrate that combined use may produce more severe behavioral consequences among offspring. Supported by AA025425

P1-57 AGE-DEPENDENT EFFECTS OF EARLY WEANING ON PAVLOVIAN FEAR CONDITIONING IN YOUNG RATS, **Kevin Brown,** *Drake University, Des Moines, United States* E-mail: kevin.l.brown@drake.edu

Kevin Brown, Drake University; Malaz Kreiker, Drake University; Maggie Golshani, Drake University; Cory Phillips, Drake University

Neonatal maternal separation stress has been shown to enhance long-term retention of Pavlovian fear conditioning in young rats (Callaghan & Richardson, 2012, Translational Psychiatry, e138, pp.1-7). Stress associated with early weaning enhances anxiety-like behaviors in tasks including the elevated plus maze (Ito, Kikusui, Takeuchi, & Mori, 2006, Behavioural Brain Research, 171, pp. 87-93). To our knowledge, the effects of early-weaning stress have not been examined in periweanling rats using Pavlovian fear conditioning. We hypothesized that early-weaned rats would show greater conditional freezing relative to late-weaned littermates and controls from normally-reared litters. Littermates were weaned at postnatal day (P)15 (early wean) or P27 (late wean), and controls from separate litters were weaned on P21. Rats were trained on P18 or 25 with a white noise conditional stimulus (CS) forward-paired with a floor shock unconditional stimulus (US). For the retention test (1 or 15 days later), the CS was presented in a novel environment. No evidence of enhanced retention as a function of weaning age was observed in subjects trained on P18, contrary to expected results. However, early-weaned rats trained on P25 showed some evidence of enhanced retention relative to late-weaned littermates. Additionally, both early- and late-weaned rats trained on P25 showed elevated conditional freezing relative to controls weaned on P21. Our results suggest that the effects of early weaning do not manifest until after P18. Furthermore, levels of conditional freezing in late-weaned rats were higher than expected. Ongoing studies are replicating and extending these findings to contextual fear conditioning.

S4-03 TRANSLATIONAL MODELS OF EARLY-LIFE STRESS AND THE IMPACT ON HPA AXIS FUNCTION AND BEHAVIOR IN MALES AND FEMALES, **Susanne Brummelte,** *Wayne State University, Detroit, United States* E-mail: sbrummelte@wayne.edu

Susanne Brummelte, Wayne State University; Sean Mooney-Leber, Penn State University; Chela Wallin, Wayne State University; Scott Bowen, Wayne State University

Human infants can be exposed to a variety of stressors in the perinatal period such as procedural pain or maternal drug use that influence HPA-axis programming, brain development and behavior. However, causal relationships and potentially contributing factors to outcomes are difficult to study in humans. Thus, in our translational rodent models, we aim to mimic human situations closely, in order to gain a better understanding of underlying mechanisms behind the consequences of early-life stress on later stress reactivity and behaviors. For example, we are modeling aspects of the neonatal intensive care unit (NICU) environment by exposing neonatal rats to procedural pain and reduced maternal care which results in long term changes to HPA axis function in females. Another currently common stressor in humans is gestational exposure to opioids due to the opioid crises in the US. However, there is a dearth of knowledge on the long-term consequences of opioid maintenance drugs prescribed during pregnancy and the role that the HPA axis may play in mediating some of the effects on the offspring including stress responsivity later in life. Our results suggest that both sexes appear to be somewhat resilient against a low dose of the opioid maintenance drug, buprenorphine given to dams before conception and continued throughout the postpartum period, but that high levels of buprenorphine have devastating effects if continued into the postpartum. There is a critical need for more translational models of early-life stress that mimic human stress exposure patterns to better understand sensitivity or resilience in exposed offspring.

P2-72 TEMPERAMENTAL APPROACH AND REWARD-RESPONSIVENESS HAVE DIFFERENTIAL ASSOCIATIONS WITH HOT AND COOL EXECUTIVE FUNCTIONS IN PRESCHOOL-AGED CHILDREN,
Lauren Bryant, *College of the Holy Cross, Cheshire, United States* E-mail: lauren.bryant@uconn.edu

Lauren Bryant, College of the Holy Cross; ADAM HOLLIE, University of Connecticut; Nicholas Pinnock, University of Connecticut; Cassie Radzanower, University of Connecticut; Christina Flores, University of Connecticut; Julie Marino, University of Connecticut; Kimberly Cuevas, University of Connecticut

Research on the effects of reward on childhood executive function (EF) has traditionally utilized separate measures with varying demands to investigate EF under rewarded (“hot”) and non-rewarded (“cool”) conditions. The few studies that controlled for task demands have yielded mixed findings (Beck et al., 2011; Tarullo et al., 2018), but did not consider the influences of temperament on reward-EF associations. The present study investigated whether reward-based change in EF is moderated by dimensions of child temperament related to affect/excitement in response to anticipated positive events/activities. We administered hot and cool versions of equivalent EF measures (Day/Night task: Gerstadt et al., 1994; Big/Small task) to 3.5- to 5-year-olds (N = 93; Mage = 4.55 years). For both tasks, children completed non-Stroop and Stroop (i.e., saying the opposite stimulus label) phases. Temperament was assessed via parent-report: Reward-Responsiveness (Behavior Activation System; Blair, 2003) and Approach scales (Children’s Behavior Questionnaire; Rothbart et al., 2001). MANCOVAs (covariates: Reward-Responsiveness and Approach) revealed significant Phase × Reward interactions (ps< .02); for the Stroop phase only, children had a higher proportion of correct responses during the rewarded task (M = .90, SD = .10) than the non-rewarded task (M = .86, SD = .15), t(92)= 2.94, p = .03. Significant 3-way interactions with each temperament covariate (ps< .02) indicated that whereas high Reward-Responsiveness predicted greater response accuracy on the non-rewarded Stroop phase, r(91)= .33, p = .001, high Approach was associated with poorer performance on the rewarded Stroop, r(91)= -.21, p = .04. These findings indicate that related components of child temperament predict different aspects of EF.

P1-40 AMYGDALAR CRF SIGNALING IS INVOLVED IN THE LASTING EFFECTS OF NEONATAL PAIN.,
Michael Burman, *University of New England, Biddeford, United States* E-mail: mburman@une.edu

Michael Burman, University of New England; Seth Davis, University of New England; Jared Zuke, University of New England; Russo Erica, University of New England

Human infants in the neonatal intensive care unit (NICU) are exposed to a variety of stressful and painful events and are more likely to suffer from conditions such as chronic pain, anxiety and depression. We've adapted rodent models to investigate the neurobiological mechanisms underlying these changes in which rats receiving either repeated tactile or chronic inflammatory pain during the first week of life.

Contextual and auditory fear conditioning, elevated plus maze behavior and somatosensory function were assessed post-weaning, in adolescence and adulthood in male and female rats. Contrary to our initial hypothesis, we found reductions in fear conditioning and anxiety-like behaviors but enhanced stress-induced tactile hypersensitivity, in rats exposed to neonatal pain.

In parallel, in situhybridization revealed that neonatal pain significantly enhanced CRF signaling in the amygdala, but not hypothalamus, in male, but not female, rats. Furthermore, the stress-induced tactile hypersensitivity was reduced by administration of a CRFR1 antagonist either systemically during neonatal stress on PND 1-7 or intra-amygdala during the activating stressor at PND 24.

Together, these experiments provide evidence that amygdala CRF signalizing is at least one mechanism by which neonatal pain and stress have lasting effects of affective and sensory function.

P1-67 SOCIAL DISORDER MODERATES THE LINK BETWEEN PARENTS' AND THEIR INFANTS' ATTENTION TO THREAT, **Jessica Burris,** *Rutgers University, Newark, United States* E-mail: jlburris@ucdavis.edu

Jessica Burris, Rutgers University; Denise Oleas, Rutgers University ; Lori Reider, Rutgers University; Michell Sarquez, Rutgers University; Ashley Weems, Rutgers University; Samantha Leigh, Pennsylvania State University ; Briana Hernandez, Pennsylvania State University ; Kristin Buss, Penn State; Koraly Perez-Edgar, The Pennsylvania State University; Vanessa LoBue, Rutgers University

Some evidence points to a link between parents' and their children's attention patterns to threat (Cresswell et al., 2010). However, less work has investigated the role that the environment plays in this relation, with some findings suggesting that negative environmental factors can impact attention patterns (Degnan et al., 2010). Little work has investigated the developmental origins of the interplay between intergenerational and environmental processes, and their impact on attention to threat starting in infancy. The current study aimed to investigate the relation that a disordered environment has on the link between parents' and their infants' attention to threat.

Four-month-old infants' attention to threat was quantified using an eye-tracking task that measured infants' visual latency to fixate angry faces, and adults' was quantified using button press latency to the presence of a threatening face embedded in a matrix of happy faces (N=18; data collection ongoing). To measure variables related to social disorder, we used the Community Survey Questionnaire.

For participants who reported high levels of social disorder in their environment, there was no relation between infants' and parents' latency to respond to threatening targets ($t = .92$, $p>.05$); however, there was a significant link for participants who reported low levels of social disorder ($t = 1.77$, $p<.05$).

These preliminary findings highlight the important role played by environmental factors in the relation between attention to threat in parents and their infants. Further analyses will focus on disentangling social disorder from other SES-related variables, to further elucidate the factors impacting intergenerational concordance of attention bias to threat.

O1-04 INVESTIGATING HOW THE TIMING OF REMOVAL FROM INSTITUTIONAL CARE AND PLACEMENT WITH FOSTER-CARE FAMILIES INFLUENCES BRAIN OSCILLATION PATTERNS, **George Buzzell,** *University of Maryland, College Park, United States* E-mail: gbuzzell@umd.edu

George Buzzell, University of Maryland; Sonya Troller-Renfree, Teachers College, Columbia University; Mark Wade, Harvard Medical School; Ranjan Debnath, University of Maryland, College Park; Santiago Morales Pamplona, University of Maryland; Charles Zeanah, Tulane University; Charles Nelson, Harvard Medical School; Nathan Fox, University of Maryland

Children with a history of psychosocial neglect display impairments in monitoring and controlling their behavior (cognitive control), however, the neural underpinnings of such effects remain unclear. Mediofrontal theta oscillations (MTO) underlie cognitive control in various mammalian species. Rodent work demonstrates that presence/absence of mothers exhibit stronger influences on MTO of their offspring earlier in life, and repeated maternal separation (neglect) early in life leads to lasting reductions in MTO. Drawing parallels between the rodent and human literatures, this talk reports on how prolonged institutional rearing (neglect) impacts MTO in humans, compared to a randomized control trial of a high-quality foster care intervention. 136 children aged 6-31 months residing in Romanian institutions were randomly assigned to remain living in the institution (n = 68, 33 boys) or placed into high-quality foster-care (n = 68, 34 boys). The intervention lasted until 54 months and subsequent follow-ups assessed EEG during a go/nogo cognitive control task at ages 8, 12 and 16 years. Initial analyses at age 16 reported positive findings with both an intervention and timing effect. The current talk will present data from previous age points and will examine trajectories of mediofrontal theta across age for both those randomized to foster care and those randomized to care as usual. We will as well examine how placement timing relates to trajectories of MTO development.

David Kucharski Young Investigator Award David Kucharski Young Investigator Award: THE EFFECT OF OUR EARLY EXPERIENCES ON THE DEVELOPMENT OF THE MIND, BRAIN, AND BODY, **Bridget Callaghan,** *The University of California, Los Angeles, Los Angeles, United States* E-mail: bridgetcallaghan281@gmail.com

Bridget Callaghan, The University of California, Los Angeles

It is widely accepted that our early experiences shape the respective development of the brain and body, with each of these systems contributing to the emergence of health and disease. Nonetheless, much of the research on disease outcomes remains siloed, investigating central or peripheral processes with little integration across the two. In this talk, I will present data from three different studies which highlight the importance of brain-body communication in pediatric mental health, the clinical potential of body-focused approaches for early detection of psychological illness, and the promise of integrative brain-body science for understanding environmental shaping of brain development.

P2-38 MATERNAL OBESITY AND INFLAMMATION DURING PREGNANCY PREDICT INFANT NEURODEVELOPMENT, **Marie Camerota,** *RTI International, Research Triangle Park, United States* E-mail: marie.camerota@unc.edu

Marie Camerota, RTI International; Cathi Propper, University of North Carolina at Chapel Hill; Laurie Wideman, University of North Carolina at Greensboro

Maternal pre-pregnancy obesity is linked to negative neurodevelopmental outcomes in offspring, possibly due to increased----- systemic inflammation (van der Berg et al., 2016). However, much of this research is based on animal studies and basic research, rather than observational, longitudinal studies of children. The proposed study tests whether maternal obesity and inflammation during pregnancy impact infant neurodevelopment, using a sample of 40 African-American dyads.

Inflammatory markers were assayed from plasma collected during the third trimester of pregnancy. When infants were 3 months, maternal BMI was recorded and used as a proxy for pre-pregnancy obesity (BMI > 30; nobese = 24). At 6 months, infants completed the cognitive subscale of the Bayley Scales of Infant Development (BSID-III; Bayley, 2006), as well as the Still-Face Paradigm (SFP; Tronick et al., 1978). Bayley scaled scores and infant negative affect (averaged across still-face and reunion episodes) were neurodevelopmental outcomes of interest.

Controlling for infant age and maternal education, maternal pre-pregnancy obesity negatively predicted infant Bayley scores ($\beta = -.35$, $p = .005$) but not infant negative affect. Although maternal obesity positively correlated with prenatal CRP levels ($r = .38$, $p = .02$), and CRP was marginally correlated with Bayley scores ($r = -.31$, $p = .06$), the indirect path from obesity to CRP to Bayley was not significant. Independent of obesity, higher levels of TNF-α ($\beta = .30$, $p = .04$) predicted more infant negativity during the SFP. These findings suggest that prenatal obesity and inflammation may be independently related to infant neurodevelopmental outcomes.

P2-30 A DESCRIPTION OF MOTHER SOCIAL AND OBJECT PLAY DURING A DYADIC PLAY EXPERIENCE WITH INFANTS, **Julie Campbell,** *Illinois State University, Macomb, United States* E-mail: juliecampbell812@gmail.com

Julie Campbell, Illinois State University; Emily Marcinowski, Virginia Commonwealth University; Jessica Rillo, Illinois State University; Darcy Storer, Illinois State University

Research demonstrates that infants prefer to watch caregivers as they manipulate objects as opposed to face-to-face play or watching objects alone (Deak et al., 2014). Infants spend more time looking at caregivers' hands and objects during object manipulation, as opposed to the caregiver's face (Yu & Smith, 2013). It follows that parents who spend more time engaged in object play, as opposed to social play, should have infants who have spent significantly more time observing object manipulation as opposed to infants' whose parents spend more time engaged in social play. This project aims to investigate empirically whether parents spend more time engaged in object play or social play during a play session with their infant.

Infants were recruited at sitting emergence from the community across 6 longitudinal visits. Parents were provided with four standard toys and video-recorded interacting with their infants for five minutes. Reliable coders marked the duration of object (object was involved in interaction) or social play (primarily social interaction with no object involvement). Parents spent more time engaged in social play (M = 97s), than in object play (M = 23s).

Future analyses will benefit from a description of parent play behavior. Previous research supports the idea that infants observe object manipulations of their caregiver(s) by watching the caregiver's hands and objects when engaged in object manipulation. However, there is no research investigating under what circumstances object manipulation is likely to occur. These observations set the stage for investigating the impact of object affordances on behavior.

P2-09 DEVELOPMENTAL TRAJECTORIES OF TEMPORAL MEMORY AND HIPPOCAMPAL SUBREGIONS, **Kelsey Canada,** *University of Maryland, College Park, United States* E-mail: kcanada@umd.edu

Kelsey Canada, University of Maryland; Morgan Botdorf, University of Maryland, College Park; Tracy Riggins, University of Maryland

Episodic memory is a cornerstone ability that involves remembering events from one's past, including spatial and temporal information, and critically relies upon the hippocampus. Prior research has identified developmental differences in subregions of the hippocampus (i.e., head, body, and tail) that relate to aspects of episodic memory during early childhood. However, existing studies are cross-sectional and have yielded mixed results for both age-related differences in subregion volume and relations between subregion volume and memory.

In the current study, we used an accelerated longitudinal design to characterize developmental trajectories of the temporal aspect of episodic memory, or temporal memory, hippocampal subregions, and their relations from early to mid-childhood. 198 subjects (ages 4-8 years) participated in 1 to 3 waves of temporal memory assessments and MRI scans at one-year intervals. Using linear mixed-effects modeling, we identified linear age-related improvements in temporal memory ability. In the hippocampus, we found non-linear age-effects in hippocampal head volume; such that children showed accelerated increases in volume between 5-7 years. In the hippocampal body and tail, we found age-related increases volume between 4- to 8-years. Initial analyses assessing relations between hippocampal subregions and temporal memory suggest greater hippocampal head volume relates to better temporal memory ability earlier in childhood, while decreased head volume predicts improved temporal memory as children enter middle childhood. Temporal memory did not relate to body or tail.

Together, these data suggest that the developmental of temporal memory in young children is dynamic and related to specific changes in the hippocampus during early childhood.

P2-81 THEORY OF MIND TASK PERFORMANCE IN EXPECTANT FATHERS: LINKS WITH PRENATAL ATTACHMENT, **Sofia Cárdenas,** *University of Southern California, PLAYA DEL REY, United States* E-mail: sicarden@usc.edu

Sofia Cárdenas, University of Southern California ; Diane Goldenberg, University of Southern California; Sarah Stoycos, University of Southern California; Narcis Marshall , University of Southern California; Jenna Chin, University of Southern California; Pia Sellery, University of Southern California; Darby Saxbe, University of Southern California

Given the importance of father involvement in healthy child development, research is needed to elucidate the mechanisms underlying father-child attachment. Paternal bonding may be facilitated by brain regions associated with Theory of Mind (ToM): the ability to consider the thoughts and feelings of others. Previous fMRI studies of fathering have examined neural responses to infant stimuli but have not used standardized tasks to measure ToM in conjunction with fathering. The present study addresses this gap by examining whether expectant fathers' performance on a standardized ToM task is associated with their self-reported prenatal attachment to the fetus. As part of a longitudinal study of couples transitioning to first-time parenthood, expectant fathers (N=25, mean age=31.92 (range 24-41; SD =4.41)) completed the Why-How task in an fMRI scanner. This task presents participants with a series of actions (such as putting on sunscreen or taking medicine) and asks participants to respond to questions relating to "how" an action is being performed (i.e., action perception) or "why" the action is being performed (i.e., ToM). We found that greater relative accuracy in "why" versus "how" trials correlated with stronger prenatal attachment ($r(25)=.40$, $p = .047$). In other words, fathers who reported greater feelings of bonding with their unborn child showed more accurate performance on a standardized ToM task. These preliminary results suggest that ToM may support a father's ability to form a more meaningful relationship with their infant—starting before birth. In the future, we will investigate whether these results predict postpartum father-child attachment and fathers' parenting sensitivity.

P2-45 RESPIRATORY SINUS ARRHYTHMIA, NEGATIVE AFFECT, AND DYADIC CONFLICT IN PARENTS AND PRESCHOOLERS, **Daniel Choe,** *UC Davis, Davis, United States* E-mail: danchoe@ucdavis.edu

Daniel Choe, UC Davis; Elisabeth Chun, UC Davis

Respiratory sinus arrhythmia (RSA) is a physiological marker of parasympathetic regulation, with high RSA reflecting optimal self-regulation in children and adults. Parent–child interactions (PCI) influence physiological processes underlying emotional expression and regulation, but it is unclear how parents' and children's RSA influences their affect and conflict. Using physiological and observational data, we expect parent and child RSA to be differentially related to each other, negative affect, and dyadic conflict depending on whether PCI are stressful or familiar. Thirty-two parents (M = 38.26 years, 28 mothers) and preschoolers (M = 50.71 months, 16 daughters) participated in baseline, free-play, and clean-up interactions, in which parents instructed children to put toys away without helping. Electrocardiogram data were collected using MindWare Mobile Impedance Cardiographs. RSA was averaged across 30-second epochs using Heart Rate Variability Analysis. RSA reactivity was calculated for parent and child by subtracting free-play/clean-up by baseline RSA. Differences in negative affect and dyadic conflict coded by research assistants from videos were tested using t-tests in SPSS. Path models in Mplus tested for associations between parent and child RSA, affect, and conflict. Parent negative affect did not differ across free-play and clean-up, but child negative affect and dyadic conflict were higher during clean-up. During free-play, parent and child RSA were unrelated to each other, negative affect, and dyadic conflict, whereas during clean-up, child and parent RSA were positively related and child RSA positively predicted dyadic conflict. Findings will be discussed in regards to the coordination of parent and child psychophysiology and emotion.

P2-35 THE EFFECTS OF INITIAL LEARNING CONDITIONS ON OTHER-SPECIES FACE PROCESSING IN INFANCY, William Chollman, *University of Tennessee Knoxville, Knoxville, United States* E-mail: wchollma@vols.utk.edu

William Chollman, University of Tennessee Knoxville; Greg Reynolds, University of Tennessee; Kelly Roth, University of Tennessee Knoxville; Jennifer Shearon , University of Tennessee; Cathryn Pryor, University of Tennessee; Malorie Garrett, University of Tennessee

Perceptual narrowing is characterized by a decline in perceptual sensitivity to non-native stimuli in early development (Maurer & Werker, 2014). Previous experience likely moderates perceptual narrowing in that processing of native and non-native stimuli varies based on prior experience (e.g., Scott & Monesson, 2009). The current study utilized high density event-related potentials (ERPs) to examine the effects of initial learning conditions on individuation and subordinate-level categorization of monkey faces in infancy. Eighteen 12-month-old infants were tested in one of two familiarization conditions. In the single exemplar condition infants were exposed to a single monkey face, whereas in the multiple exemplar condition infants were shown a series of monkey faces from the same species (either Capuchin or Macaque). Following familiarization, infants were shown familiar faces, novel faces of the same species, and novel faces from the other species during ERP testing. The ERP analysis focused on the Negative central (Nc) ERP component associated with infant attention and the Late Slow (LSW) associated with perceptual processing and recognition memory. Infants in the multiple exemplar familiarization group demonstrated greater LSW amplitude for familiar compared to novel-same species monkey faces at left temporal electrodes, and greater LSW amplitude for novel-other species compared to novel-same species faces at right temporal electrodes. In contrast, infants only exposed to a single exemplar during familiarization showed no differences in LSW amplitude based on familiarity or species. These findings indicate that exposure to multiple exemplars during familiarization facilitates individuation and categorization of other-species faces at 12 months of age.

P1-61 COGNITIVE EMPATHY FOLLOWING EARLY INSTITUTIONAL CARE: ASSOCIATIONS WITH COGNITIVE CONTROL, Tricia Choy, *University of California, Riverside, Rowland Heights, United States* E-mail: tcchoy.93@gmail.com

Tricia Choy, University of California, Riverside; Kathryn Humphreys, Vanderbilt University; Dylan Gee, Yale University; Laurel Gabard-Durnam, Boston Children's Hospital; Bonnie Goff, UCLA; Eva Telzer, UNC Chapel Hill ; Jessica Flannery, University of Oregon; Christina Caldera, UCLA; Nim Tottenham, Columbia University

Adverse caregiving increases the risk for poor development of cognitive empathy (i.e., perspective taking) (Burack et al., 2006). Cognitive empathy, the ability to understand another's emotions/perspectives even if they differ from one's own, is essential for many higher-level skills, in particular social competence (Davis, 1983). Cognitive empathy is a complex behavior that requires cognitive control (Carlson & Moses, 2001; Wardlow, 2013), in part because cognitive control facilitates management of competing representations (e.g., self and other) (Decety & Lamm, 2006). Here, we examined cognitive empathy in adolescents (n=136, 9-17 years old (M(SD)age = 12.37(2.46)) with or without previous institutional (PI) care experience, a form of severe neglect. Parents reported that at the group level, adolescents in the PI group had lower cognitive empathy scores relative to the comparison group ($F(1, 129) = 3.98$, $b = .24$, $p = .01$), and these scores were associated with lower social competence scores ($F(6,114) = 3.60$, $b = .21$, $p = .02$,). However, individual differences in cognitive empathy were positively associated with parent-reported inhibitory control ($F(4,124) = 2.63$, $p = .02$). Parent-reports were validated by laboratory-based assessment of inhibitory control (i.e., a computerized 'go/nogo' task), such that adolescents with higher parent-reported inhibitory control also produced fewer commission errors. Moreover, inhibitory control statistically mediated the association between caregiving group and cognitive empathy. These findings add to our understanding of mechanisms underlying social difficulties that can arise following institutional care (Humphreys et al., 2018) and support the hypothesis that cognitive control difficulties may contribute to social problems, in part, by interfering with the development of cognitive empathy.

P2-02 PREVENTING ABERRANT DNA METHYLATION ASSOCIATED WITH ADVERSE EXPERIENCES IN EARLY LIFE, **Nicholas Collins,** *University of Delaware, Newark, United States* E-mail: Nicollin@udel.edu

Nicholas Collins, University of Delaware; Catherine Zimmerman, University of Delaware; Tiffany Doherty, University of Delaware; Natalia Phillips, University of Delaware; Tania Roth, University of Delaware

Adverse experiences in early life have developmental implications, such as an increased risk for anxiety and depression. One way this may occur is through the epigenetic process of DNA methylation. Using a rodent model, our lab has demonstrated significant differences in adult maternal behavior and DNA methylation after exposure to maltreatment in early life. The present study sought to investigate whether valproic acid (VPA), a histone deacetylase inhibitor (HDACi), can mitigate aberrant DNA methylation associated with maltreatment in the prefrontal cortex (PFC). Utilizing a scarcity adversity paradigm of maltreatment outside the home cage, male and female Long-Evans rat pups were exposed to either nurturing care or maltreatment for 30 minutes per day during postnatal days 1-7. Prior to this behavioral paradigm, rats were given an intraperitoneal injection of VPA (200 mg/kg) or vehicle. We replicated previous findings in the lab such that male and female rats exposed to maltreatment had significantly higher levels of methylation in the PFC comparable to control animals. At the dose of 200mg/kg, administration of VPA was not able to prevent the increased DNA methylation associated with maltreatment. Currently, the lab is working to determine whether higher doses of VPA can normalize aberrant DNA methylation associated with maltreatment. Future work will include raising these pups to adulthood, to elucidate an effective way of mitigating aberrant maternal behavior associated with early life adversity.

P2-34 INTERSENSORY PROCESSING SKILLS AT 12 MONTHS PREDICTS GROWTH IN WORD PRODUCTION BETWEEN 18 AND 24 MONTHS, **Kaityn Contino,** *Florida International University, Homestead, United States* E-mail: Kcont012@fiu.edu

Kaityn Contino, Florida International University; Elizabeth Edgar, Florida International University; Kaitlyn Testa, Florida International University; Amanda Delgado, Florida International University; James Todd, Florida International University; Lorraine Bahrick, Florida International University

Intersensory processing (IP; coordinating synchronous auditory and visual stimulation) is considered a foundation for language development (Bahrick & Lickliter, 2012). However, IP has typically been studied at the group level. The Multisensory Attention Assessment Protocol (MAAP; Bahrick et al., 2018) was recently developed to assess individual differences in IP, allowing researchers to directly assess relations between IP and later outcomes such as language. Using the MAAP, Bahrick et al. (2018) found that IP at 2-5 years predicts concurrent expressive language. The present study extends these findings to younger children by examining whether 12-month IP predicts growth in word production between 18 and 24-months.

Forty-five 12-month-olds received the MAAP to index IP. Each trial begins with a central event which stays on while two 12s lateral events (two women speaking) are presented. One lateral event is in synchrony with its natural soundtrack. IP was calculated as the proportion of total looking time to the audiovisual synchronous event. Word production was calculated as the total number of words spoken by the child during an 8-minute parent-child interaction. We assessed growth in word production between 18 and 24 months.

IP at 12-month was correlated with growth in word production from 18 to 24-months ($r = .35$; $p = .01$). These findings indicate that infants with greater IP exhibit greater gains in word production from 18 to 24-months.

The current study extends research on relations between IP and language development and demonstrates that IP in infants as young as 12-months predicts later growth in word production.

P2-67 RESPIRATORY SINUS ARRYTHMIA (RSA) DURING AN EXECUTIVE FUNCTIONING TASK: ASSOCIATIONS WITH CHILDREN'S FEARFUL TEMPERAMENT AND FAMILY ENVIRONMENT, **Andrea Cordero,** *The Pennsylvania State University, University Park, United States* E-mail: alc5886@psu.edu

Andrea Cordero, The Pennsylvania State University ; Anna Zhou, Penn State University; Kristin Buss, Penn State

Fearful temperament and family environments are associated with the development of executive function (EF) (Aksan & Kochanska, 2004; Schroeder & Kelley, 2009). RSA, a marker of self-regulation, has been linked to executive functioning performance (Marcovitch et al., 2010). We examined how temperament and negative family environment interact to predict RSA during an EF task.

Participants (n = 51, 43% female) were drawn from a larger longitudinal study of temperament and socioemotional development. Fearful temperament was observed at age 2. We created a composite of negative family environment at 3.5 years using subscales from the Intimate Relations Questionnaire (Braiker & Kelley, 1979), Co-parenting Questionnaire (Margolin et al., 2001) and Self-Expressiveness in the Family Questionnaire (Halberstadt et al., 1995). We measured RSA during the Dimensional Change Card Sort task (DCCS; Zelazo et al., 1996) at 5 years.

Mean reactivity from baseline to the DCCS suggested RSA augmentation, increase (M = 0.55, SD = 0.67). There were no main effects. However, family environment approached significance in moderating the association between temperament and RSA reactivity, B = -0.23, t(47) =-1.73, p = .08. The Johnson-Neyman technique showed that in the context of less negative family environments, less fearful temperament was significantly associated with greater RSA augmentation.

The overall pattern shows that children are increasing parasympathetic tone while engaging in EF task, suggesting that augmentation is the adaptive pattern during this task. This pattern holds only for children lower in fearful temperament and living in less negative family environments. In contrast, temperament did not predict RSA in the context of high negative family environments.

P2-57 DOES HAND PREFERENCE FOR ACQUISITION INFLUENCE THE ABILITY TO PERFORM ROLE-DIFFERENTIATED BIMANUAL MANIPULATION?, **Sarai Cortina,** *Illinois State University, Normal, United States* E-mail: smcorti@ilstu.edu

Sarai Cortina, Illinois State University; Julie Campbell, Illinois State University; George Michel, University of North Carolina-Greensboro; Robert Pearson, Illinois State University

Hand preference for acquisition role-differentiated bimanual manipulations (RDBMs) have been shown to be related, as infants prefer to use the same hand for performing these actions (Babik & Michel, 2015). RDBMs occur when one hand stabilizes an object, while the other hand performs a fine motor action on the object. These complex actions require both hands to work together to accomplish a mutual goal (Babik & Michel, 2015). Previous research has demonstrated that having a consistent hand preference is advantageous for better performance of cognitive functions (Nelson et. al, 2017). This project assessed whether a consistent hand preference provides an advantage when performing RDBM actions.

The purpose is to explore the relation of acquisition hand preference to RDBM efficiency, which is defined as the speed of an infant successfully completing an RDBM action. Data from fifty-six (14 early-right, 14 late-right, 14 late-left, and 14 no-preference) infants were derived from archived videos from a larger longitudinal study. Videos were examined for the time taken to successfully complete simple and difficult RDBM actions. The start time was indicated by the infant's initial contact with an object and stop time was indicated by successful completion of a RDBM action.

A one-way repeated-measures ANOVA revealed a significant effect for age ($p = .001$) with a large effect size (Cohen's $d = .57$). Pairwise comparisons revealed a significant difference in average RDBM efficiency between 9 months ($M = 9.15$) and each of the other months of testing.

P2-74 THREAT DYNAMICS IN YOUTH: A GAME ENVIRONMENT TO PROBE NEURAL CORRELATES,
Michael Crowley, *Yale School of Medicine, New Haven, United States* E-mail: michael.crowley@yale.edu

Michael Crowley, Yale School of Medicine

This talk will focus on EEG correlates of threat processing in relation to anxiety symptoms in youth, with an eye toward mechanisms sustaining social anxiety and the value of considering threat processing as a dynamic cascade. We present data from a game-line environment (the Bomb) designed to unpack the neural correlates of a threat processing cascade at multiple stages (ambiguous potential threat, actual threat, reappraisal opportunity and escape). In a sample of 36 youth (9-13 yrs.) screened for high (SCARED clinical cutoff) and low anxiety symptoms we present event-related potential data during the 'Bomb' threat detection/processing task. This work can shed light on neural correlates of threat processing during various processing stages from cue to threat to avoidance feedback in the unfolding context of a game environment. Anxious youth (n=19) show a heighted attention response (P3), indicating enhanced vigilance for ambiguous threat cues, whereas low anxious youth (n=17) react more strongly to actual threats (P3) and also show discrimination between threats to them and threats to others (P6).

P1-19 ENHANCED & PERSISTENT CORRUGATOR SUPERCILII ACTIVITY DURING NEGATIVE ANTICIPATION IN PREADOLESCENT GIRLS WITH ANXIETY DISORDERS, **Joshua Cruz,** *University of Wisconsin-Madison Psychiatry Department, Madison, United States* E-mail: jrcruz@wisc.edu

Joshua Cruz, University of Wisconsin-Madison Psychiatry Department; Lisa Williams, University of Wisconsin - Madison; Daniel McFarlin, University of Wisconsin-Madison; Nakul Aggarwal, University of Wisconsin-Madison; Ned Kalin, University of Wisconsin-Madison

Studies have demonstrated that corrugator supercilii muscle activity is modulated in response to acutely presented emotion-related stimuli (negative>non-negative). Here, we examined whether corrugator activity can be used as a reflection of sustained anxious anticipation, which is a hallmark of childhood ADs, and assessed pathophysiological alterations in girls with AD and girls at-risk for the development of ADs.

165 treatment-naive girls (age 9-11; 48 AD, 80 at-risk, 37 controls) underwent an anticipation paradigm where they viewed 2-minute blocks of negative or neutral pictures during the collection of corrugator electromyography (EMG). A 2 (valence -- (negative vs. neutral) by 2 (uncertainty--uncertain vs. certain anticipation) task design was used. Analysis of the sustained responses focused on the anticipation periods prior to image presentation.

Overall, corrugator activity was greater during sustained anticipation of negative pictures compared to neutral pictures [$F(1,162)=9.00$, $p=0.003$]. This valence effect was most prominent in AD girls [$F(1,47)=10.52$, $p=0.002$]. Across the entire sample, corrugator activity during sustained negative anticipation was correlated with self-reported anticipation task-related anxiety [$R2 = 0.04$, $p=0.01$] but not anxiety symptoms as assessed by the Screen for Child Anxiety-Related Emotional Disorders (SCARED) parent & child reports.

These findings suggest that corrugator activity can be modulated by sustained negative anticipation in addition to acutely presented emotional stimuli. Greater valence sensitivity in AD girls suggests that corrugator activity may be enhanced in youth with ADs. Lastly, corrugator activity during sustained negative anticipation may be a useful measure of context-specific anxiety but not general anxiety symptoms.

P1-08 AGE AND SEX DIFFERENCES IN BEHAVIORS RELEVANT TO SCHIZOPHRENIA AND ADDICTION, **Ellen Cullity,** *Florey Institute of Neuroscience and Mental Health, University of Melbourne, Melbourne, Australia* E-mail: ellen.cullity@florey.edu.au

Ellen Cullity, Florey Institute of Neuroscience and Mental Health, University of Melbourne; Alexandre Guérin, The Florey Department of Neuroscience and Mental Health; Heather Madsen, Florey Institute of Neuroscience and Mental Health; Christina Perry, Florey Institute of Neuroscience and Mental Health; Jee Hyun Kim, The Florey Institute of Neuroscience and Mental Health

Dopamine receptors 1 (D1) and 2 (D2) are important for neurodevelopmental disorders. We have shown previously that in the insula cortex, the density of D1- compared to D2-expressing neurons (D1:D2 ratio) is lower in adolescent male mice compared to adolescent female and adult mice. Since addiction and schizophrenia are male dominant disorders which often have an adolescent onset, this reduced ratio may be relevant in understanding their neurobiological basis. Using a methamphetamine conditioned place preference (CPP) paradigm, I examined age and sex differences in methamphetamine-induced hyperactivity and place preference- relevant to psychosis in schizophrenia and addiction, respectively. Brains were perfused to investigate D1- and D2-expressing neuron activationwithin the insula cortex following these behaviors. I hypothesized that adolescent males would form a stronger CPP compared to adolescent females and adults, and that psychosis-like and addiction-related behaviors would be associated with a reduced ratio in the insula cortex. Methamphetamine at 3 mg/kg increased locomotor activity in all mice, and this effect was enhanced in adults compared to adolescents; no effects were found at 0.1 mg/kg. In males, a higher proportion of adolescents formed a preference to 0.1 mg/kg methamphetamine compared to adults, and a higher proportion of adults formed an aversion to 3 mg/kg methamphetamine compared to adolescents. In females, no age differences were found at either dose. This suggest there is an age effect in the development of methamphetamine-induced hyperactivity, and that more male adolescents showa preference for methamphetamine compared to male adults. Collection of brain data is ongoing.

P1-39 REPEATED EXPOSURES TO BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENE (BTEX) VAPOR AT ENVIRONMENTAL-LIKE CONCENTRATIONS IN ADOLESCENT SWISS-WEBSTER MICE RESULTS IN ALTERATIONS TO LOCOMOTOR ACTIVITY AND OTHER BEHAVIORAL OUTCOMES,
Cameron Davidson, *Wayne State University, Ypsilanti, United States* E-mail: fw4948@wayne.edu

Cameron Davidson, Wayne State University ; Scott Bowen, Wayne State University ; Drew Svenson, Wayne State University; Kevin Heslip, Wayne State University; Michael Naddaf, Wayne State University

Volatile organic compounds (VOCs) such as benzene, toluene, ethylbenzene, and xylene are widely utilized in industry and occasionally in home products. Collectively known as BTEX, these VOCs are present in most urban areas and industrial sites and readily vaporize from liquid to gas at room temperature. Although VOC levels can vary, there are relatively higher concentrations found in urban-industrial areas, roadways, and parking structures. With no published preclinical investigation of the effects of the combination of these compounds, an investigation was warranted. Adolescent male Swiss-Webster mice were exposed Monday – Friday to BTEX concentrations that were modified to mimic human exposure (1.5 hrs/exposure x 2 exposures/day x 3 weeks = 30 total exposures). Four exposure conditions were utilized which included three BTEX mixture “groups” (ENV1, ENV2, and OCC) and an “air only” (AIR) condition as a control. In Experiment 1, locomotor activity was assessed during BTEX exposures (N=32). In Experiment 2, animals exposed to various BTEX mixtures were evaluated for behavioral changes using the Y-maze, Rotarod, fecal bolus, and inverted screen assays (N=40). Preliminary analysis of locomotor behavior revealed differential patterns of activity with all BTEX exposure groups initially displaying increases in locomotor activity as compared to AIR. Additionally, disruptions in behavioral measures were found for the groups exposed to BTEX. Our preclinical BTEX model illustrates that repeated exposures may have significant detrimental effects on behavioral measures such as locomotor activity. Further analysis of behavioral and neurochemical outcomes will provide greater insight into the consequences of repeated BTEX exposure.

P1-13 INVESTIGATING BRAIN ELECTRICAL ACTIVITY AND NETWORK ORGANIZATION IN ADOLESCENTS WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER IN ALPHA FREQUENCY BAND, **Ranjan Debnath,** *University of Maryland, College Park, College park, United States* E-mail: rdebnath@umd.edu

Ranjan Debnath, University of Maryland, College Park; Natalie Miller, University of Maryland; Santiago Morales Pamplona, University of Maryland; Kaylee Seddio, University of Maryland - College Park; Nathan Fox, University of Maryland

Within the ADHD literature, several studies have examined spectral power, connectivity or networks via EEG in alpha band. However, none investigated these components together and individual studies have reported mixed results in isolation on them. To address this gap, the present study investigated power, connectivity and network organization in the alpha band in a sample of adolescents with ADHD. We measured spectral power, functional connectivity and brain networks using graph theoretical approach. Eyes closed resting EEG was collected from 25 adolescents with clinical levels of ADHD symptoms (F=9, Mage = 12.88; Age range = 12-14 years) and 25 age and gender matched control subjects (Mage = 13.11). Spectral power and connectivity were computed in lower (8-9Hz), peak (10Hz), and upper (11-12Hz) alpha bands. Furthermore, clustering coefficient, pathlength and small-world network were computed in these bands to examine the brain network organization. Results revealed reduced power and connectivity in lower (Pabs_pow = .015; Prel_pow = .002; Pconnectivity = .001) and peak alpha (Pabs_pow = .004; Prel_pow <.001; Pconnectivity = .032) band and reduced clustering coefficient (P=.019) and small-worldness (P=.018) in lower alpha band in the ADHD group compared to the Control group. The two groups did not differ in upper alpha band for any of the measured parameters. These findings suggest differences in brain electrical activity and functional brain network organization in ADHD, particularly in the lower alpha band. These results will be discussed within the framework of understanding the neural correlates of ADHD.

S5-03 COHERENCE AND DIVERGENCE IN PARENTS' REPORTED AND ENACTED REACTIONS TO CHILDREN'S DISAPPOINTMENT PREDICT PSYCHOPHYSIOLOGICAL FUNCTIONING, **Laura DeLoretta,** *University of California Riverside, Riverside, United States* E-mail: ldelo002@ucr.edu

Laura DeLoretta, University of California Riverside; Emily Shih, University of California Riverside; Elizabeth Davis, University of California Riverside

The parent-child relationship is implicated in myriad outcomes for children including social competence, emotional understanding, and self-regulation. Parents are influential socialization agents, particularly in terms of shaping children's socioemotional development. Respiratory sinus arrhythmia (RSA) is a noninvasive psychophysiological measure of parasympathetic functioning that is often used to index of emotion regulation. The current study aimed to examine the relation between parental coherence in reporting versus enacting different emotion socialization strategies and child RSA reactivity during an unfolding emotional challenge.

A diverse (majority Hispanic) sample of 181 4- to-11-year-olds and one parent participated. Children ranked 5 prizes and were later given their least-favorite prize. Children's reactions to the disappointing gift were assessed while with the experimenter (Phase 1), alone (Phase 2), and with their parent (Phase 3). RSA was assessed continuously. Parents completed the Coping with Children's Negative Emotions Scale, which captures the extent to which parents typically respond to children's expressed distress with various strategies (e.g., punishing, emotion-focused reactions). Parents' enacted socialization strategies during Phase 3 were coded offline.

We quantified the convergence of parents' reported versus enacted emotion socialization strategies (1 = consistent; 0 = inconsistent). Coding and data processing are ongoing, but preliminary analyses indicate predominant divergence in reported versus enacted strategies. Parental consistency in punishing socialization strategies was specifically related to children's RSA reactivity while alone, suggesting the importance of considering social context. Planned analyses with complete data will examine the associations between parent emotion socialization coherence and physiological reactivity/recovery processes throughout the disappointing emotional challenge task.

