

Single talk session 5

Talk 1

Neurophysiological Markers of Cardiac Interoceptive Processing in First-Time Expectant Mothers[☆]

Patrícia Vilela Braga^a, Amanda Marshall^b, Diogo Lamela^a, Inês Jongenelen^a, Nuno Barbosa Rocha^c, Raquel Costa^d, Rita Pasion^a, Simone Schütz-Bosbach^b, Tiago Miguel Pinto^a, Ruth Feldman^e, Carlos Campos^f
^aHEI-Lab: Digital Human-Environment Interaction Labs, Lusófona University, Portugal

^bDepartment of Psychology, General and Experimental Psychology Unit, Ludwig-Maximilians-Universität München, Germany

^cTBIO/E2S, Polytechnic of Porto, Portugal

^dHEI-Lab: Digital Human-Environment Interaction Labs, Lusófona University; EPIUnit - Instituto de Saúde Pública, Universidade do Porto; Laboratório para a Investigação Integrativa e Translacional em Saúde Populacional (ITR), Universidade do Porto, Portugal

^eCenter for Developmental Social Neuroscience, Baruch Ivcher School of Psychology, Reichman University, Israel

^fLusófona University, HEI-Lab: Digital Human-Environment Interaction Labs; LabRP/CIR, E2S, Polytechnic of Porto, Portugal

Pregnancy is a complex biological phenomenon where two distinct pathways may produce changes in interoception (ability to perceive and subjectively experience inner bodily states). First, pregnancy modifies the parental caregiving brain network, which includes key regions for interoceptive processing, particularly the insula. Second, pregnancy also changes the strength, frequency, and/or nature of interoceptive signals across different modalities (e.g., cardiac, respiratory, gastric). This study investigates pregnancy-related changes in neural markers of cortical interoceptive processing, specifically heartbeat-evoked potentials (HEP), by comparing first-time expectant mothers with non-pregnant, age-matched females. Data were collected from first-time expectant mothers ($n = 13$; Mage = 32.15 years) and matched controls ($n = 8$; mean age = 30.88 years) at 28–32 weeks of gestation. EEG recordings, time-locked to R-peaks (ECG), were obtained while participants completed the Infant Face Repetition Suppression Task. This paradigm was designed to induce an emotion (sad vs. neutral) and age-specific (infant vs. adult) modulation of HEP amplitude. A cluster mass permutation test was employed to identify the electrodes and time-windows where HEP amplitude was effectively modulated (right frontal-central; 308 - 600 ms). Repetition-suppression effects on HEP amplitude were observed for adult stimuli ($p = .049$, $d = 0.499$), while no modulation was observed in the infant condition ($p = .471$, $d = 0.174$). Pregnant participants displayed significantly lower HEP amplitude in adult trials in comparison to non-pregnant controls ($p = .046$, $g = 0.997$). Despite significant differences only emerging in the adult trials, pregnant women displayed lower HEP amplitude across all conditions. These findings suggest that pregnancy modifies cardiac interoceptive processing, leading to an overall decrease in HEP amplitude. Contrary to our hypothesis, expectant mothers did not exhibit infant- or emotion-specific changes in neural markers of cardiac interoception.

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Talk 2

Exploring the role of hormonal contraception in emotion and cognition[☆]

Ramune Griksiene^a, Rimante Gaizauskaite^a, Ingrida Zelionkaite^a

^aNeurobiology and Biophysics, Vilnius University, Lithuania

The introduction of “the pill” in the 1960s paved the way for female sexual self-determination. Today, hormonal contraception is one of the most reliable birth control methods used by millions of adolescents and adults worldwide. However, both animal and human studies have elucidated that synthetic hormones from hormonal contraceptives can influence brain function, cognition, and behavior. In our psychophysiological study, we evaluated the impact of hormonal contraceptives on females, comparing those who use them with those who do not. We recorded electrical brain activity (EEG) and eye movements during resting states and tasks involving emotion perception, emotion regulation, working memory, and visuospatial performance. Our findings revealed: i) no significant relationship between hormonal contraceptive use and resting-state EEG parameters or working memory performance; ii) decreased attention to faces in oral contraceptive users compared to naturally cycling women; iii) enhanced attention-related ERP components in emotional tasks and greater accuracy in visuospatial tasks among intrauterine device users than oral contraceptive users and naturally cycling females. These results suggest that hormonal contraception type might differentially influence cognitive and emotional processing, underscoring the need for further research to explore these effects and inform choices regarding contraceptive use.

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Talk 3

Resting EEG at 7 month of age – differences related to familial socioeconomic background[☆]

Birgit Mathes^a, Ulrike Frischen^a, Ömer Koc^b, Robin Kemmerich^a, Annika Susann Wienke^a

^aFaculty for Human and Health Sciences, Universität Bremen, Germany

^bDepartment of Psychology, Izmir University of Economics, Turkey

Most developmental studies do not adequately represent children with socioeconomic challenges, even though early social inequalities can affect neural and cognitive development. Infant alpha power and individual alpha frequency (IAF, i.e. frequency of maximum alpha power) may relate to cognitive ability and serve as an early risk marker. Data was derived from the Bremen Initiative to Foster Early Childhood Development (BRIFE); an interventional and longitudinal study accompanying $N = 550$ children and their families from pregnancy to the first year of primary school. Familial socioeconomic status (SES) was assessed with questionnaires, including measures on parental level of education, income and infant's migration background. Migration from countries of low socioeconomic power in concert with language and cultural barriers often leads to multiple challenges of families. These include low financial resources, high stress levels and low access to public child support services. Infants (7 months, $N = 138$) watched a silent and child-friendly video during EEG measurement. IAF and occipital alpha power around IAF were analyzed. Alpha power of children, whose parents migrated to Germany, was increased in comparison to children, whose parents were born in Germany. This indicates that early socioeconomic challenges relate to lower vigilance in infants. These results are in accordance with our recent work showing differences in the acoustic oddball response in relation to socioeconomic challenges. The impact of early exposure to media, such as background television, and longitudinal effects of the finding will be discussed in terms of state and trait marker of infant alpha activity. Taken together, understanding the impact of familial diversity on cognitive and brain development is feasible and critical both for scientific progress and for supporting children.