Specialisations and Research Topics in Cognitive Sciences at **ELTE Budapest**

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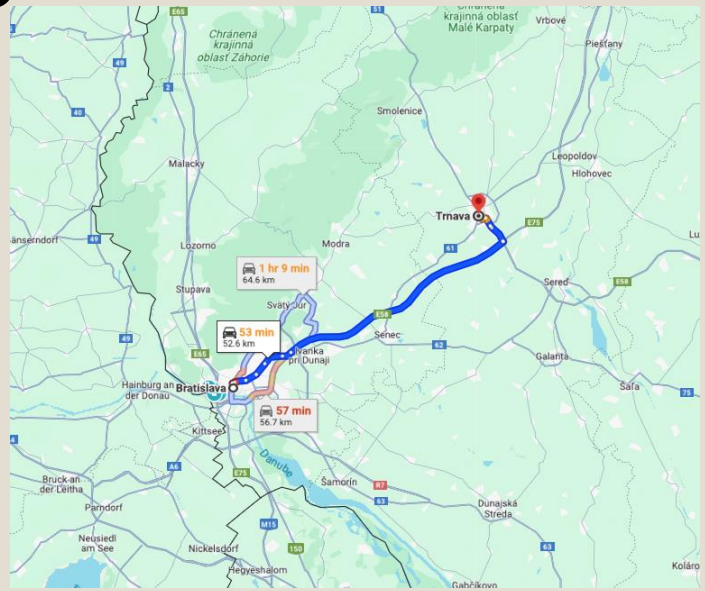
X-mas Meeting 2024

Eötvös Loránd Tudományegyetem - ELTE

Trnava
(Nagyszombat)
1635

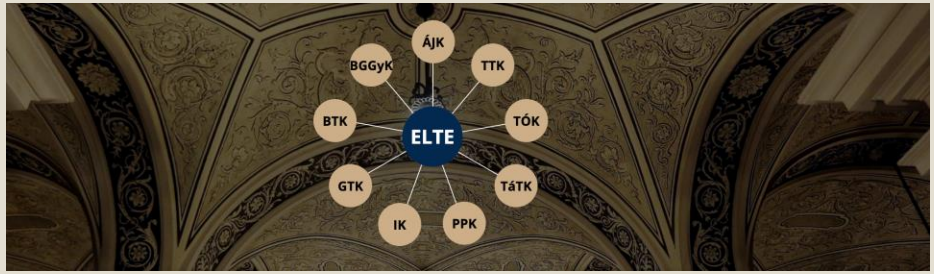


1777 - Maria Theresia
move Budapest

A NAGYSZOMBATI EGYETEM. Rajzolta Dörre Tivadar.

9 Faculties
33 000 students
1800 faculty
members

Mei:CogSci at ELTE



Our students can choose to join the MeiCogSci programme.

A collaborative Masters Program with the contribution of several Faculties and disciplines.

It offers research specialisations from diverse fields of scientific research:

Cognitive neuroscience – acustic processes: **Ferenc Honbolygó,** *Memory and Hippocampus:* **Attila Keresztes,** *Mentalization processes:* **Balint Forgacs,** *spatial cognition, time perception:* **Zoltán Nádasdy**

Comparative Ethology - lead by **Ádám Miklósi, József Topál, Attila Andics**

Experimental Psychology – *Numerical Cognition:* **Attila Krajcsi;** *and Social Minds Research groups:* **Ildikó Király, and many more**

Human Electrophysiology Group

Zoltán Nádasdy –
nadasdy.zoltan@ppk.elte.hu

COGNITIVE PSYCHOLOGY DEPARTMENT

- Studying the role of **oscillations** in perceptual processes using **EEG**
- Visual consciousness
- Development of **spatial cognition** and its relationship to the theory of mind
- **Time perception** and cognitive representation of time

Stationary and mobile EEG, VR environments

Social Minds Research Group + Baby Lab

COGNITIVE PSYCHOLOGY DEPARTMENT

ELTE Babalabor

http://babalabor.hu

PEOPLE

Dr. Ildikó Király
lab leader

Dr. Bálint Forgács
research fellow

Dr. Márton Nagy
adjunct lecturer

Dr. Katalin Oláh
researcher, adjunct lecturer

Dr. Hanna Marno
associate professor

Rebeka Zsoldos
PhD student

Schvajda Réka
PhD Student

Alexandra Kelemen
PhD student

Krisztina Andrási
PhD candidate / lab manager

ELTE Babalabor

TOPICS

- social cognition and episodic memory + interactions of different cognitive functions
- studying both children and adults