P1-80 TYPE OF EARLY LIFE ADVERSITY CONFERS DIFFERENTIAL RISK FOR ALTERED TIMING OF DEVELOPMENT, **Camila Demaestri,** *Brown University, Providence, United States* E-mail: camila_demaestri@brown.edu

Camila Demaestri, Brown University; Kevin Bath, Brown University

Early life adversity (ELA) dramatically increases the risk for developing psychiatric disorders, including anxiety and depression, and is associated with poorer health outcomes. Females have elevated risk for ELA-associated pathology and are twice as likely than males to develop depression and post-traumatic stress disorder. A significant gap in the literature remains with regard to how the specific type and severity of ELA may influences outcomes and contribute to sex-specific risk. ELA can come in many forms, including extreme poverty, hypervigilant parenting, or parental neglect. Importantly, these disparate experiences may provide unique signals to the developing organism about the quality of their environment and drive different effects on brain and behavioral development. Understanding the unique consequences of different forms of ELA on neurobehavioral development will be critical for identifying sex-specific risk factors.

Here, we compare two mouse models of ELA reflecting different forms of adversity with relevance for humans. Specifically, we test the effects of limiting maternal resources or repeated maternal separation on genetic markers of neuronal maturation, somatic and sensory development, and anxiety- like phenotypes during development.

We find that the domain of functioning impacted, and the severity of these effects depend upon both up on the form of stress and sex of the developing animal.

The current work advances our understanding of what developmental mechanisms are impacted in response to ELA and contribute to sex-specific vulnerabilities. Such findings may reveal targets for earlier interventions or identification of genetic biomarkers of risk/resilience and provide critical groundwork for individualized medicine.

O3-02 PUBERTY ALLOWS REVERSIBILITY OF THE EFFECTS OF EARLY LIFE DEPRIVATION FOR POST-INSTITUTIONALIZED CHILDREN, **Carrie DePasquale,** *Institute of Child Development, Minneapolis, United States* E-mail: depas010@umn.edu

Carrie DePasquale, Institute of Child Development; Brie Reid, University of Minnesota; Bonny Donzella, University of Minnesota Twin Cities; KALSEA KOSS, University of Georgia; Megan Gunnar, University of Minnesota

Infants exposed to institutional neglect still display reduced cortisol reactivity to stressors several years following adoption and a substantial increase in care quality.1 While cross-sectional studies have identified puberty as an opportunity for hypothalamic-pituitary-adrenocortical (HPA) recalibration to current environment,2,3 there is no longitudinal evidence examining whether the pubertal transition allows post-institutionalized children to normalize their cortisol production. This study examined within-individual change in adolescent cortisol reactivity as a function of exposure to institutional rearing, pubertal stage, and current life stress. Post-institutionalized (PI) youth who initially calibrated their HPA axis to harsh institutional conditions were expected to show the greatest change in HPA reactivity (recalibration), particularly if they report lower current stress.

This longitudinal study (three annual sessions) included 129 PI youth (Mage.S1 = 11.4, 7-15 years) adopted from institutions on average at 19.1 months (range=5-59) and 170 non-adopted youth (NA; Mage.S1 = 11.2; 7-15 years). Participants repeated laboratory visits that included the Trier Social Stress Test – Child,4 with salivary cortisol; Tanner pubertal staging,5,6; and a semi-structured interview assessing current life stress. Mixed-effects model results indicate early institutionalization significantly moderated the effect of pubertal stage such that PI children show the largest within-person increases in cortisol reactivity with increasing pubertal stage ($t = 2.35$, $p = .02$; see Figure 1). Furthermore, NA children reporting the highest current stress show the largest within-person increases in cortisol reactivity over time ($t = -2.93$, $p = .003$). These results provide the first longitudinal evidence of pubertal recalibration in humans. Findings suggest that early and current forms of stress differentially impact pubertal recalibration of cortisol reactivity.

S3-01 Chronic Environmental Stress is related to a Maturational Lag in Infant Brain Activity by 9 Months of Age, Pooja Desai, *Teachers College, New York, United States* E-mail: pmd2137@tc.columbia.edu

Pooja Desai, Teachers College; Sonya Troller-Renfree, Teachers College, Columbia University; Natalie Brito, New York University; Jerrold Meyer, University of Massachusetts; Kimberly Noble, Teachers College, Columbia University

Chronic environmental stress has been increasingly linked with aberrations in young children's behavioral, cognitive, and social development, yet the effects of chronic environmental stress on neural function during the first year of life are largely unknown. Furthermore, many studies of chronic environmental stress rely on stressful circumstances (e.g., poverty or neglect), and not on physiologic markers of stress (e.g., cortisol output). The present study aims to link a physiologic index of chronic stress (maternal hair cortisol concentration) to maturational differences in infant brain activity during the first year of life. Participants were 94 parent-infant dyads (mean infant age 9.16 months). Mothers provided hair samples that were then assayed to index the previous three months' cortisol output as a measure of chronic environmental physiologic stress. Infants completed a 5-minute baseline electroencephalography (EEG) recording in order to examine the development of brain activity during the first year of life. Compared to infants being raised in low maternal physiologic stress environments, infants in high stress environments showed increased low-frequency (theta) power and reduced high-frequency power (alpha) – a pattern consistent with a maturational lag in brain activity development. These findings hold after controlling for socioeconomic status and other confounding factors. This pattern of findings is consistent with other studies suggesting that early life stress may lead to a maturational lag in brain activity development; however, this study is the first to identify this pattern as early as 9 months of age and to tie this pattern to a physiological marker of chronic maternal stress.

P1-48 PHYSICAL GROWTH FOLLOWING INSTITUTIONAL REARING PREDICTS BEHAVIOR REGULATION, **Bonny Donzella,** *University of Minnesota Twin Cities, Minneapolis, United States* E-mail: donze001@umn.edu

Bonny Donzella, University of Minnesota Twin Cities; Mariann Howland, University of Minnesota, Twin Cities; Brie Reid, University of Minnesota; Megan Gunnar, University of Minnesota; Eric Perez, Augsburg University

Children who spend a significant portion of their early lives in institutional care are often physically stunted, typically short relative to norms. Following adoption into well-resourced homes, rapid catch-up growth has been noted (Johnson & Gunnar, 2011.) Stunting could reflect the degree of adversity experienced, resulting from poor pre-adoption nutrition and/or psychosocial factors such as neglect or abuse. Rapid catch-up growth could divert resources away from cognitive development. Post-institutionalized (PI) children have greater reported problems with attention, impulsivity, and externalizing (Wiik et al., 2011). This study provides unique description of growth over time following institutional rearing, and links physical growth to behavioral outcomes into early childhood. It is hypothesized that greater stunting and rapid growth each contribute to behavior regulation difficulty.

Height-for-age and weight-for-age were measured 5 times between age 19-67 months in 91 PI children beginning at adoption and 51 age-matched non-adopted (NA) children. Linear mixed models examined growth trajectories. Intercepts and slopes for each growth metric were extracted to examine behavior regulation (BR) indexed by externalizing/ADHD parent and teacher report at 5-7 years.

Linear mixed models showed that PI children were initially smaller in height and weight, and had greater rates of growth in height over time relative to NA children.

As expected PI children had higher levels of BR symptoms (PI=.18, NA=-.32, $p<.001$). Growth was unrelated to BR for NAs. Among PI youth, height-for-age predicted BR, $R^2 = .09$, $F(2,70)=3.5$, $p<.05$, with stunting $\beta=.24$, $p = .06$ and rate $\beta=.32$, $p<.05$. Weight-for-age did not predict BR in PI children.

P1-46 PSYCHOSOCIAL RISK IN INFANCY AND SOCIOECONOMIC RISK IN ADOLESCENCE PREDICT GREATER CARDIOMETABOLIC RISK IN YOUNG ADULTHOOD, **Jenalee Doom,** *University of Michigan, Ann Arbor, United States* E-mail: jrdoom@umich.edu

Jenalee Doom, University of Michigan; Raquel Burrows, Universidad de Chile; Sheila Gahagan, University of California, San Diego

Objective: To assess whether the timing of psychosocial and socioeconomic risk during childhood and adolescence predicts cardiometabolic risk in young adulthood in a prospective, longitudinal cohort.

Methods: Young adults and their mothers participated in a longitudinal study beginning in infancy in Santiago, Chile (N = 1040; 52.1% female; 20-26y). At infancy, 5y, 10y, and adolescence, mothers reported depressive symptoms, stressful experiences, poor support for child development, and father absence for psychosocial risk composites. Mother-reported parental education and socioeconomic status were used to create socioeconomic risk composites. Young adults provided fasting serum samples and participated in anthropometric and blood pressure assessments.

Results: Greater infant psychosocial risk was associated with a higher likelihood of young adult metabolic syndrome (MetS) (aOR = 1.26; 95% CI = 1.01-1.56), a higher number of MetS risk factors (B = 0.07, 95% CI = .01-.14), and greater anthropometric risk (BMI, waist circumference, body fat percentage; B = 0.06, 95% CI = .001-.12). Greater adolescent socioeconomic risk was associated with a higher number of MetS risk factors (B = 0.06, 95% CI = .001-.13) and greater anthropometric risk (B = 0.08, 95% CI = .02-.15) in adulthood. Infant and adolescent measures predicted cardiometabolic risk better than 5y or 10y measures. Psychosocial and socioeconomic risk were not associated with higher blood pressure or biomarkers of cardiometabolic risk (cholesterol, triglycerides, insulin resistance).

Conclusion: These findings demonstrate that infancy and adolescence are sensitive periods of development for predicting cardiometabolic risk in young adulthood. Possible mechanisms will be discussed.

P2-33 THE RELATION BETWEEN INTERSENSORY PROCESSING & DIVERSITY OF CHILD WORD PRODUCTION IS MODERATED BY SOCIOECONOMIC STATUS, **Elizabeth Edgar,** *Florida International University, Miami, United States* E-mail: eedga001@fiu.edu

Elizabeth Edgar, Florida International University; Amanda Delgado, Florida International University; Kaitlyn Testa, Florida International University; James Todd, Florida International University; Lorraine Bahrick, Florida International University; Kaityn Contino, Florida International University

Intersensory processing (IP; coordinating synchronous auditory and visual stimulation) is foundational for language development (Bahrick & Lickliter, 2012). Socioeconomic status (SES) also predicts language development (Hart & Risley, 1995). We thus explored the role of SES (maternal education) in the relation between 12-month IP and 18-month word production. We predicted greater word production for children with greater IP skills from families with greater SES.

To index 12-month IP (N = 38), children received the Multisensory Attention Assessment Protocol (Bahrick et al., 2018). Each trial begins with a central event which stays on while two 12s lateral events (two women speaking) are presented. One lateral event is in synchrony with its natural soundtrack. IP is calculated as the proportion of total looking time to the sound synchronous event. At 18-months, child language was assessed as the diversity of words produced (DWP; number of unique words per minute) during an 8-minute parent-child interaction.

We tested a model in which the relation between 12-month IP and 18-month DWP was moderated by maternal education (some college, bachelor's, master's). Results revealed a significant interaction, $b = 2.04$, $R2 = .50$, $p = .01$. Twelve-month IP was a significant predictor of 18-month DWP at high (master's) $b = 5.94$, $p<.001$, and middle (bachelor's), $b = 3.90$, $p<.001$, but not low (some college), $p = 0.92$, levels of maternal education.

Findings are among the first to reveal that the relation between IP and word production differs depending on SES. High levels of IP and SES early in development are associated with greater word production in children later in development.

O2-09 EVERY WEEK COUNTS: A POPULATION-BASED STUDY OF GESTATIONAL AGE AT BIRTH AND BRAIN MOPHOLOGY IN CHILDREN AT 10 YEARS, **Hanan El Marroun,** *Erasmus Medical Center, Rotterdam, Netherlands* E-mail: h.marrounel@erasmusmc.nl

Hanan El Marroun, Erasmus Medical Center; Henning Tiemeier, Harvard TH Chan School of Public Health

Pregnancy duration is an important determinant of perinatal health and development of children. Worldwide, approximately 13 million newborns are preterm (< 3 7 weeks of gestation). Preterm birth has repeatedly been related to child brain development, but studies consisted of small samples with focusing on children born extremely preterm (< 2 8 weeks of gestation). In the current study, we investigated the relationship between gestational duration and brain morphology in 10-year old children. We hypothesize that every week counts, i.e. gestational age at birth as a continuous measure is associated with long-lasting brain morphological differences.

This study was embedded within the Generation R study, a large population-based prospective cohort study in Rotterdam, the Netherlands. In a sample of 3,079 children born between 26.3 and 43.4 weeks of gestational age at birth. Brain volumes and cortical measures were collected using neuroimaging at 10 years. Multiple linear regression and surface-based analyses were used accounting for several potential confounders.

A linear relationship between gestational age at birth and global and specific brain volumes indicated that children with higher gestational age at birth have larger brain volumes. Also, gestational age at birth was positively related with gyrification and surface area of the cortex. These associations were not driven by children born preterm, as the linear association of gestational age at birth and brain outcomes did not change after excluding preterm children.

This study is important for clinicians as gestational duration, even above the clinical cut-off of 37 weeks, may be an important determinant of long-term brain developmental processes.

P2-20 EFFECTS OF COGNITIVE-MOTOR TRAINING ON EXECUTIVE FUNCTION AND RESTING PREFRONTAL CORTEX CONNECTIVITY IN PRESCHOOL CHILDREN: AN FNIRS STUDY, Cassondra Eng, *Carnegie Mellon University, Pittsburgh, United States* E-mail: cassonde@andrew.cmu.edu

Cassondra Eng, Carnegie Mellon University; Melissa Pocsai, Carnegie Mellon University; Dominic Calkosz, Carnegie Mellon University; Nathan Williams, Carnegie Mellon University; Frank Fishburn, University of Pittsburgh; Erik Thiessen, Carnegie Mellon University; Anna Fisher, Carnegie Mellon University

Prior studies show that PFC connectivity at rest plays an important role in the development of executive functions (EF), and Exergames (concurrent cognitive-motor stimulation) improve EF. Yet, little is known about the effects of Exergames on EF and the associated neural substrates in preschool children. This study investigated the effects of Exergame training on PFC connectivity and EF of children ages 4-5. Children were blocked on sex, classroom, and age, then randomly assigned to either the Exergame (n=21;M = 5.06±.65years;8 females) or Control (n=20;M = 5.06±.64years;8 females) group. The 1-week, 20-minute Exergame consisted of children stepping on a gaming mat's arrows in accordance with the goals of the game. PFC connectivity, performance on two EF tasks (Flanker/Day-Night), and teacher ratings of EF (BRIEF) were collected before the intervention (pretest) and after the intervention (posttest). PFC connectivity was assessed using Inscapes: a resting-state paradigm. PFC oxy-hemoglobin concentration was recorded using a 10-channel continuous wave fNIRS system (TechENCW6, 8 detectors, 4 sources). A repeated measures ANOVA was conducted on the Z-transformed connectivity values for each channel pair between pretest and posttest, correcting for multiple comparisons. Exergame training significantly increased PFC inter-hemispheric and left intra-hemispheric connectivity, Flanker and Day-Night accuracy, and BRIEF scores from pretest to posttest (all ps<.001), while no significant changes were found in the control group on assessments from pretest to posttest. These Exergame training induced changes in PFC connectivity correlated with improved EF skills. This study provides novel insights into the associations between Exergame training, PFC connectivity, and EF development in preschool children.

O3-05 EVIDENCE FOR SELECTIVE INFLAMMATORY PROPENSITIES IN ADOLESCENTS REMOVED FROM EARLY LIFE ADVERSITY, **Melissa Engel,** *University of Minnesota, Minneapolis, United States* E-mail: engel861@umn.edu

Melissa Engel, University of Minnesota; Brie Reid, University of Minnesota; Bonny Donzella, University of Minnesota Twin Cities; Chris Coe, University of Wisconsin; Megan Gunnar, University of Minnesota

Growing evidence demonstrates that early life adversity (ELA) may become biologically embedded, influencing the development of the immune system and resulting in negative health outcomes in adulthood. Little is known about whether the timing and duration of ELA is important in producing a pro-inflammatory phenotype, nor when in development inflammatory effects emerge. This study examined whether individuals exposed to ELA during infancy only would display an inflammatory propensity in adolescence. Participants were previously institutionalized (PI) youth who spent infancy in orphanages before being adopted into well-resourced homes by age 36 months and non-adopted (NA) counterparts. Levels of circulating CRP and cytokines (IL-1ra, IL-6, TNFa) and cellular cytokine responses to three stimulants (lipopolysaccharide (LPS), phytohemagglutinin (PHA), and phorbol myristate acetate plus ionomycin (PMA/IO) were examined in 95 adolescents (13-21 years; 53% PI). Plasma: later-adopted PI (>13 months) males had higher circulating TNFa than NA youth of either sex. After stimulation with PMA/IO, later-adopted PI adolescents showed larger cytokine responses than NA adolescents. No rearing condition or condition by sex effects in responses to LPS or PHA were found. Several main effects of sex were found, with males responding more than females. In summary, we obtained some evidence of a heightened inflammatory propensity in adolescents exposed to infancy-limited ELA, restricted to specific cytokines and assay conditions. Effects were more evident in individuals who spent a greater duration in institutional care. Future studies of ELA and inflammation in adolescents should examine sex differences, TNFa as a sensitive biomarker, and PMA/IO as a stimulant.

P2-69 LEFT FRONTAL ALPHA ASYMMETRY AND ATTENTION TO SOCIAL REWARD RELATED TO EXTERNALIZING SYMPTOMS IN YOUNG CHILDREN, **Briana Ermanni,** *The Pennsylvania State University, University Park, United States* E-mail: bze68@psu.edu

Briana Ermanni, The Pennsylvania State University ; Alicia Vallorani, The Pennsylvania State University; Berenice Anaya, The Pennsylvania State University; Santiago Morales Pamplona, University of Maryland; Koraly Perez-Edgar, The Pennsylvania State University

Externalizing symptoms consist of disruptive, hyperactive, and aggressive behaviors (Liu, 2004). Both left frontal alpha asymmetry (Gatzke-Kopp, Jetha & Segalowitz, 2012) and attention to social reward (Morales, Perez-Edgar & Buss, 2016) have been associated with greater levels of externalizing in children. The current study examines if greater left frontal alpha asymmetry and greater attention to social reward may interact to mark children with heightened levels of externalizing symptoms.

The current sample (N=79; 50% boys; Mage = 72.92 months, SD = 9.30) was drawn from a larger study examining socioemotional processing in young children. Children provided EEG data while at rest and frontal alpha asymmetry was computed. Children completed a social reward dot-probe task and mean reaction times (RT) to congruent and incongruent trials were calculated. Parents reported their children's externalizing symptoms via the Child Behavior Checklist.

Data were modeled using a Poisson regression. Total number of externalizing symptoms was entered as a count outcome. Frontal alpha asymmetry and mean RT for incongruent trials were centered and entered as predictors. Mean RT for congruent trials and sex were entered as control variables. A significant interaction was found between frontal alpha asymmetry and RT to incongruent trials ($b = 0.004$, $z = 2.06$, $p = .039$). A Johnson-Neyman test indicated that the effect of left frontal alpha asymmetry on externalizing symptoms was significant for children exhibiting more bias to social reward (RT ≥928.15). Results add to the existing literature on the multiple factors that contribute in tandem to externalizing behaviors in children.

P2-73 The Role of Negativity in the Relation Between Internalizing Behaviors and the Brain: A Mediation Model, Arcadia Ewell, *University of Maryland, College Park, United States* E-mail: aewell1@umd.edu

Arcadia Ewell, University of Maryland; Tracy Riggins, University of Maryland; Lea Dougherty, University of Maryland, College Park; Tamara Allard, University of Maryland; Benjamin Weinberg, University of Maryland

Links exist between internalizing behaviors and cortical thickness of the middle temporal region. This relation is believed to stem from emotion regulation processes; however, this hypothesis is largely untested. Data from typically developing children was used to investigate the role of emotional lability/negativity in the association between internalizing behaviors and the brain.

Parents provided information on child internalizing and externalizing behaviors using the Child Behavior Checklist (CBCL) and on child emotion regulation using the Emotion Regulation Checklist (ERC). A standard resolution (.9mm3) T1-weighted whole brain structural scan was acquired during fMRI neuroimaging and processed in FreeSurfer (v5.1). Cortical thickness labels were derived from the Desikan-Killany atlas and inspected manually for accuracy.

Preliminary results from 55 participants indicated that the relation between internalizing behaviors and cortical thickness of the right middle temporal gyrus (MTG) was mediated by Emotional Lability/Negativity (L/N). The indirect effect of negativity/lability on right MTG thickness through internalizing behaviors approached significance, ab = -0.213. The mediator could account for roughly half the total effect, PM = .42.

These findings are consistent with the hypothesis that the relation between the right MTG and internalizing symptoms may exist due to the way a child regulates their emotions. This also supports the possibility that individual differences in emotion regulation and internalizing behaviors may map onto other individual differences in brain structure. Future analyses will include additional participants and further examine subcortical regions (e.g., hippocampus, caudate) as well as other environmental influences, such as parenting style.

P1-72 DISRUPTIONS IN CAREGIVING ASSOCIATED WITH BOTH COGNITIVE CONTROL IMPAIRMENTS AND ENHANCEMENTS IN CHILDHOOD, **Andrea Fields,** *Columbia University, New York, United States* E-mail: afields122@gmail.com

Andrea Fields, Columbia University; Chelsea Harmon, Columbia University; Michelle VanTieghem, Columbia University; Tricia Choy, University of California, Riverside; Nicolas Camacho, Columbia University; Lisa Gibson, Columbia University; Rebecca Umbach, Columbia University; Charlotte Heleniak, Columbia University; Nim Tottenham, Columbia University; Paul Bloom, Columbia University

Cognitive control, or the modulation of goal-directed behavior, is typically found to be disrupted in children exposed to early caregiving adversity (DePrince et. al, 2009; McDermott et. al, 2012). Prior research has identified caregiving instability as a leading predictor of cognitive control for children following adverse caregiving experiences (Lewis et. al, 2007; Roos et. al, 2016). While much of this work has focused on isolated constructs of cognitive control, evidence in adults has suggested that cognitive control may not be globally impacted. Rather, experiencing unpredictable caregiving may impair performance in certain domains (i.e. inhibitory control) while promoting adaptation in others (i.e. task switching) (Mittal et. al, 2015). In the present study, we investigate distinct cognitive control processes in a sample of school-age children who have experienced heterogeneous early caregiving environments (i.e. institutionalization, foster care, kinship care, temporary parental separation) (N = 300, Age = 6-12 years). We characterize three constructs of cognitive control (inhibitory control, selective attention, and task switching) using a go/no-go, flanker, and the DCCS. Results indicate that caregiving instability (e.g. number of switches in caregiving environment) is associated with poorer inhibitory control and selective attention, but improved task switching. Future planned analyses will examine rsfMRI patterns predictive of task performance, and investigate how these are impacted by caregiving instability. Our findings build on past work, showing that caregiving disruptions are differentially associated with dissociable components of cognitive control, and suggest that caregiving instability may result in specific effects on cognitive control development, including both impairment and enhancement.

P1-81 ACCULTURATIVE STRESS AND INFANT HAIR CORTISOL AS PREDICTORS OF IMPULSIVITY,
Jennifer Figueroa, *California State University San Marcos, Perris, United States* E-mail: figue028@cougars.csusm.edu

Jennifer Figueroa, California State University San Marcos; Kimberly D'Anna-Hernandez, CSUSM

Impulsivity in children is an early life predictor of higher levels of risk-taking and low academic achievement. The fetal programming hypothesis suggests that in utero stress may alter development in children, including impulsivity. Some populations may be more vulnerable to this phenomenon due the amount of psychological stress they experience. Mexican-Americans experience high levels of psychosocial stressors, including those related to adapting to a new culture, termed acculturative stress. Acculturative stress is a risk factor for perinatal mental health, but it is unknown if it is associated with the fetal programming of impulsive behavior in children. This study hypothesized that higher levels of maternal acculturative stress experienced by pregnant Mexican American women are associated with impulsivity in preschool aged children as well as an early marker of stress activity in fetal hair cortisol. Women of Mexican descent (N=49) completed acculturative stress surveys during pregnancy and hair was collected from a subset of infants at birth (N=22) as a retrospective measure of fetal cortisol. Impulsivity in preschool aged children was measured via Snack Delay from the Laboratory Temperament Battery Assessment. Prenatal acculturative stress was not related to impulsivity ($R2 = .543$ $B = .000$, $SE = .015$, $t = 0.23$, $p = .982$). However, there was a significant moderation, such that children with low hair cortisol born to mothers with high acculturative stress were less likely to be impulsive ($R2 = .251$, $B = -.0002$, $SE=.0001$, $t = -2.346$, $p = 0.031$). Fetal exposure to acculturative stress may alter fetal physiology with consequences for child development and behavior later in life.

S1-03 MATERNAL CANNABIS VAPOR EXPOSURE DOSE-DEPENDENTLY IMPAIRS BEHAVIORAL FLEXIBILITY IN ADULT OFFSPRING, **Timothy Freels,** *Washington State University, Pullman, United States*
E-mail: timothy.freels@wsu.edu

Timothy Freels, Washington State University; Ryan McLaughlin, Washington State University; Hayden Wright, Washington State University; Collin Warrick, Washington State University; Jacqulyn Kuyat, Washington State University; Joshua Rodriguez, Washington State University; Janelle Lugo, Washington State University

Cannabis is the most commonly used illicit substance among pregnant women, yet the effects of prenatal cannabis exposure on cognitive functioning remain largely unknown. Thus, there is an urgent need to understand the impact of prenatal cannabis exposure on cognitive functioning in adulthood. We investigated whether chronic exposure to vaporized cannabis during pregnancy alters cognitive flexibility in male and female offspring using a set-shifting task. Dams were passively exposed to vaporized cannabis extract (29.2% THC; 50 or 400mg/mL), vehicle vapor, or no vapor throughout mating and gestation. Offspring were trained to press a cue-paired lever to receive a sugar pellet reward. Then, rats were tested in the set-shifting task, which required disregarding the previously learned strategy for an egocentric spatial strategy. Next, rats were tested in a reversal-learning task that required them to press the lever opposite of the previous task. The number of trials required to meet criterion, the number of errors, and error types were compared across groups.

Rats prenatally exposed to cannabis showed no impairment in visual cue discrimination, suggesting that they can learn rule contingencies similar to non-exposed rats. However, exposure to high concentrations of vaporized cannabis extract significantly impaired attentional set shifting compared to no vapor control rats. High-dose prenatal cannabis exposure increased never-reinforced and regressive errors, indicating an inability to acquire and maintain the new rule. No deficits in reversal learning and no significant sex differences were observed. These data indicate that maternal cannabis vapor exposure dose-dependently impairs behavioral flexibility when tested in adulthood.

S1-05 PRENATAL MARIJUANA EXPOSURE: EFFECTS ON BRAIN MORPHOLOGY AND EXECUTIVE FUNCTIONS IN YOUNG CHILDREN, Xiaoxue Fu, *Nationwide Children's Hospital, Columbus, United States*
E-mail: Xiaoxue.Fu@nationwidechildrens.org

Xiaoxue Fu, Nationwide Children's Hospital; Eric Nelson, Nationwide Children's Hospital; Mark Klebanoff, Nationwide Children's Hospital; Sarah Keim, Nationwide Children's Hospital; Jackie Sullivan, Nationwide Children's Hospital; Holly Blei, Nationwide Children's Hospital

Marijuana use is widespread in the United States but the effects on development are not clearly understood. Indeed, there is some indication that development may be an important moderator of many long-term impacts of marijuana use. The prenatal period is a particularly sensitive developmental window and past research has demonstrated that prenatal marijuana exposure (PME) is associated with impaired cognitive functioning in both children and adults. There is also some evidence that PME is associated with differences in brain structure and function later in development. To enhance the understanding of the impact of PME on neurocognitive development, the present study was designed to assess brain and behavioral differences related to executive functions (EFs) in children with PME and matched controls at age 7, a developmental period marked by rapid growth of EFs.

In this ongoing study, participants performed inhibitory control (Go/Nogo) and visual working memory (Face Memory) tasks while undergoing functional MRI. Structural imaging was also performed to assess gray matter and white matter integrity. A sustained attention task (Track-It) was also performed outside the scanner. Preliminary comparisons indicate that children with PME display poorer performance on executive function tasks, and altered activations in regions associated with inhibitory control (ventral prefrontal regions) and visual processing (occipito-temporal, limbic, and prefrontal regions) relative to unexposed controls. Differences in brain structure are also evident and may also relate to functional impairments. These results point to important biomarkers of cognitive impairments in young PME children.

S2-04 A CROSS-SPECIES BIOMARKER OF SENSITIVE PERIOD ONSET, **Laurel Gabard-Durnam,** *Boston Children's Hospital, Boston, United States* E-mail: laurel.gabarddurnam@gmail.com

Laurel Gabard-Durnam, Boston Children's Hospital; Takao Hensch, Harvard University; Helen Tager-Flusberg, Boston University; Charles Nelson, Harvard Medical School

Many neurodevelopmental disorders, including Autism Spectrum Disorder (ASD), are thought to result from atypical sensitive periods in brain development. Measuring these sensitive period dynamics in humans has been a longstanding challenge, but literature in animal models has established mechanisms governing sensitive period progression. Specifically, sensitive period onset is regulated by maturing inhibition, which shifts the balance of spontaneous neural activity and experience-induced activity (the S/E ratio). The S/E ratio decreases with sensitive period onset relative to pre-sensitive period levels. The present study translated the S/E ratio measure of sensitive period onset into human neurodevelopment via electroencephalography to test whether an early language sensitive period is delayed in ASD. The S/E ratio over auditory cortex in typically developing infants decreased between 3 and 6 months of age, consistent with a native phoneme sensitive period onset behaviorally ($p < 0.05$, $n = 79$). The S/E ratio in the ASD group remained elevated at 6 months of age, and was significantly higher than infants without ASD ($p = 0.015$, $n = 170$). Elevated S/E ratios were associated with subsequent atypical neural processing of language phonemes ($p < 0.01$, $n = 170$), and were negatively associated with later receptive language scores at 1 year ($p < 0.05$, $n = 170$). These findings are consistent with delayed language sensitive periods in ASD that affect later language skill. More broadly, the S/E ratio may serve as a translational sensitive period marker that can link animal model insights to mechanistic accounts of human brain and cognitive development.

P2-26 THE EFFECT OF PRENATAL LIGHT EXPOSURE DURATION AND PRESENTATION PATTERN ON BODY COMPOSITION AND GAIT PERFORMANCE IN BOBWHITE QUAIL CHICKS, **Diana Garcia,** *Florida International University, Miami, United States* E-mail: dgarc321@fiu.edu

Diana Garcia, Florida International University; Starlie Belnap, Flordia International University; Robert Lickliter, Florida International University

Avian nesting behavior exposes developing embryos to sporadic episodes of prenatal light experience during incubation. Research suggests that prenatal light exposure is important for several developmental processes, including incubation duration, hemispheric lateralization, body composition, and motor development. However, most of this research has investigated artificial light regimens; less is known about how naturally occurring light exposure patterns can influence these processes. We evaluated how sporadic bursts of light exposure, mimicking naturally occurring prenatal light experience, and total duration of light exposure influence incubation period, body composition, and motor coordination. Bobwhite quail embryos were exposed to either sporadic or cerpuscular light exposure for either 2hr or 6hr per day, following a 2x2 factorial design. Results indicated that duration of prenatal light exposure can influence incubation period. Embryos in both 2hr light conditions hatched later when compared to embryos in both 6hr light conditions. Body composition was significantly influenced by light duration and light presentation pattern. Embryos who experienced 6hr of sporadic prenatal light showed increased body weight and bone length when compared to their 6hr discontinuous counterparts; however, the 2hr light groups did not vary across light pattern exposure groups. Chicks exposed to 2hr sporadic prenatal light showed improved motor coordination when compared to 2hr discontinuous chicks. Sporadic chicks showed a reduction in falls, stride length, and step width, indicating better motor performance. These findings suggest that maternally regulated prenatal light experience can influence incubation length, body composition, and early motor development.

P2-25 PROSPECTIVE LONGITUDINAL EFFECTS OF HARSH PARENTING ON CORTICOLIMBIC FUNCTION DURING ADOLESCENCE, **Arianna Gard,** *University of Michigan, Ann Arbor, Ann Arbor, United States* E-mail: arigard@umich.edu

Arianna Gard, University of Michigan, Ann Arbor; Colter Mitchell, Institute for Social Research; Jeanne Brooks-Gunn, Columbia University; Tyler Hein, Department of Veterans Affairs; Sara McLanahan, Princeton University; Christopher Monk, University of Michigan, Ann Arbor; Luke Hyde, University of Michigan, Ann Arbor

Neural activation within the amygdala and regions of the prefrontal cortex (PFC) supports emotion processing and concomitant socioemotional behaviors (Monk et al., 2008). Early life adversity (ELA) is thought to increase risk for psychopathology in part through effects on the developing corticolimbic system. Though several recent reviews have posited that there are developmental periods (i.e., early childhood, adolescence) during which ELA exerts the largest effects on corticolimbic function (Callaghan & Tottenham, 2016), empirical evidence for this in humans is lacking. In the current paper, we leveraged longitudinal data from a sample of 162 youth (52.3% girls; 75.5% Black Non-Hispanic) drawn from the Fragile Families and Child Wellbeing Study to examine differential effects of harsh parenting in early childhood and changes in harsh parenting across childhood on amygdala and PFC activation during angry face processing in adolescence. Growth curve modeling was used to estimate an intercept and a slope of harsh parenting, using five parent-reported items of physical aggression from the Conflict Tactics Scale (Straus et al., 1998), at ages 3, 5, and 9. Amygdala and PFC activation during angry face processing (compared to neutral faces) was assessed using data from an implicit emotion processing task at age 15.

Greater initial levels (but not the slope) of harsh parenting were associated with lesser amygdala (but not PFC) reactivity to angry facial expressions. By contrast, greater increases (but not the intercept) in harsh parenting were associated with lesser dorsal anterior cingulate (but not amygdala) reactivity to angry faces.

P2-20 BILATERAL FRONTAL ASLANT TRACT DEVELOPMENT AND ITS RELATION TO INHIBITORY CONTROL IN 4- TO 7-YEAR-OLD CHILDREN., Dea Garic, *Florida International University, Miami, United States* E-mail: dgaric@fiu.edu

Dea Garic, Florida International University; Diana Behar, Florida International University; Armando Torres, Florida International University; Rina Badran, Florida International University; Valentina Linocci, Florida International University; Hector Borges, Florida International University; Anthony Dick, Florida International University

The frontal aslant tract (FAT) is a recently discovered bilateral fiber pathway that is thought to play an important role in verbal fluency and speech production (Dick, Bernal, & Tremblay, 2014). The FAT is most commonly thought to connect the left hemisphere inferior frontal gyrus to pre-supplementary and supplementary motor areas (Catani et al, 2013). Given its connectivity, many studies have focused on the FAT's relation to language, but recent work indicates that the FAT, primarily the right FAT, could play a role in executive control as well (Garic et al, 2018, Dick, Garic, Graziano, & Tremblay, 2019). Our study aims to expand on these previous findings by using diffusion tensor imaging to examine the relationships between both hemispheric segments of the FAT and inhibitory control in a developing sample. The results indicate linear age-related decreases in both left FAT and right FAT, with decreasing mean diffusivity with age, which is not seen in whole brain mean diffusivity in this narrow age range. Additionally, mean diffusivity of the FAT in both hemispheres predicts better performance on the Head-Toes-Knees-Shoulders task, even after controlling for confounding factors (age, sex, whole brain microstructure, parental income, movement in the scanner, and non-verbal IQ). Interestingly, only the right FAT predicted improved performance on the NIH flanker task, indicating that the right FAT is more involved in the visuo-spatial domain of executive function. The study replicated previous findings that the FAT is related to inhibitory control and provides further insight into possible domain specialization across hemispheres.

P2-40 SEX DIFFERENCES IN THE DEVELOPMENT OF FRONTAL ELECTROENCEPHALOGRAM (EEG) ASYMMETRY, **Maria Gartstein,** *Washington State University, Pullman, United States* E-mail: gartstma@wsu.edu

Maria Gartstein, Washington State University; Gregory Hancock, University of Maryland; Natalia Potapova, Washington State University; Martha Ann Bell, Virginia Tech

Asymmetric patterns of frontal brain electrical activity reflect approach and avoidance tendencies, with stability of relative right activation associated with withdrawal emotions/motivation and left hemisphere activation linked with approach and positive affect. However, considerable shifts in approach/avoidance-related lateralization have been reported for children not targeted because of extreme temperament. In this study, dynamic effects of frontal electroencephalogram (EEG) power within and across hemispheres were examined throughout early childhood. Specifically, EEG indicators at 5, 10, 24, 36, 48, and 72 months-of-age (n = 410) were analyzed via a hybrid of difference score and panel design models, with baseline measures and subsequent time-to-time differences modeled as potentially influencing all subsequent amounts of time-to-time change (i.e., predictively saturated). Infant sex was considered as a moderator of dynamic developmental effects, altering the pattern of within and across-hemisphere effects. A multisample model fit indicators deemed satisfactory: RMSEA = 0.06; SRMR = 0.06; AIC = -2048.48; BIC = -417.61. Statistically significant differences between boys and girls were observed for a number of paths, particularly notable from 36 to 48 months of age.Standardized path coefficients indicated that right frontal power was associated with fewer within-domain effects for boys. For girls, primary cross-domain paths were directed from left to right, whereas for boys the pattern was the opposite, with the right frontal power changes primarily affecting growth on the left.This pattern of results was interpreted as potentially accounting for previously reported sex differences in temperament and behavior problems, especially under-controlled behavior more frequently reported for boys.

P1-75 ANXIETY-LIKE BEHAVIOR AND PREFRONTAL CORTEX PERINEURONAL NET DYSFUNCTION: IMPACT OF A TWO-HIT MODEL OF DEVELOPMENTAL ADVERSITY IN MALE AND FEMALE RATS,
Kelsea Gildawie, *Northeastern University, Boston, United States* E-mail: k.gildawie@northeastern.edu

Kelsea Gildawie, Northeastern University; Jennifer Honeycutt, Northeastern University; Heather Brenhouse, Northeastern University

Exposure to early life adversity results in increased vulnerability to a multitude of neuropsychiatric disorders, such as depression, anxiety, and schizophrenia. Notably, clinical studies demonstrate an additive effect of adversity, where repeated stressful life events throughout childhood result in more severe neuropsychiatric symptoms. It is not understood, however, whether differential timing of later stressors alters the behavioral and neurobiological consequences of early life adversity in a sex-dependent manner. Research demonstrates that the formation of perineuronal nets (PNNs) – which preferentially enwrap fast-spiking parvalbumin (PV)-expressing interneurons – is essential for proper neurodevelopment. We have previously observed that adversity during developmental periods where PNNs are not yet fully formed could disrupt the formation of PNNs surrounding PV+ cells in the prefrontal cortex (PFC). To further investigate the later-life behavioral and cellular implications of multiple developmental stressors, male and female rat pups underwent maternal separation (MS) 4h per day from postnatal day (P) 2-20 (or control rearing), followed by juvenile social isolation (SI) from P21-35 (or standard pair-housing). In early adulthood (P70), anxiety-like behavior was measured using the open field test and elevated zero maze. At P85, tissue sections containing the PFC were immunohistochemically stained and fluorescent images were quantified to measure the number and intensity of PNNs, PV cells, and PNN+ PV cells. We present findings elucidating the association between adult PFC PNN dysfunction and enhanced anxiety-like behavior following multiple instances of adversity throughout development. These data provide critical information regarding the differential windows of vulnerability to chronic stress exposure in males and females.

P2-61 DEVELOPMENTS IN MOTOR AND SENSORY FUNCTION BEFORE AND AFTER NEUROREHABILITATION PROGRAM IN BABIES WITH NEUROLOGICAL RISK FACTOR, **Averi Giudicessi,** *Benemérita Universidad Autónoma de Puebla, Tlaxcalancingo, Mexico* E-mail: agiudicessi@fordham.edu

Averi Giudicessi, Benemérita Universidad Autónoma de Puebla; Cristian Ibarra, Benemérita Universidad Autónoma de Puebla; Hector Pelayo, Universidad Veracruzana

Early detection of neurodevelopmental disorders is essential as these conditions impact various brain functions including: cognitive, language, motor, learning and behavioral processes. In recent years ample research in neurodevelopment has concentrated on the effects of environmental and experience stimulus on brain development and plasticity in infants. More specifically, the newborn age is a crucial time in intervention of neurodevelopmental disorders to help prevent future manifestation of developmental conditions. The objective of this study was to compare changes in motor and sensory abilities in infants with neurological risk after receiving an intervention program targeted at improving sensory and gross motor function.

Our study evaluated 152 babies with neurological risk at Hospital General de Cholula and Hospital del Norte in Puebla, México. Babies included in the sample come from low socioeconomic households and live in rural areas. A pre and post evaluation was applied to babies that received a rehabilitative program based on the Katona system that involves sensory and motor improvement exercises and was applied to participants 60 minutes every day (Monday to Sunday) for 7 months. A paired-samples t-test was conducted to compare pre and post-test scores to measure advances. There was a significant improvement in scores between the pre ($M=10.99$, $SD=1.27$) and post-test ($M= 27.5$, $SD= 2.25$); $t(151)=-85.28$, $p=0.001$. Our results suggest early intervention efforts in newborns help mediate neurological risk by way of external environment training executed by primary caregivers with guidance from trained professionals.

P1-63 SOCIAL EARLY LIFE STRESS MEDIATES THE EFFECTS OF ECONOMIC FACTORS ON INTERNALIZING SYMPTOMS AND REWARD SENSITIVITY, **Marlen Gonzalez,** *Cornell University, Ithaca, United States* E-mail: mzg5@cornell.edu

Marlen Gonzalez, Cornell University; Haily Merritt, Cornell University

Life history theory suggests that early life stress calibrates adult motivational systems. However, neural evidence shows both a downregulation (Hanson et al, 2015) and an upregulation (Gonzalez et al., 2013) of mesolimbic systems in association with developmental stressors. We hypothesized that economic versus social operationalizations of early life stress may be behind these mixed findings. Two-hundred and two participants from a convenience sample completed the Balloon Analog Risk Task as well as self-report measures of developmental economic and social context and current internalizing symptoms, reward sensitivity, and risky behaviors. Using structural equation modeling, we created three latent factors: Developmental Economic Privilege, Developmental Social Harshness, and Reward Sensitivity (RMSEA = .05, CFI = .96, TLI = .95). Greater Economic Privilege was related to decreased symptoms of depression (b = -.73, z = -2.13, p = .03). and anxiety (b = -.70, z = -2.05, p = .04) and greater Reward Sensitivity (b = .45, z = 2.3, p = .02) and risky sexual behaviors (b = .68, z = 2.34, p = .02). However, these relationships were fully mediated by Social Harshness (indirect effects: internalizing, z = -3.168; p = .002, Reward Sensitivity, z =2.03, p = .04) with the exception of risky sexual behaviors (z = -0.88, p = .38). Social harshness, (e.g., poor parent-child relationship, low neighborhood cohesion) may downregulate motivational systems and be more important than economic factors in developmental calibration. Interestingly, the association between Economic Privilege and risky sexual behavior was counter to life history-behavior expectations.

