NÓRA BUNFORD

HUN-REN Research Centre for Natural Sciences
Institute of Cognitive Neuroscience and Psychology

Address: Magyar Tudósok körútja 2.,
H-1117 Budapest, Hungary

RESEARCH AREA

My program of research focuses on the intersection of clinical psychology, psychiatry, electrophysiology, and developmental neuroscience, with a particular emphasis on (neuro)developmental disorders, especially Attention-Deficit/Hyperactivity Disorder (ADHD) and its comorbidities.

We investigate affective, behavioral, and cognitive neurophysiological processes that underlie risk, maintenance, prognosis, and heterogeneity in ADHD and related conditions across development.

Using multilevel and translational approaches, our work integrates clinical, genetic, and electrophysiological (EEG/ERP) data to identify biomarkers of risk, prognosis, and response to treatment. We aim to delineate developmental trajectories and cross-diagnostic mechanisms that explain both distinct and shared features of disorders.

A core goal of this line of research is to move beyond clinical symptoms toward biologically and developmentally informed subtyping, improving the precision of early identification and intervention in child psychiatry.

TECHNIQUES AVAILABLE IN THE LAB

genetics, electrophysiology, clinical interview, cognitive/neuropsychological testing, rating scales, psychometrics

We combine behavioral, clinical, neurophysiological, and genetic methods within a multimodal and longitudinal framework. Key techniques include:

Electrophysiology (EEG/ERP): Recording and analysis of event-related potentials during affective, cognitive, and reward tasks (e.g., Doors, MID).

Genetics: Collection of buccal swab and saliva samples for genotyping; analysis of polygenic scores (PGS), dopaminergic polymorphisms, and gene–environment interactions relevant to child psychiatry.

Clinical Interview and Rating Scales: Administration of diagnostic interviews (e.g., K-SADS, SCID-5) and rating scales to assess broadband and narrowband psychopathology.

Cognitive and Neuropsychological Testing: Comprehensive evaluation of cognitive domains, including attention, executive functions, and learning, using standardized instruments such as the Wechsler Intelligence Scales (WAIS, WISC) and laboratory-based paradigms assessing executive functions and emotional processing.

Psychometrics and Statistical Modeling

Together, these approaches enable us to identify multimodal biomarkers that bridge biological and behavioral levels of analysis, contributing to mechanistic models of developmental psychopathology and precision psychiatry.

SELECTED PUBLICATIONS

Ágrez, K., Visky, Z., Hámori, G., Takács, M., Pulay, A. J., Réthelyi, J. M., & **Bunford, N.** (2025). Not just old wine in new bottles: Polygenic liability for ADHD is associated with electrophysiological affective-motivational processing beyond anxiety, depression, and ODD. **Transl Psychiatry 15**(1): 213.

Ágrez, K., Vakli, P., Weiss, B., Vidnyánszky, Z., & **Bunford, N**. (2025). Assessing the association between ADHD and brain maturation in late childhood and emotion regulation in early adolescence. **Transl Psychiatry 1**5(1): 185.

Bunford, N., Agrez, K., Hámori, G., Koller, J., Pulay, A., Nemoda, Z., & Rethelyi, J. M. (2025). Electrophysiological indices of reward anticipation as ADHD risk and prognostic biomarkers. **Eur Child Adolesc Psychiatry 34**(6): 1905-1916.

Bunford, N., Hamori, G., Nemoda, Z., Angyal, N., Fiáth, R., Sebők-Welker, T. É., ... & Réthelyi, J. M. (2023). The domain-variant indirect association between electrophysiological response to reward and ADHD presentations is moderated by dopaminergic polymorphisms. **Compr Psychiatry 124**: 152389.

Hámori, G., File, B., Fiáth, R., Pászthy, B., Réthelyi, J. M., Ulbert, I., & **Bunford, N.** (2023). Adolescent ADHD and electrophysiological reward responsiveness: A machine learning approach to evaluate classification accuracy and prognosis. **Psychiatry Res 323**: 115139.