P2-60 TODDLER HAND PREFERENCE TRAJECTORIES PREDICT 5 YEAR LANGUAGE OUTCOME,
Sandy Gonzalez, *Florida International University, Miami, United States* E-mail: sgonz219@fiu.edu

Sandy Gonzalez, Florida International University; Julie Campbell, Illinois State University; Emily Marcinowski, Virginia Commonwealth University; George Michel, University of North Carolina-Greensboro; Stefany Coxe, Florida International University; Eliza Nelson, Florida International University

Prior research found that consistent hand preference from 18 to 24 months predicts language skills at 2- and 3-years-old. The current study investigated the longevity of handedness-language cascades at 5-years-old. Ninety children were assessed monthly from 18-24 months on hand use for role differentiated bimanual manipulation actions (RDBM), where one hand stabilizes the object (non-preferred hand) while the other hand manipulates the object (preferred hand). Children completed the Preschool Language Scales, 5th edition (PLS-5; Zimmerman et al., 2011) at 5-years-old. Handedness index (HI) scores were calculated [HI=(R-L)/(R+L)] per visit per child from 18 to 24 months. A latent class growth analysis (LCGA) was conducted using HI scores to identify subgroups of children with similar hand preference trajectories. LCGA results indicated that 41% of children had a predominately right-hand preference for RDBM with a mild amount of left-hand use (R-Mild L), 34% had a largely right-hand preference with moderate left-hand use (R-Mod L), and 24% had a largely left-hand preference with moderate right-hand use (L-Mod R). ANOVAs were conducted to evaluate differences in PLS scores across the three classes. Significant differences in receptive language were found between the R-Mild L and R-Mod L classes ($p = .048$), and between the R-Mild L and L-Mod R classes ($p = .028$). A significant difference was also found for expressive language between the R-Mild L and L-Mod R classes ($p = .029$). Results indicate that hand preference patterns in toddlerhood have cascading effects on language outcomes into the preschool years.

[Supported by NIH R03HD097419-01 to ELN; NIH/NICHD T32-HD-007376 to ELN and JCM; and NSF DLS 0718045 to GFM]

P1-82 MODULATING BEHAVIORAL EFFECTS OF EARLY LIFE ADVERSITY BY TARGETING PREFRONTAL CORTEX NMDA NR2A SUBUNITS IN ADOLESCENT RATS: IMPACT ON INFANT-CARETAKER COMMUNICATION, COGNITION, AND ANXIETY, **Lauren Granata,** *Northeastern University, Boston, United States* E-mail: granata.l@husky.neu.edu

Lauren Granata, Northeastern University; Jennifer Honeycutt, Northeastern University; Heather Brenhouse, Northeastern University

Early adverse experiences are linked to social dysfunction and increased vulnerability to psychiatric disorders. An ethologically relevant model of adversity in rodents is the maternal separation (MS) paradigm. MS leads to behavioral deficits in adolescence, with concurrent aberrant development of the prefrontal cortex (PFC). Specifically, the NMDA receptor NR2A subunit and the post-synaptic density protein PSD-95 increase expression, while parvalbumin (PV)-positive interneurons decrease in rats. We have shown that after MS, intracranial treatment with TAT2A, a cell-permeable peptide that uncouples NR2A from PSD-95, returned PV expression and measures of anxiety to control levels in males. Due to sex differences in developmental trajectories of rats exposed to MS, this study aims to elucidates the effects of disrupting NR2A/PSD-95 associations in males and females at two developmental timepoints. After MS, rats received TAT2A or vehicle during juvenility or adolescence and were then tested in PFC-dependent assessments of anxiety and cognition at P42 and P70. To assess the impact of MS on infant-mother communication, juvenile ultrasonic vocalizations (USVs) were collected at weaning. While USVs are understood as behavioral markers of a rat's affective state, our work shows that juvenile USVs may also reflect a learned response to early experiences, reflected by MS-induced changes in USVs. By correlating juvenile USV properties with adolescent behavior, we can determine whether individual differences in response to an aversive experience underlies vulnerability to behavioral dysfunction. Our results demonstrate that specific juvenile USV types predict the degree of anxiety-like behavior in adolescence dependent on rearing condition and TAT2A treatment.

P1-78 ASSOCIATIONS BETWEEN MATERNAL STRESS, PARENTAL LEAVE, AND INFANT LANGUAGE OUTCOMES, **Ashley Greaves,** *New York University, New York, United States* E-mail: ag6572@nyu.edu

Ashley Greaves, New York University; Natalie Brito, New York University

Extensive research has demonstrated that the first year of life may present mothers with difficult experiences like postpartum depression (Schulte et al. 2017). In parallel, this time is associated with incredible language growth in optimal environments (Friedmann & Rusou, 2015). In the United States, a country without a national paid leave policy, almost a quarter of employed mothers return to work as early as two weeks after birth (Pozniak et al. 2014), potentially compromising their maternal mental wellbeing and stimulating moments with their children in order to provide for their families. The current study uses a sample of mothers who were employed during pregnancy to examine associations between maternal stress, parental leave, and 3-month-old infant language outcomes (current n=45). Chronic stress, measured by hair cortisol, was higher for mothers with unpaid leave, but only if they were low-income ($t=5.02$, $p=0.02$). Hair cortisol did not differ in groups of mothers who returned to work vs. were still at home at 3-months ($p=0.13$), took paid vs. unpaid leave ($p=0.63$), or were low vs. high income ($p=0.27$). Infant language scores, controlling for income, were higher when mothers were given a paid leave ($\beta =0.52$, $p=0.04$). This association held even controlling for income, the presence of two primary caregivers, and the availability of paternal income (adjusted $R2=0.31$, $F=4.38$, $p=0.008$). Examining these associations is crucial for the development of public policies that adequately support families.

P2-62 AN EXAMINATION OF SLEEP INSTABILITY IN INFANCY, Melissa Grimes, *University of North Carolina at Chapel Hill, Chapel Hill, United States* E-mail: mrgrimes@live.unc.edu

Melissa Grimes, University of North Carolina at Chapel Hill; Cathi Propper, University of North Carolina at Chapel Hill

Early sleep is predictive of later cognitive, behavioral, and socioemotional functioning (Sadeh, 2007). Most studies have only examined mean-level values of sleep variables, but, considering the rapid development of sleep in early infancy, it is critical to examine individual-level variability in sleep behaviors.

Data come from the Neonatal and Pediatric Sleep study, a prospective and longitudinal study of 95 Black infants and their caregivers. At 3 and 6 months of age, sleep was measured via actigraphy for 7 days and nights. Sleep instability was calculated using mean successive squared differences, which accounts for both variability and temporal dependence (Jahng et al., 2008). Bedtime routine consistency at 3 months was measured using an item from the Sleep Practices Questionnaire (Goldberg & Keller, 2007). Sociodemographic risk was comprised of 5 risk factors (Holochwost et al., 2016).

Findings reveal that sleep instability at 3 months was not related to sleep instability at 6 months. A more consistent bedtime routine at 3 months was related to less instability in both sleep efficiency at 3 months ($r = -.30$, $p < .01$) and nighttime sleep duration at 6 months ($r = -.25$, $p < .05$). Greater sociodemographic risk was related to more instability in number of naps at 6 months ($r = .27$, $p < .05$)

Sociodemographic risk and caregiving are related to sleep instability in the first 6 months of life. Future analyses will consider the predictive role of early sleep instability in socioemotional and cognitive development across the first year of life.

S5-05 MATERNAL DEPRESSIVE SYMPTOMS AND INFANT ATTENTION: MODERATION BY RESTING RESPIRATORY SINUS ARRHYTHMIA, **Noa Gueron-Sela,** *Ben-Gurion Univeristy, Beer-Shev, Israel* E-mail: gueron@bgu.ac.il

Noa Gueron-Sela, Ben-Gurion Univeristy; Marie Camerota, RTI International; Cathi Propper, University of North Carolina at Chapel Hill

Attention systems undergo rapid developmental changes during the first three years of life, and adverse early life experiences during this period can alter the developmental trajectory of attentional skills. Although elevated maternal depressive symptoms (MDS) have been associated with increased risk for a plethora of child adjustment problems, little is known about the links between MDS and early attention skills. Inspired by a biological sensitivity to context approach, the current study examined the link between MDS at 3 months postpartum and infants' visual attention at 6 months of age, as well as the moderating role of infants' resting respiratory sinus arrhythmia (RSA). Participants were 91 African American mother-child dyads. At 3 months, mothers reported about their current depressive symptoms and infants' cardiac activity at rest was recorded and analyzed to produce estimates of RSA. At 6 months, infants' peak looking durations at a static puppet stimuli were measured. Shorter looking durations were considered indicative of more efficient information processing. MDS interacted with infant RSA to predict infant attention at age 6 months ($\beta = -.46$, $p = 0.01$). Specifically, the positive link between MDS and infant looking duration was significant only when infants had low (-1SD) resting RSA ($b = 28.98$, $SE = 5.65$, $p < .001$), but not when they had high (+1SD) resting RSA ($b = -5.73$, $SE = 6.68$, $p = .39$). Further examining the mechanisms by which MDS is related to attention skills is imperative in understanding atypical cognitive functioning in children exposed to MDS.

P2-14 EXAMINATION OF PARTICIPANT FACTORS THAT CONTRIBUTE TO MRI MOTION ARTIFACT IN CHILDREN WITH MILD TRAUMATIC BRAIN OR ORTHOPEDIC INJURY, **Sunny Guo,** *University of Calgary, Calgary, Canada* E-mail: xin.guo1@ucalgary.ca

Sunny Guo, University of Calgary; Ashley Ware, University of Calgary; Ayushi Shukla, University of Calgary; Bryce Geeraert, University of Calgary; Bradley Goodyear, University of Calgary; Catherine Lebel, University of Calgary; Keith Yeates, University of Calgary

Background: Mild traumatic brain injury (mTBI) affects millions of children annually. While no biomarker for mTBI exists, advanced magnetic resonance imaging (MRI) techniques show promise as a diagnostic tool. However, MRI data can be confounded by motion artifacts, which distort the image and must be corrected. This study examined whether injury, sex, and age influence in-scanner head motion in children with mTBI, orthopedic injury (OI), and typically developing (TD) controls.

Method: Children (N=175) aged 8-16 years with mTBI (n=91) or OI (n=44) were recruited from the emergency department at Alberta Children's Hospital, where injury characteristics were assessed; participants also completed a post-acute visit (<2 weeks post-injury) that included an MRI. TD children were recruited from the community (n = 40). In-scanner motion was quantitatively estimated (mm) from diffusion MRI data using FMRIB Software Library v6.0 eddy. Hierarchical multivariable linear regression was used to examine the prediction of average motion from group, age, sex, and their interactions.

Results: The initial model was significant, $p = .003$. Age (negatively, $p<.001$) and group were significantly associated with motion. Follow-up indicated no differences between mTBI and OI groups, $p = .886$, but motion in the TD group was significantly lower than the mTBI group, $p = .026$, and marginally lower than the OI group, $p = .062$. No 2- or 3-way interactions were significant.

Discussion: Generally, children with mTBI and OI demonstrated greater head motion during MRI acquisition than TD children. Results have implications for reliability of diffusion MRI results and highlight the importance of considering head motion in studies of mTBI in children.

O1-02 A RELATIONSHIP BETWEEN FORGETTING IN INFANCY AND RESILIENCE THROUGHOUT DEVELOPMENT, **Sylvia Harmon-Jones,** *The University of New South Wales, Sydney, Australia* E-mail: sylviaharmonjones@gmail.com

Sylvia Harmon-Jones, The University of New South Wales; Caitlin Cowan, University College Cork; Nadia Shnier, The University of Sydney; Rick Richardson, University of New South Wales

Young animals, both human and non-human, typically forget experiences much more rapidly than older individuals. This robust phenomenon is referred to as infantile amnesia, and was first empirically documented over 50 years ago (Campbell & Campbell, 1962). Although infantile amnesia is characteristic of normal development, many have thought of it as a deficit in infant functioning. In the current experiments, we used a rodent model to examine a novel interpretation of infantile amnesia: that it is related to resilience. In Experiment 1, we measured ultrasonic vocalizations following separation from the infant's mother, a frequently-used measure of distress in infant rodents, at postnatal day (P)8-10. Infants then received Pavlovian fear conditioning at P17 and were assessed for memory of the association 7 days later (P24; an interval where we previously found individual differences in memory for the association). Lower levels of ultrasonic vocalizations at P8-10 were associated with poorer memory for the fear association at P24. In Experiment 2, we conditioned and tested infants as described in Experiment 1. Six weeks (± 1 week) later, when all animals were adults, they were given weak context conditioning (i.e., a single shock in a novel context) and assessed for fear of the context the following day. Animals that had poorer memory at P24 (i.e., exhibited infantile amnesia) were less fearful in adulthood. Together, these results suggest that those animals that exhibited infantile amnesia at the 7-day test were more resilient, both prior to training and in adulthood.

P1-24 EARLY-LIFE ANTIPYRETIC EXPOSURE AND THE DISPLAY OF ANXIETY AND REPETITIVE PHENOTYPES IN C57BL/6J MICE, **Christopher Harshaw,** *University of New Orleans, New Orleans, United States* E-mail: charshaw@uno.edu

Christopher Harshaw, University of New Orleans; Anna Warner, University of New Orleans

A number of epidemiological studies have reported associations between early-life acetaminophen (APAP) and hyperkinetic disorders such as Attention Deficit Hyperactivity Disorder (ADHD). Relatively few studies, however, have examined the neurodevelopmental effects of APAP in animal models. Here, we examined long-term consequences of early-life APAP administered with or without fever/inflammation on activity-, repetitive-, and anxiety-related phenotypes. Litters of C57BL/6J mouse pups with at least 3 male and 3 females were selected for use. On P5, P8, and P11 pups were provided s.c. injection of either phosphate buffered saline (PBS; vehicle) or IL-1β (.2 μg/kg). After a 45 min delay, pups received either a second injection of PBS or dose of APAP (103.9 mg/kg) scaled to equal that commonly used for human infants. Mice were subsequently given a number of tests of social-emotional functioning across development. Using linear mixed effects models controlling for litter and cage as a random effects, we found that APAP significantly impacted (1) measures of open field 'anxiety', including thigmotaxis (i.e., center:edge ratio) and fecal boli, (2) complexity of locomotor trajectories, across several tests, and (3) clockwise circling in both open field and automated holeboard tests (ps <.05). Several of these outcomes (e.g., circling behavior) also showed significant sex x APAP interaction ($p < .05$). IL-1β exposure had dissociable, largely non-interactive effects on a number of the same outcomes. These results indicate enduring effects of early-life APAP exposure on phenotypes relevant to hyperkinetic disorders such as ADHD and suggest the need for increased research in this area.

Sandra G. Wiener Student Investigator Award 2019 ISDP Sandra G. Wiener Student Investigator Award: TRAJECTORIES OF BEHAVIORAL AVOIDANCE IN REAL TIME IN PRESCHOOLERS: INFLUENCE OF TEMPERAMENTAL SHYNESS AND PHYSIOLOGICAL DYSREGULATION, **Raha Hassan,** *McMaster University, Hamilton, Canada* E-mail: hassar@mcmaster.ca

Raha Hassan, McMaster University; Louis Schmidt, McMaster Univ

While engaging in a moderate amount of avoidance can be adaptive, excessive social avoidance can negatively impact socioemotional development. Relatively few studies have mapped avoidance chronometry in children. Here we examined 1) children's behavioral avoidance in real time, and 2) whether temperamental shyness and physiological regulation were associated with distinct patterns of behavioral avoidance to social threat. We derived individual differences in trajectories of behavioral avoidance during a social stressor (the stranger approach task) across 4 behaviorally coded epochs within the same task using latent class growth curve analyses in 133 typically developing preschoolers (Mage = 4.06, SD = .78). A three-class solution was selected due to the best model fit and conceptually distinct trajectories, including an increasing high (12%), medium (20%), and low (69%) trajectory groups ($p < .001$). We also examined whether these three trajectories of behavioral avoidance were associated with temperamental shyness and physiological regulation (change in respiratory sinus arrythmia) during a social stressor using an ANCOVA, controlling for age, sex, and baseline RSA. Trajectory membership was significantly associated with temperamental shyness ($p = .01$) and physiological regulation ($p = .03$). Children in the high avoidance group were the most shy and demonstrated the lowest physiological regulation. Observing children's patterns of avoidance in real time may provide a model for how children regulate their emotions over the course of the social threat. These results have implications for understanding how some children behave in everyday situations such as engaging with novel peers and teachers at school.

P1-33 ATYPICAL NEURAL FUNCTION DURING THEORY OF MIND LINKS VIOLENCE EXPOSURE AND EXTERNALIZING SYMPTOMS IN ADOLESCENCE, **Charlotte Heleniak,** *Columbia University, New York, United States* E-mail: ch2799@columbia.edu

Charlotte Heleniak, Columbia University; Kelly Sambrook, University of Washington; Katie McLaughlin, Harvard University

Children who experience interpersonal violence are at markedly elevated risk of perpetrating violence later in development. This is concerning, given that one-third of American youth have been exposed to violence by the time they reach adolescence. Although atypical emotional processing has long been proposed as a determinant of psychopathology following violence exposure, scant research has examined aspects of social cognition as potential mechanisms in the cycle of violence. To that end this study examined the impact of interpersonal violence exposure on the development of cognitive and affective theory of mind (ToM), and their neural bases, as a mechanism linking interpersonal violence exposure and aggressive behavior. Using fMRI, we assessed behavioral and neural responses during cartoon vignettes requiring cognitive ToM, affective ToM or physical feature comprehension (control) in a diverse community-based sample of 50 adolescents (14-19 years) recruited for variability in violence exposure. Interpersonal violence exposure predicted slower reaction time (RT) during the affective, but not cognitive, condition of the ToM task. Slower affective ToM RT was also associated with externalizing psychopathology. We found a variety of differences associated with both violence exposure and externalizing during affective ToM in functional recruitment of brain areas involved in social cognitive processes, including temporoparietal junction, posterior superior temporal sulcus, and ventromedial PFC. Results highlight the importance of considering social cognitive processes in models of the developmental consequences of violence exposure in children.

P1-36 TRANSGENERATIONAL EFFECTS OF MATERNAL STRESS EXPOSURE ON INFANT NEURAL CONNECTIVITY, **Cassandra Hendrix,** *Emory University, Atlanta, United States* E-mail: clhendr@emory.edu

Cassandra Hendrix, Emory University; Patricia Brennan, Emory University; Daniel Dilks, Emory University; Elaine Johnson, Emory Laney Graduate School; Anne Dunlop, Emory University; Elizabeth Corwin, Emory University

Chronic and traumatic stress exposure increases risk for psychiatric illness, and it may have transgenerational effects on an individual's offspring. The current study is the first to examine associations between maternal stress exposure and infant neural connectivity in a sample of African American mother-infant dyads, a group that is disproportionately exposed to chronic stress. Women completed measures of stress exposure during the first trimester of pregnancy and at approximately 1 month postpartum, and infants (n=20, 8 female) completed a 30-minute MRI scan during natural sleep at 1 month postpartum (mean infant age=42 days). The present analyses focused on frontoamygdala resting state functional connectivity (FC) because this circuitry is sensitive to stress exposure and has been linked to psychiatric illness in adults. First, we found maternal childhood trauma exposure predicted stronger FC between the amygdala and dorsomedial prefrontal cortex in infants. These results persisted after controlling for current maternal stress exposure and depression. Second, we found racial discrimination-related stress, but not stressful life events or perceived stress, during pregnancy was associated with weaker infant FC between the amygdala and ventromedial prefrontal cortex. These results provide novel evidence that extreme experiences of early life stress have transgenerational effects that may accelerate the development of certain frontoamygdala circuits in offspring. Moreover, the timing and type of maternal stress exposure plays an important role in determining how stress shapes the infant brain. Large, prospective studies are needed to identify how these early neural changes influence long-term child development and risk for psychiatric illness.

P1-43 PRESENCE OF MOTHER PROMPTS APPARENT ADAPTIVE DISSOCIATION OF NEUROINFLAMMATORY, FEBRILE, AND BEHAVIORAL RESPONSES OF GUINEA PIG PUPS IN A THREATENING ENVIRONMENT, **Michael Hennessy,** *Wright State University, Dayton, United States* E-mail: michael.hennessy@wright.edu

Michael Hennessy, Wright State University; Joshua Sensenbaugh, Wright State University; Andrea Bell, Wright State University; Patricia Schiml, Wright State University; Terrence Deak, Binghamton University

Exposure to a pathogen induces a central inflammatory state that promotes fever to fight infection and sickness behaviors (e.g., inactivity, postures to retain warmth) to support the energetically demanding task of generating fever. Sickness behaviors can also be influenced by the social situation. A guinea pig pup that is injected with LPS to simulate pathogen exposure, and then isolated in a threatening (brightly lit, novel) environment, displays robust sickness behavior not seen if the pup is tested with the mother. We asked whether the mother also reduces fever and central neuroinflammatory signaling. In a first experiment, we found that while the presence of the mother again suppressed sickness behavior of pups injected with LPS and placed in the threatening environment, fever actually increased when the mother was present. In a second experiment, we found that expression of a variety of inflammatory signaling molecules in hypothalamus did not differ in pups tested alone or with the mother following LPS injection. Thus, the mother's presence resulted in a 3-way dissociation of behavior (reduced), fever (increased), and central inflammatory signaling (unchanged). These results seem best interpreted in an adaptive framework. While the central effect of LPS remains unchanged in the presence of the mother, the suppression of sickness behavior permits the pup to interact with and follow the mother to safety. And in the absence of the threat of isolation in brightly lit novel surroundings, the pup can allocate greater resources to generating fever to combat potential infection. Supported by grant MH068228

P1-65 MATERNAL ANXIETY AND DEPRESSIVE SYMPTOMS DURING PREGNANCY AND CHILD BEHAVIORAL/EMOTIONAL PROBLEMS IN TODDLERHOOD: THE MEDIATING ROLE OF MATERNAL POSTNATAL BONDING. A SECONDARY ANALYSIS OF THE IRIS STUDY, **Jens Henrichs,** *Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Midwifery Science, AVAG-Amsterdam Public Health, Netherlands, Amsterdam, Netherlands* E-mail: j.henrichs@vumc.nl

Jens Henrichs, Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Midwifery Science, AVAG-Amsterdam Public Health, Netherlands; Marlou de Kroon, University Medical Center Groningen, Department of Health Sciences, University of Groningen; Anke Witteveen, Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Midwifery Science, AVAG-Amsterdam Public Health; Myrte Westerneng, Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Midwifery Science, AVAG-Amsterdam Public Health; Anneloes van Baar, Child and Adolescent Studies, Utrecht University, Utrecht, The Netherlands; Ank de Jonge, Amsterdam UMC, Vrije Universiteit Amsterdam, Department of Midwifery Science, AVAG-Amsterdam Public Health; Annika Walker, Amsterdam UMC, Vrije Universiteit

Maternal anxiety and depressive symptoms during pregnancy are risk factors for child behavioral/emotional problems. However, little is known about explanatory factors mediating these associations. Maternal prenatal anxiety and depressive symptoms may be early indicators of harmful postnatal environmental conditions, including a poor mother-infant relationship, affecting child behavioral development. Using a prospective survey (n=740) embedded in the IRIS study, we investigated whether maternal bonding in infancy mediated the association between maternal prenatal anxiety or depressive symptoms and child behavioral/emotional problems in toddlerhood. Mothers reported prenatal state anxiety (State and Trait Anxiety Inventory), and depressive symptoms (Edinburgh Postnatal Depression Scale) at 22 weeks' gestation and 28 months postpartum. Mothers reported maternal bonding (Maternal Postnatal Attachment Scale) 6 months postpartum. At age 28 months, child behavioral/emotional problems were assessed by maternal report using the Child Behavior Checklist. In mediation models adjusted for demographic and perinatal confounders and maternal postnatal depressive symptoms at age 28 months, maternal prenatal anxiety and depressive symptoms were directly associated with more child internalizing and externalizing problems. Maternal postnatal bonding partially mediated the links between maternal prenatal depressive symptoms and child internalizing problems, β=0.013, percentile-bootstrap 95%CI [0.002; 0.029], and child externalizing problems, β=0.015, percentile-bootstrap 95%CI [0.002; 0.031]. Mediation analyses including maternal prenatal anxiety revealed very similar patterns of results. These findings suggest that associations between maternal anxiety and depressive symptoms during pregnancy and child behavioral/emotional problems are partly mediated through poor maternal postnatal bonding. Replication studies using objective measures of mental health, maternal bonding and/or child behavior are needed.

P2-08 ONTOGENY OF BEHAVIORAL PERFORMANCE AND REGIONAL IMMEDIATE EARLY GENE EXPRESSION ACROSS VARIANTS OF CONTEXTUAL FEAR CONDITIONING IN THE RAT, **Nicholas Heroux,** *University of Delaware, Newark, United States* E-mail: nheroux@psych.udel.edu

Nicholas Heroux, University of Delaware; Mark Stanton, University of Delaware; Jeffrey Rosen, University of Delaware; Colin Horgan, University of Delaware Department of Psychological and Brain Sciences; Claudia Pinizzotto, University of Delaware

Successful expression of long-term contextual fear memory emerges over the third and fourth week of life in the rat (Rudy & Morledge, 1994; Schiffino et al., 2011). In the current study, four groups of rats were trained on either Postnatal Day (PD) 17 or 24: Immediate-shock control, Context-only control, Context-shock; and Context-Preexposure-Immediate-Shock. The latter two groups differed in that the 3min context exposure and foot-shock presentation occurred either in the same trial (standard contextual fear conditioning; sCFC) or 24hr apart (Context Preexposure Facilitation Effect; CPFE), respectively. For each age and group, we examined behavioral performance and regional immediate early gene (IEG) expression in the prefrontal cortex (mPFC), hippocampus (dHPC/vHPC), and amygdala (BLA) using qPCR. In sCFC, post-shock freezing was equivalent at both ages but only PD24 rats displayed 24hr retention freezing. In the CPFE, only PD24 rats showed post-shock or retention freezing. Context-only and Immediate-shock non-associative control groups showed little or no freezing at all ages. For the IEG results, PD17 rats failed to show expression of the IEGs c-Fos, Arc, or Egr-1 above behaviorally naïve home-cage (HC) rats in any region or behavioral condition. In PD24 rats, IEG expression generally did not differ between behavioral conditions but was significantly elevated above PD17 and HC control rats. There was a clear developmental emergence of dHPC c-Fos expression during training in the CPFE (Context-Preexposure-Immediate-Shock group). Taken together, these results suggest that decreased experience-dependent IEG expression may underlie unsuccessful consolidation of long-term contextual fear memory in developing rats.

P2-04 DEVELOPMENTAL DISSOCIATION IN AMOUNT OF CONTEXT EXPOSURE NECESSARY TO SUPPORT ACQUISITION OF CONTEXTUAL FEAR IN RATS, **Colin Horgan,** *University of Delaware Department of Psychological and Brain Sciences, Newark, United States* E-mail: coljhor@udel.edu

Colin Horgan, University of Delaware Department of Psychological and Brain Sciences; Nicholas Heroux, University of Delaware; Mark Stanton, University of Delaware

In standard contextual fear conditioning (sCFC), rats associate a context (conditional stimulus; CS) with an aversive foot-shock stimulus (unconditional stimulus; US) within a single training session. For contextual fear learning to occur, the rat must first have sufficient time to encode an internal representation of the context prior to experiencing the foot-shock US. Immediate presentation of the US upon a rat's first exposure to a context prevents acquisition of conditioned fear (also known as the immediate-shock deficit) at any age (Fanselow 1986). In postnatal day (PD) 24 or older rats, 30 seconds of context exposure prior to foot-shock is sufficient to produce maximal freezing behavior (Fanselow 1990; Burman et al.,2009). The current study examined developmental differences in the amount of context exposure necessary to form a context-shock association across age in the rat. This study compared post-shock freezing behavior after sCFC in PD17 and PD24 Long-Evans rats after either 30 or 180 seconds of context exposure prior to foot-shock. PD24 rats showed no difference in post-shock freezing after either 30 or 180 seconds. PD17 rats who received 180 seconds of context exposure were not significantly different from PD24s who received either 30 or 180 seconds of exposure, but PD17s in the 30 second condition froze significantly less than all other groups. These results suggest a developmental dissociation in the amount of context exposure necessary to form a sufficiently robust context representation to support acquisition of contextual fear. Future experiments will investigate potential neural mechanisms which may underlie this dissociation.

P2-44 THE RELATIONSHIP BETWEEN CAREGIVING AND ADOLESCENT OFFSPRINGS' OXIDATIVE STRESS: A PRELIMINARY STUDY, **Sarah Horn,** *University of Oregon, Eugene, United States* E-mail: shorn@uoregon.edu

Sarah Horn, University of Oregon; Leslie Leve, University of Oregon; Pat Levitt, Children's Hospital Los Angeles; Philip Fisher, University of Oregon

Childhood adversity is associated with deleterious health outcomes via disruptions to stress response systems. One putative pathway through which adversity influences development is metabolic disturbances, such as oxidative stress. Oxidative stress arises from an imbalance between intracellular production of reactive oxygen species and the body's inability to neutralize negative effects to cell health via antioxidant defenses.

However, not all children exposed to adversity are at equal risk for disrupted metabolic function and subsequent health degradation. Positive caregiving, characterized by warmth and sensitivity, may buffer children against risky outcomes. An understudied area is the degree to which caregiving independently relates to children's metabolic processes.

We examine the association between caregiving styles (Assessing Environments Questionnaire) and children's oxidative stress (gold-standard biomarker, F2-Isoprostane [IsoP]). The sample includes N=50 adolescent females (Mage = 16.3) recruited primarily through the Department of Youth Services.

A significant negative relationship was observed between positive parental contact and children's IsoP levels, such that lower levels of positive parental contact were significantly correlated with higher concentrations of IsoP (B= -.33, p=.03); this association remained significant following adjustment for nicotine use. No other caregiving subscales (e.g., physical punishment, parental rejection) were significantly associated with children's IsoP.

Results provide preliminary support for a link between caregiving quality and offspring's metabolic processes (i.e., oxidative stress). Implications for early detection of risk and preventative strategies will be discussed. Future directions include examining a conceptual model that connects adversity exposure, caregiving quality, oxidative stress, and health outcomes in high-risk youth.

S3-03 TEND-AND-BEFRIEND TENDENCIES IN CHILDREN FOLLOWING ACUTE STRESS: THE ROLE OF RESPIRATORY SINUS ARRHYTHMIA IN ALTRUISM, **Camelia Hostinar,** *University of California, Davis, Davis, United States* E-mail: cehostinar@ucdavis.edu

Camelia Hostinar, University of California, Davis; Nicholas Alen, University of California, Davis; LillyBelle Deer, University of California, Davis

The social-behavioral consequences of activating the stress response include “fight-or-flight” tendencies such as aggression, anxiety, and withdrawal, but also prosocial, “tend-and-befriend” tendencies. However, these latter effects are less well understood. This study utilized an experimental design to investigate how altruistic donation behavior among children is influenced by an acute laboratory stressor, the Trier Social Stress Test modified for children (TSST-M). Participants aged 9-10 years old were randomly assigned to one of three conditions: stress (TSST-M), socially buffered stress (TSST-M preceded by 10 minutes of parental social support), or no stress (placebo tasks). After this period, children completed an altruistic donation task. Autonomic physiology was assessed throughout. Preliminary analyses with 74 children (55.8% male, full sample of N = 120 and complete physiology will be available for the conference) revealed that the stress condition led to higher donations compared to the no-stress condition (B = .35, SE = .14, p = .01), with no differences between the no-stress and socially buffered conditions. Results also revealed a quadratic association between baseline respiratory sinus arrhythmia (RSA) and altruistic donation behavior (linear term B = .10, SE = .06, p = .06; quadratic term: B = -.11, SE = .04, p = .008). These results suggest an inverted U-shape relation between baseline RSA and donation amount, such that moderate baseline RSA predicted increased altruistic donation compared to either low or high RSA. Increased altruism in children following acute stress suggests that a comprehensive understanding of the human stress response needs to incorporate “tend-and-befriend” behavior.

P1-41 PUBERTAL RECALIBRATION OF CORTISOL-DHEA COUPLING IN POST-INSTITUTIONALIZED CHILDREN, **Mariann Howland,** *University of Minnesota, Twin Cities, Minneapolis, United States* E-mail: howla042@umn.edu

Mariann Howland, University of Minnesota, Twin Cities; Bonny Donzella, University of Minnesota Twin Cities; Samantha Gardow, University of Minnesota, Twin Cities; Megan Gunnar, University of Minnesota

Puberty provides a window of opportunity for recalibration of the hypothalamic-pituitary-adrenal (HPA) axis to current conditions. We have shown that following early institutional deprivation, internationally-adopted, post-institutionalized (PI) youth go from a blunted to a normally responsive cortisol response to the Trier Social Stress Test (TSST) as they move from Tanner stages 1 to 5 (DePasquale et al., 2018). What is not clear is whether the other adrenal end-product of the HPA axis, dehydroepiandrosterone (DHEA), is involved in this pubertal recalibration. DHEA increases with puberty and plays a role in pubertal maturation. It is also elevated in response to stressors. We examined whether DHEA increases normally with puberty in 125 PI youth compared to 171 non-adopted (NA) youth. We also examined the coupling of cortisol and DHEA with pubertal development using an accelerated longitudinal design with 7- to 15-year-olds who completed 3 annual assessments (nurse-conducted Tanner staging, TSST). Our results showed no level differences in DHEA between PI and NA youth, and both showed the expected increase with pubertal development. However, a linear mixed-effects model indicated that NA children exhibited positive cortisol-DHEA coupling at all pubertal stages. For PI children, cortisol and DHEA were not coupled during pre- and early-puberty but became positively coupled, similar to NA youth, by late puberty. These results indicate that the early deprivation-induced blunting of the axis is specific to cortisol and raises the possibility that DHEA increases with puberty may play a role in opening the axis to recalibration.

P2-54 PARENTING & PREADOLESCENT FUTURE ORIENTATION: THE MODERATING ROLE OF SYMPATHETIC REACTIVITY, **Landry Huffman,** *University of Georgia, Athens, United States* E-mail: landryg@uga.edu

Landry Huffman, University of Georgia; Assaf Oshri, University of Georgia

Supportive parenting practices such as autonomy granting and engagement are associated with adaptive adolescent outcomes1. Children who experience supportive rearing environments are incentivized to have a positive outlook toward the future, or future orientation (FO), which is positively predictive of youth adjustment and wellbeing2. However, significant variability exists in the effect of parenting on youth outcomes, as not all youth exposed to supportive parenting exhibit elevation in FO. This heterogeneity may be partially explained by individual differences in sensitivity to parenting environment. Biological sensitivity to context (BSC) theory proposes that children who exhibit high physiological reactivity may benefit more from supportive environments than less-reactive children3. The influence of FO is especially salient among young adolescents4, but its development as a function of parenting and biological context is under-studied, especially among high-risk groups. The aim of the present study was to test the moderating role of physiological reactivity (measured via PEP, an index of sympathetic fight-or-flight response) during a social stress task in the link between supportive parenting behaviors and preadolescent FO. The study included an ethnically diverse sample of preadolescent youth (N = 101, Mage = 10.5) and their mothers who were 200% below the poverty line. Results indicated that the longitudinal effect of supportive parenting behaviors on child level of FO was significantly intensified among youth with higher sympathetic reactivity (b = -0.033*, SE = .016). This supports BSC theory and indicates that positive parenting may be especially beneficial in the context of high sympathetic reactivity.

O2-04 THE EFFECT OF HEART RATE VARIABILITY BIOFEEDBACK TRAINING ON MENTAL HEALTH OF PREGNANT AND NON-PREGNANT WOMEN: A RANDOMIZED CONTROLLED TRIAL, Anja Huizink, *VU University Amsterdam, Amsterdam, Netherlands* E-mail: a.c.huizink@vu.nl

Anja Huizink, VU University Amsterdam; Esi van der Zwan, AMC; Wieke de Vente, University of Amsterdam

Stress during pregnancy is well-known to affect the (un)born child but relatively few studies have examined interventions aimed at reducing stress among pregnant women. In our study, we examined the potential efficacy of heart rate variability (HRV)-biofeedback on stress and stress-related mental health problems in pregnant and non-pregnant women. Fifty women (20 pregnant, 30 non-pregnant; mean age 31.6, SD= 5.9) were randomized into an intervention (n = 29) or a waitlist condition (n= 21). All participants completed questionnaires on stress, anxiety, depressive symptoms, sleep and psychological well-being on three occasions with 6-week intervals. Women in the intervention condition received HRV-biofeedback training between assessment 1 and 2, and women in the waitlist condition received the intervention between assessment 2 and 3. The intervention consisted of a 5-week HRV-biofeedback training program with weekly 60-90 min. sessions and daily exercises at home. Results indicated a statistically significant beneficial effect of HRV-biofeedback on psychological well-being for all women, and an additional statistically significant beneficial effect on anxiety complaints for pregnant women. No significant effect was found for the other stress-related complaints. These findings support the use of HRV-biofeedback as a stress-reducing technique among women reporting stress and related complaints in clinical practice to improve their well-being. Furthermore, it supports the use of this technique for reducing anxiety during pregnancy.

O2-10 MATERNAL STRESS AND DEPRESSION ARE ASSOCIATED WITH INFANT SUBCORTICAL VOLUME, **Kathryn Humphreys,** *Vanderbilt University, Nashville, United States* E-mail: k.humphreys@vanderbilt.edu

Kathryn Humphreys, Vanderbilt University

Stressful experiences prenatally may tune the brain to expect a stressful post-birth setting. We examined whether previous findings linking maternal depression exposure to infant brain volume may be explained by greater prenatal stress exposure.

We hypothesized that the association between maternal depressive symptoms and bilateral volume of the amygdala, a stress-sensitive region in the developing brain, would be explained by increased exposure to stress (i.e., mothers' self-reported stressful experiences during pregnancy).

Our sample consisted of 33 infants (M age=6.15±0.47 months; 52% male). We assessed depressive symptoms using the CES-D and prenatal stress exposure using a life stress interview. To assess amygdala volume (AV), we acquired T1 and T2-weighted images from newborns on a 3.0T MRI scanner, which were segmented manually.

When depressive symptoms and stress severity considered jointly in a regression model predicting bilateral AV, depressive symptoms and stress explained 15 percent of the variance in newborn AV; however, only prenatal stress levels were a significant predictor of AV (b=-40.55, SE=18.63, t(29)=-2.18, p=.038), which held when considering both left and right AV independently. A single-step mediation model confirmed that the association between prenatal depressive symptoms and newborn AV was mediated through prenatal stress (indirect effect 90% CI: -6.06, -0.30).

These results suggest that depressive symptoms during pregnancy are associated with reduced AV in newborns through elevated exposure to prenatal environmental stress. Data collection is ongoing; by the time of the presentation, we expect to have complete longitudinal data from more than 50 infants in which we will examine these findings' robustness.

P1-28 LONG TERM CONSEQUENCES OF EARLY LIFE OPIOID EXPOSURE ON THE BRAIN, **Amirah Hurst,** *Georgia State University, East Point, United States* E-mail: amirahjhurst1@gmail.com

Amirah Hurst, Georgia State University; Hannah Harder, Georgia State University; Lauren Hanus, Georgia State University; Myurajan Rubaharan, Georgia State University; Anne Murphy, Georgia State University

Gestational opioid use has been noted to cause long-term neurobehavioral consequences in offspring. In rodents, gestational opioid exposure has been shown to induce alterations in anxiety, depression, and learning and memory. These changes are accompanied by cellular changes in the dentate gyrus of the hippocampus, namely, changes in neurogenesis and gliogenesis. Furthermore, it has been demonstrated that opioids can alter neurogenesis, gliogenesis and the physiological characteristics of these cells. Additionally, changes in the physiology of one cell type can induce physiological changes in other cell types. These changes can be heightened in stressed animals. In this study we have investigated the effects of early life morphine exposure on neurogenesis, gliogenesis, cellular proliferation and cellular behavior in the dentate gyrus in stressed animals. Experimental male rat pups on P0 were given 2 subcutaneous injections of morphine (2 mg/kg) spaced 6 hours apart, then were allowed to age to adulthood (P 60-100). To induce sickness behavior, adult rats received an injection of lipopolysaccharide (LPS) (250 ug/kg; i.p.). Brains were collected 6 hours post-LPS and histologically analyzed for number and morphology of proliferating cells, microglia, and young neurons in the dentate gyrus. Animals exposed to morphine show more reactive microglia, alterations in the number of proliferating cells and differences in young neuron maturation when compared with controls. Information from this study will provide insight to a possible mechanism underlying the neurobehavioral effects observed in individuals exposed to opioids during development.

P1-69 PHENOTYPING STRESS EXPOSURES RELATED TO PERINATAL HEALTH DISPARITIES, Rimma Ilyumzhinova, *University of Chicago, Chicago, United States* E-mail: rilyumzhinova@uchicago.edu

Rimma Ilyumzhinova, University of Chicago; Jillianne Fowle, University of Chicago; Cherrelle Jones, University of Chicago; Kimberley Mbayiwa, University of Chicago; Alison Hipwell, UPMC; Kathryn Keenan, University of Chicago

There is growing evidence that maternal exposure to stress during pregnancy is associated with adverse birth outcomes and suboptimal offspring neurodevelopment. Black American women living in low resource environments are at high risk for perinatal complications, and also experience disproportionally higher levels of chronic and acute stress exposure than White American women. Research using animal models has revealed that stressor types vary in their impact on health systems. In the present study, we test the magnitude and direction of association between three different types of stress exposure: perceived stress, negative life events, and discrimination stress on stress regulation during pregnancy. One hundred pregnant Black American women with Medicaid insurance completed a laboratory assessment at 10-16 weeks gestation. Salivary cortisol was used as an index of stress response to the Trier Social Stress Task (TSST). Perceived stress was assessed with the Perceived Stress Scale (PSS), negative life events with the Difficult Life Circumstances measure (DLC), and discrimination stress with the Everyday Discrimination Scale (EDS). Results from regression models revealed that both discrimination stress and perceived stress were significantly associated with cortisol response to the TSST, but in different directions. High levels of perceived stress (PSS) were associated with elevated cortisol, whereas high levels of discrimination stress were associated with lower level of cortisol. Capturing the differential impact of domains of stress exposure is likely important in testing associations between exposure and perinatal health, may improve specificity, and lead to more effective deployment of preventive interventions based on stress exposure.

S1-01 PRENATAL TOBACCO AND MARIJUANA CO-USE: SEX SPECIFIC INFLUENCES ON INFANT CORTISOL STRESS RESPONSE, **Nancy Jao,** *Brown Medical School, Providence, United States* E-mail: nancyjao2017@u.northwestern.edu

Nancy Jao, Brown Medical School; Laura Stroud, Brown Medical School; George Papandonatos, Brown University School of Public Health; Meaghan McCallum, The Miriam Hospital; Chrystal Vergara-Lopez, Brown Medical School; Katelyn Borba, The Miriam Hospital; Hannah Dalglish, The Miriam Hospital; Samantha Goldman, The Miriam Hospital; Amy Salisbury, Women & Infants Hospital; Carmen Marsit, Emory University

Abstract: Although tobacco (TOB) and marijuana (MJ) are often co-used in pregnancy, little is known regarding the joint impact of TOB+MJ on offspring development, including the developing neuroendocrine stress system. Further, despite evidence for sex-specific impacts of prenatal exposures in preclinical models, the sex-specific impact of prenatal TOB and MJ exposure on offspring neuroendocrine regulation in humans is unknown. We investigated overall and sex-specific influences of TOB+MJ co-use on offspring cortisol regulation over the first postnatal month. Participants were 111 mother-infant pairs from a low-income, diverse sample. Three groups were identified based on timeline follow back interview data with biochemical verification: (a) prenatal TOB+MJ, (b) TOB only, and (c) controls. Baseline cortisol and cortisol stress response was assessed at seven points over the first postnatal month using a daily handling paradigm in which saliva cortisol was assessed before, during, and following the NICU Network Neurobehavioral Scale. A significant exposure group by offspring sex interaction emerged for baseline cortisol over the first postnatal month; TOB+MJ-exposed males showed 35-36% attenuation of baseline cortisol levels vs. TOB-exposed and unexposed males (ps≤.003), while no effects of exposure emerged for females. Both TOB+MJ and TOB-exposed infants showed 22% attenuation of cortisol stress response over the first postnatal month (ps<.026), with no significant exposure group by offspring sex interactions. Although results are preliminary, this is the first human study to investigate the impact of prenatal MJ exposure on infant cortisol and the first to reveal a sex-specific impact of prenatal TOB+MJ on neuroendocrine regulation in humans. Future, larger-scale studies are needed to elucidate mechanisms and consequences of sex-specific effects of MJ and TOB+MJ on the developing neuroendocrine stress system.

P2-83 DOG TEMPERAMENT AND VETERINARY CONSULTATION -POODLE OWNERS CONSULT MORE THAN SHIH TZU OWNERS, **Miki Kakinuma,** *Nippon Veterinary and Life Science University, Musashino-shi, Japan* E-mail: kakinuma-miki@nvlu.ac.jp

Miki Kakinuma, Nippon Veterinary and Life Science University; Yutaka Momota, Nippon Veterinary and Life Science University; Izuru Nose, Nippon Veterinary and Life Science University; Morihisa Takarabe, Minami-Kyusyu University; Ayako Uechi, Clinic Prop; Momoko Takahashi, Nihon University; Michiko Konno, Tokyo City University; Tadaharu Watanabe, Tokyo University of Science; Kazue Igarashi, Shirayuri College; Kayoko Uemuera, Bunkyo Gakuin University; Jin Jing, Sun Yat-sen Uniersity

Cat owners are more hesitant to visit veterinarians because cats exhibit much stress. It indicates that animal temperament have influences over owners' action. In this study we focus on the dog breeds and veterinarian visits and also on the dogs health condition. Since veterinary care is often discussed in parallel to pediatric care, results of this study may help understand the medical consultation patterns of children with autistic spectrum disorder (ASD) or other communicative difficulties. They sometimes suffer from aggravated inflammations due to the delay in visiting clinics.

Survey of dog ownership and insurance coverage of major dog breeds in Japan indicates that while toy poodles have the highest coverage and Shih Tzu the lowest. Poodles are known for its high communication ability with human and also high sensitivity. Shih Tzu on the hand is known for the calmness and the stubbornness.

Preliminary survey to small animal practitioners (N=10) and university veterinary medical center vets (N=3) suggest that toy poodle owners consult them at early stage of illness or injuries or even without obvious symptoms while Shih Tzu owners tend to come after the symptoms are aggravated. As the result, toy poodle owners have higher rate of consulting vets than Shih Tzu owners, reflecting the medical insurance coverage as well.

These results suggest that temperament of those to be cared influence the behavior of the caretaker; advices based on the temperament could enhance the caretaker's perception of their target in preventing the aggravation of the illness and injuries.

P1-52 THE ROLE OF SOCIOECONOMIC STATUS IN ASSOCIATION BETWEEN MATERNAL HOSTILITY AND CHILD DIURNAL CORTISOL, **Miriam Kamens,** *Boston University, Brighton, United States* E-mail: mlkamens@gmail.com

Miriam Kamens, Boston University; Ashley Loser, Boston University Dept of Brain and Psychological Sciences; Charu Tuladhar, Boston University; Katie Kao, Boston University; Amanda Tarullo, Boston University

Biological stress regulation is influenced by early experiences, and without proper early support from caregivers, the stress regulation systems may not develop optimally. Maternal hostility may interfere with child cortisol regulation; indeed, higher maternal hostility relates to higher cortisol levels in children (Philbrook, et al., 2014). Socioeconomic status also relates to cortisol dysfunction (Lupien, et al., 2001), however less is known about the interaction between socioeconomic status, maternal hostility, and child cortisol. We examined diurnal salivary cortisol in 3.5-year-old children (N=78) in relation to maternal hostility and socioeconomic status. Maternal hostility was coded from a mother-child interaction using the Emotional Availability Scales (Biringen & Robinson, 1991). Socioeconomic status was assessed using income-to-needs ratio and parental occupational prestige. In separate models, both income-to-needs ratio (95%CI:0.0269-0.1716) and occupational prestige (95%CI:0.1540-0.6275) moderated the association between maternal hostility and child diurnal cortisol slope, such that higher maternal hostility related to a flatter cortisol slope only for children from families with low income-to-needs ratio and low occupational prestige. Lower income-to-needs ratio (95%CI:-1.0893 - -0.1635) and occupational prestige (95%CI:-3.8988 - -1.0627) were also directly associated with flatter diurnal slope. The biological stress system is immature in early childhood, and children rely on parents to regulate their stress. More hostile mothers may less effectively promote healthy cortisol rhythms, specifically in families of lower socioeconomic status. These results indicate the importance of socioeconomic context when assessing parental impacts on children’s biological stress regulation.

P2-32 INFANTS DEMONSTRATE BIASED SELECTIVE ATTENTION TO OWN-SPECIES BUT NOT OWN-RACE FACES AT 6- AND 11-MONTHS OF AGE, **Brianna Keenan,** *Tulane University, New Orleans, United States* E-mail: bkeenan@tulane.edu

Brianna Keenan, Tulane University; Julie Markant, Tulane University

Between 6 and 9 months of age infants show emerging biases in recognition of frequently experienced faces characterized by increased difficulty differentiating other-race and other-species faces. Although these changes in perceptual discrimination are well-established, few studies have examined whether infants show similar biases in selective attention orienting to frequently experienced faces when multiple distractors compete for attention. Jakobsen et al. (2016) found that infants oriented to own-species faces faster and more frequently than other-species faces within heterogenous search arrays. The current study extended this work by examining 6- and 11-month-old infants' orienting to own-race, other-race, and other-species faces in search arrays containing multiple unique distractors. We recorded infants' eye movements as they viewed arrays comprised of nine distractors and one own-race, other-race, or other-species face. We measured the proportion of trials in which infants looked at the face and eye movement response times (RT) to look at the face. At both ages, infants were slower and less likely to detect other-species faces, consistent with previous work. However, infants showed similar speed and frequency of orienting to own- and other-race faces. These results suggest that previous work demonstrating biased perceptual discrimination of own- vs. other-race faces may not extend to biased attention orienting in heterogenous search arrays. More broadly, these findings highlight potential differences in the mechanisms underlying race- and species-based face biases in infancy. Future work should consider the role of both perceptual and attention processes in the development of these face biases.

P2-05 RELEVANT DISTRACTION CAN IMPROVE STEM LEARNING IN PRESCHOOL CHILDREN WITH POOR SELECTIVE ATTENTION, **Jill King,** *Tulane University, New Orleans, United States* E-mail: jking17@tulane.edu

Jill King, Tulane University; Julie Markant, Tulane University

Distraction is often considered detrimental to learning. Studies indicate that highly decorated classrooms predict poorer learning, especially for children with poor selective attention. However, research has also shown that distraction can benefit learning when it is relevant to a learning goal. We investigated whether relevant distraction promotes STEM learning among 3-5-year-old children with varying selective attention skills. Children viewed science video lessons that were displayed centrally while distracting images appeared in each corner of the screen. Children completed four trial types: 1) baseline (no distractors); 2) relevant (all distractors related to lesson content; 3) irrelevant (all distractors unrelated to lesson content); and 4) mixed (half relevant distractors and half irrelevant distractors). We assessed learning by comparing performance on content knowledge questions before and after the videos. We also used eye tracking to examine attention to the relevant and irrelevant distractors during the videos and measured children's selective attention skills based on their performance on the Track-It task (Fisher et al. 2012). Results showed that attention to distractors interacted with selective attention skills to influence learning during the mixed condition. Attention to distractors did not affect learning among children with good selective attention skills. However, among children with poor selective attention, increased looking to irrelevant distractors hindered learning while increased looking to relevant distractors promoted learning. Thus, children with poor selective attention may be especially susceptible to distraction during learning, but this distraction may help or hinder learning depending on whether the distracting content is relevant to the learning goal.

P1-02 INVESTIGATING THE RELATIONSHIP BETWEEN ACUTE STRESS AND FUNCTIONAL BRAIN HEMODYNAMICS IN MALE CHILDREN: IMPLICATIONS FOR COGNITIVE FLEXIBILITY, **Katherine Knauft,** *Miami University, Oxford, United States* E-mail: knauftkm@miamioh.edu

Katherine Knauft, Miami University; Natalee Price, Miami University; Elizabeth Kiel, Miami University; Vrinda Kalia, Miami University; Karthik Vishwanath, Miami University

Past research has demonstrated that acute stress impairs cognitive flexibility in male adults (Shields et al., 2016). Further, Kalia and colleagues (2018) have shown that change in perseverative errors, a key indicator of cognitive flexibility, due to acute stress exposure was correlated with levels of oxygenated hemoglobin (HbO) in the left prefrontal cortex (PFC) following stress induction. Given that cognitive flexibility changes across development (Diamond, 2013), we investigated the impact of acute stress on cognitive flexibility in children. Based on previous observations, with adults, we only assessed male participants. We hypothesized that acute stress exposure would impair cognitive flexibility and behavioral performance, in the cognitive flexibility task, would correlate with hemodynamic change in HbO levels in the left PFC.

Male children (N = 16; Age = 6-8years) completed the Cold Pressor Task (CPT), to induce stress, or a non-stressful Sham-CPT. Brain hemodynamics was assessed during the stress manipulation using functional near-infrared spectroscopy (fNIRS). Cognitive flexibility was measured using the Wisconsin Card Sorting Task (WCST) following the CPT or Sham-CPT.

Paired t-test (one-tailed) demonstrated that levels of HbO in the left PFC increased marginally during stress induction, in comparison to baseline, for the stress group, $t(6) = 1.80$, $p = .06$, only. Further, mean levels of HbO during stress exposure was negatively correlated with failure to maintain set on the WCST, $r = -.77$, $p = .04$. Our data suggest that higher levels of HbO in the left PFC during stress induction are positively associated with cognitive flexibility in male children.

P1-50 LIMITED BEDDING AND NESTING MATERIAL CHANGES INDICES OF CELLULAR METABOLISM AND THERMOGENESIS IN LONG-EVANS RATS DURING THE FIRST TWO WEEKS OF LIFE, **Hannah Lapp,** *University of Massachusetts, Boston, Boston, United States* E-mail: hannah.lapp001@umb.edu

Hannah Lapp, University of Massachusetts, Boston; Celia Moore, University of Massachusetts-Boston

Significant peripheral and central development occurs during early life. Environmental conditions during this period that require increased energy expenditure to maintain homeostasis may compromise energy stores available for central nervous system growth and development. In the present study, we investigate whether an environment with limited bedding and nesting material (LBN), which prevents the dam from constructing a quality nest and alters the microenvironment for the litter, affects indices of metabolism and thermogenesis during the first two postnatal weeks in Long-Evans rat pups. Behavioral and physiological thermal regulation, central and peripheral changes in energy allocation (mitochondrial biogenesis), and maternal behavior were measured from pups in LBN or abundant bedding environments on postnatal day (P) 2, P6, P10, and P14. LBN huddles had greater area, greater perimeter, and reduced circularity ($p<.05$). LBN pups within the huddle were visible longer than controls and males were visible longer than females in both conditions ($p<.05$). LBN pups had heavier hearts after P2 ($p<.05$). LBN affected brown adipose tissue (BAT), but not white adipose tissue (WAT), thermogenesis in a sex and age-specific manner ($p<.05$). Pups were especially affected by the LBN manipulation on P6, when mitochondrial copy number was reduced in BAT and WAT ($p<.05$). Mitochondrial copy number was also reduced in LBN pups in the hippocampus, but not the brainstem ($p<.05$). Our data provide evidence of changes in behavioral, peripheral, and central indices of cellular metabolism and thermal regulation in pups in limited bedding environments which may indicate changes in energy allocation during crucial periods of development.

O1-03 THE EFFECTS OF EARLY-LIFE TEMPERATURE EXPOSURE AND SUPPLEMENTAL TACTILE STIMULATION ON THYROID HORMONE SIGNALING AND DNA METHYLTRANSFERASE 3A GENE EXPRESSION IN THE FEMALE NEONATAL RAT, **Samantha Lauby,** *University of Toronto Scarborough, Toronto, Canada* E-mail: samantha.lauby@mail.utoronto.ca

Samantha Lauby, University of Toronto Scarborough; Patrick McGowan, University of Toronto

Early-life maternal care received can affect later-life behavior at adulthood through epigenetic mechanisms (e.g., DNA methylation). There is evidence that supplemental tactile stimulation (a proxy for maternal licking/grooming) can affect later-life anxiety-like behavior and increase peripheral thyroid hormone activity in rat pups. It is unknown if early-life temperature changes with differences in maternal contact could also affect rat pup offspring through increases in thyroid hormone signaling. To study these two early-life factors, we briefly separated female rat pups daily in the first week of life at room temperature (19-21° C) or nest temperature (33-35° C) and provided half the pups in a litter with supplemental tactile stimulation. Results indicate that week-old pups with intermittent room temperature exposure had decreased circulating triiodothyronine and thyroid hormone receptor alpha-1 and beta gene expression in the paraventricular nucleus of the hypothalamus compared to pups with nest temperature exposure. This corresponded with a decrease in paraventricular DNA methyltransferase 3a gene expression, a thyroid hormone responsive gene. Acute room temperature exposure produced the opposite effect and increased circulating triiodothyronine and paraventricular thyroid hormone receptors and DNA methyltransferase 3a gene expression. There were no effects of supplemental tactile stimulation on these measures. These findings suggest that early-life intermittent room temperature exposure decreases thyroid hormone signaling, which is different from acute exposure, and is unaffected by supplemental tactile stimulation. The findings also suggest that early-life temperature exposure can affect the DNA methylation machinery during brain development.

P1-37 ASSOCIATIONS BETWEEN INSTITUTIONAL REARING AND ADOPTION DURATION WITH EEG PATTERNS IN MIDDLE CHILDHOOD, **Rebecca Lipschutz,** *University of Houston, Houston, United States* E-mail: rslipschutz@uh.edu

Rebecca Lipschutz, University of Houston; Johanna Bick, ; Mary Dozier, University of Delaware; Alexandra Tabachnick, University of Delaware

Exposure to early adversity, such as institutional rearing has been linked with alterations in neural function. Previously institutionalized children show reduced power in high frequency bands and increased power in low frequency bands (Marshall & Fox., 2004), which has long-term negative implications for memory, executive functioning (Wade, 2019) and symptoms of hyperactivity and inattention (McLaughlin, 2010). There is also evidence that adoption into supportive families promotes normalization of electrophysiological activity and these improvements may be enhanced by earlier age of adoption (Vanderwert, 2016). The present study examined associations between time spent in institutional rearing, time with adoptive families and EEG spectral power. Participants included 35 children (60% female) who were adopted into families from institutional rearing facilities. When children reached eight years of age (M = 8.71, SD = 0.31) EEG data was recorded. Later age of adoption was significantly associated with lower levels of spectral power in the low beta ($p = .006$), and gamma ($p = .004$) bands. Longer duration of foster/adoptive placement was associated with higher levels of spectral power in the low beta ($p = .006$), and gamma ($p = .003$) bands. Preliminary analyses revealed associations between spectral power at rest and parent reported externalizing problems These findings extend previously observed patterns of lower EEG power in high frequency bands that subserve cognitive, attentional and language processes in previously institutionalized children. Results also highlight that these effects are sensitive to timing of adoption and time spent with adoptive family may improve EEG activity patterns.

O3-04 FRONTAL EEG ASYMMETRY MODERATES THE ASSOCIATIONS BETWEEN NEGATIVE TEMPERAMENT AND BEHAVIORAL PROBLEMS DURING MIDDLE CHILDHOOD., Ran Liu, *Virginia Tech, Blacksburg, United States* E-mail: ranl@vt.edu

Ran Liu, Virginia Tech; Martha Ann Bell, Virginia Tech

Evidence from numerous longitudinal studies has demonstrated that fearful inhibition (FI) and unregulated impulsivity (UI) significantly predict internalizing problems (IP) and externalizing problems (EP) respectively. We focused on how frontal EEG asymmetry (FA) moderates the FI-IP and the UI-EP relationship. 212 children (102 boys, 110 girls) participated in the study. At age 6, temperament was measured using the Children's Behavior Questionnaire. Scores of shy and fear subscales were standardized and averaged to create a composite score of FI. Scores of impulsivity and inhibitory control (reversed) subscales were standardized and averaged to create a composite score of UI. Baseline (i.e., eye closed) EEG was recorded for 1 minute. At age 9, behavioral problems were measured via the Child Behavior Checklist. FA was calculated by subtracting left ln EEG power (F3) from right ln EEG power (F4; Fox, 1994). Data was analyzed via Mplus 8. The model provided good fit, Chi-square = .48, p = .79, RMSEA = .00, CFI = 1.00. FA significantly moderated the association between FI and IP (b = -10.67, β = -.13, p = .05). Specifically, FI significantly predicted IP only when children had right FA (b = 4.46, p = .00) but not left FA (b = 1.26, p = .30). FA significantly moderated the association between UI and EP (b = -7.60, β = -.11, p = .02). Specifically, UI significantly predicted EP only when children had right FA (b = 4.00, p = .00) but not left FA (b = 1.72, p = .09).

P2-18 PRESCHOOL GIRLS HAVE HIGHER INTRAHEMISPHERIC EEG COHERENCE THAN PRESCHOOL BOYS, **Diana Lopera-Perez,** *Boston University, Universidad del Norte, Boston, United States* E-mail: dlopera@bu.edu

Diana Lopera-Perez, Boston University, Universidad del Norte; Ashley St. John, Boston University; Philip Grieve, Columbia University; Amanda Tarullo, Boston University

There is mounting evidence of gender differences in morphological and functional brain organization (Barry et al., 2004; Cuevas et al., 2016; Tomasi et al., 2012), which can be partially attributed to early gonadal hormone exposures (Nugent et al., 2012). Electroencephalogram (EEG) intrahemispheric coherence measures synchronicity of activity between brain regions, reflecting organization of cortical neural networks, yet little is known about gender differences in EEG coherence in early childhood. The aim of this study was to examine gender differences in EEG intrahemispheric coherence for typically developing preschool children (N=83, 35 girls, M=4.16 years, range 3.54 to 4.62 years old). We collected two minutes of baseline EEG while children looked at a rotating screensaver. We computed intrahemispheric EEG coherence of frontal regions to temporal, parietal, and occipital regions in the 6-9 Hz frequency band. Using repeated measures ANOVA controlling for age, we found a strong main effect of gender ($F(1,80)=10.99$, $p = .001$), such that girls had higher intrahemispheric coherence than boys. There was a hemisphere x region x gender interaction ($F(1.76, 141.07)=7.82$, $p = .001$), with follow-up analyses indicating this gender difference in coherence was particularly pronounced in the left-frontal-to-parietal coherence pairing ($t(81)=-4.32$, $p<.001$) and the right-frontal-to-occipital coherence pairing ($t(81)=-3.46$, $p = .001$). These findings contrast with previous studies in middle childhood, which indicated lower levels of intrahemispheric coherence in girls than boys (Barry et al., 2004). Thus, gender differences in intrahemispheric coherence may fluctuate across development. Longitudinal methods are needed to understand how patterns of neural organization differ across age and gender.

P1-44 PERCEIVED MATERNAL OVERCONTROL DURING CHILDHOOD: IMPLICATIONS FOR EMOTIONAL AND BIOLOGICAL REGULATION OF STRESS DURING ADULTHOOD, Ashley Loser,
Boston University Dept of Brain and Psychological Sciences, Boston, United States E-mail: losera13@bu.edu

Ashley Loser, Boston University Dept of Brain and Psychological Sciences; Fang Hong, Boston University; Kathleen Malley-Morrison, Boston University; Amanda Tarullo, Boston University

Early parent-child relationships may have long-term implications for emotional and biological regulation in adulthood via the hypothalamic-pituitary-adrenal (HPA) axis, but these mechanisms are not well understood. In a sample of 195 young adults (129 female, M = 20.0 years, SD = 2.84 years), we examined the relations among retrospective report of maternal behaviors during childhood (The Parental Bonding Instrument, PBI); concurrent emotion regulation strategies (Emotion Regulation Questionnaire, ERQ); acute salivary cortisol response to psychosocial stress, and chronic biological stress as indexed by hair cortisol concentration (HCC). The ERQ measured expressive suppression strategy, the tendency to mask emotions or suppress emotional thoughts, as its use is related to poor well-being and impaired social functioning (Gross & John, 2003). In the current study, young adults who reported their mothers had been high in controlling behavior were more likely to use suppression as an emotion regulation strategy, compared to those who reported lower maternal control and higher maternal affection [$F(3,118)=7.082$, $p < 0 .001$]. High maternal control also was associated with alterations in HPA function, including increased HCC [$F(3,156)=4.168$, $p = 0.007$] and decreased salivary cortisol in response to stress [$F(3,97) =3.362$, $p = 0.022$]. Gender differences were present: males reported more use of suppression as an emotion regulation strategy ($t = -2.494$, $p = 0.014$), and had higher salivary cortisol ($t = -2.449$, $p = 0.015$). Results suggest that young adults who perceive more maternal overcontrol during childhood may have increased risk for both emotional and biological dysregulation, including using more emotion suppression and experiencing higher chronic cortisol exposure and blunted cortisol response.

P1-18 ALTERATIONS IN AUTONOMIC REGULATION IN INFANTS OF DIABETIC MOTHERS, **Maristella Lucchini,** *Columbia University Medical Center, New York, United States* E-mail: lucchini.maristella@gmail.com

Maristella Lucchini, Columbia University Medical Center; Lauren Shuffrey, Columbia University Medical Center; Joseph Isler, Columbia University; Minna Jayaswal, Columbia University Medical Center; J. David Nugent, New York State Psychiatric Institute; Timothy Ochoa, Columbia University Medical Center; Nicolò Pini, Politecnico Milano; Cynthia Rodriguez, Columbia University Medical Center; Daianna Rodriguez, New York State Psychiatric Institute; Margaret Shair, New York State Psychiatric Institute Columbia University; William Fifer, Columbia University

Recent research has demonstrated infants born to diabetic mothers are at increased risk for autism spectrum disorder and other long-term neurodevelopmental deficits. However, the mechanisms by which diabetes is associated with poor outcome are still unknown. The aim of the current study is to assess differences in measures of autonomic regulation of heart rate variability (HRV) between neonates with in-utero exposure to gestational diabetes mellitus (GDM) and controls as a potential mechanism for downstream effects on development. ECG and respiration were acquired for ~1 hour in 62 newborns at Morgan Stainley Children's Hospital well-baby nursery. The sample included 27 infants of mothers with GDM and 35 controls (gestational age at birth 38.9±0.86 weeks, hours of life at assessment 30.6±11.2). Customized software calculated the following parameters: heart rate (HR), the standard deviation of R-wave intervals (SDNN), the square root of the mean of squared successive differences in R-wave intervals (RMSSD), mean inter-breath-intervals (IBI), IBI interquartile range and cross-spectrum high-frequency power. Parameters were calculated and averaged over multiple 3-minute epochs of active sleep. Results demonstrate that infants of diabetic mothers had higher HR and lower HRV (mean HR p=0.048, SDNN p=0.027, RMSSD p=0.055), indicating an altered sympatho-vagal balance. No differences were found in mean IBI and IBI variability, nor in cardiorespiratory coupling, as measured using bivariate spectral analysis, suggesting that the alterations in HRV parameters are not driven by difference in breathing activity. These data offer an early indication of altered autonomic regulation and a potential biomarker of risk for poor outcome.

P1-68 EXPLORING WHICH ADVERSE CHILDHOOD EXPERIENCES ARE INDIRECTLY RELATED TO INTERPERSONAL RELATIONSHIP QUALITY THROUGH SELF-ACCEPTANCE, **Christian Mallett,** *Howard University, Greenbelt, United States* E-mail: christian.mallett@bison.howard.edu

Christian Mallett, Howard University; Mayowa Fageyinbo, Howard University; Nina McPhaul, Howard University; Jules Harrell, Howard University

Background: Research shows that adverse childhood experiences (ACEs) are associated with negative future health outcomes. Few studies have explicitly evaluated the role that ACEs have on the quality of interpersonal relationships or self-acceptance as a mediator of these relationships. Purpose: This study seeks to determine which adverse childhood experience types are indirectly related to interpersonal relationship quality through self-acceptance. Participants: Ninety-six undergraduate students participated in this study. Procedure: Participants signed consent forms, and completed questionnaires on site which included demographic items, the Adverse Childhood Experiences (ACE) questionnaire, and the Ryff Scales of Psychological Well-Being. Results: Self-acceptance mediated the relationship between the cumulative effects of adverse childhood experiences and quality of interpersonal relationships with others (B = -.81, 95% CI [-1.60, -.12]). Emotional abuse (B = -.5.24, 95% CI [-9.60, -1.98]), physical abuse (B = -3.97, 95% CI [-9.02, -0.01]), and emotional neglect (B = -3.56, 95% CI [-7.29, -0.83]) were each indirectly related to interpersonal relationship quality through self-acceptance. Discussion: The cumulative effects of childhood adversity impact interpersonal relationship quality through self-acceptance. Emotional abuse, physical abuse, and emotional neglect each indirectly affect interpersonal relationship quality through self-acceptance. Future studies should examine the factors contributing to the lowering of self-acceptance when experiencing emotional abuse, physical abuse, and emotional neglect.

P1-38 ESTROGEN RECEPTOR ALPHA GENE (ESR1): GENETICS, EPIGENETICS, EARLY LIFE ABUSE AND DEPRESSION IN WOMEN, **Madison Malone,** *Emory University, Decatur, United States* E-mail: mmalon5@emory.edu

Madison Malone, Emory University; Erica Smearman, Emory University; Patricia Brennan, Emory University; Alicia Smith, Emory University

The current study investigates the association between early life abuse, estrogen receptor genotype, and selective epigenetic methylation of the ESR1 gene, as well as the potential mediating/moderating role of ESR1 CpG methylation in the relationship between early life stress and adult depressive symptoms. The sample included 301 adult females, drawn from the Grady Trauma Project cohort based in Atlanta, GA. Linear regressions were used to test study hypotheses, and Bonferroni and False Discovery Rate calculations were used to correct for multiple testing. We found that self-reported exposure to early life abuse associated with methylation of two ESR1 CpG sites after stringent correction. We also found one ESR1 SNP to be associated with methylation of a specific CpG site after correction, suggesting genetic and epigenetic dependency. ESR1 methylation did not mediate the relationship between early life abuse and adult depressive symptoms ($p>0.05$). While methylation levels at several CpG sites interacted with abuse history to predict adult depressive symptoms ($p < 0 .05$), no moderator analyses survived correction. This research is a first step beyond animal ESR1 literature to explore similar biological implications of early life adversity in humans and may give credence to childhood interventions in providing an outcome (methylation) to assess the impact of adversity/intervention. As we continue to broaden our understanding of the complex interplay between early environment and genetic regulation in the development of adult psychopathology, this study suggests a potential role for ESR1 regulation in the link between early abuse and adult depressive outcomes.

P2-59 NEONATAL BUPRENORPHINE EXPOSURE AND SPINAL CORD INJURY: II. EFFECTS ON SENSORIMOTOR DEVELOPMENT, **Alleyna Martes,** *Idaho State University, Pocatello, United States* E-mail: martalle@isu.edu

Alleyna Martes, Idaho State University; Aimee Bozeman, Idaho State University; Michele Brumley, Idaho State University

Rats receiving a spinal cord injury (SCI) in infancy show more recovery of function than rats that receive the same injury in adulthood. However, little is known about the effects of SCI on the development of motor reflexes and tactile sensitivity. Additionally, buprenorphine is an opioid receptor agonist that is often used for post-operative care in research animals, including SCI-treated rats. Its effects are well characterized in adults, but less is known about younger animals. This study examines the effects of neonatal buprenorphine exposure on motor reflexes and sensory thresholds following SCI in male and female rats. On Postnatal day 1 (P1), rats receive a low thoracic spinal cord transection, sham procedure, or no treatment. Spinal-transected and sham subjects are then given either one or two daily doses of 0.04 mg/kg buprenorphine for 3 days. On P5 or P10, all subjects are tested for motor reflexes (righting, crossed-extensor, and placing) and tactile sensitivity (using an electronic Von Frey unit). It is hypothesized that 1) higher doses of buprenorphine will increase latency of reflexes and increase sensory thresholds, 2) spinal-transected rats will show increased latencies and sensory thresholds compared to controls, and 3) P10 rats will show decreased latencies and thresholds compared to P5s. Overall, findings show variable reflex latencies during this developmental period, but similar sensory thresholds across groups. Findings will help characterize buprenorphine as a post-operative analgesic for neonatal rodents, and help to clarify the role of the drug in the developing nervous system.

P2-71 DNA METHYLATION AND EARLY ADVERSITY: TRANSITION FROM INSTITUTIONAL TO FAMILY-BASED CARE, **Christiana Martin,** *University of Delaware, Newark, United States* E-mail: cmartin@psych.udel.edu

Christiana Martin, University of Delaware; Tiffany Doherty, University of Delaware; Tania Roth, University of Delaware; Rifkat Muhamedrahimov, St. Petersburg State University; Daria Chernego, St. Petersburg State University; Julie Hoye, University of Delaware; Mary Dozier, University of Delaware

Early adversity in the form of institutional care affects the development of regulatory systems, especially for infants. Children who spend the first years of their lives in institutional settings have alterations in both physiological and emotional regulation that initiate a developmental trajectory to later clinical concerns. Enhancing the caregiving environment can potentially mitigate the adverse effects on infant self-regulation, but little is known about alterations to gene regulation following removal from institutional care. The current study examines the impact of improved caregiving environment on DNA methylation in infants previously placed in orphanages who transitioned to foster care in St. Petersburg, Russia.

Participants include 30 children who were placed with foster families following institutionalization, 25 children who remained in orphanage care, and 27 children who were raised in their biological families. Participant age ranged between 8 and 48 months. Children placed with Russian foster families were randomized to receive either an intervention designed to increase caregiver sensitivity or a control intervention, with DNA methylation measured from saliva samples collected pre- and post- intervention. Samples were collected at equivalent intervals for orphanage and biological family controls. Methylation was assessed via bisulfide sequencing of CpG sites within BDNF exon IV, FKBP5, and NR3C1.

Data collection is ongoing for this pilot research. We hypothesize that children in foster care will demonstrate unique alterations in DNA methylation of BDNF, FKBP5, and NR3C1 between pre- and post-intervention time points compared to children who remained in the orphanage and children raised in biological families.

P2-79 AMOUNT OF LATE INCUBATION LIGHT EXPOSURE INFLUENCES SOCIAL MOTIVATION IN BOBWHITE QUAIL NEONATES, **Amanda Martinez,** *Florida International University, Miami, United States* E-mail: amart806@fiu.edu

Amanda Martinez, Florida International University; Starlie Belnap, Flordia International University; Robert Lickliter, Florida International University

Incubating maternal quail hens are crepuscular and typically forage for brief periods during the morning or early evening hours, leaving their eggs exposed to sunlight at these times. Research has shown that prenatal light exposure can influence precocial birds' physical development. Few studies have investigated whether prenatal light exposure influences chicks' early social motivation; we investigated this possibility in 24hr bobwhite quail (Colinus virginianus) hatchlings. Embryos were exposed to one of three prenatal light treatments, 2hr a day, 6hr a day, or standard control condition. Control embryos received a 12hr light/dark regimen throughout incubation. Starting on embryonic day 21, 2hr treatment embryos received 30mins of light exposure four times distributed over dawn and dusk hours, totaling 2hrs of light experience per day; 6hr treatment embryos received 90mins of light exposure four times totaling 6hrs of light experience per day. Our preliminary results indicate that chicks in the 6hr treatment work harder to gain access to an isolated same-aged chick when compared to 2hr and control chicks. Additionally, 6hr chicks spent the least amount of time in the area of the test chamber furthest from the social stimulus when compared to the 2hr and control chicks. These initial findings suggest that chicks receiving a 6hr prenatal light exposure regime during the last three days of incubation show increased levels of early social motivation. Further studies exploring the links between prenatal light exposure and early social motivation are currently underway.

S5-01 DYADIC SOCIAL INTERACTIONS DETERMINE INFANT SOCIAL ATTENTION AND VIGILANCE,
Gina Mason, *University of Massachusetts, Amherst, Amherst, United States* E-mail: gmmason@umass.edu

Gina Mason, University of Massachusetts, Amherst; Jennifer Schwade, Cornell University; Michael Goldstein, Cornell University

Caregiver feedback impacts infant attention (Yu & Smith 2016), though mechanisms underlying these relations remain unclear. We investigated whether the timing (contingency) and content (joint focus) of caregivers' responses influence attention via modulating infants' vigilance (arousal), promoting either attentional engagement or distractibility (Aston-Jones & Cohen 2005). We conducted two studies probing relations between adults' social responses and infant vigilance, quantified via eyegaze.

In Study 1 (Mason et al., 2018), 67 caregiver-infant dyads (5mos) engaged in video-recorded free-play. Coders identified caregivers' contingent responses to infants' behaviors (looks, vocalizations) as joint, redirective, or neutral to infants' focus. Infants whose caregivers exhibited high ratios of jointly-focused (n=7) vs. redirective responses (n=10) were then selected for analysis of their gaze shifts.

In response to caregivers' behaviors, infants of high-redirective caregivers showed increased distractibility compared to infants of high-joint caregivers, and this relation held even when assessing caregiver behaviors neutral to infants' focus ($t(15)=-2.24$, $p=.04$).

For Study 2, 6-7-month-olds (n=80) interacted with adults whose contingency and joint focus were controlled, then completed a visual vigilance paradigm. Infants receiving highly contingent feedback (~70% response rate) subsequently showed lower vigilance than infants receiving low-contingent feedback (~30% response rate) ($F(1,171.33)=3.98$, $p=.048$). Additional analyses (n=40) also suggest that adults' joint focus and contingency interact to determine infants' attention during the interaction ($F(3,36)=7.92$, $p<.001$).

Our results indicate that adult feedback influences infant social attention and vigilance, as measured by gaze dynamics. Future work should assess how infant attention reciprocally influences adult responding, and how early attention differences predict neurodevelopmental outcomes.

P2-63 COMPARING THE PHYSIOLOGY AND MEMORY BENEFITS OF MORNING AND AFTERNOON NAPS FOR 9-MONTH-OLDS UNDER TYPICAL AND NAP-RESTRICTED CONDITIONS, **Gina Mason,** *University of Massachusetts, Amherst, Amherst, United States* E-mail: gmmason@umass.edu

Gina Mason, University of Massachusetts, Amherst; Laura Kurdziel, Merrimack College; Rebecca Spencer, University of Massachusetts

For infants, naps aid memory consolidation (Seehagen et al. 2015). In older children, nap-related memory benefits are associated with sleep physiology, such as spindles (Kurdziel et al. 2013) and slow-wave sleep (SWS; Lokhandwala et al. 2019). However, infants under 15 months are polyphasic, engaging in both morning and afternoon naps. Little is known about the physiology of infants' nap bouts, and whether these naps differentially impact memory.

The present experiment examines the architecture of infants' morning and afternoon naps at 9 months, an age at which triphasic sleep is routine. We use 32-channel polysomnography to record sleep architecture of both naps. On a different day (separated by ~1 week), infants remain awake for their morning nap, but take their afternoon nap as usual. Before and immediately following each nap or wake period, infants participate in an object imitation task to assess nap-dependent changes in memory.

Preliminary analyses of nap physiology (n=3) suggests that when infants are deprived of their morning nap, afternoon naps contain greater proportions of SWS than afternoon naps when not nap-deprived. For 2 of 3 infants, their morning nap was shorter than their same-day afternoon nap, and these infants' afternoon nap contained more SWS than the morning nap. Also, while REM sleep was not observed in any morning nap, REM was observed in 2 of 3 infants' afternoon naps, particularly when infants were deprived of their morning nap. These results will be discussed in the context of observed memory changes over the nap intervals.

P1-73 MATERNAL STRESS IN THE FIRST 1000 DAYS AND CHILDHOOD OBESITY RISK, Karen Matvienko-Sikar, *University College Cork, Cork, Ireland* E-mail: Karen.msikar@ucc.ie

Karen Matvienko-Sikar, University College Cork; Jennifer Cooney, University College Cork; Caragh Flannery, University College Cork; Jennifer Murphy, University College Cork; Ali Khashan, University College Cork; Anja Huizink, VU University Amsterdam

Background: Maternal stress is associated with adverse child outcomes. The period from conception to two years postpartum (the first 1000 days) has been highlighted as a developmentally sensitive period for stress exposure. The role of maternal stress in the first 1000 days on child obesity risk is unclear. The aim of this review is to systematically examine the relationship between maternal stress across the first 1000 days and child obesity risk.

Methods: The Cochrane Library, MEDLINE, PsycINFO, EMBASE, CINAHL, and Maternity and Infant Care were searched from inception to June 2018. Eligible studies included women who experienced maternal stress in the first 1000 days; studies were required to include a measure of maternal stress and of child anthropometrics.

Results: Sixteen studies met inclusion criteria for review, the majority of these examined prenatal stress exposure. Inconsistent effects were observed for psychological or perceived stress, and physiological stress responses, on child weight outcomes. Environmental stress exposures, including natural disaster and bereavement, were more consistently associated with increased obesity risk.

Discussion: This review provides limited support for effects of maternal stress on child weight outcomes. Methodological issues apparent in reviewed papers related to conceptualisation and measurement of stress, timing of stress exposure, and limited examination of stress-related behaviours.

P1-09 IDENTIFYING MEANINGFUL PROFILES OF VISUAL ATTENTION IN CHILDREN WITH AUTISM,
Carolyn McCormick, *Purdue University, West Lafayette, United States* E-mail: mccorm37@purdue.edu

Carolyn McCormick, Purdue University; Gavino Puggioni, University of Rhode Island; Hasmik Tokadjian, Center for the Study of Children at Risk; Dima Amso, Brown University; Stephen Sheinkopf, Brown Center for the Study of Children at Risk

Children with Autism Spectrum Disorder (autism) present with a wide range of symptoms on core features. Within the context of interventions, it is difficult to measure and predict the observed variability in outcomes. New measures are needed that are not only objective, sensitive, and reliable, but also tied to underlying mechanisms. The goal of the current study was to use measures of looking patterns to social stimuli to capture variability in symptoms across the spectrum.

Participants were 48 children with autism ages 2-7 years old recruited through the Rhode Island Consortium for Autism Research (RI-CART). Children participated in two eye-tracking tasks that included images and videos of people. Looking time was summarized as percent looking at specific regions of interest across different conditions of the tasks. Using Gaussian mixture modeling, two clusters of individuals were identified. Cluster 1 contained 26 cases that had low attention to faces across tasks. Cluster 2 contained 22 cases that had high attention to faces across tasks. Measures of looking time to social stimuli were used to successfully identify two distinct profiles within our autism sample. This suggests that measures of visual attention can capture meaningful variability on the autism spectrum. More work is needed to better understand the connection between visual attention and traditional behavioral outcome measures. Planned analyses include examining differences in behavioral measures between the clusters and typically developing peers. Before becoming clinically useful, our measures also need to be assessed for reliability and for their ability to predict change in outcomes.

P1-10 VALID STATISTICAL APPROACHES FOR CLUSTERED DATA: A MONTE CARLO SIMULATION STUDY, Kristen McLaurin, *University of South Carolina, Columbia, United States* E-mail: mclaurik@email.sc.edu

Kristen McLaurin, University of South Carolina; Charles Mactutus, University of South Carolina; Rosemarie M. Booze, University of South Carolina; Dexin Shi, University of South Carolina; Amanda Fairchild, University of South Carolina

The current rigor/reproducibility crisis in the behavioral and biomedical sciences may be due, at least in part, to the use of inappropriate statistical analyses. Nested experimental designs, also known as hierarchical or clustered designs, result from the presence of two or more random effects (e.g., students within a classroom, rats within a litter). Using inappropriate statistical approaches to analyze nested experimental designs may bias results and make replication difficult. A Monte Carlo simulation study was conducted to empirically evaluate the effects of inappropriately modeling clustered data via fixed effects ANOVA. A random effects ANOVA, one statistical technique that has been advocated to appropriately handle clustered data, was also evaluated for comparison. Simulation results revealed a dramatic increase in the probability of type-1 error and relative bias of the standard error as the number of level-1 (e.g., rats) units per cell increased in the fixed effects ANOVA; effects that were largely attenuated when the nested experimental design was appropriately accounted for via a random effects ANOVA. Statistical power failed to reach the ideal level of 0.8 in the fixed effects ANOVA; an effect that was not improved via the random effects ANOVA due to small sample size. The failure to account for a nested experimental design may have critical implications on the statistical analysis and interpretation, increasing type-1 error and decreasing the stability of results. Utilizing a random effects ANOVA or other appropriate statistical technique (e.g., cluster means) to account for the nested experimental design may improve the reliability of results. Funded by NIH grants DA013137, HD043680, NS100624 and MH106392.

S4-02 PATTERNS OF CORTISOL EXPRESSION AND INTERNALIZING BEHAVIORS IN CHILDREN BORN VERY PRETERM: MODERATING ROLE OF MATERNAL PARENTING, **Mia Mclean,** *The University of British Columbia & B.C. Children's Hospital Research Institute, Vancouver, Canada* E-mail: mia.mclean@bcchr.ca

Mia Mclean, The University of British Columbia & B.C. Children's Hospital Research Institute; Cecil Chau, BC Children's Hospital Research Institute; Joanne Weinberg, University of British Columbia; Anne Synnes, British Columbia Childrens Hospital Research Institute; Steven Miller, Hospital of Sick Kids; Ruth Grunau, University of British Columbia

Internalizing behaviors are common in children born very pre-term. Previous studies suggest these heightened anxiety/depressive symptoms may be related to procedural stress during NICU care. However, the mechanisms underlying development of this behavioral phenotype in preterm children are little understood. In rodents, early stress and maternal deprivation can induce long-term anxiety behaviors via altered programming of the HPA axis. In humans, maternal interactive parenting behaviors and dysregulated children likely influence each other in a bi-directional manner, in the development of internalizing behaviors across childhood. In a prospective longitudinal cohort of very preterm infants born 24 - 32 weeks gestation, we discuss how patterns of cortisol expression across ages 1.5, 3, and 4.5 years are related to internalizing problems at 4.5 years, and the role of mother interactive behaviors as a moderator, to uncover pathways of resilience in this vulnerable population. Salivary cortisol was measured before, during and after cognitive assessment at each age. Children with persistent high cortisol across early childhood showed more anxiety and withdrawal behaviors during cognitive tasks at age 4.5 years, compared to children with low cortisol across childhood. In boys only, neonatal factors were related to the cortisol pattern. Our findings will inform understanding of the role of parenting behaviors in optimizing child stress regulation and internalizing behaviors in children born very-preterm. This work advances knowledge of mechanisms of recovery following early life adversity in very preterm children.

P1-54 PRECURSORS AND CORRELATES OF 4-YEAR SENSORY PROCESSING PROBLEMS IN CHILDREN BORN VERY PRETERM: NEONATAL FACTORS AND CORTISOL, **Mia Mclean,** *The University of British Columbia & B.C. Children's Hospital Research Institute, Vancouver, Canada* E-mail: mia.mclean@bcchr.ca

Mia Mclean, The University of British Columbia & B.C. Children's Hospital Research Institute; Ruth Grunau, University of British Columbia; Cecil Chau, BC Children's Hospital Research Institute; Joanne Weinberg, University of British Columbia; Anne Synnes, British Columbia Childrens Hospital Research Institute; Steven Miller, Hospital of Sick Kids; Margot MacKay, BC Women's Hospital; Nikoo Niknafs, BC Women's Hospital and BC Children's Hospital Research Institute

Children born preterm display altered sensory processing. Moreover, these problems may manifest as negative affect, hypervigilance, or avoidance in response to sensory stimuli. Few studies have examined physiological correlates or neonatal precursors of sensory processing in preterm children. In this vulnerable population, exposure to neonatal pain-related stress, as well as inflammatory factors, are associated with programming of the hypothalamic-pituitary adrenal (HPA) axis. We examined relationships between sensory processing problems, cortisol levels and neonatal factors (including pain-related stress and infection) in children born very preterm.

In a prospective longitudinal cohort study, 175 infants born 24-32 weeks gestational age (GA) recruited from the level-III neonatal intensive care unit at BC Women's Hospital Vancouver Canada were seen at age 4 years. Exclusions: major sensory (blind, hearing) or cognitive impairment (IQ < 70), severe brain injury. Saliva to assay cortisol was collected three times across cognitive testing (pretest, after testing, end of session); parents completed the Short Sensory Profile questionnaire. Neonatal factors were collected from daily chart review.

Using generalized estimation equation (GEE) modeling, postnatal infection predicted higher cortisol at 4 years, independent of other neonatal factors. Lower GA and higher pretest cortisol were associated with more sensory processing problems, but relationships did not differ by sex.

Our findings suggest that in children born very preterm, how a child responds to sensory input and cortisol reactivity to stress are related, but may have different precursors. Understanding how sensory processing relates to social development of children born preterm is an important next step.

P1-55 TODDLER TEMPERAMENTAL CHARACTERISTICS MEDIATE THE RELATIONSHIP BETWEEN DISASTER-RELATED PRENATAL MATERNAL STRESS ON CHILDHOOD ANXIETY SYMPTOMATOLOGY: THE QF2011 QUEENSLAND FLOOD STUDY, **Mia Mclean,** *The University of British Columbia & B.C. Children's Hospital Research Institute, Vancouver, Canada* E-mail: mia.mclean@bcchr.ca

Vanessa Cobham, The University of Queensland; Sue Kildea, Mater Research - The University of Queensland; Suzanne King, McGill University; Gabrielle Simcock, Mater Research – The University of Queensland, Australia & Thompson Institute, University of the Sunshine Coast; Mia McLean, Mater Research – The University of Queensland

It is possible that alterations to temperamental characteristics caused by prenatal maternal stress (PNMS) exposure account for the development of childhood internalizing behaviors and anxiety symptoms ("anxiety symptomatology"). The Queensland Flood Study (QF2011) examined whether toddler temperamental characteristics explained the association between PNMS exposure and early childhood anxiety symptomatology; and whether these effects were dependent upon the timing of gestational exposure to PNMS or sex-specific.

Soon after the event, women who were pregnant during the 2011 Queensland flood completed recruitment questionnaires (N=230) regarding their objective hardship (e.g. loss of personal property), cognitive appraisal and subjective distress in relation to the disaster. Mother's reported on their toddler's temperament at 16 months (attentional control, shy-inhibition, negative reactivity) and childhood anxiety symptomatology (internalizing and anxiety symptoms; N = 106) at 4 years. At 4 years teacher's also reported on child internalizing behaviors (N = 77).

Severity of maternal objective hardship during pregnancy and greater shy-inhibitory behaviors were independently associated with child anxiety at 4-years. Higher levels of negative reactivity in toddlers accounted, in part, for the relationship between increased maternal objective hardship due to a flood disaster and greater maternal- but not teacher-reported internalizing problems. Neither gestational timing of exposure nor child sex moderated the hypothesized mediations.

Our findings highlight several pathways through which varying aspects of disaster-related PNMS, may influence early childhood anxiety. Importantly, findings elucidate multiple intervention points for at-risk families.

P2-51 IDENTIFYING A NEURAL MARKER OF INTERNALIZING PROBLEMS IN EARLY CHILDHOOD: THE LATE POSITIVE POTENTIAL (LPP), Mia Mclean, *The University of British Columbia & B.C. Children's Hospital Research Institute, Vancouver, Canada* E-mail: mia.mclean@bcchr.ca

Mia Mclean, The University of British Columbia & B.C. Children's Hospital Research Institute; Marion van den Heuvel, Tilburg University; Bea Van den Bergh, Tilburg University; Martijn Baart, Tilburg University; Jean Vroomen, Tilburg University; Geert van Boxtel, Tilburg University

One potentially relevant neurophysiological marker of internalizing problems is the late positive potential (LPP), as it is related to processing of emotional stimuli. In school-age children, the LPP has been linked to behavioral displays of sadness and fear, but its association with preschool internalizing problems is still unknown. We investigated the value of the LPP as a neurophysiological marker for childhood internalizing problems at preschool age.

At age 4 years, children (N = 84) passively viewed a series of neutral, pleasant, and unpleasant pictures selected from the International Affective Pictures System. Affective picture processing was measured via the LPP (EEG recorded) and mothers reported on child internalizing behaviors (CBCL 1 _ - 5). Difference scores between the neutral and affective pictures (neutral-pleasant and neutral-unpleasant) were computed for posterior, central and anterior brain locations for early (300-700 ms), middle (700-1200 ms) and late (1200-2000 ms) time windows.

Preliminary results found significant positive correlations with LPP difference scores for pleasant and unpleasant pictures in the anterior and central recording sites across early, middle and late time windows. No associations were found for the posterior recording site. Follow-up analyses showed that LPP differences scores were mostly related to the CBCL-internalizing subscales of anxious and depressed behaviors.

Our study has identified a potential neurophysiological marker of preschool internalizing problems. Children with larger LPPs (possibly related to enhanced attention to both pleasant and unpleasant stimuli) may be at greater risk of internalizing problems, potentially due to an increased emotional reactivity to affective stimuli.

W-01 WILEY DISTINGUISHED SPEAKER: SENSORIMOTOR MATTERS IN CHILDHOOD DEVELOPMENT, AND HOW PSYCHOBIOLOGY CAN SAVE LIVES , Mark Mon-Williams, *University of Leeds, Leeds, United Kingdom* E-mail: M.Mon-Williams@leeds.ac.uk

Mark Mon-Williams, University of Leeds, Leeds, United Kingdom

The 'Born in Bradford' study aims to improve the health and education of people living in Bradford (the 6th largest English city, population 293,717). The number of children dying in Bradford was almost double the national average in 2003, and levels of childhood illness are high, with poor educational outcomes and chronic unemployment facing school leavers. The BiB longitudinal birth cohort study (www.borninbradford.nhs.uk) consists of ~13,500+ children. We are capturing all of the routine health, social care and educational data available for these children, supplementing these data with a wealth of psychobiology measures, and using these data to implement interventions to improve the outcomes of childhood. The Born in Bradford project (established by Prof John Wright) represents the Bradford community taking control of their lives and creating a trailblazing research site that can inform interventions aimed at improving childhood outcomes (regardless of where in the world those interventions are implemented).

Our psychobiology measures include detailed investigations of the mother and child's physical health and cognitive function. The mother and child's physical health was tracked throughout pregnancy, birth and the early years to identify factors that impact on a child's outcomes (in physical health, mental health, educational attainment and ultimately social mobility). Our cognitive assessments include rich measures of the child's sensorimotor abilities and offline cognitive function (e.g. working memory and executive function abilities). The detailed cognitive investigations are conducted in discrete 'sweeps', with the first sweep taking place when the children started school (4- 5 years of age), the second (current) sweep capturing the children when they enter the English primary school Year 4 (8- 9 years of age), and planning underway for the secondary schools sweep (when the children are 11- 12 years of age). The secondary schools sweep will take advantage of immersive technologies to capture the data (and engage the children in the research), and will have a particular focus on the children’s mental health.

I will highlight some of the findings from 'Born in Bradford' through the prism of sensorimotor learning. I will attempt to show the importance of sensorimotor learning across different domains (including physical health, mental health and educational attainment), and discuss how psychobiology research has the potential to improve the health and education of children across the world.

P2-42 ELECTROPHYSIOLOGICAL CORRELATES OF INHIBITORY CONTROL IN YOUNG CHILDREN,
Santiago Morales Pamplona, *University of Maryland, College Park, United States* E-mail: smoralespam@gmail.com

Santiago Morales Pamplona, University of Maryland; Maureen Bowers, University of Maryland; Stephanie Leach, University of Maryland; George Buzzell, University of Maryland; Amy Elliott, Avera McKennan Hospital & University Health Center; William Fifer, Columbia University; Nathan Fox, University of Maryland

Many studies have examined electrophysiological measures of performance monitoring such as the error-related negativity (ERN) in adults, however, considerably less work has examined these measures and their behavioral correlates in young children. The existing developmental work has been mixed regarding whether the ERN relates to behavioral measures of cognitive control. The current study leverages a large ongoing ECHO-funded study of young children in South Dakota (N = 197; Mean age = 5.43; age range = 4-7 years) to examine the presence of the ERN in early childhood as well as its relations with behavioral performance in an inhibitory control task. Children completed a child-friendly Go/No-Go task while EEG was collected.

In general, the ERN was spatially and temporally similar to the effect observed in studies with adults and older children, such that the ERN was more negative for errors compared to correct responses and was maximal in frontocentral electrodes. A larger delta ERN (error - correct) was related to increased age, faster reaction times, better overall task accuracy, and better accuracy for trials that required inhibitory control (No-Go trials). Importantly, the expected relations between the delta ERN task performance (i.e., overall accuracy and accuracy for No-Go trials) remained significant after controlling for age. These results suggest that the ERN is related to task performance above and beyond age-related improvements. Together, this findings support the notion that the ERN is a valid measure of performance monitoring from early childhood.

P2-43 BEHAVIORAL INHIBITION AND TELOMERE LENGTH: THE MODERATING ROLE OF INHIBITORY CONTROL, **Santiago Morales Pamplona,** *University of Maryland, College Park, United States* E-mail: smoralespam@gmail.com

Santiago Morales Pamplona, University of Maryland; Selin Zeytinoglu, University of Maryland; Kyle Esteves, Tulane University; Stacy Drury, Tulane University; Nathan Fox, University of Maryland

Although research suggests that stress experienced during childhood accelerate the erosion of telomere length (TL), there is limited work on what characteristics of the individual may lead to increased erosion of TL. In the current study we examine the impact of early temperament, behavioral inhibition (BI), on later telomere shortening. BI is a predictor of later internalizing problems such as anxiety and depression as well as increased social reticence and loneliness. Importantly, the impact of BI on emotional and social problems is most pronounced among individuals who also display high levels of inhibitory control. As such, we examined whether the effect of BI on TL is stronger for children who display high levels of inhibitory control.

As part of a larger longitudinal study (N=291), children were assessed for BI at 2 and 3 years, a composite of inhibitory control at ages 4, 5, and 7, and TL at ages 7 and 12. Analyses consisted of a path model using full information maximum likelihood estimation to handle missing data.

As expected, TL shortened from age 7 to 12. Moreover, we found that the longitudinal effect of BI on TL shortening differed based on the levels of inhibitory control across childhood ($p = .049$). Specifically, BI predicted greater telomere shortening for children high ($p = .01$) in inhibitory control. This was not true for children with average ($p = .27$) or low ($p = .70$) inhibitory control, such that children high in BI and inhibitory control displayed greatest telomere shortening from age 7 to 12 years.

P1-66 A CARETAKER ACUTE STRESS PARADIGM: EFFECTS ON BEHAVIOR AND PHYSIOLOGY OF CARETAKER AND INFANT, **Isabelle Mueller,** *University of Massachusetts Boston, Cambridge, United States*
E-mail: isabelle.mueller001@umb.edu

Isabelle Mueller, University of Massachusetts Boston; Ed Tronick, University of Massachusetts Boston; Jennifer DiCorcia, University of Massachusetts Boston; Nancy Snidman, University of Massachusetts Boston

While experimental stressors of infants are tools for infant research, no study has experimentally stressed mothers to observe its independent effects on the infant stress regulation. Here we present a standard procedure, the Caregiver Acute Stress Paradigm (CASP), for stressing mothers during en faceinteractions. The CASP is made-up of 5 two minute episodes: 1. A face-to-face play episode; 2. Either exposure to (a) the stress (cries of infants undergoing medical procedures); or (b) non-stress manipulation (infant positive vocalizations) over soundproof earphones to the mothers; 3. A face-to-face play episode, 4. A still-face episode; and 5. A face-to-face play episode. We hypothesized that infants of the stressed mothers would be more distressed than the infants of non-stressed mothers.108 4-month-old infants and their mothers were randomly assigned to the experimental stress or non-stress manipulation. Mothers rated the cries as significantly more stressful than the positive vocalizations. Infants of the stressed mothers were significantly more likely to become distressed and require terminating the procedure during the episodes following the maternal manipulation than infants of non-stressed mothers. In addition to behavior we evaluate changes maternal and infant salivary cortisol and continuous cardiac data throughout the paradigm.The findings indicate that CASP is an effective experimental paradigm for exploring the independent effects of an acute stress on caretakers, including effects on mother-infant dyads experiencing other compromising conditions, such as poverty or mental illness which are likely to be particularly vulnerable to the effects of stress.

P1-49 CHILDHOOD SOCIOECONOMIC DISADVANTAGE PREDICTS MIDLIFE INFLAMMATION, **Brianna Natale,** *University of Pittsburgh, Wilkinsburg, United States* E-mail: bnn11@pitt.edu

Brianna Natale, University of Pittsburgh; Stephen Manuck, University of Pittsburgh; Matthew Muldoon, University of Pittsburgh; Anna Marsland, University of Pittsburgh

Prior research has demonstrated that early-life socioeconomic disadvantage has long-term health consequences, including increased risk for cardiovascular and metabolic diseases at midlife. At the core of cardiometabolic diseases is low-grade systemic inflammation, which is often assessed via circulating levels of the pro-inflammatory biomarkers, C-reactive protein (CRP) and interleukin-6 (IL-6). CRP and IL-6 associate with childhood socioeconomic status (SES), but few studies have examined them concurrently.

The current study investigated the relationship of childhood SES with CRP and IL-6 in healthy midlife adults aged 30-54, raised in intact two-parent homes through at least age 13 (Adult Health and Behavior Study; N=1,785). Childhood SES was measured via two-factor Hollingshead Index (education, occupational grade) at participant ages 5-10, and participants' adulthood SES was assessed analogously at time of study enrollment. IL-6 and CRP levels were assayed from a fasting morning blood sample.

Regression analyses controlling for demographic factors showed lower childhood SES associated significantly with higher CRP (B=-0.002, SE=0.001, p=0.001) and IL-6 levels (B=-0.001, SE=0.000, p=0.042), whereas adulthood SES was not related to these inflammatory markers. In addition, when childhood and adulthood SES were entered simultaneously, childhood SES remained a significant predictor of CRP (B=-0.002, SE=0.001, p=0.002), but not IL-6. Notably, associations became non-significant when further adjusted for adult health behaviors. These findings point to early origins of socioeconomic disparities in midlife inflammation, at least as indicated by circulating CRP, and results suggest this relationship may reflect developmental influences on adult health practices.

Supported in part by NIH grant PO1 HL040962.

P1-26 THE DEVELOPMENTAL INFLUENCE OF ADOLESCENT SOCIAL ISOLATION ON SOCIAL BEHAVIOR AND STRESS REACTIVITY IN FEMALE PRAIRIE VOLES, **Marigny Normann,** *Northern Illinois University, DeKalb, United States* E-mail: marignycollins@gmail.com

Marigny Normann, Northern Illinois University; Angela Grippo, Northern Illinois University

Social experiences during adolescence are important for the development of later social and emotional skills. Social stress during development contributes to behavioral difficulties in adolescence and impaired stress coping abilities in adulthood. The prairie vole provides a unique model for exploring the developmental consequences of social stress due to their highly social nature. These rodents are similar to humans due to their extended family groups, social monogamy, and bi-parental rearing of offspring. The present study investigated the influence of adolescent social isolation on play and other pro-social behaviors in adolescence, and stress reactivity in adulthood. Female prairie voles (n=23) were weaned from the family group and placed directly into isolation for 2, 3, or 4 weeks, or were weaned into sibling pairs (control). Subsequently, animals were exposed to a 10-minute social interaction test with a female sibling. The siblings remained paired until adulthood, and then experienced a 5-minute swim stressor followed by plasma collection for corticosterone analyses. Prairie voles that were isolated for 3 or 4 weeks engaged in significantly more play behaviors and spent more time in physical contact with a sibling compared to the control group. Prairie voles isolated for 3 weeks displayed slightly elevated corticosterone levels following the swim stressor versus the control group. These preliminary data suggest that early life social deprivation can influence later social behaviors and physiological stress reactivity. These data highlight the importance of social stimulation during critical developmental periods, and provide a model for investigating mechanisms underlying social stress in humans.

P1-53 ASSOCIATIONS BETWEEN UNPREDICTABLE MATERNAL SENSORY SIGNALS AND INFANT HPA AXIS REACTIVITY, **Amanda Noroña,** *University of Denver, University of Colorado School of Medicine, Denver, United States* E-mail: amanda.norona@du.edu

Amanda Noroña, University of Denver, University of Colorado School of Medicine; Elysia Davis, University of Denver; Laura Glynn, Chapman University; Curt Sandman, University of California, Irvine; Hal Stern, University of California, Irvine; Alyssa Morgan, University of Denver

Background: Dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis is associated with poor physical and mental health. Maternal care strongly influences early offspring HPA axis development. While experimental animal studies demonstrate that exposure to unpredictable maternal signals has long-lasting effects on HPA functioning, existing human research focuses primarily on quality of maternal signals (e.g., sensitivity), but not their patterns. The current study examined whether unpredictable patterns of maternal sensory signals are related with cortisol reactivity in human infants.

Method: Participants were 102 mothers and their children enrolled in a longitudinal study. At 6 and 12 months, mothers engaged their infants in a 10-minute play episode in the laboratory. Maternal behaviors, which provide auditory, visual, and/or tactile signals to the infant, were coded continuously from video recordings. To measure the extent to which sequences of maternal sensory signals were predictable, we calculated entropy rate using the conditional probabilities of transitions between signals (e.g., visual to auditory). Infant salivary cortisol before and 20 minutes after inoculation was assessed at 12 months.

Results: Regression analysis revealed that higher levels of unpredictable maternal sensory signals (high entropy rate) were associated with decreased infant cortisol reactivity. This relation remained after consideration of maternal sensitivity, maternal depression and anxiety, and time of day of the cortisol sample. See Table 1.

Conclusions: The current study provides evidence that infant exposure to unpredictable maternal sensory signals is associated with a blunted cortisol response to a painful stressor. Patterns of maternal signals may shape the development of offspring stress response systems.

P2-47 DELTA BRUSH RATE OF OCCURRENCE IN FULL-TERM INFANT ELECTROENCEPHALOGRAM,
J. David Nugent, *New York State Psychiatric Institute, New York, United States* E-mail: jdavidnugent@gmail.com

J. David Nugent, New York State Psychiatric Institute; Philip Grieve, Columbia University; William Fifer, Columbia University; michael Myers, New York State Psychiatric Institute; Matthew Corwin, New York State Psychiatric Institute ; Nathalie Cousy, Cape Services; Lauren Shuffrey, Columbia University Medical Center

Delta brushes are distinctive electroencephalogram (EEG) bursts of oscillatory electrical activity, characterized by high frequency oscillations (8-20 Hz) superimposed on low frequency (1-3 Hz) activity. These distinctive patterns of EEG begin at ~30 weeks post conceptional age. Such EEG bursts are related to sensory synapse formation and central nervous system maturation (CNS). They are a marker for the estimation of brain maturity and are involved in the process of refinement of sensory cortical maps involved in the future synaptic connections to the cortex and subplate. Given the evidence of sexual dimorphic vulnerabilities for developmental disorders, early emergence of sex differences in EEG burst parameters warrant investigation.

EEG data was collected on newborns (12 – 100 hours postnatal) during sleep using a 28-channel high impedance sensor net. Delta brush detection was calculated using a time-varying spectrum for each 30 second epoch from 156 newborns (81 male) in active sleep and 102 newborns (56 male) in quiet sleep. After controlling for gestational age at birth, hours of life at assessment, and drug exposure, an ANCOVA determined newborn males had significantly greater mean rates of burst occurrence in the right frontal brain region during active sleep, $F(1,150)=4.239$, $p=0.041$,). Males also produce higher rates of bursts in the right frontal region in quiet sleep, $F(1,96)=4.411$, $p=.038$). These data suggest that sex differences in oscillatory brain activity are evident in the newborn period and that early assessments need to incorporate sex as a key biological variable in risk detremination.

P1-83 PATHWAYS BETWEEN ADVERSE CHILDHOOD EXPERIENCES (ACEs) AND PSYCHOTIC-LIKE EXPERIENCES: THE MEDIATING ROLE OF PARENTAL STYLE., Tara O'Neill, *Queen's University Belfast, Belfast, United Kingdom* E-mail: tara.oneill@qub.ac.uk

Tara O'Neill, Queen's University Belfast; Teresa Rushe, Queen's University Belfast

The relationship between ACEs and long-term detrimental outcomes are well established within the literature. Research has also demonstrated how childhood adversities act as significant risk factors in the onset of mental health problems and particularly psychosis. Less is known however, about the mechanistic pathways that may contribute to, or effectuate these long-term negative outcomes. Pathogenic parenting and sub-optimal parental styles such as indifference, abuse and over-control have been suggested as potential mediators in this relationship, and have been shown to predict poorer outcomes in later life. The present study sought to investigate the mediating role of parental style in the relationship between ACEs and Schizotypy in 124 “high-risk vulnerable” 18-25 year old (mean age= 20.71, SD =2.37, mean ACE =5.29, SD =3.00) emerging adults, sampled from the Northern Ireland Childhood Adversity Study (NICAS). The proposed relationships were examined and findings revealed that overall maternal parental style, but not paternal, mediated the relationship between high adversity and schizotypy albeit partially (β =.829, CI= [0.12, 1.63]). Further mediation models revealed that of the three parenting style factors, only maternal over-control demonstrated a mediating relationship (β =.099, CI= [0.009, 0.20]) and this again was partial. Current findings suggest that negative and over-controlling mother child relationships may act as a unique mechanism, compounding the risk associated with ACEs further, which in turn may increase vulnerability to the development of psychotic-like experiences. These findings may also highlight a pathway where improvements in positive mother-child relationships could potentially mitigate the long-term consequences of ACEs.

P1-07 Assessing Behavioral and Passive Viewing Methodologies Across a Diverse Sample of Mothers of Infants, Denise Oleas, *Rutgers University, Newark, United States* E-mail: oleasdenise@gmail.com

Denise Oleas, Rutgers University ; Jessica Burris, Rutgers University; Lori Reider, Rutgers University; Michell Sarquez, Rutgers University; Koraly Perez-Edgar, The Pennsylvania State University; Kristin Buss, Penn State; Vanessa LoBue, Rutgers University

Research has commonly relied on participants from western, educated, industrialized, rich, and democratic backgrounds (Henrich et al., 2010). Recent interest in diverse samples requires a reevaluation of standard methodologies used in psychology research to allow for more broad generalizations of research findings. This study aims to examine a commonly-used visual attention paradigm in a diverse population of mothers.

Here, we examined data from an ongoing longitudinal study across three diverse sites. We assessed maternal self-reported education and looking behavior using a visual search paradigm. Participants (N=51; data collection ongoing) were presented with 9 images from a single category (happy or angry) or 8 images from one category and a single discrepant image. We measured visual latency to the discrepant target using an eye tracker, as well as button press responses.

Maternal education level significantly moderated the relation between visual and button press latency to angry faces ($b = .08$, $p = .23$ for low and $b = .27$, $p<.01$ for high education). This finding suggests that education, a variable related to socioeconomic status (SES), plays a role in the coordination between visual and motoric responses. Further, we found that looking behavior was significantly correlated with button press responses for Caucasian mothers ($r=.43$, $p=.03$), but not for Latinx mothers ($r=.18$, $p = .52$), although looking behavior did not significantly differ across ethnic groups.

Findings suggest that button-press, but not passive viewing responses, may vary based on SES variables. Further research should not assume that all methodologies will render the same results across diverse populations.

P1-64 Infant neurobehavioral processing of the caregiver: Translating across species during typical and maltreatment rearing, Maya Opendak, *New York University Langone Medical Center, New York, United States* E-mail: m.opendak@gmail.com

Maya Opendak, New York University Langone Medical Center; Regina Sullivan, Nathan Kline Institute & NYU School Medicine; Donald Wilson, NKI and NYU School of Medicine; Anna Blomkvist, Stockholm University; Emma Theisen, New York University; Kaitlin Hollis, Columbia University; Mary Dozier, University of Delaware; Teresa Lind, UCSD; Johan Lundstrom, Karolinska Institute; Emma Sarro, Dominican College

Infants rely on their mothers to provide the sensory stimulation for normal brain development. Altered maternal care, such as maltreatment, initiates a pathway to pathology, much of which remains dormant until later-life. However, atypical infant behavior in the Strange Situation Procedure, a paradigm that progressively stresses the child to reveal characteristic ways of responding to the caregiver when distressed (1), has been associated with maltreatment or frightening behavior of parents (2). Here, we adapted this test for use in rat pups to align findings across species and assess neural mechanisms/causation. Using the Scarcity-Adversity Model of maltreatment induced by low bedding (LB) for nest building beginning at postnatal day (PN)8, we compared SSP performance in maltreated rodents (PN13-14) and children; both exhibited behavioral features of disordered attachment in the SSP. In addition, in maltreated pups, reunion with the mother failed to modulate the infant's cortical local field potential (LFP) oscillations, compared to pups with no maltreatment. Next, we measured LFP in both pup and mother during brief periods of LB (between PN10-17). During LB, the dynamic range of LFPs induced by mother-pup interactions decreased, with both pup and mother showing impaired LFP responses to specific interactions, such as milk ejection and grooming. Blocking pup stress hormone synthesis via metyrapone during maltreatment and the SSP restored behavior, maternal regulation of LFP power, and cross-frequency coupling patterns to control levels. These results suggest that when a mother is stressed, she has impaired ability to modulate both her own and her pups' cortical function.

P1-01 EARLY LIFE STRESS EXPOSURE IMPAIRS SHORT-TERM MEMORY AND DECREASE DRD1 AND DRD2 EXPRESSION IN THE MEDIAL PREFRONTAL CORTEX OF ADOLESCENT MICE, **Rodrigo Orso,** *Pontifical Catholic University of Rio Grande do Sul, Porto Alegre, Brazil* E-mail: rodrigo_orso@hotmail.com

Rodrigo Orso, Pontifical Catholic University of Rio Grande do Sul; Thiago Viola, Pontifical Catholic University of Rio Grande do Sul; Luis Eduardo Wearick-Silva, Pontifical Catholic University of Rio Grande do Sul; Francisco Lumertz, Pontifical Catholic University of Rio Grande do Sul; Kerstin Creutzberg, Pontifical Catholic University of Rio Grande do Sul; Rodrigo Grassi-Oliveira, Pontifical Catholic University of Rio Grande do Sul

It is well known that early life stress (ELS) may increase the susceptibility to mental disorders and cognitive disfunctions by affecting the expression of several genes, especially in the medial prefrontal cortex (mPFC). The dopaminergic signaling pathway in the mPFC plays a major role in regulating cognitive functions. However, the underpinnings in which ELS affects the dopaminergic system, contributing to cognitive deficits is not fully understood. Thus, the aim of this study was to evaluate the impact of ELS on short-term memory and expression of dopamine receptors in adolescent mice. Male BALB/c mice were exposed to a combination of Maternal Separation and Limited Bedding between PND2 to PND15. During adolescence (PND45), the animals were tested in the Y-maze and Object in Place task. RT-qPCR was utilized to investigate the expression of Drd1 and Drd2 in the mPFC. Mice exposed to ELS presented a significant decreased in the recognition index of the Y-maze ($t(56) = 3.300$, $p = < 0.05$) and Object in Place task ($t(46) = 9.492$, $p = < 0.05$) when compared to control animals. Moreover, animals from the ELS group showed a decrease in the expression of Drd1 ($t(13) = 3.610$, $p = < 0.05$) and Drd2 ($t(13) = 2.422$, $p = < 0.05$) in the mPFC. Our data indicate that ELS impairs short-term memory of adolescent male mice, and decrease the expression of dopamine receptors that are essential for cognitive processes.

O1-01 COGNITIVE-NEURAL RISK MARKERS ASSOCIATED WITH TEMPERAMENTAL ANXIETY AND SENSITIVITY TO INTERVENTION, **Koraly Perez-Edgar,** *The Pennsylvania State University, University Park, United States* E-mail: kxp24@psu.edu

Koraly Perez-Edgar, The Pennsylvania State University; Alicia Vallorani, The Pennsylvania State University; Berenice Anaya, The Pennsylvania State University; Pan Liu, Western University

Despite initial promise, the impact of attention bias modification (ABM) on anxiety is in question. Individual differences in temperamental risk and openness to experimental manipulation may underlie this heterogeneity. The proposed talk will illustrate how a person-centered approach, focusing on individual differences in cognitive, neural, and regulatory mechanisms can be used to probe potential risk patterns. We focused on 9-to-12-year-old children characterized for a range of temperamental risk for anxiety due to behavioral inhibition (BI; N=180). At baseline, we found that social phobia is associated with a cognitive-neural risk marker created by combining attention biases to threat across two tasks and EEG measures (Delta-Beta Coupling and EEG Asymmetry) via latent profile analysis, as well as variation in Effortful Control. Variation in BI was most strongly associated with increases in anxiety when the probability of the risk profile was high, $t = 2.12$, $p = 0.035$, 95% CI=[0.005, 0.132]. Highly at-risk children (N=91) were then randomized to either ABM or placebo. ABM was associated with less social anxiety. The risk marker and effortful control continued to predict anxiety levels for children in the placebo group. However, for the ABM group, these risk factors were no longer associated with level of anxiety, $t = -2.60$, $p = 0.012$, 95% CI=[-17.96, -2.l3]. With this example, we will discuss the promises, and complexities, of implementing protocols designed to generate samples with the necessary power to detect variation across and within individuals over time.

O2-11 MULTIPLE TIME SCALES OF BRAIN-TO-BRAIN SYNCHRONIZATION, Sammy Perone, *Washington State University, Pullman, United States* E-mail: sammy.perone@wsu.edu

Sammy Perone, Washington State University; Alana Anderson, Washington State University ; Maria Gartstein, Washington State University

Parent-infant interactions play a foundational role in shaping brain, cognitive, social, and emotional development. Simultaneously recording EEG from parent-infant dyads provides a window into the real-time processes by which this development happens. We recorded simultaneous EEG from 10 parent-infant dyads during the still face paradigm (SFP), a mildly stressful context requiring mothers and infants to regulate their emotions. SFP involves alternating play and still face episodes during which mom exhibits emotionless expression. We probed synchronization over time scales of shared activity(e.g., while playing with toys), momentary(e.g., second-to-second), and cortical rhythm(e.g., alpha phase angle). Mother-infant interactions were coded for responsiveness, i.e., how warm, prompt, contingent, and supportive mothers interact with their infant. On the shared activity time scale, dyads with more responsive mothers exhibited more left frontal alpha asymmetry during SFP than dyads with less responsive mothers, an indicator the dyad regulate themselves in a more positive, approach-oriented fashion. On the momentary time scale, dyads with more responsive mothers were more likely to be in the same neural state (e.g., higher levels of gamma) during short windows of time (e.g., 5 s) during play and still face episodes of SFP. On the cortical rhythm time scale, dyads with more responsive mothers exhibited higher levels of brain-to-brain phase synchronization. Results are consistent with the view the real-time scale of parent-child interactions shape the longer time scale of neurodevelopmental processes underlying behavior in multiple domains.

S2-02 PART 2 OF A CROSS-SPECIES STUDY: A SOCIAL COMPETENCE INTERVENTION RESCUES COGNITIVE NEUROBEHAVIORAL DEFICITS IN A RODENT MODEL OF SCARCITY-ADVERSITY,
Rosemarie Perry, *New York University, Brooklyn, United States* E-mail: rosemarie.perry@nyu.edu

Rosemarie Perry, New York University; Stephen Braren, New York University; Annie Brandes-Aitken, New York University; Cristina Alberini, New York University; Regina Sullivan, Nathan Kline Institute & NYU School Medicine; Clancy Blair, NYU

Social skills facilitate learning and are an important component to academic achievement. It is well established that children of low income families are at increased risk of disrupted social development, and in turn academic achievement. Indeed, previous findings from our broader cross-species study provided evidence using the Family Life Project that social competence through executive functions (EF) is a developmental pathway by which early-life poverty-related risk predicts academic skills. Based on these findings, we leveraged a rodent model to experimentally test if EF development following early-life “scarcity-adversity” exposure could be improved by targeting the improvement of social development. Specifically, we investigated if pair housing a scarcity-adversity reared rat with a more socially competent control reared peer improved their social competence and rescued neurobehavioral working memory problems. Results showed that early-life scarcity-adversity rearing reduced social motivation levels and spatial working memory performance in peri-adolescent rats. Furthermore, scarcity-adversity rearing produced heightened glucocorticoid receptor levels in the medial prefrontal cortex following the working memory task. Co-housing scarcity and control rats repaired social motivation levels and rescued working memory problems of the scarcity cage-mate, without detriment to the development of the control cage-mate. Additionally, our peer-based social intervention significantly reduced glucocorticoid receptor levels in the medial prefrontal cortex of scarcity-adversity reared subjects. Results support the use of peer-based social interventions for improving EF outcomes following exposure to early-life scarcity-adversity.

P1-11 INFANT VOCALIZATIONS AS A BIOMARKER FOR AUTISM SPECTRUM DISORDER: INITIAL METHODOLOGICAL CONSIDERATIONS, Victoria Petrulla, *Children's Hospital of Philadelphia, Philadelphia, United States* E-mail: petrullav@email.chop.edu

Victoria Petrulla, Children's Hospital of Philadelphia; Lisa Yankowitz, Children's Hospital of Philadelphia and University of Pennsylvania; Samantha Plate, Children's Hospital of Philadelphia; Meredith Cola, Children's Hospital of Philadelphia; Whitney Guthrie, Children's Hospital of Philadelphia; Birkan Tunc, Children's Hospital of Philadelphia and University of Pennsylvania; Aubrey Faggen, Children's Hospital of Philadelphia; Juhi Pandey, Children's Hospital of Philadelphia and University of Pennsylvania; Robert Schultz, Children's Hospital of Philadelphia and University of Pennsylvania; Julia Parish-Morris, Children's Hospital of Philadelphia and University of Pennsylvania

Identifying biobehavioral markers of Autism Spectrum Disorder (ASD) in the first year of life could facilitate early diagnosis, spurring intervention and maximizing developmental outcomes (Abbas et al., 2018). Vocalization acoustics hold particular promise as clinically useful biomarkers, because infant vocalization quality is tightly linked with neurodevelopment (Marschik et al., 2017). However, infant vocalizations rarely occur in silent settings, and no previous work on early vocalization acoustics in ASD has systematically investigated the impact of adult speech on vocalization metrics. The present study examines the effect of overlapping speech on automatically extracted infant vocalization acoustic features in a longitudinal sample of infants at high- (HR) and low- (LR) familial risk for ASD, as part of the Infant Brain Imaging Study (R01HD055741; PI: Piven). Infants were recorded interacting with parents/clinicians during social and behavioral assessments at 6, 12, and 24 months of age. At 24 months, infants underwent gold standard diagnostic assessments. Three outcome subgroups were matched on sex ratio: LR with no ASD (LR-; N=38), HR with no ASD (HR-; N=61), and HR with ASD (HR+; N=25). The extended Geneva Minimalistic Acoustic Parameter Set (eGeMAPS) was extracted from 28,000 vocalizations using openSMILE (Eyben, 2013, 2016). Vocalizations were manually coded to note the presence or absence of adult overlapping speech. Linear mixed models controlling for age and diagnosis revealed that the presence of adult speech affected 66 of 88 eGeMAPS parameters. This study is pertinent for establishing the types of early vocalization data that can be used for early detection of ASD.

P1-29 COGNITIVE FUNCTIONS OF WORKING MEMORY AND MATRIX REASONING ARE RELATED TO PERFORMANCE ON MENTAL ROTATION TASK IN 8-YEAR-OLDS BORN VERY PRETERM, **Hannah Phillips,** *University of British Columbia, BC Children's Hospital Research Institute, Vancouver, Canada* E-mail: hannah.phillips@bcchr.ca

Hannah Phillips, University of British Columbia, BC Children's Hospital Research Institute; Mia Mclean, The University of British Columbia & B.C. Children's Hospital Research Institute; Lynne Williams, BC children's hospital; Bruce Bjornson, University of British Columbia; Cecil Chau, BC Children's Hospital Research Institute; Anne Synnes, British Columbia Childrens Hospital Research Institute; Steven Miller, Hospital of Sick Kids; Ruth Grunau, University of British Columbia

Children born very preterm are at risk of visual-spatial difficulties and cognitive deficits at school-age. Mental rotation (hands) task is used widely in adults to examine visual-spatial processing, including during fMRI. We aim to examine whether performance on this mental rotation task is related to other cognitive functioning in children born very preterm.

In an ongoing prospective longitudinal cohort study, 41 children born very preterm (24–32 weeks gestation) were seen at age 8-years (23 male, 18 female). Excluded: major brain injury, sensory (blind, hearing), and/or cognitive (IQ Accuracy on the mental rotation task was significantly correlated with higher 8-year WISC-V Working Memory Index (r=.36, p=.02) and WASI-II Matrix Reasoning (r=.41, p=.01), but not verbal ability (WASI-II Vocabulary [r=.16, p=.33]).

Our findings contribute to understanding visual-spatial processing in relation to other cognitive functions in children born very preterm. Interestingly, performance on the mental rotation task was only moderately related to complex visual-spatial reasoning, suggesting mental rotation captures additional visually-based processes, while its relation with auditory working memory reflects visual recruitment during retention. Future directions involve understanding brain function using fMRI during mental rotation in this vulnerable population.

P1-30 CHARACTERIZING THE BEHAVIORAL PHENOTYPE OF CHILDREN BORN VERY PRETERM AT SCHOOL AGE, **Hannah Phillips,** *University of British Columbia, BC Children's Hospital Research Institute, Vancouver, Canada* E-mail: hannah.phillips@bcchr.ca

Hannah Phillips, University of British Columbia, BC Children's Hospital Research Institute; Cecil Chau, BC Children's Hospital Research Institute; Julie Petrie, BC Women's Hospital; Margot MacKay, BC Women's Hospital; Anne Synnes, British Columbia Childrens Hospital Research Institute; Steven Miller, Hospital of Sick Kids; Ruth Grunau, University of British Columbia

Children born preterm are at risk for attention problems. A "preterm behavioral phenotype" has been proposed, reflecting symptoms of inattention, anxiety, and social difficulties. However, little is known about relationships between attention and other behaviors in preterm children, and the extent to which attention difficulties reflects lower cognitive ability. We aimed to examine relationships of attention with: 1) anxiety, social behavior, autistic symptoms, sensory sensitivity, and 2) cognitive ability, in children born very preterm at age 8 years.

In a longitudinal cohort of N=90 children born ≤32 weeks gestation, at age 8 years: parent questionnaires (CBCL, Short Sensory Profile, BRIEF, Social Responsiveness Scale [SRS-2]), and cognitive assessments WASI-II, WISC-V Working-Memory. Excluded: major brain injury, neurosensory/motor/IQ CBCL DSM-Oriented Attention Problem Scale was highly correlated with CBCL Attention Problems (r=.90, p.80 CBCL Attention, CBCL Social Problems, Sensory Profile, BRIEF GEC, SRS Autism symptoms; 2nd component accounted for 12% variance with factor loadings WASI-II Vocabulary .74, WASI-II Matrix Reasoning .68, Working Memory .55. Regression analysis with behavioral and cognitive measures as predictors and CBCL Attention as outcome, Adjusted R2 = .70, pChildren born very preterm display a constellation of attention, executive function and social difficulties, and autism spectrum behaviors, confirming a "preterm behavioral phenotype". Importantly, this behavioral cluster appears to be largely independent of verbal and non-verbal IQ in this vulnerable population.

P1-35 EARLY ADVERSITY RISK SCORE ASSOCIATED WITH VISUAL EVOKED POTENTIAL (VEP) DEVELOPMENT DURING THE FIRST YEAR OF LIFE, **Lara Pierce,** *Boston Children's Hospital/Harvard Medical School, Boston, United States* E-mail: Lara.Pierce@childrens.harvard.edu

Lara Pierce, Boston Children's Hospital/Harvard Medical School; Jang Lee, Boston Children's Hospital/Harvard; Lisa Schlueter, Children's Hospital Los Angeles, Saban Research Institute; Pat Levitt, Children's Hospital Los Angeles; Charles Nelson, Harvard Medical School

Exposure to early adverse experiences has been associated with increased developmental risk, in part from early alterations to developing neural circuitry. Visual Evoked Potential (VEP) amplitude and latency, thought to index the integrity of cortical pathways and global neural maturation, may predict later risk for neurodevelopmental or cognitive impairment (Calloway et al., 1973; Jensen et al., 2019; Torres-Espinola et al., 2018). However associations between early risk and VEP development, particularly within the first year of life, are not well understood.

Pattern-reversal VEPs were recorded from scalp electrodes in 6, 9, and 12-month-old infants from predominantly low-SES backgrounds followed longitudinally (n=59). Amplitude and latency of the first positive component (P1) were extracted. A cumulative score of early post-natal risk exposures (socioeconomic, maternal mental health, stress, perinatal) was correlated with P1 amplitude at 12 months ($r = .413$, $p = .019$). Because P1 amplitude decreases across the first year, higher amplitude may index a less mature pattern. Total risk also correlated with change in P1 amplitude ($r = .457$, $p = .043$) and latency ($r = .530$, $p = .016$) from 6 to 12 months, adjusting for 6 month values, such that less change was observed for infants with higher risk scores. Adjusted P1 amplitude change also correlated with 12 month Mullen Scales of Early Learning Visual Reception scores ($r = .448$, $p = .047$), suggesting functional consequences of these neurodevelopmental patterns.

P2-49 WHILE A SHY CHILD WAITS: AUTONOMIC AND AFFECTIVE RESPONSES DURING ANTICIPATION OF A SPEECH, **Kristie Poole,** *McMaster University, Hamilton, Canada* E-mail: poolekl@mcmaster.ca

Kristie Poole, McMaster University; Louis Schmidt, McMaster Univ

Although shyness is a ubiquitous phenomenon, approximately 15-20% of the population experiences temperamental shyness, which is a stable trait characterized by wariness to social novelty and perceived social evaluation. We know, however, very little about shy children's psychophysiological and subjective responses to impending novel social events. Here we examined whether temperamentally shy children showed distinct autonomic and subjective responses to anticipation of an unfamiliar social presentation task. Participants included 84 children (Mage = 7.77 years, 43 boys, 41 girls) who had their heart rate and respiratory sinus arrhythmia (RSA) measured during a baseline condition and a two-minute anticipation period where the child was told that he/she would soon have to deliver a videotaped speech to other children. Children reported on their subjective level of nervousness during the anticipation period. Children's trait shyness was assessed using both parent- and child-report. Results revealed that temperamentally shy children showed significant increases in heart rate and significant reductions in RSA (i.e., greater vagal withdrawal) during the anticipation period relative to baseline, and also self-reported higher subjective nervousness relative to non-shy children during the anticipation period. These findings suggest that temperamentally shy children may experience greater autonomic and emotion dysregulation during the anticipation of novel social encounters than their non-shy counterparts, which may be reflective of their tendency to overreact to perceived social threat on both physiological and affective levels.

P1-58 EMOTIONAL EXPRESSIVITY RELATES TO OXYGENATED HEMOGLOBIN IN RIGHT MPFC IN MALE CHILDREN: A FUNCTIONAL NEAR-INFRARED SPECTROSCOPY (FNIRS) INVESTIGATION,
Natalee Price, *Miami University, Hamilton, United States* E-mail: pricenn2@miamioh.edu

Natalee Price, Miami University; Katherine Knauft, Miami University; Elizabeth Kiel, Miami University; Karthik Vishwanath, Miami University; Vrinda Kalia, Miami University

In adults, the medial prefrontal cortex (mPFC) is implicated in regulating emotional responses to stress (Cerqueira et al., 2008). Although brain hemodynamics associated with emotion regulation have been reported in children (McRae et al., 2012), mPFC hemodynamics during acute stress exposure and their relation with children's propensity to express emotions remain unclear. We hypothesized that children would show an increase in levels of oxygenated hemoglobin (HbO) in the mPFC during acute stress and that HbO levels would correlate with greater emotional expressivity.

Participants were 16, right-handed boys (6-8years) and their mothers. Children either completed a child-appropriate version of the Cold Pressor Task (CPT; experimental condition) or a non-stressful sham-CPT (control condition). Hemodynamic changes in the mPFC during the CPT/sham-CPT were assessed using fNIRS. Mothers provided a measure of boys' tendencies to express their emotions through the Emotional Inhibition subscale on the CEMS.

One-tailed paired samples t-tests revealed that the experimental (but not control) group had marginally higher HbO levels in the right-mPFC during the CPT, relative to baseline, $t(7) = 1.79$, $p = .062$. Spearman's rank-order correlations indicated that for only experimental condition participants, increases in HbO levels in the right mPFC were correlated with lower emotional inhibition (i.e., greater emotional expressivity; $r = -.93$, $p = .003$). These results indicate that in conditions of acute physiological stress (a) there may be increases in levels of HbO in the right mPFC and (b) boys who are more willing to express emotions display higher levels of HbO in their right mPFC.

S4-01 NICU-RELATED STRESS, TELOMERE LENGTH EROSION AND HPA AXIS DYSREGULATION IN PRETERM INFANTS, Livio Provenzi, *Scientific Institute IRCCS E. Medea, Bosisio Parini, Italy* E-mail: livio.provenzi@lanostrafamiglia.it

Livio Provenzi, Scientific Institute IRCCS E. Medea; Roberto Giorda, Scientific Institute IRCCS E. Medea; Monica Fumagalli, University of Milan; Francesco Morandi, Fatebenefratelli Hospital; Rosario Montirosso, Scientific Institute IRCCS E. Medea

Preterm (PT) require long-lasting hospitalization in the Neonatal Intensive Care Unit (NICU), a highly medical environment in which they are exposed to pain-related stress capable of altering neuroendocrine (e.g., hypothalamic-pituitary-adrenal, HPA axis) regulation pathways later in life. Telomeres are repeat-sequence caps of chromosomes that shorten with age and stress exposure. Increased telomere length (TL) shortening has been associated with HPA axis dysregulation in children exposed to trauma. Here, we present findings from a longitudinal study assessing (a) the differences in TL between PT and full-term (FT) newborns, (b) the link between NICU-related stress and TL shortening in PT infants from birth to NICU discharge, and (c) the association between TL erosion and HPA axis reactivity to socio-emotional stress at 3-months corrected age (CA). TL was measured in blood leukocytes and 3-month stress reactivity was assessed as salivary cortisol concentrations in response to a lab observational procedure, namely the Still-Face Paradigm (SFP). Findings suggest that (a) TL are longer in PT newborns, confirming their role as biomarkers of ageing, (b) greater exposure to NICU-related stress associated with a higher TL shortening in PT infants from birth to discharge, and (c) higher TL shortening was predictive of a more dampened HPA axis reactivity to the SFP at 3 months CA. This study contributes to the emerging field of preterm behavioral epigenetics and has important implications highlighting potential biomarkers of early adversities and developmental risk in human infants.

P1-03 FEMALES ARE MORE VULNERABLE TO THE IMPACT OF ACUTE EARLY LIFE STRESS ON SUBSEQUENT STRESS-ENHANCED FEAR LEARNING AND ETHANOL CONSUMPTION, **Jennifer Quinn,** *Miami University, Oxford, United States* E-mail: quinnjj@miamioh.edu

Jennifer Quinn, Miami University; Collin Riddle, Miami University; Rachel Skipper, Miami University; Brianna Minshall, Miami University; Elizabeth Sneddon, Miami University; Anna Radke, Miami University; Dragana Claflin, Wright State University

Women have a higher risk for posttraumatic stress disorder (PTSD). Early life stress (ELS) increases vulnerability, and comorbid alcohol dependence is common. This is modeled in rodents using acute exposure to aversive stimuli in early development and showing stress-enhanced fear learning (SEFL) in adulthood. The present experiments addressed whether males and females exposed to acute ELS differ in adult SEFL or adolescent ethanol consumption, which is a sensitive period for the development of addiction and possibly adult PTSD. The findings validate the SEFL model for studies of the development. Rats received 0, 4, or 15 footshocks on postnatal day (PND) 17. In Experiment 1, rats were then fear conditioned in a novel context using a single footshock during adulthood. Female, but not male, rats exposed to moderate ELS (4 footshocks) showed SEFL compared to non-stressed controls. Exposure to substantial ELS (15 footshocks) produced comparable enhancements for both males and females. In Experiment 2, adolescent rats were allowed to consume 20% ethanol using a 2-bottle choice procedure. Increased ethanol consumption was observed in females that had previously received 15 footshocks on PND17 compared to non-stressed control females. Males showed no stress-related increase in ethanol consumption. Additional control experiments revealed that female and male rats respond similarly to footshock and fear condition at comparable rates on PND17. These data suggest that acute ELS exposure yields robust, sex-dependent, impacts on subsequent emotional learning and alcohol consumption, consistent with PTSD symptoms in human patients.

P1-06 INVESTIGATION OF HIPPOCAMPAL AREA CA2 DEPENDENT BEHAVIORAL METAPLASTICITY IN ADULT RATS AFFECTED BY JUVENILE STRESS, **Radha Raghuraman,** *National University of Singapore, Singapore, Singapore* E-mail: e0001913@u.nus.edu

Radha Raghuraman, National University of Singapore; Sreedharan Sajikumar, National University of Singapore

Hippocampal area CA2 is one of the regions implicated in social memory. With the aim of exploring social interaction and sociability in rats that were subjected to juvenile stress, we address questions of if and how the neural circuitry is altered, and thereby its aftermath in social behaviour. Our preliminary results have brought about pivotal insights of juvenile stressed rats showing a lower sociability yet a higher social interaction with a familiar candidate, which is atypical for rodents. Hippocampal area CA2 of control (non-stressed) rats is resistant to the induction of long lasting plasticity in schaffer collateral CA2 (SC-CA2) but is able to show plasticity in the entorhinal cortical CA2 (EC-CA2) neurons. Surprisingly, there was induction of LTP seen in both schaffer collateral and entorhinal cortical pathways in the case of juvenile stressed rats, but the LTP declined in both the pathways after 2-3 hours. It has been established recently that the neuropeptide substance-P (SP) shows a slow onset potentiation leading to a late-phase LTP in schaffer collateral pathway in hippocampal CA2 pyramidal neurons in control rats. However, in the case of juvenile stressed rats, contrary to the above findings, an exogenous bath application of SP did not result in slow -onset long term potentiation, thus showing occlusion of LTP. Our findings so far show that juvenile stress induces behavioural metaplasticity in hippocampal area CA2 that may interfere with mechanisms behind social memory and social interaction.

P2-20 CHARACTERIZING NEURAL RESPONSES DURING A PROBABLISTIC REVERSAL LEARNING TASK IN CHILDREN, **Michelle Ramos,** *Florida International University, Miami, United States* E-mail: mramo033@fiu.edu

Michelle Ramos, Florida International University; Bethany Reeb-Sutherland, Florida International University

Probabilistic reversal learning involves learning to respond correctly to a previously unrewarded stimulus. This measures participants' ability to adapt to changing reward contingencies by initially rewarding for responding to one stimulus for a period of time and then switching the rewarding stimulus to a previously unrewarded one. This allows us to examine both reward processing and inhibitory control. The current study examined neural activation during a probabilistic reversal learning task in typically developing children (N=10, 9 female, M=7.3 years). Youth were asked to choose between two Hiragana characters. Correct and incorrect responses were followed by a green smiley or red sad face, respectively. EEG measures tracking the feedback-related negativity (FRN) will allow for the examination of neural activity associated with the receipt of performance feedback in response to making a reward prediction error (RPE). Results indicated that on average, youth committed 58 RPEs (SD=2.9, range=11-163). Neural responses for positive, negative, and negative feedback during the reversal period were explored. Peak amplitude analysis revealed that youth exhibited a more negative response to negative (M=-2.56) compared to positive feedback (M=-1.07), with the most negative responses occurring to receipt of negative feedback received during the reversal period (M=-5.68), though differences were not significantly different. These results suggest that while hypersensitivity to reward is not usually observed until adolescence, children do express an enhanced neural response to PREs, indicating difficulty adapting to changing reward contingencies (i.e., inhibitory control). Moving forward, an adolescent sample will be added in order to compare these responses across groups.

P2-53 DYNAMIC FLUCTUATIONS IN CHILDREN'S RSA AT SLOW AND FAST TIMESCALES, Niyantri Ravindran, *The Pennsylvania State University, University Park, United States* E-mail: nur374@psu.edu

Niyantri Ravindran, The Pennsylvania State University; Xutong Zhang, The Pennsylvania State University; Lindsey Green, The Pennsylvania State University; Pamela Cole, The Pennsylvania State University; Lisa Gatzke-Kopp, The Pennsylvania State University; Nilam Ram, The Pennsylvania State University

Children's cardiac reactivity to emotional cues in the environment has typically been examined through examining block-to-block changes or temporally aggregated data (e.g., 30s epochs). However, given that emotions and parent-child interaction operate at much faster timescales, it is likely that underlying physiological systems also do. We examined fluctuations in children's Respiratory Sinus Arrythmia (RSA) in response to dynamic stimuli and maternal RSA as a moderator of this association on two timescales – 30s and second-by-second. We expected children's physiological responses to be more accurately represented in "fast" vs. "slow" timescales.

Ninety-eight mother-preschooler dyads viewed a 3-min chase scene from The Little Mermaid that was rated second-by-second on negative emotional intensity based on emotion expressions of the characters, background music, and plot using a continuous scale. Second-by-second estimates of emotional intensity were also averaged for each 30s epoch. Children's and mothers' cardiac activity was measured using RSA, which was quantified in two ways – for each of 6 consecutive 30s epochs (standard approach), and for each of the 180 seconds of task time using a 30s moving Hanning-window (Gates et al., 2015).

Two multilevel models were tested, examining (1) 30s aggregates (2) second-by-second estimates. Model 1 showed that increases in emotional intensity in a given 30s epoch predicted concurrent decreases in children's RSA, but maternal RSA did not moderate this association. Model 2 showed that increases in emotional intensity in a given second predicted concurrent decreases in children's RSA, but only if mothers' RSA also decreased in the same second.

As expected, dyadic physiological processes only manifested on the "fast" timescale. Consistent with behavioral studies on parent-child exchanges, parents and children may align their physiological states when faced with emotional stimuli on a micro timescale, which may not be captured with aggregated data.

P1-04 THE RELATION BETWEEN VIOLENCE EXPOSURE, ANXIETY, AND THREAT PROCESSING, **Lori Reider,** *Rutgers University, Newark, United States* E-mail: lorireider95@gmail.com

Lori Reider, Rutgers University; Jessica Burris, Rutgers University; Denise Oleas, Rutgers University ; Michell Sarquez, Rutgers University; Norbert Promagan, Pennsylvania State University; Dara Tucker, Pennsylvania State University; Koraly Perez-Edgar, The Pennsylvania State University; Kristin Buss, Penn State; Vanessa LoBue, Rutgers University

A large body of research has linked biased attention to threat to the etiology and maintenance of anxiety (Bar-Haim et al., 2007). Here, we examined the relation between biased attention to threat and environmental risk and anxiety using a diverse sample of mothers from an ongoing longitudinal study of infant temperament and socioemotional development. During the infants' 4-month visit, caregivers viewed and responded via button press to the detection of a target image (happy or angry face) among 8 distractors. The Beck Anxiety Inventory (Beck et al., 1988) was used to assess anxiety symptoms (N = 42, Mage = 31.12 years), and a Community Survey Questionnaire (Earls, 2013) was used to assess environmental stressors (N = 41).

We found that anxiety was negatively correlated with latency to respond to threatening (angry) faces (r = -.313, N = 42, p While data collection is ongoing, these findings preliminarily suggest that environmental risk and anxiety are associated with threat processing, specifically highlighting the impact that environmental factors can have on threat bias patterns observed in anxious individuals.

P1-59 DEVELOPMENTAL TRAJECTORIES OF INFANT ATTENTION TO THREAT-RELATED FACIAL EXPRESSIONS VARY BY MATERNAL STRESS, **Emily Reilly,** *University of Minnesota, Institute of Child Development, Minneapolis, United States* E-mail: ebradenreilly@gmail.com

Emily Reilly, University of Minnesota, Institute of Child Development; Lara Pierce, Boston Children's Hospital/Harvard Medical School; Jukka Leppänen, University of Tampere; Alma Gharib, University of Southern California; Viviane Valdes, Boston Children's Hospital; Barbara Thompson, Michigan State University; Lisa Schlueter, Children's Hospital Los Angeles, Saban Research Institute; Pat Levitt, Children's Hospital Los Angeles; Charles Nelson, Harvard Medical School

Infants develop an attention bias towards fearful facial expressions in the first year of life thought to alert the infant to potential danger; a similar angry bias emerges by 3 years (Leppänen et al., 2018). These biases vary with proximal environmental factors such as physical abuse (Shackman et al., 2007), but evidence for an influence of SES or parent psychopathology is mixed possibly because much of this research is with higher-SES samples. The goals of this study were to model trajectories of infant attention to threatening expressions from 6 to 12 months in a diverse, representative sample (N=49) and test whether trajectories vary with maternal stress. Infant attention biases were computed as the time it took an infant to disengage (i.e., look away) from a central angry or fearful face stimulus to a lateral distractor stimulus, divided by the disengagement time for happy faces. Maternal stress was assessed by self-report on the Perceived Stress Scale (PSS). Trajectories of infant angry and fear biases were fitted using linear mixed-effects modeling. On average, infants demonstrated bias to both angry and fearful faces. Maternal stress at 6 months moderated these trajectories such that infants of mothers with higher stress demonstrated greater initial bias to threatening expressions and a decreasing trajectory, compared to the typical increasing bias in infants of mothers with lower stress. These results show, for the first time, that the early development of attention to threat-alerting social cues is associated with maternal stress.

P1-60 MATERNAL DEPRESSIVE SYMPTOMATOLOGY AND SES PREDICT INFANT JOINT ATTENTION PERFORMANCE, **Emily Reilly,** *University of Minnesota, Institute of Child Development, Minneapolis, United States* E-mail: ebradenreilly@gmail.com

Emily Reilly, University of Minnesota, Institute of Child Development; Isabella Stallworthy, University of Minnesota; Shanna Mliner, University of Minnesota; Kirsten Dalrymple, University of Minnesota; Michael Troy, Children's Minnesota; Jed Elison, University of Minnesota, Twin Cities; Megan Gunnar, University of Minnesota

Responding to joint attention (RJA)— an infant's ability to respond to cues from others to both share attention on an object— emerges and consolidates between 6 and 18 months of age (Adamson & McArthur, 1995; Scaife & Bruner, 1975) and is a foundational skill for social and language development. Researchers are now measuring RJA performance, rather than competence, such that performance may vary by the complexity of social cues or proximal environmental factors, like SES and maternal mental health. Because much of the research on RJA is with higher-SES families, the goal of this study was to test whether infant RJA performance varies by family environment in a diverse, representative sample (N=128). Infant RJA was measured using the Dimensional Joint Attention Assessment (DJAA), a play-based assessment that captures variability in infant RJA performance with cues of varying complexities, in 8- to 18-month-olds in a primary care clinic. Family SES variables were measured by self-report; federal poverty level (FPL) was calculated using the NCCP online calculator. Maternal depression symptoms were measured using the Center for Epidemiology Studies Depression Scale (CES-D). As predicted, infant RJA performance increased with infant age and varied within individuals by cue complexity. Models predicting infant RJA were fit using linear regression. Maternal education, FPL, and maternal depression symptoms predicted infant age corrected RJA performance. We show, for the first time in a representative sample, that infant joint attention performance varies by family SES and maternal depression symptomatology.

S1-04 LONG-TERM DEVELOPMENTAL EFFECTS OF PRENATAL MARIJUANA EXPOSURE, **Gale Richardson,** *University of Pittsburgh, Pittsburgh, United States* E-mail: gar@pitt.edu

Gale Richardson, University of Pittsburgh; Natacha De Genna, University of Pittsburgh

The importance of studying the effects of prenatal marijuana exposure (PME) is highlighted by several recent trends, including the increasing prevalence of marijuana use, increasing potency, and the decreasing prevalence of beliefs that it is harmful. We will review the findings from a longitudinal study of PME in which women were recruited early in pregnancy from 1982 to 1985. Women were interviewed twice during pregnancy, at delivery, and at multiple postpartum phases about their substance use and sociodemographic and psychological characteristics. Offspring were assessed at delivery and at multiple phases from infancy through adulthood with age-appropriate assessments. Prenatal marijuana use was moderate; most women decreased or discontinued use after the first trimester. During the first and third trimesters, ~50% and ~25% used marijuana, respectively. Women who used marijuana during pregnancy were less likely to be Caucasian and more likely to also use alcohol, tobacco, and other drugs than those who did not use. At the most recent follow-up, the adult offspring were 22.8 years old, had 12.8 years of education, 61% were employed or in school, 57% were African-American, and 53% were female. Offspring who were prenatally exposed to marijuana were significantly more likely to exhibit cognitive deficits and behavior problems, including early substance use, than those who were not exposed. These analyses controlled for other prenatal substance exposure and current sociodemographic factors. These findings are an indication that there are detrimental effects of PME that persist across developmental stages and into adulthood.

P1-77 SUPPRESSION OF LEARNED FEAR BY MATERNAL PRESENCE AND DEVELOPMENTAL TRANSITIONS IN PREFRONTAL ACTIVITY, **Patrese Robinson-Drummer,** *New York University Medical Center, New York, United States* E-mail: patrese.robinson-drummer@nyumc.org

Patrese Robinson-Drummer, New York University Medical Center; Maya Opendak, New York University Langone Medical Center; Anna Blomkvist, Stockholm University; Regina Sullivan, Nathan Kline Institute & NYU School Medicine

For infants, the mother serves as a potent reward stimulus and induces robust proximity-seeking in the infant regardless of infant care quality. A less well-understood feature of the attachment system is the caregiver's ability to reduce infant fear. Here, using odor-shock conditioning in young rodents, we questioned when the infant system transitions to the adult-like system and whether the late-developing prefrontal cortex (PFC) is involved in the caregivers' reduction of infant fear. Rat pups were odor-shock conditioned (0.6mA) at either postnatal day (PN)18 or 28 with either the mother present or absent, with PFC assessment during acquisition followed 24hr later by cue testing. Since human literature suggests the mother's ability to socially buffer the infant is diminished following maternal abuse, half of the pups were reared with an abusive mother from PN8-12. Results showed that for typical control-rearing, the mother attenuated fear in both PN18 and PN28 pups, although the PFC was only engaged at PN28. Abuse-rearing completely disrupted maternal social buffering at PN18. At PN28, pups showed that while the mother modulated learning in both control and abuse-reared pups, the behavioral and PFC effects were attenuated after maltreatment. Our data suggest that pups transition to the adult-like PFC social support circuit after independence from the mother (PN28), and this circuit remains functional after early trauma, although its effectiveness appears reduced. This is in sharp contrast to the effects of early life trauma during infancy, where maternal regulation of the infant, such as fear suppression, is more robustly impacted.

P2-07 WHEN THE NEW GETS IN THE WAY OF THE OLD: TESTING RETROACTIVE MEMORY INTERFERENCE IN TODDLERS, **Joscelin Rocha Hidalgo,** *Georgetown University, Washington, United States* E-mail: jr1679@georgetown.edu

Joscelin Rocha Hidalgo, Georgetown University; Olivia Blanchfield, Georgetown University; Sylvia Rusnak, Georgetown University; Rachel Barr, Georgetown University; Madeline Lui, Georgetown University; Eva Nuñez, Georgetown University; Sharanya Suresh, Georgetown University; Michael Varnerin, Georgetown University

Retroactive memory interference (RMI) occurs when new information interferes with the retrieval of old information. This phenomenon has been found as early as 3 months of age but has received surprisingly little empirical attention during early childhood. Taking advantage of the success of deferred imitation tasks to test toddlers' memory processing, we modified an imitation task to assess RMI with 18-month-olds.

One hundred and twenty toddlers were tested in their homes as part of a longitudinal project on bilingualism and memory flexibility. Three sets of stimuli (puppets: tiger, cow, duck; animals: rabbit, monkey, panda; rattles: green, white, red), and three target actions for each set were counterbalanced across children. For each set of stimuli, the experimenter demonstrated the target actions with stimulus A then stimulus B, followed by an immediate test of stimulus A. We hypothesized that the demonstration with stimulus B would interfere with toddlers' recall of target actions with stimulus A.

Demonstrating an interference effect, total scores (max = 9) were significantly less (mean= 4.20, ppThere was no difference in the performance of monolingual and bilingual toddlers; both exhibited retroactive interference. An ongoing longitudinal study will link performance on imitation during infancy with performance on imitation tasks in preschoolers.

P2-46 DELAYED MATURATION OF VISUAL EVOKED POTENTIALS IN NEWBORNS OF GESTATIONAL DIABETIC MOTHERS, **Cynthia Rodriguez,** *Columbia University Medical Center, New York, United States* E-mail: cyrodri@nyspi.columbia.edu

Cynthia Rodriguez, Columbia University Medical Center; William Fifer, Columbia University; Hana Mahallati, New York State Psychiatric Institute; Timothy Ochoa, Columbia University Medical Center; Daianna Rodriguez, New York State Psychiatric Institute; Jennifer Barbosa, New York State Psychiatric Institute; Margaret Shair, New York State Psychiatric Institute Columbia University; Joseph Isler, Columbia University; Lauren Shuffrey, Columbia University Medical Center

Gestational diabetes mellitus (GDM) is defined as impaired glucose tolerance with onset during pregnancy. Although children born to mothers with GDM are at increased risk for perinatal medical complications and neurodevelopmental sequela, the effect of GDM on neonatal neurophysiology is still unclear. Visual Evoked Potentials (VEPs) derived from electroencephalography (EEG) can be used to determine central nervous system maturity. In the current study we examined differences in VEP amplitude and latency in 47 healthy newborns with and without in-utero exposure to GDM. Groups were matched based on gestational age (GDM: 38.67 ± .81 weeks; Controls: 39.05 ± .93 weeks), sex (GDM: 14 males; Controls: 14 males), and postnatal age (GDM: 1.24 ± 0.49 days; Controls: 1.3 ± 0.47 days). Neonatal flash stimulation was presented using a photic stimulator positioned 20cm above the infant's eyes for four minutes. We extracted VEP adaptive mean amplitude and peak latency within a 170-250ms time window after stimulus presentation during rapid eye movement sleep. Results revealed a significant correlation between gestational age and VEP latency where latency decreased with age ($r(47) = -.34$, $p < .05$). When controlling for gestational age at birth, sex, and postnatal age, infants of diabetic mothers had significantly longer VEP latency than controls (GDM: 219 ± 17.17ms; Controls: 206 ± 17.17ms; $F(1, 42) = 5.38$, $p < .01$). There was no statistically significant difference in adaptive mean amplitude between groups. Our findings suggest VEP latency is a robust measure of cortical maturation which is delayed in infants of diabetic mothers.

O2-01 UTILIZING BRAIN NETWORK PERSPECTIVE FOR STUDYING THE DEVELOPMENTAL IMPACT OF INFANT EXPOSURE TO PRENATAL MOOD DISTURBANCES, **Naama Rotem-Kohavi,** *University of British Columbia, Vancouver, Canada* E-mail: nrk@alumni.ubc.ca

Naama Rotem-Kohavi, University of British Columbia; Lynne Williams, BC children's hospital; Angela Muller, University of British Columbia; Hervé Abdi, The University of Texas at Dallas; Naznin Virji-Babul, University of British Columbia; Bruce Bjornson, University of British Columbia; Ursual Brain, BC children's hospital; Janet Werker, University of British Columbia; Ruth Grunau, University of British Columbia; Steven Miller, Hospital of Sick Kids; Tim Oberlander, University of British Columbia

Region-Of-Interest (ROI) approaches (hypothesis-driven) have been widely used to characterize early human brain development. Increasingly, graph theory approaches (GTA) (data-driven) are being used to study functional connectivity organization (FCO) using functional magnetic resonance imaging (fMRI) and electroencephalography (EEG). This presentation will focus on comparing and contrasting ROI findings with GTA findings. GTA views the brain as a network, whereby brain regions are defined as nodes and the connections between them as edges. GTA can quantify global FCO measures such as network-modularity (reflecting network segregation and perceptual dynamics) and identify ‘hub’ (highly-connected) regions with greater impact on information flow. We will describe how GTA was applied to provide a network perspective of the developmental impact of exposure to prenatal mood disturbances (PMD). While existing ROI findings showed that PMD associated with hyperconnectivity between the amygdala and the anterior-cingulate and insula, using GTA, we show that not only do these regions serve as highly connected hubs, but PMD is associated with increased efficiency of these hubs in supporting neuronal communication. While previous ROI-EEG studies have shown frontal EEG-asymmetry associations with increased maternal mood disturbances for viewing positive emotions, using GTA we revealed associations of increased PMD with reduced efficiency of frontal hubs for viewing negative and positive emotions. PMD also associated with reduced global network segregation possibly reflecting increased perceptual dynamics for observing negative emotions.

This demonstrates how compared to other approaches (i.e ROI), GTA can quantitatively characterize global FCO and hubs, providing additional layer of information on the developing brain.

P2-36 NEURAL CORRELATES OF SUBORDINATE-LEVEL CATEGORIZATION OF OTHER-RACE FACES IN INFANCY, **Kelly Roth,** *University of Tennessee Knoxville, Knoxville, United States* E-mail: kelcroth@vols.utk.edu

Kelly Roth, University of Tennessee Knoxville; William Chollman, University of Tennessee Knoxville; E. Green, University of Tennessee Knoxville; Raley Smith, University of Tennessee Knoxville; Greg Reynolds, University of Tennessee; Carlos Mancilla, University of Tennessee Knoxville

Perceptual narrowing is characterized by an increase in sensitivity for native stimuli and a reduction for non-native stimuli. Six-month-olds discriminate “familiar” monkey faces from novel ones but 9-month-olds do not (Pascalis, de Haan, & Nelson, 2002). Infants raised in racially homogenous environments also demonstrate a decreased ability to discriminate other-race faces (Anzures et al., 2013). After 6 months of age, infants may begin to categorize non-native stimuli instead of processing them at the individual level (Nelson, 2001; Reynolds & Roth, 2018). Previous research has shown that exposure to multiple exemplars facilitates differentiation and categorization of other-species faces (Dixon, et al., 2019).

The current study utilized EEG and event-related potentials (ERP) to investigate whether exposure to multiple exemplars facilitates 10-month-old infants’ ability to form subordinate-level categories of other-race human faces. Infants (N=9) were familiarized with either multiple exemplars or a single-exemplar of other-race faces. During ERP testing, infants were shown the face(s) shown during familiarization (Familiar), novel faces from the same race used during familiarization (Novel-Same), and novel faces from a different race than that used in familiarization (Novel-Other). We analyzed the late slow wave (LSW) ERP component associated with infant recognition memory. Infants in the multiple exemplar group displayed significant differences in LSW amplitude between Novel-Other faces and Novel-Same faces ($p = .03$). In contrast, no differences in LSW amplitude were found based on novelty/familiarity or race for infants in the single exemplar familiarization group. Preliminary results suggest exposure to multiple exemplars facilitates infant subordinate-level categorization of faces based on race.

P1-74 PREDICTORS OF DELIBERATE SELF HARM IN YOUNG ADULTS WITH HIGH LEVELS OF ADVERSE CHILDHOOD EXPERIENCES, **Teresa Rushe,** *Queen's University Belfast, Belfast, United Kingdom* E-mail: t.rushe@qub.ac.uk

Teresa Rushe, Queen's University Belfast; Tara O'Neill, Queen's University Belfast

Adverse Childhood Experiences (ACEs) are key predictors of deliberate self-harm (DSH). As part of the Northern Ireland Childhood Adversity Study (NICAS) we collected measures of self-reported ACES (extended ACE-IQ), DSH, mental health (anxiety, depression, stress), personality (behavioural inhibition, behavioural activation, mental toughness), resilience (Brief Resilience Score) and neurocognitive function (Iowa gambling test-IGT- performance) in a sample of vulnerable young people aged 18-25 years (n=122), and using Hierarchical Logistic Regression tested whether mental health, personality, resilience or neurocognitive function variables mediated the association between ACEs and DSH. The sample was characterized by a high mean rate of ACEs (5.29,sd = 3.00, range 0-13). Experience of 5 or more ACES (compared to those scoring < 5) was by far the strongest predictor of DSH (OR: 23.35, Cis: 5.56, 83.02), with mental health (high vs low anxiety; OR: 5.1, CIs: 2.35-11.12) and personality (high vs low mental toughness; 0R:4.18. CIs: 1.96, 8.91) also emerging as significant predictors of DSH. Both Advantageous vs disadvantageous performance on the IGT was also associated with DSH, but only at the NS trend (OR: 1.98, CIs:0 .94, 3.97, P =0.07). We found no evidence to suggest associations between ACEs and DSH were mediated by mental health, personality or neurocognitive function variables. In the final model ACEs (OR:16.70, CIs: 4.51,61.8) and anxiety (OR:3.53, CIs: 1.45,61.8) remained; together accounting for 37% of the variation in DSH. The identification of targeted interventions and effective treatments for vulnerable young people at risk of DSH is essential.

P2-06 DO THE ROBOT: USING THE ROBOTS IMITATION TASK TO MEASURE MEMORY FLEXIBILITY AND WORKING MEMORY IN PRESCHOOLERS, **Sylvia Rusnak,** *Georgetown University, Washington, United States* E-mail: snr30@georgetown.edu

Sylvia Rusnak, Georgetown University; Joscelin Rocha Hidalgo, Georgetown University; Olivia Blanchfield, Georgetown University; Mackenzie Odier, Georgetown University; Tuleen Sawaf, Georgetown University; Hadley Greenwood, Georgetown University; Rachel Barr, Georgetown University

Early childhood is characterized by rapid increases in memory flexibility (MF) and working memory (WM). MF allows children to retrieve memories despite changes in perceptual cues. WM is the short-term ability to retain and manipulate information. Because few tasks exist that link performance on MF and WM in preschoolers, we developed a new imitation task, the Robots task.

In experiment 1, we tested 67 monolingual and bilingual 3- and 5-year-olds in their homes. Bilinguals were defined as children exposed to a second language for at least 20% of the time. An experimenter demonstrated 2- to 5-step sequences on one robot, and children were tested on a robot that was functionally the same but perceptually different. Poisson models on the correct number of movements summed across all sequences demonstrated that 3-year-old bilinguals performed better than monolinguals, p In experiment 2, we tested WM and updating following verbal feedback in 60 3- to 5-year-old children at the National Building Museum. Each age group was tested on “low” (2- and 3-step) and “high” (3- to 5-step) memory load sequences. Children were asked to imitate the sequence three times and received feedback from the experimenter following each trial. Coding and data analysis is in progress.

The Robots task tests age- and load-related changes in MF and WM using imitation. An ongoing longitudinal study will link performance on imitation during infancy with performance on the Robots task in preschoolers.

ISDP Dissertation Award 2019 ISDP Dissertation Award Presentation: MU RHYTHM DESYNCHRONIZATION MEDIATES THE RELATION BETWEEN GESTURE EXPERIENCE AND LANGUAGE DEVELOPMENT IN INFANCY, **Virginia Salo,** *Vanderbilt University, Nashville, United States* E-mail: virginia.salo@vanderbilt.edu

Virginia Salo, Vanderbilt University

Sensorimotor brain activity (indexed by EEG mu rhythm event-related desynchronization [mu ERD]) is implicated as a neural correlate of action understanding. Action understanding is a proposed foundation for communicative development, such that infants can apply a similar process of interpreting the goal-structure of actions to the understanding of others' gestures as well as spoken language. Exposure to gestures predicts language development, and gestures are an intermediary between action and language. This project examined whether experimentally manipulating infants' exposure to gestures would influence language development through changes in sensorimotor brain activity. Mu ERD was measured in 10- to 12-month-olds while they observed an experimenter gesturing. Half of the infants then received increased gesture exposure at home through a parent-directed training. Increased parent gesture predicted increased infant mu ERD at follow-up, and increased mu ERD was related to increased infant receptive vocabulary. This is the first evidence that increasing exposure to gestures impacts infants' language development through its effect on sensorimotor activity.

P2-28 Measuring proximity as a window into caregiver–child interaction patterns, Virginia Salo, *Vanderbilt University, Nashville, United States* E-mail: virginia.salo@vanderbilt.edu

Virginia Salo, Vanderbilt University; Kathryn Humphreys, Vanderbilt University

The types of interactions that we believe to be most supportive of positive child development (e.g., joint attention, physical touch) can only take place in moments of closer contact with a caregiver. Maternal deprivation in rodent models has shown that physical proximity to a caregiver influences the formation of neural connections necessary for fostering adaptive functioning. Research with children raised in profoundly deprived environments shows that extreme neglect can have striking and lasting negative effects. However, we know little about the patterns of real-life interactions between human children and caregivers in more typical settings. To address this gap, we have developed a wearable device used to dynamically and unobtrusively measure physical proximity between children and caregivers throughout the day in their natural environments. The portable nature of these devices allows for proximity to be measured both inside and outside the home throughout the day, in any context. We postulate that measurements corresponding to close proximity between child and caregiver indicate periods in which increased opportunity for developmentally critical interactions occur. Whereas measurements corresponding to greater caregiver-–child distance indicate periods with limited to no interaction. To test this, we pair these devices with the LENA, a widely used portable language monitoring device, which quantifies linguistic input and can be linked to the proximity information. We will present data collected using these devices from one caregiver–child dyad, including information about their patterns of interaction as well as a detailed look at the interactions that occurred during periods of close proximity.

O2-07 PRENATAL DISTRESS: MULTIPLE MEASURES ARE ASSOCIATED WITH SHARED AND UNIQUE ASPECTS OF HIPPOCAMPAL FUNCTIONAL CONNECTIVITY OF NEONATES, **Dustin Scheinost,** *Yale School of Medicine, new haven, United States* E-mail: dustin.scheinost@yale.edu

Dustin Scheinost, Yale School of Medicine; Marisa Spann, Columbia University Irving Medical Center; Bradley Peterson, University of Southern California/Children's Hospital of Los Angeles; Catherine Monk, Columbia University

Maternal prenatal distress—depression, anxiety, or stress—is a risk factor for psychiatric disorders. Exposure to distress is associated with altered hippocampal development. Studies often rely on a single facet of distress. The current study aims to determine whether various types of maternal distress affect neonatal functional connectivity in similar or unique ways. Forty-five pregnant adolescents were recruited. At 34-37 weeks of gestation, the women completed self-reports including the Perceived Stress Scale, Reynolds Adolescent Depression Scale, and Prenatal Distress Questionnaire. Neonatal resting-state functional MRI data were acquired on a GE 3T scanner. Standard seed connectivity from the right and left hippocampus was performed. Measurement of memory was obtained at 4-months. With higher levels of maternal stress, neonates exhibited weaker connectivity between the left hippocampus and dorsal anterior cingulate cortex (dACC), between the right hippocampus and the dACC and mid cingulate cortex, and stronger connectivity between the right hippocampus and left fusiform gyrus. With higher levels of maternal depression, neonates exhibited weaker connectivity between the left hippocampus and posterior cingulate cortex and between the right hippocampus and precuneus. With higher levels of maternal distress/anxiety, neonates exhibited stronger connectivity between the left hippocampus and right superior temporal sulcus. Third trimester stress and hippocampal connectivity correlated with infant memory. Using multiple distress measures, we demonstrate weaker connectivity between the hippocampus and several cortical regions in the neonatal brain. We also show connectivity patterns that are unique to the type of distress. The study highlights the importance of considering multiple facets of distress.

O2-02 NEUROANATOMICAL ABNORMALITIES IN A NON-HUMAN PRIMATE MODEL OF ZIKA INFECTION, **Adele Seelke,** *University of California, Davis, Davis, United States* E-mail: amseelke@ucdavis.edu

Adele Seelke, University of California, Davis; Danielle Beckmann, University of California, Davis; Paige Dougherty, University of California, Davis; John Morrison, University of California, Davis; Eliza Bliss-Moreau, University of California, Davis

Infection with the Zika virus during gestation can have significant negative effects on neural development. While much attention has been paid to impacts on cortical development, other brain regions may also be significantly impacted. Here we performed the first whole-brain assessment of neuroanatomical effects of Zika infection in a non-human primate model. Subjects were 6 full term macaque fetuses, three of which had been infected with ZIKV during mid-gestation. Histological analyses were performed on fixed, frozen tissue from half of each brain (the other half was subjected to viral analyses); tissue was sectioned on a sliding freezing microtome and then Nissl stained. The infected subjects did not exhibit microcephaly, however they showed a number of other anatomical abnormalities on both the macro and micro scale, including alterations in surface area to volume ratio and changes proportions of gray-to-white matter. Other abnormalities, including lesions within thalamic nuclei and laminar dysregulations in the occipital lobe, were present in Zika infected subjects. Finally, we identified activated astrocytes and microglia in the infected subjects. Together, these findings suggest that Zika infection impacts the brain in more subtle and substantial ways than previously believed. These results will inform the diagnosis and treatment of humans infected with Zika.

P1-12 PREDICTION OF AUTISM DIAGNOSES FROM NEONATAL CRY AND NEUROBEHAVIOR, **Stephen Sheinkopf,** *Brown Center for the Study of Children at Risk, Providence, United States* E-mail: Stephen_Sheinkopf@brown.edu

Stephen Sheinkopf, Brown Center for the Study of Children at Risk; Gavino Puggioni, University of Rhode Island; Elena Tenenbaum, Duke University; Harvey Silverman, Brown University; Barry Lester, Women & Infants Hospital

BACKGROUND: Autism has prenatal etiology, but signs of autism are not readily observable until the second year of life. Identifying precursor signs of autism in early infancy is a high priority for clinical research.

OBJECTIVE: The goal of this study was to investigate cry acoustics and early neurobehavioral characteristics in relation to later autism diagnoses.

METHOD: Participants were drawn from the Maternal Lifestyle Study (MLS), an investigation of 1288 infants with varying pre and postnatal risks followed into adolescence. Autism was identified and confirmed in 12 children. Comparison children were matched on the basis of sex, prenatal exposures, and availability of neonatal measures. At 1-month of age the NICU Network Neurobehavioral Scales (NNNS) was administered and infant cry bouts were elicited, recorded and subjected to acoustic analysis.

RESULTS: Using logistic regression with covariates, autism diagnoses were predicted by Cry and NNNS combined ($p = 0.028$). There were 247 controls for this analysis. NNNS features related to later diagnosis included poor movement quality, elevated stress signs, and disrupted arousal and regulation. Significant cry features included utterance timing, voicing and frication, and signal amplitude within specific frequency bands. We estimated ROC's using bootstrap resampling (AUC = 0.96).

CONCLUSIONS: Infants with later diagnoses of autism may differ from non-autism controls on measures of neurobehavior and cry acoustics. These results are too preliminary to discuss in terms of accuracy metrics, but do indicate that signal detection characteristics of the Cry and NNNS variables have the potential of performing well as early predictors of autism.

P2-56 COVARIATION OF SPONTANEOUS MOVEMENTS AND VOCALIZATIONS IN EARLY INFANT CRYING: INVESTIGATING TNE ROLE OF AUTONOMIC STATE, **Yuta Shinya,** *The University of Tokyo, Tokyo, Japan* E-mail: shinya@p.u-tokyo.ac.jp

Yuta Shinya, The University of Tokyo; Hama Watanabe, The university of Tokyo; Gentaro Taga, The university of Tokyo

Previous research of infant crying has revealed its acoustic characteristics in the context of assessing medical risk or physiological states (Wasz-Höckert, Michelsson, & Lind, 1985; Stewart et al., 2014), such that higher fundamental frequency (F0) of cries is associated with lower parasympathetic activity in high risk infants (Shinya et al., 2016). However, motor properties of infant crying and the relationship to vocalization have been still unclear, although infants undergo dramatic developmental changes in both of spontaneous movements and vocalization for the first few months. The current study investigated how spontaneous movements and vocalizations would covariate depending on change of autonomic state from neutral to crying state in full-term infants at 3-month-old age (n = 49). We recorded their both legs' acceleration and vocalization before and after spontaneous crying, and assessed autonomic states by heart rate and skin temperature measures. Results showed that spontaneous movements were covariate with vocalizations in terms of the increased frequency and the decreased interval variation. In addition, infants with more jerky movements showed higher number of vocalizations with less variation in F0 and formant frequency during crying. These motor and vocal changes were associated with strongly by increased heart rate, and moderately by decreased heart rate variability and distal skin temperature. Our observations suggest that autonomic nervous system might mediate the covariation of spontaneous movements and vocalizations in early infant crying, which would be based on emotional expression in gesture and prosody at a later developmental stage.

P1-20 Maternal buffering strongly affects inflammation-induced hypothalamic gene expression in mouse pups, Kiseko Shionoya, *Linkoping University, Linkoping, Sweden* E-mail: kiseko.shionoya@liu.se

Kiseko Shionoya, Linkoping University; Adriano Zager, Linkoping University; Joanna Zajdel, Linkoping University; Silvia Castany Quintana, University of Linköping; David Engblom, Linkoping University; Anders Blomqvist, Linköping University

Maternal care is crucial for infants and strongly affects their responses to different stressors. However, the consequences of depriving pups of maternal care during inflammation are not well studied. Here, we examined how maternal separation affects inflammatory gene expression and the corticosterone response to an acute immune challenge induced by lipopolysaccharide (LPS; 40 µg/kg ip) in mouse pups, 8–9 days old. Maternal separation initially attenuated LPS-induced hypothalamic pro-inflammatory gene expression, but later, at 3 h after immune challenge, robustly augmented such gene expression and increased serum corticosterone levels. Providing the pups with a warm and soft object blocked the separation-induced augmented hypothalamic-pituitary-adrenal (HPA)-axis response. It also normalized the expression of some, but not all, inflammatory genes to similar levels observed in pups staying with the dam. We show that acute maternal separation potentiates LPS-induced hypothalamic gene expression and HPA-axis activation, which may have detrimental effects if separation is prolonged or repeated. This potentiating effect seems to be driven primarily by the deprivation of passive touch (warmth and softness) rather than by the lack of milk ingestion or the absence of maternal olfactory cues. (Zajdel et al. 2019. Brain Behavior and Immunity, 77, 141-149). We are currently assessing how mother-infant interaction can modulate their inflammatory response.

O2-05 ASSOCIATIONS BETWEEN PRENATAL RISK FACTORS, NEWBORN BRAIN ACTIVITY, AND TODDLER NEURODEVELOPMENTAL PHENOTYPE, **Lauren Shuffrey,** *Columbia University Medical Center, New York, United States* E-mail: lcg2129@tc.columbia.edu

Lauren Shuffrey, Columbia University Medical Center; Natalie Brito, New York University; Mandy Potter, Stellenbosch University; Priscilla Springer, Stellenbosch University; Hein Odendaal, Stellenbosch University; Maristella Lucchini, Columbia University Medical Center; Timothy Ochoa, Columbia University Medical Center; Ayesha Sania, Columbia University Medical Center; michael Myers, New York State Psychiatric Institute; Joseph Isler, Columbia University; Lucy Brink, Stellenbosch University; William Fifer, Columbia University

The current study examines whether prenatal maternal and environmental factors and neonatal EEG are predictive of socioemotional behaviors and neurocognitive function in toddlerhood. Participants are a subset of infants previously enrolled in the Safe Passage Study with available neonatal EEG data and neurodevelopmental follow-up at 3 years of age (n=243; gestational age at birth: 39.2 ± 0.95 weeks; age at follow-up 38.9 ± 3.0 months). Developmental assessments consisted of the Bayley Scales of Infant Development, Brief Infant Toddler Social-Emotional Assessment, and Modified Checklist for Autism in Toddlers. Based on parameters extracted from these assessments, we utilized hierarchical clustering to derive four neurodevelopmental cluster groups: low-risk, social-emotional-risk, autism/neurodevelopmental-risk, and cognitive-risk. Multinomial logistic regression was implemented to predict cluster group membership based on neonatal EEG power, maternal depression and anxiety, and household crowding. Prenatal maternal depression was associated with increased social-emotional and cognitive-risk in offspring (OR 1.30, 95% CI 1.13–1.72; OR 1.44, 95% CI 1.21–1.91). Household crowding was associated with increased autism-risk (OR 2.07, 95% CI 1.20–3.57). Additionally, males were more likely to be categorized in the autism-risk group than females (OR 2.43, 95% CI 1.13–5.86). Increased delta and theta EEG power in the temporal and parietal regions were associated with increased social-emotional risk (OR 2.19, 95% CI 1.32–3.63) whereas increased beta EEG power in the temporal region was associated with increased autism-risk (OR 1.58, 95% CI 1.11–2.47). Our results suggest newborn brain activity is a robust predictor of subsequent neurodevelopment.

P2-17 STUDYING WHITE MATTER VULNERABILITY IN PEDIATRIC MILD TRAUMATIC BRAIN INJURY,
Ayushi Shukla, *University of Calgary, Calgary, Canada* E-mail: ayushishukla@gmail.com

Ayushi Shukla, University of Calgary; Ashley Ware, University of Calgary; Sunny Guo, University of Calgary; Bryce Geeraert, University of Calgary; Bradley Goodyear, University of Calgary; Keith Yeates, University of Calgary; Catherine Lebel, University of Calgary

Background: The nature of white matter (WM) alterations following pediatric mild traumatic brain injury (mTBI) is unclear. We examined WM microstructure and its relation to post-concussive symptoms (PCS) in children with mTBI, mild orthopedic injury (OI) and typically developing (TD) controls.

Method: Children aged 8-16 years with mTBI (n=45) or mild OI (n=24) were recruited from the Alberta Children's Hospital emergency department. DTI and PCS ratings were completed at post-acute assessments (

Results: The mTBI and OI groups differed from TD children in FA in the CC body (both injury groups>TD) and MD in the CST (both injury groups>TD). Group*PCS interactions were significant: for mTBI, somatic PCS related positively with FA in all CC subregions and negatively with MD in genu but were not correlated with diffusion measures in OI. Cognitive PCS related negatively with FA in body and genu and positively with MD in all CC subregions in the OI group, while significant relations were not observed in mTBI.

Discussion: Differences between OI and TD groups highlight the need to carefully select comparison groups in pediatric mTBI studies. mTBI may alter WM microstructure in ways that alter relationships to PCS.

P1-51 Stressful life events and children's hair cortisol: Moderation by parental mental health, Katrina Simon, *Teacher's College, New York, United States* E-mail: krs2174@tc.columbia.edu

Katrina Simon, Teacher's College; Kimberly Noble, Teachers College, Columbia University; Jerrold Meyer, University of Massachusetts; Emily Merz, Teachers College, Columbia University; Pooja Desai, Teachers College

Exposure to stressors in childhood increases the risk for negative health and developmental outcomes across the lifespan. The dysregulation of the hypothalamic-pituitary-adrenocortical (HPA) axis stress response may serve as one potential mechanism underlying these associations, in turn leading to adverse health outcomes. Parents are thought to modulate the extent to which stressors impact the HPA axis stress response in children. However, parents with more anxiety or depression symptoms may be less able to buffer children's stress-related HPA axis responses. In this study, we examined whether parent anxiety and/or depression symptomatology moderated the association between stressful life events and hair cortisol concentration (HCC) in children. Participants were 5- to 9-year-old children (N = 94; 61% female) and their parents (N = 94; 92.6% female) recruited from the New York City area. Parents completed the Life Events Scale, Beck Anxiety Inventory, and Patient Health Questionnaire-9 in order to collect information about stressful events and mental health symptomology. Hair samples were collected from children and assayed for cortisol concentration. Stressful life events were significantly positively associated with children's HCC (β = .01 p=.03). However, counter to our hypotheses, neither parental anxiety nor depressive symptoms significantly moderated this association. Future research should further investigate which factors buffer the association between stressful life events and children's physiologic stress, which can serve to inform policy and interventions aimed at the well-being of parents and children.

S5-04 ANXIOUS PARENTS SHOW HIGHER PHYSIOLOGICAL SYNCHRONY WITH THEIR INFANTS, **Celia Smith,** *King's College London, London, United Kingdom* E-mail: celia.smith@kcl.ac.uk

Celia Smith, King's College London; Sam Wass, University of East London; Emily Jones, Birkbeck, University of London; Tony Charman, King's College London; Kaili Clackson, University of Cambridge; Farhan Mirza, University of Plymouth

Interpersonal processes influence our physiological states and associated affect. Physiological arousal dysregulation, a core feature of anxiety disorders, has been investigate in children of parents with anxiety disorders. But little is understood about how parent and infant physiology inter-relates when the dyad features an anxious parent. We investigated moment-to-moment fluctuations in arousal within parent-infant dyads using miniaturised microphones and autonomic monitors. We continually recorded arousal and vocalisations in infants and parents in naturalistic home settings. Our results indicated that physiological synchrony across the day was stronger in dyads featuring more-anxious rather than less-anxious mothers. Across the whole recording epoch, more-anxious mothers showed more reactivity to small-scale fluctuations in their infant's arousal than less-anxious mothers. However, when maternal arousal levels were high, more-anxoous mothers were less influenced by their infant's arousal levels than less-anxious mothers. Our findings have implications for understanding the differential processes of physiological regulation in anxious and non-anxious partnerships. They may help us in the process of informing intervention strategies for dyads needing support for elevated levels of anxiety.

O2-03 PRENATAL MATERNAL IMMUNE ACTIVATION IS ASSOCIATED WITH BRAIN MICROSTRUCTURAL TISSUE ORGANIZATION AND METABOLITES IN NEONATES, **Marisa Spann,** *Columbia University Irving Medical Center, New York, United States* E-mail: mns2125@cumc.columbia.edu

Marisa Spann, Columbia University Irving Medical Center; Ravi Bansal, Children's Hospital of Los Angeles; Catherine Monk, Columbia University; Bradley Peterson, University of Southern California/Children's Hospital of Los Angeles

Maternal immune activation (MIA) is associated with alterations in offspring brain development and risk of psychiatric disorders. Human studies of MIA in association with early brain development are sparse. We hypothesized that higher levels of MIA as measured by maternal interleukin -6 (IL-6) and C-reactive protein (CRP) are associated with variation in gray and white matter organizational properties and brain metabolite concentrations in neonates. At 24-27 weeks gestation, 49 healthy pregnant women underwent assessments and blood draws. IL-6 and CRP were measured using the ELISA. The neonates underwent a MRI scan and analyses of the directional diffusion of water indexed by fractional anisotropy (FA) and brain metabolites (N-acetylaspartate, creatine, and choline) were performed. Higher levels of maternal IL-6 were associated with: (1) increased FA values in the basal ganglia and thalamus, and across the occipital and right anterior temporal regions; and (2) decreased brain metabolites in the left hemisphere of the fronto-parieto-occipital regions, and subcortical regions including the basal ganglia and thalamus. Higher levels of CRP were associated with: (1) decreased FA values across the frontal and occipital lobes, and the anterior limb of the internal capsules, and increased FA values of the posterior limb; and (2) decreased brain metabolites in the basal ganglia and thalamus. We demonstrate that both immune markers have shared and distinct patterns of association with brain tissue organization, but differ in their associations with brain metabolites. The findings emphasize the value of considering multiple measures of MIA and imaging in this emerging area of research.

O3-03 7,8-DHF IMPROVES EXTINCTION RETENTION AND REDUCES RELAPSE IN NON-STRESSED AND STRESSED ADOLESCENT RATS, **Anthea Stylianakis,** *UNSW Sydney, Sydney, Australia* E-mail: a.stylianakis@unsw.edu.au

Anthea Stylianakis, UNSW Sydney; Kathryn Baker, UNSW Sydney; Rick Richardson, University of New South Wales

A number of preclinical studies have demonstrated that fear extinction is impaired during adolescence, an effect that is further exacerbated by chronic stress exposure. The small-molecule Tropomyosin receptor kinase B (TrkB) agonist, 7,8-dihydroxyflavone (7,8-DHF), is a promising pharmacological approach that improves fear extinction retention and reduces fear relapse (renewal) in adult mice when administered prior to extinction training. Therefore, in this study we examined whether 7,8-DHF also improves extinction retention and leads to less renewal in both stressed and non-stressed adolescents. In this study, a Corticosterone (30 mg, 7-day release) or placebo pellet (cholesterol) was subcutaneously implanted into adolescent rats (at Postnatal day (P) 28). At P35, animals received Pavlovian fear conditioning which involved three pairings of a white noise (CS) with a footshock (US). Twenty-four hours later, half the rats were injected with 5mg/kg of 7,8-DHF and the other half with vehicle. One hour later, the rats were exposed to presentations of the white-noise only in a second context (within-session extinction). Over the next two days animals were tested for CS-elicited freezing in both the extinction (i.e., a test of extinction retention) and fear conditioning (i.e., a test of fear renewal) contexts. Both stressed and non-stressed adolescents injected with 7,8-DHF displayed better extinction retention and less fear renewal than those injected with vehicle. Overall, 7,8-DHF may provide a means by which to improve the otherwise-impaired extinction retention present in both stressed and non-stressed adolescents.

S3-02 WHAT HAPPENS TO THE INFANT DURING MALTREATMENT? STRESS TARGETS HIPPOCAMPUS BUT STRESS WITH MOTHER TARGETS AMYGDALA AND SOCIAL BEHAVIOR, **Regina Sullivan,** *Nathan Kline Institute & NYU School Medicine, New York, United States* E-mail: regina.sullivan@nyumc.org

Regina Sullivan, Nathan Kline Institute & NYU School Medicine; Charlis Raineki, University of British Columbia; Maya Opendak, New York University Langone Medical Center

In altricial species, such as humans and rodents, the brain continues to develop after birth and sensitive to environmental programing that permits adaptation to diverse environments and cultures. However, this open system also leaves the brain vulnerable to programming by trauma, with programming that goes beyond adaptation to initiate pathology. Childhood trauma experiences, especially with the caregiver (as occurs in maltreatment), are associated withmental health issues, many of which emerge in later-life. Yet the mechanisms initiating pathology during the infant trauma remain elusive. To define this, rat pups were reared with a maltreating mother for five days beginning at postnatal (PN)8, which increased pup plasma corticosterone, decreased social interactions with the mother, disrupted both hippocampal structure (volume, neurogenesis) and amygdala function (c-Fos, LFP)/ structure (volume, neurogenesis). Next, we deconstructed the infant maltreatment experience to reveal sufficient and necessary conditions to induce these outcomes. Hippocampal effects could be phenocopied by merely elevating stress hormone under any experimental condition, while unexpectedly, pairing stress hormone with the mother, even when she was anesthetized, was required to recapitulate maltreatment effects on social behavior and amygdala. Causation was shown by blocking corticosterone during maltreatment and suppressing amygdala during social behavior. By deconstructing a complex mother-infant interaction we defined immediate infant brain response and mechanisms that highlight some of the diverse programing occurring during infant mother-infant interactions. These results complement our understanding of the importance of sensory stimuli guiding brain development but highlight the critical role of stress and maternal presence in guiding neural response.

P2-24 THE IMPACT OF PRENATAL MARIJUANA EXPOSURE ON BRAIN STRUCTURAL DEVELOPMENT IN YOUNG CHILDREN, Jackie Sullivan, *Nationwide Children's Hospital, Columbus, United States* E-mail: Jackie.Sullivan@nationwidechildrens.org

Jackie Sullivan, Nationwide Children's Hospital; Xiaoxue Fu, Nationwide Children's Hospital; Whitney Mattson, Nationwide Children's Hospital; Michele Morningstar, Nationwide Children's Hospital; Holly Blei, Nationwide Children's Hospital; Sarah Keim, Nationwide Children's Hospital; Mark Klebanoff, Nationwide Children's Hospital; Eric Nelson, Nationwide Children's Hospital

Prenatal marijuana exposure (PME) remains at an all-time high, with a 62% increase in prenatal use amongst U.S. women in 2016. PME disrupts fetal endogenous cannabinoid signaling system, predisposing the offspring to perturbed neural and cognitive development. Little is known about the effects of PME on early brain structural development that may be linked to executive functions. As a part of an ongoing longitudinal study, the present study compares brain morphology between children with PME and non-exposed controls at age 7, a key developmental stage when executive functions are emerging. Thirty-seven children (15 exposed) provided high-resolution T1 scans. They also completed a sustained attention task outside the scanner. Volumetric measures and cortical thickness were computed using FreeSurfer image analysis suite. PME is associated with smaller global cortical volumes. Vertexwise group analyses reveal that exposed children exhibit widespread cortical thinning in frontal, temporal, parietal, and occipital regions in left and right hemispheres. Furthermore, there is a group difference in the relation between sustained attention performance and right lateral orbitofrontal (rlOFC) thickness. Specifically, among control children, better sustained attention is associated with thinner rlOFC, whereas the performance-thickness association is negative among exposed children. The preliminary results suggest that PME is associated with altered cortical gray matter development. The expected link between executive function development and frontal synaptic pruning is not observed in exposed children.

P1-15 DEVELOPMENT OF WHITE MATTER MICROSTRUCTURAL CORRELATIONS IN INFANTS AT HIGH RISK FOR DEVELOPING AUTISM, **Sooyeon Sung,** *University of Minnesota, Minneapolis, United States* E-mail: sungx077@umn.edu

Sooyeon Sung, University of Minnesota; Jed Elison, University of Minnesota, Twin Cities; Meghan Swanson, University of Texas at Dallas; Martin Styner, University of North Carolina; Joseph Piven, University of North Carolina at Chapel Hill; Annette Estes, University of Washinton; Stephen Dager, University of Washinton; John Pruett, Washington University in St.Louis

Neuroimaging studies suggest that autism spectrum disorder (ASD) is associated with altered white matter development. Whole-brain approaches to structural network connectivity have been illustrative, but more work is needed to elucidate patterns of brain development specific to ASD or familial risk. We investigated inter-tract correlations of fractional anisotropy across 23 tracts in 50 high-risk infants diagnosed with ASD (HR+), 200 high-risk infants who did not meet ASD criteria (HR-), and 112 low-risk infants at 6, 12, and 24 months. A three-way ANOVA including age, group, and correlation type (homologous vs. non-homologous) revealed a significant interaction effect between age and group ($F(4,2267)=33.38$, $p < 0.001$), with overall inter-tract correlation in HR+ being significantly higher than in LR at 6 months, but lower at 12 and 24 months. Unlike other groups, overall inter-tract correlations in HR+ significantly decreased over time. Additionally, the inter-tract correlation matrices were compared using Box's M-test and the Fisher z-transformation. At 6 months, the LR group differed from HR+ infants. At 12 and 24 months, the LR group was different from both HR- and HR+ who were statistically indistinguishable, suggestive of a familial effect. Examination of independent entries of the matrices revealed that differences in the inter-tract correlations were prominent between the corticospinal tract, the middle cerebellar peduncle, and the anterior thalamic radiation (HR+ > LR-) at 6 months, but between the cingulum, the uncinate and the arcuate (LR- > HR+) at 24 months. These results suggest the importance of the connectivity and coherence among white matter tracts.

P1-79 MATERNAL DEPRESSIVE SYMPTOMS PREDICT GENERAL AND INTERNALIZING-SPECIFIC LIABILITY IN CHILD PSYCHOPATHOLOGY, **Danielle Swales,** *University of Denver, Denver, United States*
E-mail: daswales@gmail.com

Danielle Swales, University of Denver; Hannah Snyder, Brandeis University; Benjamin Hankin, University of Illinois at Urbana-Champaign; Curt Sandman, University of California, Irvine; Laura Glynn, Chapman University; Elysia Davis, University of Denver

Background: Maternal depression has been established as a robust predictor of both internalizing and externalizing disorders, however limited research has investigated whether this general liability for broad, co-occurring psychopathology maps onto the general common psychopathology factor (p-factor) and/or if symptom variance is specific to the internalizing or externalizing symptom domains. Objective: The current study utilizes a latent bifactor of model to evaluate whether maternal depressive symptoms predict both transdiagnostic (p-factor) and specific (internalizing and externalizing-specific) psychopathological risk. Method: Maternal report of depressive symptoms and child psychopathological symptoms were provided by 554 mother child pairs. Results: A bifactor confirmatory factor analysis was used to derive the p-factor, reflecting shared symptom variance across traditional psychopathological diagnoses, and then further partition remaining variance into internalizing and externalizing specific factors. Regression models revealed that maternal depressive symptoms were significantly and positively associated with the p-factor and the internalizing-specific factor but were not associated with the externalizing-specific factor. Notably, maternal depressive symptoms were positively associated with total symptoms counts for both internalizing and externalizing sympoms. Discussion: We find that maternal depressive symptoms confer transdiagnostic risk for broad child psychopathology, as well as risk specific to the internalizing domain. Notably, while maternal depressive symptoms predict report of more child externalizing problems, current findings suggest this association is driven entirely by the p factor rather than externalizing specific risk. Findings have important clinical implications, as a latent structure of psychopathology may provide greater specificity in characterizing child mental health and its relation to maternal depression.

P2-27 ENHANCEMENT OF MOTHERS' POSITIVE EMOTIONS THROUGH NEW DIAPER TECHNOLOGY: EFFECT VERIFICATION BY ELECTROENCEPHALOGRAM MEASUREMENT, **Yukari Tanaka,** *Kyoto University, Kyoto, Japan* E-mail: yucari.carol@gmail.com

Yukari Tanaka, Kyoto University; Francoise Diaz-Rojas, Kyoto University; Ayami Suga, Unicharm Corporation; Tatsuya So, Unicharm Corporation; Masako Myowa, Kyoto University

Japan is facing a declining birth rate, explained in part by the difficulties of childrearing. The improvement of parental motivation and enhancement of self-efficacy in terms of childcare may facilitate an increase in birth rate. However, while caretakers' motivation would be enhanced by explicit positive feedback, preverbal infants are unable to provide explicit feedback.

To address this issue, we have developed a diaper equipped to visualize infants' positive emotions. Upon wetting, the diaper displays a positive message as visual feedback for caretakers. The purpose of this study was to investigate whether this diaper could enhance mothers' positive emotions.

We recruited 20 mothers raising preverbal infants. After a familiarization period of three days with both new and conventional diapers, we showed participants videoclips showing the diaper-changing scenes under the following two conditions: using conventional diapers (control condition), and using new diapers (experimental condition). We recorded the electroencephalogram measurements of the mothers while they were watching the videos. Afterwards, mothers evaluated their own emotions in response to each stimulus.

Participants reported more positive emotions in the experimental condition than in the control. The experimental condition also elicited greater theta and alpha power in the frontal regions, which are thought to reflect an enhanced positive emotional state in participants. Our findings suggest that the new diapers enhance mothers' positive emotions at both neurophysiological and behavioral levels.

S3-04 AUTONOMIC REACTIVITY TO SOCIAL REJECTION, PSYCHOPATHOLOGY AND THE BUFFERING EFFECTS OF ADOLESCENT FRIENDSHIPS FOLLOWING EARLY PSYCHOSOCIAL DEPRIVATION, **Alva Tang,** *University of Maryland, College Park, United States* E-mail: tangalva.at@gmail.com

Alva Tang, University of Maryland; Katie McLaughlin, University of Washington, Seattle; Margaret A. Sheridan, Harvard Medical School; Charles Nelson, Harvard Medical School; Charles Zeanah, Tulane University; Nathan Fox, University of Maryland

Perturbed stress reactivity, reflected in altered responses of the autonomic nervous system, has been posited as a mechanism contributing to increased psychopathology risk among children exposed to early-life adversity. Using data from the Bucharest Early Intervention Project, we assessed (1) whether altered autonomic reactivity to peer rejection in previously institutionalized adolescents mediated the link to more internalizing and externalizing behaviors and (2) whether these associations depended on friendship quality. Participants included 136 children with a history of institutional care, and 72 never-institutionalized children. At age 12, participants reported friendship quality with respect to a best friend and completed a social rejection task while electrocardiogram and impedance cardiography were recorded. Sympathetic and parasympathetic nervous system reactivity to rejection feedback were assessed using pre-ejection period (PEP) and respiratory sinus arrhythmia (RSA). At age 16, externalizing and internalizing behaviors were reported by parents and teachers. Mediation models revealed that blunted sympathetic, but not parasympathetic, reactivity to social rejection at age 12 partially mediated the association of institutionalization with internalizing (indirect effect: b = .03; 95% CI = .02, .06) and externalizing (indirect effect: b = .04; 95% CI = .01, .08) behaviors at age 16. Furthermore, moderated mediation models revealed that the mediation effect of institutionalization on externalizing behaviors via blunted sympathetic reactivity was observed only in those with low-quality friendships (indirect effect: b = .05; 95% CI = .02, .12), but not high-quality friendships. These findings suggest that while altered sympathetic reactivity to social rejection is a mechanism linking early institutionalization to adolescent psychopathology, positive adolescent friendships may buffer these effects.

P2-52 THE EVOLVED NEST AND SELF-REGULATION: LINKING FREEPLAY WITH VAGAL TONE IN YOUNG CHILDREN, **Mary Tarsha,** *University of Notre Dame, Notre Dame, United States* E-mail: mtarsha@nd.edu

Mary Tarsha, University of Notre Dame; Darcia Narvaez, University of Notre Dame

Early experience significantly impacts physiological development, specifically neurobiological processes. Vagal tone (respiratory sinus arrhythmia, RSA) is shaped from early experience. This study examined both environmental and RSA mechanisms in 78 mother-child dyads ($M_{motherage}$= 33.75, $SD_{motherage}$= 5.39, $M_{childage}$= 5.91, $SD_{childage=}$ .50) and the Evolved Developmental Niche (EDN; Narvaez et al, 2019), the developmental system of care evolved to match up with child maturation, specifically self-directed free play in the past week. RSA regulation was simultaneously evaluated across three conditions for both members of the dyad, at baseline, during a stress condition and at recovery. Latent basis coefficient modeling for six models (three models per dyad member) demonstrated that free play significantly predicted child's RSA at baseline and stress but not maternal vagal regulation or adaptability (trend). Change on change growth curve modeling with maternal and child latent intercept and slopes as covarying, with free play as an exogenous variable were good fitting models and reiterated the importance of free play on child autonomic regulation. For children, increased free play resulted in higher vagal tone parasympathetic reactivity during rest and under stressful conditions, indicating less physiological stress across different conditions.

These results are consistent with previous work investigating the benefits of the EDN, specifically, free play to promote the neurobiological mechanisms of self-regulation (Narvaez et al., 2013). Free play appears to be an important factor in children's autonomic regulation development.

P2-39 ADOLESCENT CONSUMPTION OF CAFFEINATED ALCOHOL AFFECTS RNA EXPRESSION AND REWARD PROCESSING, **Shannon Thompson,** *Miami University, Oxford, United States* E-mail: thomp223@miamioh.edu

Shannon Thompson, Miami University; Margot Duffy, Miami University; Matthew McMurray, Miami University; Anna Campion, Miami University

The consumption of caffeinated alcoholic beverages (CABs) is common among adolescents, and has been associated with increased alcohol consumption; however, the mechanism for this is unclear. The ability of caffeine to block alcohol's sedative effects may extend the duration of drinking and facilitate greater consumption. Alternatively, the rate of consumption may also increase, suggesting that caffeine enhances alcohol's reward potential. Thus, to determine if caffeine enhances alcohol's rewarding potential, we used a rat model of adolescent voluntary intake and compared the behavioral and biological effects of CAB to alcohol, caffeine, and vehicle. We examined reward processes with intracranial self-stimulation (ICSS) and conditioned place preference. Using Targeted RNA Expression Analysis, we also characterized changes in expression of RNA for receptors, transporters, and synthesis enzymes of a wide array of neurotransmitter systems in the orbitofrontal cortex and nucleus accumbens, to determine how activation of these circuits changes between conditions. Results showed that consumption of CAB escalated compared to alcohol alone. Additionally, ICSS data showed no change in activation of reward circuitry, while conditioned place preference data suggest that caffeine may reduce the aversive properties of alcohol to facilitate greater intake. Lastly, the pattern of RNA expression suggests that CAB may affect a wide array of systems differently than alcohol alone. Combined, these results suggest that the addition of caffeine to alcohol may affect the neurobiological systems associated with reward processing and aversion to enhance the rate of consumption.

S1-02 A PROSPECTIVE NEURODEVELOPMENTAL STUDY OF CHILDREN PRENATALLY EXPOSED TO CANNABIS WITH 10 YEAR FOLLOW-UP, **Henning Tiemeier,** *Harvard TH Chan School of Public Health, Boston, United States* E-mail: H.TIEMEIER@GMAIL.COM

Henning Tiemeier, Harvard TH Chan School of Public Health; Hanan El Marroun, Erasmus Medical Center

Studies of the long-term consequences of maternal cannabis use during pregnancy on offspring development are sparse. We used a multi-information approach to assess prenatal maternal cannabis exposure and child behavioral functioning and contrasted this with associations of paternal cannabis use. Also, we investigated how prenatal cannabis exposure relates to brain morphology.

The Generation R Study is a population-based birth cohort in The Netherlands (n = 5903, 169 exposed, 96 exposed in the imaging study). Information on parental cannabis use was collected using questionnaires; urine of mothers was analyzed for cannabis metabolites. Child behavioral problems at 10 years were measured using teacher and child reports. Brain volumetric measures and cortical thickness were also obtained at age 10 years.

Our findings showed associations of maternal cannabis use during pregnancy with offspring externalizing (B = 0.53; 95% CI: 0.29-0.77), but not with internalizing problems (B = -0.10; 95% CI: -0.31-0.11). However, paternal and maternal cannabis use before pregnancy was also associated with offspring externalizing problems. Prenatal cannabis exposure was not associated with global brain volumes but related to differences in cortical thickness. These brain differences did not mediate behavioral problems.

Prenatal exposure to maternal cannabis use was associated with offspring behavioral problems but this associations was probably not causal as maternal cannabis exposure before and paternal use during pregnancy were also related to externalizing problems in children. The association between prenatal maternal cannabis exposure and offspring cortical thickness was more specific. Further research is needed to explore whether this association has behavioral implications.

P1-34 EFFECTS OF NEONATAL PROCEDURAL PAIN AND REDUCED MATERNAL CARE ON BRAIN DEVELOPMENT AND CELL PROLIFERATION IN MALE AND FEMALE RAT PUPS, Brian Timmerman,
Wayne State University, Ferndale, United States E-mail: btimmerman@wayne.edu

Brian Timmerman, Wayne State University; Sean Mooney-Leber, Penn State University; Susanne Brummelte, Wayne State University

Almost 10% of all U.S. live births in 2016 were preterm. Children born preterm often display impaired cognitive, behavioral, motor, and neural development compared to full-term peers. Studies have found a relationship between these alterations and the number of neonatal stressors that preterm infants experience. Utilizing a rodent model, our study investigated how stressors that preterm infants commonly experience in the Neonatal Intensive Care Unit, particularly procedural pain and reduced maternal care, may alter brain development. Male and female rat pups were bred in-house. On the day after birth (postnatal day 1 (PD1)), litters were culled to have equal numbers of male and female pups. Pups received needle insertions into their paws (pain) or paintbrush stimulation (control). Afterwards, pups were returned to their cages within a tea-ball infuser to reduce maternal care (isolation) or on the nest with littermates. This produced four groups within each litter (n=8): pain, pain + isolation, touch, touch + isolation. Pain/isolation exposure was performed in 4 sessions per day from PD1–4. Animals were sacrificed at PD8 and brains were processed via immunohistochemistry for Ki67, a marker of cell proliferation. Preliminary results suggest pups who received pain + isolation had significantly lower cell proliferation in the dentate gyrus compared to pups in the touch + isolation group. This may indicate that neonatal pain and isolation have synergistic effects on cell proliferation in the neonatal dentate gyrus. Future research will investigate additional markers of brain maturation and the consequences of these early life stressors at adulthood.

P1-76 Previous Institutionalization Worsens the Relationship Between Current Life Stress, Internalizing Psychopathology, and Adaptive Functioning, Emily Towner, *University of California, Los Angeles, Los Angeles, United States* E-mail: emilytowner@ucla.edu

Emily Towner, University of California, Los Angeles; Joao Guassi Moreira, University of California, Los Angeles; Adriana Mendez Leal, UCLA; Yael Waizman, University of California, Los Angeles; Emilia Ninova, UCLA; Jennifer Silvers, UCLA

Being institutionalized in early childhood can be detrimental to health and well-being later in life. Little work has examined the effect of this institutionalization on people's ability to deal with later stressful experiences. We recruited participants aged between 9 and 24, roughly half of whom had been institutionalized in international orphanages before being adopted to the United States as toddlers (N = 95). In these previously institutionalized participants, and a matched comparison group who were raised by their biological parents, we investigated the relationship between current life stress and two measures of well-being—internalizing psychopathology and adaptive functioning. Our data revealed several significant interactions between early and current life stress, when controlling for age and gender. Overall, we found that current life stress was related to worse outcomes for previously institutionalized participants than for comparison participants –both in terms of internalizing psychopathology and adaptive functioning. These results suggest that severe early life neglect might impair people's ability to cope with stress later in life.

P2-41 EFFECTS OF GENDER AFFIRMING HORMONE TREATMENT ON WHITE MATTER ORGANIZATION IN GENDER DYSPHORIC YOUTH, **Meika Travis,** *Nationwide Children's Hopsital, Columbus, United States* E-mail: meika.travis@nationwidechildrens.org

Meika Travis, Nationwide Children's Hopsital; Eric Nelson, Nationwide Children's Hospital; Roberto French, Nationwide Children's Hospital; Connor Grannis, Nationwide Children's Hospital; Andy Hung, Nationwide Children's Hopsital; Xiaoxue Fu, Nationwide Children's Hospital; Michele Morningstar, Nationwide Children's Hospital; Whitney Mattson, Nationwide Children's Hospital; Leena Nahata, Nationwide Children's Hospital; Scott Leibowitz, Nationwide Children's Hospital

Objective: Neuroimaging studies have demonstrated that white matter in the brain continues to mature across adolescence. This process is thought to be partly facilitated by the surge of gonadal hormones at puberty. Several studies have reported age-independent effects of puberty in both boys and girls with effects generally being stronger and later in boys. In the present study we examined the impact of exogenous administration of testosterone and estradiol to gender dysphoric (GD) youth undergoing gender affirming hormone therapy (GAH) on white matter organization using diffusion tensor imaging (DTI).

Methods: GD youth receiving gender affirming hormones and an age matched group of community controls underwent 64-direction DTI in a 3T Siemens scanner. Using a semi-automated procedure (DSI studio), tractography was performed on five tracts: inferior occipito-frontal fasciculus (IFOF), inferior longitudinal fasciculus (ILF), uncinate fasciculus (UF), arcuate fasciculus, and fornix. Mean levels of fractional anisotropy (FA) were compared among groups.

Results: Results from three of the tracts (UF, IFOF, ILF) indicate that GD youth receiving testosterone had lower levels of FA than comparison controls with the same assigned gender at birth while GD youth receiving estradiol treatment had an increase in the same tracts.

Conclusion: Preliminary results of this ongoing study suggest that testosterone and estradiol treatment exert opposite effects on white matter development in GD youth. These results are noteworthy because they differ from reported effects of endogenous hormones in cis-gender youth, and from a few reports of GAH treatment in GD adults.

P1-42 INFANT SLEEP AND ITS RELATION TO CHRONIC AND ACUTE CORTISOL FUNCTION, Charu Tuladhar, *Boston University, Boston, United States* E-mail: tuladhar@bu.edu

Charu Tuladhar, Boston University; Amanda Tarullo, Boston University; Jerrold Meyer, University of Massachusetts

Sleep and cortisol function are two biological processes that develop in parallel during infancy, and dysregulation of one system could adversely impact the other. Over time, sleep problems may lead to higher cumulative cortisol exposure, resulting in increased health risks. Both sleep and cortisol vary day-to-day, yet temporal dependencies between sleep and diurnal cortisol regulation are not well understood. To investigate whether sleep has implications for cumulative exposure to cortisol as early as infancy, we examined actigraphy-derived sleep in relation to hair cortisol (N = 84, 43 female, Mage = 12.24 months). To assess the day-to-day interplay between sleep and cortisol, we tested how sleep onset and nighttime sleep duration related to salivary cortisol the next day, and how bedtime cortisol related to sleep onset on the same night. Infants with higher hair cortisol had shorter nighttime sleep duration ($r = -.35$, $p<.01$) and later sleep onset ($r = .48$, $p<.01$). Sleep was temporally related to day-to-day cortisol, such that later sleep onset ($r = .18$,$p = .02$)and shorter nighttime sleep duration ($r = -.19$,$p = .01$)related to higher salivary cortisol exposure the next day. Further, higher bedtime cortisol related to later sleep onset the same night ($r = .22$, $p = .01$). Findings indicate that infant sleep not only has implications for long-term physiological stress exposure and related wear and tear on the body, but also interacts with acute cortisol on a day-to-day basis. Synchronously well-regulated sleep and physiological stress systems are critical for better health outcomes. Future research should examine if interventions to improve infant sleep would contribute to improved cortisol regulation as well.

P1-47 PSYCHOSOCIAL ADVERSITY DURING PREGNANCY AND PATTERNS OF HEART RATE VARIABILITY IN RESPONSE TO ACUTE STRESS, **Irene Tung,** *University of Pittsburgh, Pittsburgh, United States* E-mail: tungi@upmc.edu

Irene Tung, University of Pittsburgh; Meaghan Delcourt, University of Pittsburgh; Alison Hipwell, UPMC; Kathryn Keenan, University of Chicago

Psychosocial adversity during pregnancy can disrupt maternal stress regulation and negatively impact offspring health. Despite the central role of the parasympathetic nervous system (PNS) in stress regulation, few studies have investigated how adversity influences PNS regulation (e.g., heart rate variability; HRV) during pregnancy. The present study aimed to (1) characterize patterns of HRV before, during, and after an experimental stressor administered in pregnancy and (2) examine associations between adversity and HRV reactivity/recovery. Participants included 90 pregnant women oversampled from low-income neighborhoods (79% receiving public assistance; 73% black). HRV was recorded continually during the preparation, task and recovery periods of the Trier Social Stress Task and indexed by the root mean square of successive differences (RMSSD), a reliable estimate of PNS activity. Participants self-reported past-month exposure to difficult life circumstances (e.g., financial, interpersonal), and linear regressions modeled their associations with RMSSD reactivity/recovery. Repeated measures ANOVA revealed a significant effect of time on RMSSD in expected directions ($F=11.27$, $p<.01$) as well as an interaction between time and trimester ($F = 2.75$, $p<.01$), with women in their third trimester recovering more slowly than women in their first or second trimester. Controlling for gestational age and race, poverty (i.e., receipt of public assistance) was associated with lower stress reactivity ($B = -.13$, $p = .02$) in a linear regression, consistent with prior studies linking poverty and blunted stress response. Frequent exposure to difficult life circumstances was associated with more rapid cardiac recovery from acute stress during pregnancy ($B = .02$, $p = .03$), a pattern that may reflect PNS adaptation to anticipated stressors.

P2-29 EXAMINING LINKS BETWEEN MATERNAL RESPONSIVENESS AND TASK-RELATED EMOTION LATERALIZATION., Joshua Underwood, *Washington State University, Pullman, United States* E-mail: joshua.underwood@wsu.edu

Joshua Underwood, Washington State University ; Haven Warwick, Washington State University ; Allegra Campagna, Washington State University; Elizabeth Youatt, Penn State University; Natalia Potapova, Washington State University; Sammy Perone, Washington State University; Maria Gartstein, Washington State University

The goal of the current study was to improve our understanding of relations between qualities of parent-infant interactions and emotion lateralization, measured using electroencephalography (EEG). Asymmetric frontal EEG patterns reflect approach and avoidance tendencies, with relative right activation associated with withdrawal emotions/motivation and left hemisphere activation linked with approach and positive affect. While EEG asymmetry has been studied across the lifespan, few studies have examined asymmetry in the context of emotional-eliciting tasks, with comparisons to baseline to ascertain the response to the emotional task, especially for infants.

Parent-infant interactions represent one of the most critical and enduring aspects of infants' experience and development. The qualities of parent-infant interactions are related to social-emotional and cognitive developmental outcomes; however, exactly how parent-infant interactions shape the functional organization of the brain is only beginning to be understood. Interactional dynamics of thirty-eight mother-infant dyads were coded for maternal responsiveness during free-play (Gartstein et al., 2018), with EEG asymmetry data obtained in the context of a baseline task and the repeated Still-Face Paradigm (i.e., second episode; Haley & Stansbury, 2003).

Results indicated that changes in alpha asymmetry from baseline to repeated Still-Face were related to responsiveness of parent-infant interaction ($r = .36$). Specifically, greater maternal responsiveness was associated with a more leftward shift in frontal alpha asymmetry from baseline to Still-Face. Thus, infants experiencing more responsive interactions with their caregivers demonstrated a propensity toward approach-related emotion/motivation even during the 2nd Still-Face episode, designed as a mild stressor to challenge regulation.

P2-64 SLEEP HEALTH IS ASSOCIATED WITH OBSERVED CLASSROOM BEHAVIOR AND ACADEMIC ACHIEVEMENT AMONG CHILDREN OF COLOR LIVING IN HISTORICALLY DISINVESTED NEIGHBORHOODS, **Alexandra Ursache,** *NYU School of Medicine, New York, United States* E-mail: alexandra.ursache@nyulangone.org

Alexandra Ursache, NYU School of Medicine; Rebecca Robbins, NYU School of Medicine; Alicia Chung, NYU School of Medicine; Spring Dawson-McClure, NYU School of Medicine; Dimitra Kamboukos, NYU School of Medicine; Esther Calzada, University of Texas at Austin; Girardin Jean-Louis, NYU School of Medicine; Laurie Brotman, NYU School of Medicine

Healthy sleep is essential for well-being, development, and academic achievement among children, yet children of color are at higher risk for poor sleep health compared to white children. In early childhood, poor sleep health may place children at greater risk for behavioral problems in the classroom and lower academic performance. In investigating associations with sleep health, however, few studies have utilized objective reports of children's classroom behavior and achievement, which may be particularly important given potential biases in teachers' reports of behavioral issues among children of color. The current study uses a sample of 572 primarily Black children living in historically disinvested neighborhoods and has three aims: 1) to describe ethnic and socioeconomic differences in children's sleep (parent and teacher report), 2) to examine whether children's sleep is related to observer reports of adaptive and problem behaviors in the first grade classroom; and 3) to determine whether sleep longitudinally predicts academic achievement in second grade. The sample was part of a longitudinal follow-up study of a cluster (school) randomized controlled trial in ten public elementary schools. Results demonstrate that higher teacher reported child sleepiness in first grade was concurrently associated with lower adaptive classroom behaviors and higher problem behaviors, and longitudinally predicted lower academic achievement one year later. Parent reports of higher bedtime resistance and higher disordered breathing also longitudinally predicted lower academic achievement in second grade. This study demonstrates that teacher reported sleepiness is an important measure for understanding children's preparedness to productively engage in the classroom and to succeed academically.

O2-08 ACCELERATED MATURATION OF FETAL AMYGDALA FUNCTIONAL CONNECTIVITY AFTER MATERNAL CHILDHOOD TRAUMA EXPOSURE, **Marion van den Heuvel,** *Tilburg University, Tilburg, Netherlands* E-mail: m.vdnheuvel@gmail.com

Marion van den Heuvel, Tilburg University; Moriah Thomason, New York University; Catherine Monk, Columbia University; Jamine Hect, Wayne State University; Seonjoo Lee, Columbia University; Tianshu Feng, Columbia University

Background. Childhood maltreatment (CM) is an important risk factor for developing psychopathology later in life, and, recently, accumulating research suggests that the negative effects of CM are not limited to the individual, but are transmitted across generations. In this study, we examined the effect of maternal childhood trauma on amygdala-cortical functional connectivity in late pregnancy in utero. Methods. Healthy pregnant women (N=60) underwent functional MRI measurement to scan the fetal brain (25 female; 35 male). Bilateral amygdala masks were used as ROI to conduct ROI-to-voxel functional connectivity analyses. Mothers completed self-reports of Childhood Trauma Questionnaire (CTQ) describing their own childhood trauma experiences, at 3-year dyad follow-up. Fetal amygdala-cortical functional connectivity was then regressed with maternal self-reported CM. Results. In relation to greater maternal CM, we found weaker positive functional connectivity of the amygdala with frontal areas (orbitofrontal cortex, left ventrolateral prefrontal cortex, right ventromedial prefrontal cortex) and stronger positive connectivity with the right medial and lateral temporal lobe. Conclusion. In this study, pregnant women's experiences of CM were already evident in their offspring's brain in utero. The altered fetal amygdala connectivity patterns observed in our study are indicative of a possible prenatal adaptation in the fetus of heightened sensory reactivity and a more mature emotion regulation system, potentially programmed to survive a traumatic environment that was foreshadowed by their mother's childhood maltreatment related-intrauterine cues.

P2-68 NURSING BEHAVIOR AND PROACTIVE COPING PREDICT RESISTANCE TO DIARRHEAL ILLNESS IN YOUNG RHESUS MACAQUES, **Jessica Vandeleest,** *University of California-Davis, Davis, United States* E-mail: vandelee@ucdavis.edu

Jessica Vandeleest, University of California-Davis; Brianne Beisner, University of California-Davis; Brenda McCowan, University of California-Davis

Diarrheal illness is a common cause of morbidity and mortality among children world-wide. While sanitation is a major contributor to reduced incidence of diarrheal disease, psychosocial factors (e.g. stress and temperament) have also been suggested to influence the incidence of diarrheal illness. Using a nonhuman primate model we explored the social factors that predicted resistance to diarrheal disease in 52 rhesus macaques followed from birth to 2.8 years of age. Animals were reared by their mothers and housed in a single captive naturalistic social group containing 150 animals of mixed age and sex classes. Animals were housed outdoors in 0.2 ha enclosures which were cleaned at least weekly, yet lacked formal structural sanitation making it a good model for a population at risk of experiencing diarrheal illness. Clean drinking water was provided ad libitum and food was provided twice daily. Maternal behavior (measured at 3-6 mos), infant temperament (assessed at 3-4 mos of age), maternal social status, and infant sex were entered into a survival analysis to predict veterinary treatment for diarrhea. Results indicate that a proactive coping style and nursing behavior predicted reduced risk for diarrhea. These results suggest that temperament (e.g. proactive coping style) and maternal care (e.g. nursing) can promote resistance to diarrhea among at risk individuals.

P1-71 EARLY CAREGIVING ADVERSITY INFLUENCES EFFORT-BASED PERSISTENCE BEHAVIOR DURING CHILDHOOD, **Michelle VanTieghem,** *Columbia University, New York, United States* E-mail: michelle.vantieghem@gmail.com

Michelle VanTieghem, Columbia University; Paul Bloom, Columbia University; Andrea Fields, Columbia University; Chelsea Harmon, Columbia University; Tricia Choy, University of California, Riverside; Nicolas Camacho, Columbia University; Lisa Gibson, Columbia University; Rebecca Umbach, Columbia University; Charlotte Heleniak, Columbia University; Daphna Shohamy, Columbia University; Nim Tottenham, Columbia University

Prior studies show that early caregiving adversities (ECA) influence the development of positive valence systems, such as reward reactivity and fronto-striatal circuitry, implicated in mental health risk. However, these mechanisms have not been investigated in the context of effort-based persistence behavior, which involves both effort-based motivation and regulatory responses to setbacks. In the current study, we designed a novel fMRI task to examine the role of early caregiving environments on effort-based persistence in 125 children (60F/65M) with ECA history and 52 comparison children (26M/26F) between the ages of 6-12 (mean=9.5, SD=2.0). For each of 42 trials, children chose between a hard-effort task (many ring-finger presses) with a higher pay-out (stack of gold coins) and easy-effort task (few thumb presses) with a lower pay-out (few gold coins). To assess persistence behavior in the context of uncertainty, feedback was reinforced at 50% for both effort conditions. Behavioral results showed that overall effort-based motivation (defined as the proportion of hard-effort choices) did not differ as a function of ECA exposure. However, trial-wise analysis of win-stay lose-shift behavior showed differential patterns of decision-making strategies based on early experience. Although both groups showed significant persistence (lose-stay) behavior following a hard-effort setback (i.e. chose hard again after a hard-effort setback), the ECA group showed greater win-stay behavior following a hard-effort reward (i.e. chose hard again after a hard-effort reward) relative to comparisons, suggesting that ECA children show increased effort-allocation following hard-effort reward receipt. Future analyses will investigate the role of fronto-amygdala-striatal circuitry underlying these behavioral effects.

P2-13 THE MEDIATING EFFECTS OF WAYFINDING ANXIETY AND CHILDHOOD WAYFINDING EXPERIENCE ON GENDER DIFFERENCES IN WAYFINDING STRATEGIES AND AFFECT IN ADULTS,
Vanessa Vieites, *Florida International University, Miami, United States* E-mail: vviei001@fiu.edu

Vanessa Vieites, Florida International University; Shannon Pruden, Florida International University; Asia Eaton, Florida International University; Bethany Reeb-Sutherland, Florida International University

Early experiences shape spatial skill development, with boys engaging in more spatial activities than girls since preschool. The basis for sex differences in spatial aptitude is still debated but explanations include the use of different strategies for solving spatial problems, higher levels of spatial anxiety, and less spatial experience in women than in men. The current study seeks to understand childhood factors that lead to the development of sex differences in wayfinding anxiety and strategies in adulthood. One-hundred-fifty-nine undergraduate psychology students reported their childhood wayfinding experiences (i.e., distance traveled, time spent outside), current wayfinding and general anxiety levels, and current use of wayfinding strategies (i.e., route, orientation). Independent samples t-tests revealed that men reported spending more time outside ($t[152]=-2.411;p<.05$) and traveling farther distances ($t[152]=-2.396;p<.05$) as children, having less wayfinding anxiety ($t[156]=3.008;p<.01$) and route strategy usage ($t[154]=2.624;p<.05$), and having more orientation strategy usage ($t[151]=-2.275;p<.05$) than women. Furthermore, both wayfinding anxiety and distance traveled during childhood mediated the relation between sex and route strategy use, controlling for general anxiety. Lastly, distance traveled during childhood mediated the relation between sex and wayfinding anxiety, controlling for general anxiety. The current findings provide some environmental explanations for sex differences in spatial reasoning. Specifically, sex differences in past wayfinding experience may help us understand why men and women develop different levels of wayfinding anxiety and different wayfinding strategies. Thus, more environmental exploration during childhood may help lessen girls' fears about navigating, which may, in turn, improve the kinds of approaches they choose to traverse unfamiliar territories.

P1-31 DEPRIVATION, THREAT, AND CHAOS AS LINKS BETWEEN EARLY LIFE SES AND EXECUTIVE FUNCTIONING OUTCOMES, **Sarah Vogel,** *New York University, New York, United States* E-mail: scv267@nyu.edu

Sarah Vogel, New York University; Rosemarie Perry, New York University; Annie Brandes-Aitken, New York University; Stephen Braren, New York University; Clancy Blair, NYU

Research on early-life adversity has begun a shift from cumulative risk approaches to more dimensional approaches. One such dimensional approach to understanding early-life adversity uses dimensions of deprivation and threat to differentially predict developmental outcomes. However this framework has not been applied to the context of poverty-related adversity, which encompasses more than deprivation and threat and is characterized by high levels of both these dimensions. Previous studies have found that experiences of deprivation, but not threat, predict executive functions (EF). We propose a model of deprivation, threat, and chaos as dimensions of poverty-related adversity, and we hypothesized that deprivation and chaos, but not threat, would mediate links between socioeconomic status (SES) and EF. Data come from the 15-, 24-, and 48- month visits of the Family Life Project (n=1,292).

We used latent variables of deprivation, threat, chaos, and SES in a multiple mediation model with SES as the main predictor, and deprivation, threat, and chaos, as mediators predicting 48 month EF. Lower SES was related to higher levels of deprivation (β= -0.372, $p < 0.001$), threat (β= -0.382, $p < 0.001$), and chaos (β= -0.467, $p < 0.001$). Deprivation partially mediated the link between SES and EF (β= 0.093, $p < 0.001$), as did chaos (β= 0.035, $p = 0.046$). Threat was not a mediator between SES and EF (β= -0.017, $p=0.244$). Deprivation and chaos explained the entire relationship between SES and EF (β= 0.056, $p = 0.119$).

O2-06 BUPRENORPHINE EXPOSURE DURING GESTATION RESULTS IN DOSE-DEPENDENT CONSEQUENCES FOR THE DAM AND HER LITTER IN A TRANSLATIONAL MODEL OF OPIOID-MAINTENANCE THERAPY, **Chela Wallin,** *Wayne State University, Detroit, United States* E-mail: fz7628@wayne.edu

Chela Wallin, Wayne State University; Susanne Brummelte, Wayne State University; Scott Bowen, Wayne State University ; Chelsea Roberge, Wayne State University

The opioid crisis has led to increases in pregnant opioid-dependent women treated with opioid-maintenance therapy (buprenorphine, BUP). However, not much is known about the consequences of gestational BUP exposure on pregnancy outcomes, maternal care, or offspring development. Our translational model aimed to resemble human BUP treatment therapy by starting vehicle or BUP exposure subcutaneously (s.c.) in adult female rats (N=30) at least 7 days before conception and continuing exposure throughout the postpartum period. We evaluated effects of therapeutic (low-dose, 0.3 mg/kg) and overexposure (high-dose, 1 mg/kg) BUP exposure against saline-control. Females were bred in house with drug-naïve adult males. At parturition, each litter was culled to 5 males/5 females and randomly assigned to various behavioral tests during either the neonatal or adolescent period. Litter characteristics, maternal caregiving, neonatal opioid withdrawal syndrome (NOWS), offspring development and adolescent behaviors were evaluated. Low-dose BUP exposure decreased maternal care, delayed offspring development, decreased body weight, length, and temperature, as well as increased tolerance to morphine's analgesic effect (p's<.05). However, high-dose BUP exposure altered litter characteristics and resulted in a striking decrease of both maternal caregiving and offspring survival as well as increased expression of NOWS (p's<.05). These results demonstrate that the therapeutic (low-dose) level of BUP was relatively safe with subtle effects on maternal care and offspring. However, overexposure (high-dose) levels of BUP interfered with litter characteristics, NOWS, maternal caregiving and thus offspring survival. More research is critical to validate the translational implication of these findings for human opioid-dependent mothers maintained on buprenorphine-maintenance therapy.

P2-84 ADOLESCENTS' EXPECTATIONS AND JUDGEMENTS OF LG PEER IDENTITY DISCLOSURE OUTCOMES, **Yueyao Wang,** *University of Rochester, Rochester, United States* E-mail: reowang1004@gmail.com

Yueyao Wang, University of Rochester

Adolescence is a crucial time of sexual and gender identity development and a crucial time for development of the sense of group conformity with peers. Many factors are at play when adolescents decide whether an LG (lesbian and gay) peer would disclose their identity: realizing one's LG identity, recognizing the social context one is coming out to, and considerations of future outcomes. This pilot study examined expectation of LG identity disclosure, expectations and judgements made by adolescents about inclusion and exclusion outcomes in two different peer contexts (i.e., coming out to a best friend and to a friend group). The sample included N = 26 ethnically and socioeconomically diverse 12- to 17-year-olds (MAge = 12.68 years, SD = 1.18). Expectation of identity disclosure was predicted by intergroup contact, some types of stereotype endorsement in best friend scenarios, and by expectations of increased quality of friendship in lesbian character scenarios. Adolescents had higher expectations for lesbian character to come out to her best friend than to a friend group, or for gay character to come out to a friend group. Expectation and judgement in disclosure outcomes were consistent in different identity and peer contexts, while judgement showed significant difference across inclusive and exclusive outcomes. These results highlight the complexity of adolescents' expectation and judgment of peers' action in different contexts: not only does the peer's own LG identity, but also the peer group they interact with, play a role in adolescents' decision of disclosure, expectation and judgement of disclosure outcomes.

P2-15 WHITE MATTER MICROSTRUCTURE IN CHILDREN WITH MILD TRAUMATIC BRAIN OR ORTHOPEDIC INJURY COMPARED TO TYPICAL DEVELOPMENT, **Ashley Ware,** *University of Calgary, Calgary, Canada* E-mail: ashley.ware@ucalgary.ca

Ashley Ware, University of Calgary; Bryce Geeraert, University of Calgary; Ayushi Shukla, University of Calgary; Bradley Goodyear, University of Calgary; Catherine Lebel, University of Calgary; Keith Yeates, University of Calgary

Background: No biomarker is available for diagnosing mild traumatic brain injury (mTBI), which affects millions of children annually. Diffusion tensor imaging (DTI) has shown promise for diagnosis of mTBI. However, comparison groups vary across studies. White matter (WM) diffusivity was examined in children with mTBI, mild orthopedic injury (OI), and typically developing (TD) controls to determine appropriateness of each comparison group.

Method: Children aged 8-16 years with mTBI (n=91) or OI (n=44) were recruited from the emergency department at Alberta Children's Hospital, where injury characteristics were assessed; participants also completed a post-acute visit (<2 weeks post-injury) that included DTI. TD children (n=40) were recruited from the community. Fractional anisotropy (FA) and mean diffusivity (MD) were derived for 20 WM tracts using Automated Fiber Quantification. Multivariable linear regression was used to examine group differences in DTI metrics for 20 tracts covarying for age and sex, controlling for multiple comparisons using false discovery rate.

Results: FA (increased) and MD (reduced) were significantly altered (corrected $p<.05$) in the injury groups relative to the TD group in several WM tracts, but did not differ between the mTBI and OI groups. Age was significantly associated with DTI metrics (FA: positively; MD: negatively) in multiple tracts. Sex was not significantly associated with DTI metrics.

Discussion: Children with mTBI and OI did not differ from each other and demonstrated similar differences in DTI metrics as compared to TD children. Findings support the inclusion of children with OI as a comparison group in neuroimaging studies of mTBI.

P1-23 ANTIPYRETIC EXPOSURE DURING EARLY DEVELOPMENT AND THE EMERGENCE OF SOCIAL BEHAVIOR IN C57BL/6J MICE, **Anna Warner,** *University of New Orleans, New Orleans, United States* E-mail: agwarner@uno.edu

Anna Warner, University of New Orleans ; Christopher Harshaw, University of New Orleans

Previous studies suggest that perinatal exposure to antipyretics can produce lasting effects, including long-term changes in brain and behavior relevant to neurodevelopmental disorders such as Autism Spectrum Disorders (ASDs). Relatively few studies have attempted to model such exposure in non-human animals. Here, we examined the long-term consequences of early-life acetaminophen (APAP) exposure, administered with or without the presence of fever/inflammation. Litters of C57BL/6J mouse pups were selected for the study if they had at least 3 male and 3 females. On P5, P8, and P11 pups were provided s.c. injection of either phosphate buffered saline (PBS; vehicle) or IL1β (.2 µg/kg). After a 45 minute delay, pups received a second injection of PBS or APAP (103.9 mg/kg). Mice were subsequently given a battery of tests across development, including a sociability and social memory (SSM) test on ~P50. We analyzed data using linear mixed effects models, with litter and cage controlled as random effects. During the social memory portion of the SSM, we found significant sex x APAP x IL1β interaction (ps < .05) for (1) duration of time spent on the side of the familiar stimulus mouse and (2) proportion of entries for the familiar versus novel stimulus mice. We also found significant APAP x IL1β interaction (p< .01) for duration for the familiar side relative to behavior during the sociability phase. These results suggest that early exposure to APAP may interact with early immune challenges to produce lasting differences in behavior relevant to ASDs.

P2-80 EEG FRONTAL ASYMMETRY CHANGES DURING EMOTION-ELICITING TASKS AFFECT PARENT-CHILD INTERACTION DYNAMICS, **Haven Warwick,** *Washington State University, Pullman, United States* E-mail: haven.warwick@wsu.edu

Haven Warwick, Washington State University ; Allegra Campagna, Washington State University; Maria Gartstein, Washington State University; Eric Desmarais, Washington State University ; Alyssa Neumann, Washington State University; Joshua Underwood, Washington State University

Mother-infant interactions are significant contributors to child social-emotional development and their links to brain activity are starting to be explored (Bernier, Calkins & Bell, 2016). Relative left frontal electroencephalogram (EEG) activation is associated with surgency/attentional preference for novel stimuli, whereas greater relative right activation is linked with avoidance and negative affect (Coan and Allen, 2004; Fox, 1991). Frontal EEG asymmetry during emotion-eliciting tasks have been underexplored, and the current study examines parent-child interaction factors and the change in infant frontal asymmetry during positive and negative emotion-eliciting tasks relative to baseline.

Healthy infants (n = 33) were administered components of the Laboratory Temperament Assessment Battery (Lab-TAB) and the Repeated Still Face, with EEG data collected simultaneously. Asymmetry during Lab-TAB Peekaboo and the second Still Face administration were compared in their ability to predict parent-child interaction dynamics, coded utilizing an established scheme. ANCOVAs were conducted, with parent-child interaction factors as the dependent and Peekaboo/Still Face asymmetry change from baseline as the independent variables, dichotomized as either positive or negative in direction (i.e., associated with either a shift toward relative left or right frontal activation).

Results indicated changes in frontal EEG asymmetry during both Peekaboo [$F(1, 23)=4.230$, $p = 0.015$] and Still Face tasks [$F(1, 23)=6.954$, $p = 0.05$] predicted reciprocity/synchrony among mother-infant dyads. Frontal EEG asymmetry during Still Face also predicted intensity [$F(1, 23)=8.085$, $p = 0.009$] and directedness [$F(1, 23)=5.897$, $p = 0.023$] of play exchanges. Results highlight the importance of understanding patterns of EEG activity during positive and negative tasks, and their unique effects on parent-child interactions.

S5-02 GOTTA GOTTA GET UP, TO GET DOWN: PARENTS DYNAMICALLY CHANGE THEIR OWN AROUSAL TO HELP CO-REGULATE THEIR CHILD'S AROUSAL, **Sam Wass,** *University of East London, London, United Kingdom* E-mail: s.v.wass@uel.ac.uk

Sam Wass, University of East London; Kaili Clackson, University of Cambridge; Caitlin Gibb, University of East London; Joan Eitzenberger, University of East London; Farhan Mirza, University of Plymouth; Celia Smith, King's College London

When we see someone experiencing an emotion, and when we experience it ourselves, common neurophysiological activity occurs. But although inter-dyadic synchrony, concurrent and sequential, has been identified, its functional significance remains inadequately understood. Specifically, how do influences of partner A on partner B reciprocally influence partner A? For example, if I am experiencing an affective state and someone matches their physiological state to mine, what influence does this have on me – the person experiencing the emotion? Here, we investigated this using infant-parent dyads. We developed miniaturised microphones to record spontaneous vocalisations and wireless autonomic monitors to record heart rate, heart rate variability and movement in infants and parents concurrently in naturalistic settings. Overall, we found that infant-parent autonomic activity did not covary across the day – but that ‘high points’ of infant arousal led to autonomic changes in the parent, and that instances where the adult showed greater autonomic responsivity were associated with faster infant quieting. Parental responsivity was higher following peaks in infant negative affect than in positive affect. Overall, parents responded to increases in their child’s arousal by increasing their own. However, when the overall arousal level of the dyad was high, parents responded to elevated child arousal by decreasing their own arousal. Our findings suggest that autonomic state matching has a direct effect on the person experiencing the affective state, and that parental co-regulation may involve both connecting, and disconnecting, their own arousal state from that of the child contingent on context.

O3-01 PRAIRIE VOLE OFFSPRING RAISED BY CHRONICALLY STRESSED PARENTS EXHIBIT BEHAVIORAL DYSFUNCTION AS JUVENILES AND ADULTS: POTENTIAL MEDIATION BY OXYTOCIN,
W. Tang Watanasriyakul, *Northern Illinois University, DeKalb, United States* E-mail: tang.watanasriyakul@gmail.com

W. Tang Watanasriyakul, Northern Illinois University; Marigny Normann, Northern Illinois University; Reilly Mitchell, Northern Illinois University; Kal Nastek, Northern Illinois University; Angela Grippo, Northern Illinois University

Overwhelming evidence indicates that parental stress can have long-term consequences on children. Being raised by chronically stressed parents is associated with delayed physical development, behavioral issues at school, and development of mental illnesses in adulthood; these dysfunctions may be mediated by oxytocin. Translational models in rodents have often focused on the mother, even though humans exhibit biparental care. Using socially monogamous and biparental prairie voles, the current study examined behavioral and neural function of offspring reared by chronically stressed parents. Prairie vole parents were exposed to prolonged social isolation plus a series of mild environmental stressors prior to mating. Offspring were reared by the parents until weaning, then housed with a same-sex sibling. Social behaviors were examined at four developmental stages: juvenile, periadolescence, adolescence, and adulthood. In adulthood, all offspring underwent a forced swim test (FST) and an elevated plus maze (EPM), and brains were collected for immunohistochemical analyses. As juveniles, offspring from stressed parents displayed significantly fewer play and huddling behaviors versus offspring from unstressed parents. In adulthood, offspring from stressed parents spent marginally more time in the closed arms of the EPM (increased anxiety-like behavior) and exhibited significantly more immobility during the FST (increased depression-like behavior). Oxytocin activation in the hypothalamus was significantly attenuated in the offspring from stressed parents versus offspring from unstressed parents after a social interaction test in adulthood. These preliminary findings indicate that rearing by chronically stressed parents impairs social behaviors and increases depressive- and anxiety-like behaviors; oxytocin may mediate these dysfunctions.

P1-27 LIMITED BEDDING AFFECTS COGNITION AND BDNF EXON IV MRNA EXPRESSION IN THE MPFC AND HIPPOCAMPUS DURING ADOLESCENCE WITH NO DIFFERENCES IN TOTAL BDNF PROTEIN LEVELS, **Luis Eduardo Wearick-Silva,** *Pontifical Catholic University of Rio Grande do Sul, Porto Alegre, Brazil* E-mail: lewearick@gmail.com

Luis Eduardo Wearick-Silva, Pontifical Catholic University of Rio Grande do Sul; Thiago Viola, Pontifical Catholic University of Rio Grande do Sul; Anderson Centeno-Silva, Pontifical Catholic University of Rio Grande do Sul; Rodrigo Orso, Pontifical Catholic University of Rio Grande do Sul; Kerstin Creutzberg, Pontifical Catholic University of Rio Grande do Sul; Géssica Antunes, Pontifical Catholic University of Rio Grande do Sul; Márcio Donadio, Pontifical Catholic University of Rio Grande do Sul; Rodrigo Grassi-Oliveira, Pontifical Catholic University of Rio Grande do Sul

The BDNF is the most abundant neurotrophin in the brain and very sensitive to the effects of early-life stress. Long-term changes in BDNF pathway are linked to memory impairments. The interplay between stress and BDNF expression are complex and the molecular underpinnings are not fully understood. Female C57BL/6 mice were exposed to limited bedding protocol from P2 to P9 and tested in the radial 8-arm maze, Y-Maze and Step-Down avoidance task at the end of adolescence (P60). RT-qPCR was used to investigate BDNF exon IV and TrkB expression as well as Western Blot to quantify total BDNF protein levels in the mPFC and Hippocampus. In the radial 8-arm maze, female mice raised in LB conditions showed more perseverative errors in the retention trial when compared to controls. Additionally, mice from LB group have a significantly higher latency to step down from the platform in the step-down avoidance task. This effect was followed by increased BDNF exon IV expression in the mPFC and hippocampus. No differences were observed in total protein levels in both regions. Our study provide new evidences on the impact that limited bedding has on cognition during adolescence.

S4-04 MODIFYING PRETERM INFANT RISK AND RESILIENCE: APPLICATION OF DEVELOPMENTAL PSYCHOBIOLOGICAL PRINCIPLES, **Martha Welch,** *Columbia University Medical Center, New York, United States* E-mail: mgw13@columbia.edu

Martha Welch, Columbia University Medical Center; Amie Hane, Williams College; michael Myers, New York State Psychiatric Institute; Robert Ludwig, Columbia University Medical Center; Jacek Kolacz, Indiana University; Katie Kwon, Columbia University Medical Center; Stephen Porges, Indiana University; Joseph Barone, Columbia University Medical Center; Amanda Surman, Columbia University; Raymond Stark, Columbia University Medical Center

About 12% of infants worldwide are born too early and are at risk for developing multiple adverse emotional, cognitive and health outcomes. Medical approaches for significantly reducing morbidity associated with preterm birth are asymptotic. Developmental psychobiology has led the way in demonstrating the power of early nurture and mother/infant interactions in shaping subsequent risk and resilience. The Family Nurture Intervention (FNI) for preterm infants in the NICU arose from an integration of knowledge from clinical practice and experimental investigation. A theory of change and mechanisms for reducing risk and increasing resilience have emerged. This theory is based on the hypothesis that facilitating mother and infant physiological co-regulation, principally autonomic activity, leads to reinstatement of the emotional connection between mother and infant which, in turn, promotes reduction in morbidity in this infants. To test this theory, Welch and colleagues conducted a randomized controlled trial of FNI given to preterm infants in the NICU. At term age, FNI infants demonstrated improved physiological regulation as measured by vagal tone and vagal efficiency. At age 4-5 years both children and mothers in the FNI group had significantly greater levels of RSA, an index of parasympathetic regulation. Results suggest that FNI-NICU leads to healthier autonomic function of both mother and child during close physical and behavioral interaction. Calming Cycle theory provides the mechanism by which socio-emotional autonomic regulation can be changed from maladaptive to adaptive. Polyvagal theory supports Calming Cycle theory by providing the evolutionary and ontogenetic underpinnings of pro-social behavior.

P2-55 Family Nurture Intervention in the NICU Increases Autonomic Regulation in Mothers and Children at 4-5 Years of Age, Martha Welch, *Columbia University Medical Center, New York, United States*
E-mail: mgw13@columbia.edu

Martha Welch, Columbia University Medical Center; Joseph Barone, Columbia University Medical Center; michael Myers, New York State Psychiatric Institute; Amie Hane, Williams College; Stephen Porges, Indiana University; Jacek Kolacz, Indiana University; Robert Ludwig, Columbia University Medical Center

Maturation of multiple neurobehavioral and physiological systems is delayed by preterm birth. The purpose of this study was to assess the effects of Family Nurture Intervention (FNI) in the NICU on autonomic regulation of preterm infants and their mothers when the infants were 4 to 5 years of age. Infants born 26-34 weeks gestational age were randomly assigned to groups receiving either standard care (SC) or SC plus the FNI in the NICU. At 4 to 5 years corrected age infants and mothers returned for follow-up assessments. ECGs of mothers and children were collected for 10 minutes while children were on their mothers' laps. Heart rate, standard deviation of heart rate, respiratory sinus arrhythmia (RSA), and a measure of vagal efficiency were quantified. Analyses show that both children and mothers in the FNI group had significantly greater levels of RSA, an index of parasympathetic regulation, compared to those in the SC group. In addition, RSA increased more rapidly in FNI children between infancy and the 4 to 5 year follow-up time point. Results suggest that FNI-NICU led to healthier autonomic regulation in both mother and child, when measured during a brief face to face socioemotional interaction. These results are consistent with calming cycle theory, which proposes a Pavlovian autonomic co-conditioning mechanism to change a maladaptive socioemotional relationship between mother and infant to one that is adaptive, and polyvagal theory, which provides the evolutionary and ontogenetic underpinnings of mammalian vagal physiology in prosocial behavior.

P2-10 ROLE OF NR2B FUNCTION IN EXTINCTION CONSOLIDATION FOLLOWING ADOLESCENT- OR ADULT-ONSET METHAMPHETAMINE SELF-ADMINISTRATION IN RATS OF BOTH SEXES, **Sara Westbrook,** *University of Illinois Urbana-Champaign, Champaign, United States* E-mail: srwestb2@illinois.edu

Sara Westbrook, University of Illinois Urbana-Champaign; Jacob O'Russa, University of Illinois at Urbana-Champaign; Kathryn Hamblen, University of Illinois at Urbana-Champaign; Erika Carlson, University of Illinois at Urbana-Champaign; Joshua Gulley, University of Illinois Urbana-Champaign

Previous work suggests adolescent rats have deficient extinction consolidation relative to adults. Although the mechanisms underlying this age difference are currently unknown, studies in adult rats have implicated NR2B-containing NMDA receptor function in extinction consolidation of drug-associated memory. Importantly, NR2B neurotransmission emerges during adolescent development, and drugs of abuse during adolescence may delay the development of extinction consolidation by disrupting the ontogeny of NR2B function. This may in turn contribute to age-of-onset differences in extinction and subsequent reinstatement of drug-seeking. Here, we trained Sprague-Dawley rats of both sexes to self-administer methamphetamine (METH, 0.1 mg/kg/infusion i.v.) beginning during adolescence [postnatal (P) day 41] or adulthood (P91). Rats were given short access (2 h) to self-administer METH in seven daily sessions followed by fourteen sessions with long access (6 h). Subsequently, rats underwent four daily 30-min extinction sessions with immediate post-session injections of either an NR2B antagonist (Ro25-6981; 6 mg/kg, i.p.) or a vehicle solution. After four daily 2-h extinction sessions, a priming injection (1 mg/kg METH, i.p.) was given prior to a final 2-h reinstatement session. All groups reduced their drug-seeking behavior across extinction sessions, with no significant group differences. All groups reinstated drug-seeking following the METH priming injection, with adult-onset males reinstating the least. These results do not support our hypothesis that adolescent-onset METH use would disrupt the ontogeny of NR2B transmission and contribute to age-of-onset differences in extinction of METH-seeking. However, our findings support the view that age-of-onset and sex are factors that contribute vulnerability to relapse to METH-seeking.

P1-22 SEX DIFFERENCES IN INFANT PROCESSING OF SOCIAL CUES IN THE VALPROIC ACID-INDUCED AUTISM-LIKE RAT PHENOTYPE, **Amanda White,** *University of Michigan, Ann Arbor, United States* E-mail: whiteama@umich.edu

Amanda White, University of Michigan; Jacek Debiec, University of Michigan; Xianli An, Yangzhou University

Disrupted processing of social cues and altered social behaviors are among the core symptoms of autism spectrum disorders (ASDs). Rats exposed to valproic acid (VPA) at embryonic day (E) 12.5 show autism-like behaviors as juveniles and adults. However, less is known about how VPA-treated rats respond to social cues in infancy. At postnatal day (P) 6-7, VPA and saline-treated pups underwent an odor preference test (OPT) in an arena that contained clean bedding (CB) at one end and contained soiled bedding (SB) laden with social olfactory cues from the homecage at the other end. VPA-treated pups spent significantly less time and made fewer entries into the SB zone than saline-treated pups. When examining these results by sex, we observed that female VPA-treated pups, but not male VPA-treated pups, spent significantly less time in the SB zone than saline-treated pups. Regardless of sex, VPA and saline-treated pups did not differ in their total distance traveled during the test. We did not observe any significant differences between VPA and saline-treated pups or effects of sex in P13 pups. In early infancy, VPA-treated pups may have impaired social recognition and/or may be less motivated to approach social odors. This is especially important because early infancy is a period of intense attachment learning, which relies on social cues. Our results may inform about the underlying behavioral characteristics of ASDs, including sex differences reported by clinical studies, and could shed light on potential opportunities for intervention.

P1-25 ORAL OXYCODONE SELF-ADMINISTRATION IN THE PREGNANT RAT AFFECTS MATERNAL BEHAVIOR AND RESULTS IN MILD BEHAVIORAL CHANGES IN THE OFFSPRING, Giulia Zanni,
Children's Hospital of Philadelphia, Philadelphia, United States E-mail: giulia.zanni85@gmail.com

Giulia Zanni, Children's Hospital of Philadelphia ; Gordon A. Barr, Children's Hospital of Philadelphia; Patrese Robinson-Drummer, New York University Medical Center; Regina Sullivan, Nathan Kline Institute & NYU School Medicine; Amelia Eisch, Children's Hospital of Philadelphia; Matthew DeSalle, Children's Hospital of Philadelphia; Jahnvi Chandar, Children's Hospital of Philadelphia; Ashlee Dougher, Children's Hospital of Philadelphia; Hannah Deutsch , Children's Hospital of Philadelphia; Aishwarya Vemulapalli, Children's Hospital of Philadelphia ; David Teplitsky, Children's Hospital of Philadelphia

The use and misuse of prescription opiates during pregnancy has resulted in a surge of infants diagnosed with Neonatal Opiate Withdrawal Syndrome (NOWS). The long-term consequences of gestational and early postnatal oxycodone exposure is incompletely understood. Applying our newly-developed preclinical model of oxycodone self-administration, adult female Long Evans rats drank oxycodone (0.06-0.12 mg/ml, ~10/mg/kg/day) before and during pregnancy, and after delivery, and had similar liquid intake relative to water only controls. Although oxycodone was detected in the serum of mothers and pups, growth parameters in moms and pups, litter mass and pups/litter were similar to controls. Oxycodone moms were more sedated, with disrupted pup retrieval behavior vs. control moms. In regard to plantar thermal response, oxycodone pups tended to have longer withdrawal latencies than control pups at P2 but not P14. Oxycodone and control pups had similar motor coordination, cliff avoidance, righting time, and olfactory spatial learning (P3-P13). However, P7 oxycodone pups performed fewer pivots vs. control pups. Also, separation-induced ultrasonic vocalizations at P8 revealed female - but not male - oxycodone pups vocalized more before and after maternal reunion. Finally, during precipitated withdrawal in P9 oxycodone pups vocalized more than control pups, consistent with a previously-published withdrawal phenotype. Thus, prenatal exposure to opioids is transiently analgesic and mildly detrimental to activity, and exacerbates affect/social communication in a sex-dependent manner. This novel preclinical NOWS model enables longitudinal analysis of how oxycodone changes brain and behavior in both mothers and offspring.

P1-62 GENERAL PSYCHOPATHOLOGY (P FACTOR) IN EARLY CHILDHOOD PREDICTS SHORTER TELOMERE LENGTH IN ADOLESCENCE, **Selin Zeytinoglu,** *University of Maryland, Baltimore, United States* E-mail: selinzeytinoglu@gmail.com

Selin Zeytinoglu, University of Maryland; Santiago Morales Pamplona, University of Maryland; Kyle Esteves, Tulane University; Stacy Drury, Tulane University; Nathan Fox, University of Maryland

Telomere length, the length of the protective caps on chromosomes, has been shown to be related to health outcomes and mortality, with shorter length being associated with worse health outcomes (e.g., higher BMI, smoking) and higher mortality rates (Bateson & Nettle, 2018). Although telomeres gradually erode as individuals age, a process thought to reflect biological aging, this erosion may occur more rapidly in individuals experiencing high levels of stress. One factor that may also accelerate telomere erosion is generalized psychopathology ("p factor") as it may reflect children's experience of stress and emotion dysregulation. We examined whether p factor in early childhood predicts telomere shortening in adolescence.

Participants (N=515) were recruited as part of a larger longitudinal study on the role of temperament for social outcomes. Mental health problems were assessed via the Child Behavior Checklist age 5. Telomere length was assessed at ages 7 and 12.

Latent bifactor analyses were conducted to construct a p factor reflecting general psychopathology. Results from path analyses indicated that p factor at age 5 was associated negatively with telomere length at age 12 ($B = -.05$, $p=.015$), after controlling for the stability in telomere length from 7 to 12 years ($B = .46$, $p<.001$).

The finding that the p factor in early childhood predicts shorter telomeres in adolescence suggests that the early experiences of stress and emotion dysregulation, reflected in the p factor, contribute to telomere loss across childhood and into adolescence. The role of general psychopathology for health-related outcomes will be discussed.

P1-70 CURRENT PSYCHOSOCIAL STRESS AFFECTS WEIGHT DISTRIBUTION IN YOUTH EXPOSED TO DEPRIVATION EARLY IN LIFE, **Danruo Zhong,** *Institute of Child Development, University of Minnesota, Minneapolis, United States* E-mail: zhong350@umn.edu

Danruo Zhong, Institute of Child Development, University of Minnesota; Megan Gunnar, University of Minnesota; Bonny Donzella, University of Minnesota Twin Cities

Children adopted from orphanages (post-institutionalized, PI) do not reach puberty earlier nor do they have higher BMIs than non-adopted (NA) comparison children (Reid et al., 2017). We wondered whether these findings were due to PI children experiencing greater psychosocial stress during the peripubertal period which might reduce weight gain. In an accelerated longitudinal design, with children 7- to 15-years at time 1, we collected anthropometrics and the Rudolph stress interview 3 times over a two-year period for 132 PI and 176 NA youth. Current stress was higher for PI's than NA's. At time 1, PI youth were shorter and thinner than NA youth. Controlling for age, child sex and medications, we found no influence of current stress on BMI or height-for-age. However, for the PI youth, higher current stress was associated with having a smaller waist ($F(16, 28) = 3.03$, $p = 0.05$) and waist-for-height ratio ($F(16, 28) = 2.69$, $p < 0.05$). Youth in both groups were slender on average, but this was especially true for PI youth experiencing higher levels of current life stress. Additionally, current stress does not seem to affect change over time, as for both PI and NA youth the ratio of waist-to-height was fairly stable. Thus, a history of early deprivation is associated with being slimmer and when early deprivation is followed by higher current life stress, youth are even slimmer. This is the opposite of what is seen for youth experiencing childhood trauma and maltreatment, as they often present with problems of obesity.

P2-50 ASSOCIATIONS BETWEEN TODDLERS' EXTERNALIZING BEHAVIORS AND TRAJECTORIES OF BASELINE RSA DURING EARLY CHILDHOOD, **Anna Zhou,** *Penn State University, University Park, United States* E-mail: amzhou@psu.edu

Anna Zhou, Penn State University; Kristin Buss, Penn State; Santiago Morales Pamplona, University of Maryland

Baseline Respiratory Sinus Arrhythmia (RSA) measures parasympathetic activity, with higher baseline or resting levels of RSA reflecting greater flexibility to respond to challenges (Beauchaine, 2001). Baseline RSA during early development typically increases from 9 to 36 months (Porges et al., 1994). Lower baseline RSA is often associated with more externalizing symptoms (e.g., Beauchaine et al., 2007). However, less is known about how externalizing behaviors may be associated with trajectories of baseline RSA across early childhood.

The present study is part of a larger longitudinal study examining temperament and socioemotional development from toddlerhood to school entry. Baseline ECG was collected from 96 children during laboratory visits at 24, 42 and 60 months while children were sitting quietly coloring or reading. Mothers reported on children's externalizing behaviors using the Infant Socioemotional Assessment (Carter et al., 2003) when children were 18-months.

A linear latent growth curve model fit the data well, $c2 = 0.60$, CFI=1.00, RMSEA<.001, $p = .74$. Children's externalizing behaviors at 18 months did not significantly predict the intercept at 24 months, but significantly predicted the rate of change in baseline RSA. Children with more externalizing symptoms showed less increase in baseline RSA over time, $b = -0.54$, $p = .05$. More externalizing behaviors were also significantly associated with lower baseline RSA at 60-months, $b = -1.02$, $p = .03$.

This study demonstrates that early externalizing behaviors are associated with less adaptive trajectories of physiological development. Externalizing behaviors during toddlerhood could be an early behavioral marker for inhibited development of physiological flexibility to respond to challenges, and risk for later psychopathology.

P1-17 A LAMINAR DISSECTION OF PREFRONTAL FEAR EXTINCTION CIRCUITS ACROSS DEVELOPMENT, Kelsey Zimmermann, *University of New South Wales, Coogee, Australia* E-mail: k.zimmermann@unsw.edu.au

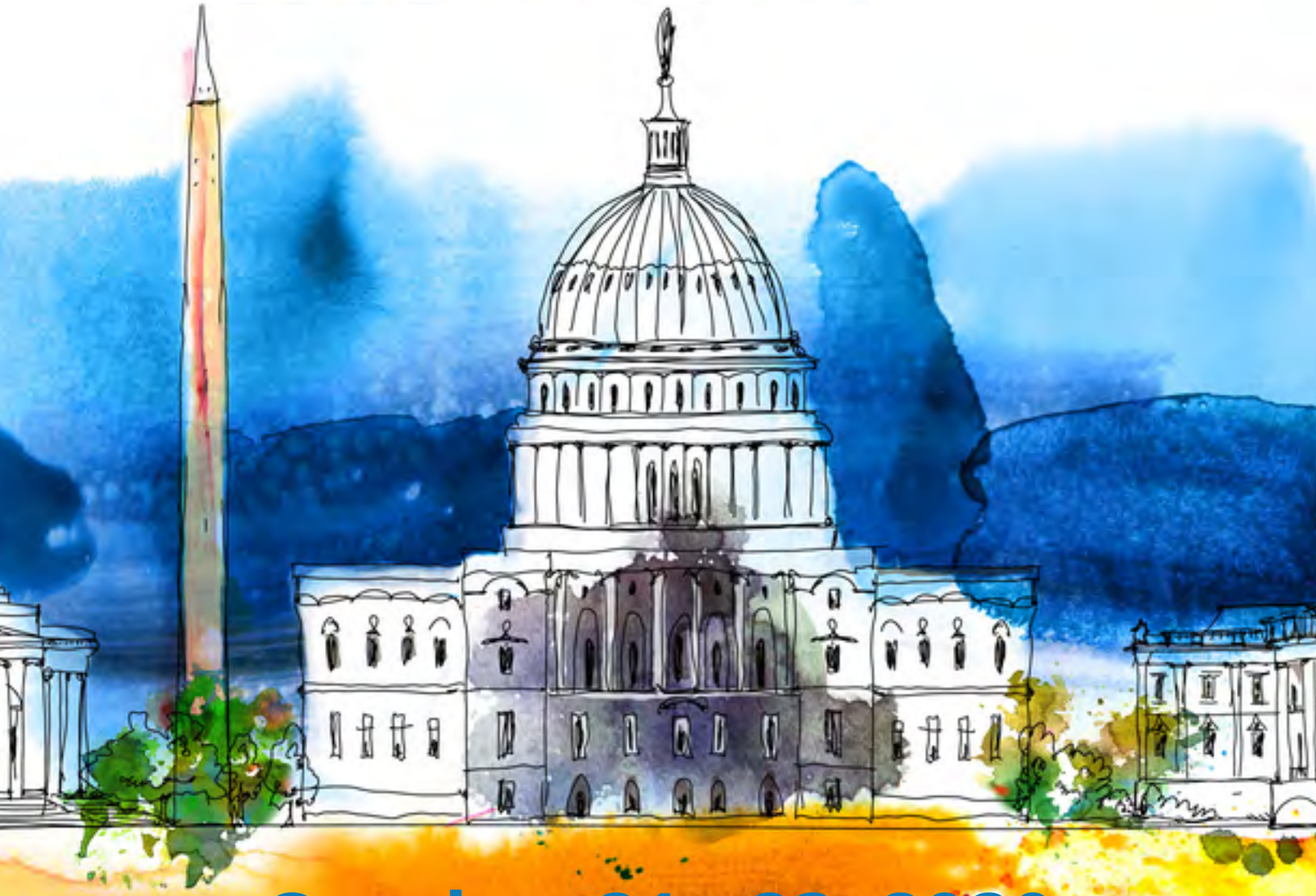
Kelsey Zimmermann, University of New South Wales; Rick Richardson, University of New South Wales; Kathryn Baker, UNSW Sydney

Anxiety disorders that develop in adolescence are particularly challenging to treat, due in no small part to the high occurrence of relapse in this age group following exposure therapy. This persistent maintenance of fear is preserved across species; relative to younger and older ages, adolescents consistently show poorer retention of extinction, a key process underpinning exposure therapy. This suggests that the neural processes underlying fear extinction are temporarily but profoundly compromised during adolescence. The formation, retrieval, and modification of fear- and extinction-associated memories are regulated by connectivity between the prefrontal cortex (PFC), and the amygdala. These regions undergo robust maturational changes in early life, with unique alterations in structure and function occurring throughout adolescence.Our data suggest a novel model of connectivity between the medial (m)PFC and amygdala in rats. We find that superficial Layers II/III of the mPFC send projections to the ipsilateral basolateral amygdala, whereas deep Layer V (particularly within the pro-extinction infralimbic – IL – region) sends projections to the ipsilateral andcontralateral central amygdala. In addition, preliminary data suggest that extinction-related activity – measured by expression of the plasticity marker pMAPK – within these pathways changes across development. While juveniles show enhanced pMAPK expression specifically in IL to amygdala Layer V neurons following extinction, no such changes are observed in adolescence. In addition, extinction-related plasticity decreased in deep and superficial IL layers across development, but was not altered in the prelimbic cortex. We observe that this suppression of plasticity coincides with regional maturation of inhibitory interneurons in the mPFC.

SEE YOU NEXT YEAR!
53RD ANNUAL MEETING
OF THE ISDP

International Society for
Developmental Psychobiology

www.isdp.org



October 21 - 23, 2020

Bethesda North Marriott Hotel & Conference Center

Rockville, Maryland, USA

Steps from the White Flint Metro Station
in the Washington DC Area

Official Satellite Meeting of the SfN