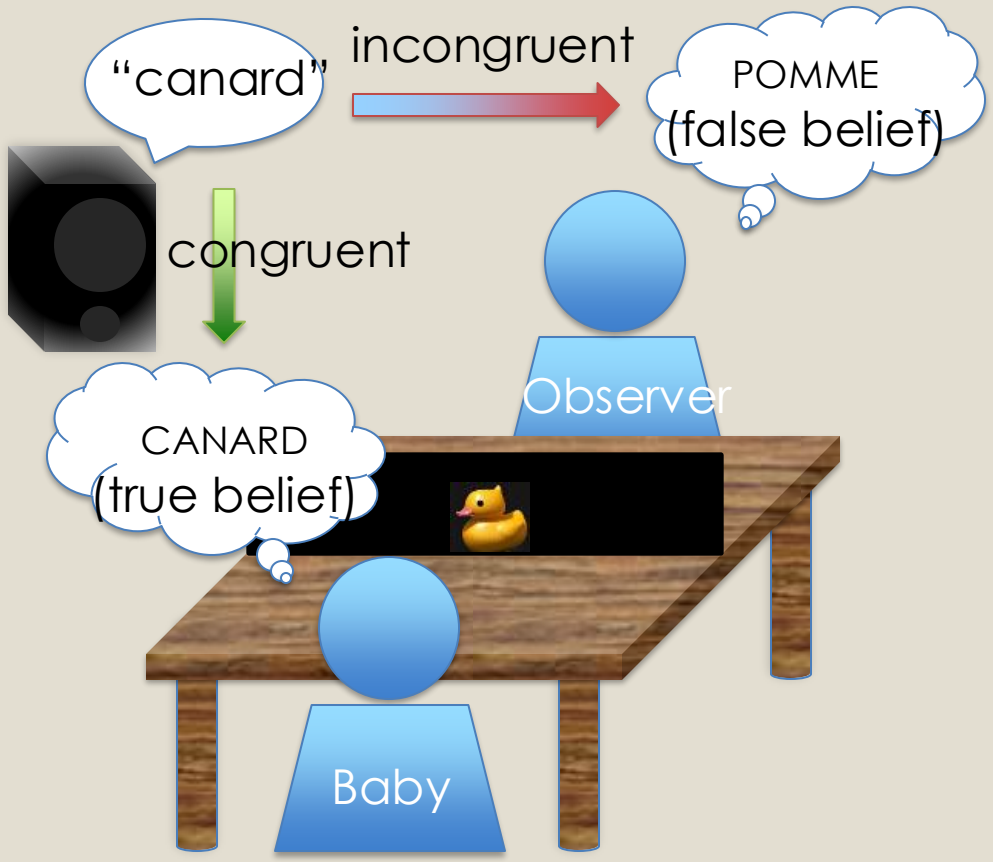
- **THEORY OF MIND**
  - Spontaneous processes in perspective taking
  - How do we update belief representations?
  - Do we compute the beliefs of in-group and out-group members in a different way?

- **NAÏVE SOCIOLOGY**
  - What cues do young children use to sort the social world into categories?
  - What kind of inferences does group membership warrant for them?
- **EPISODIC MEMORY**
  - Conscious and unconscious processes in relational retrieval
  - Eye-movements as a measure of relational retrieval
  - Episodic updating of belief representations
  - Episodic memory in young children

Language and Brain Research Group

Bálint Forgács

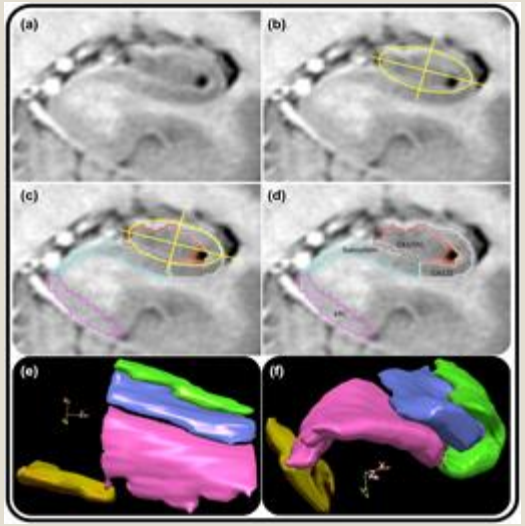
Department of Cognitive Psychology
https://sites.google.com/view/balint-forgacs
forgacs.balint@ppk.elte.hu



1. Language and mentalization in infancy
2. Neuroscience of metaphors

Hippocampal Circuit and Code for Cognition Lab - Attila Keresztes

- **Studying the hippocampus across the lifespan**
- Age-related changes in pattern separation via domain specific pathways in the MTL? (Zsuzsan Nemecz)
- Neural underpinnings of Memory Ontogeny – the NeMO study (Hunor Kis)



ELKH | Eötvös Loránd Research Network

Eötvös Loránd University
Faculty of Education and Psychology

HCCCL

Learning, memory, and consolidation processes underlying **habit-like behaviors**

Research interest

Typical and atypical development of implicit and explicit learning processes

The effect of non-invasive brain stimulation (TMS, tACS, tDCS) on implicit statistical learning

Statistical learning in Tourette's syndrome

Sleep, learning, and memory

Functional brain connectivity during statistical learning

Investigating learning by ERPs

Eötvös Loránd University
Faculty of Education and Psychology

BRAIN, MEMORY AND LANGUAGE LAB

Eötvös Loránd University & Eötvös Loránd Research Network
Budapest, Hungary

Our research

The main focus of our cognitive neuroscience research team is to investigate learning, memory, and consolidation processes underlying habit-like behaviors. Our studies benefit from the approach of lifespan development and neuropsychology.

Lab Members

Lab Directors

Dezso NEMETH
Full Professor
Principal Investigator

Karolina JANACSEK
Associate Professor
Co-director

Mathematical cognition research group

Attila Krajcsi - krajcsi.attila@ppk.elte.hu

MATHEMATICAL COGNITION RESEARCH GROUP

COGNITIVE PSYCHOLOGY DEPARTMENT

https://www.thenumberworks.org/

Numerical cognition - How do people understand numbers?

Methodological works and data analysis

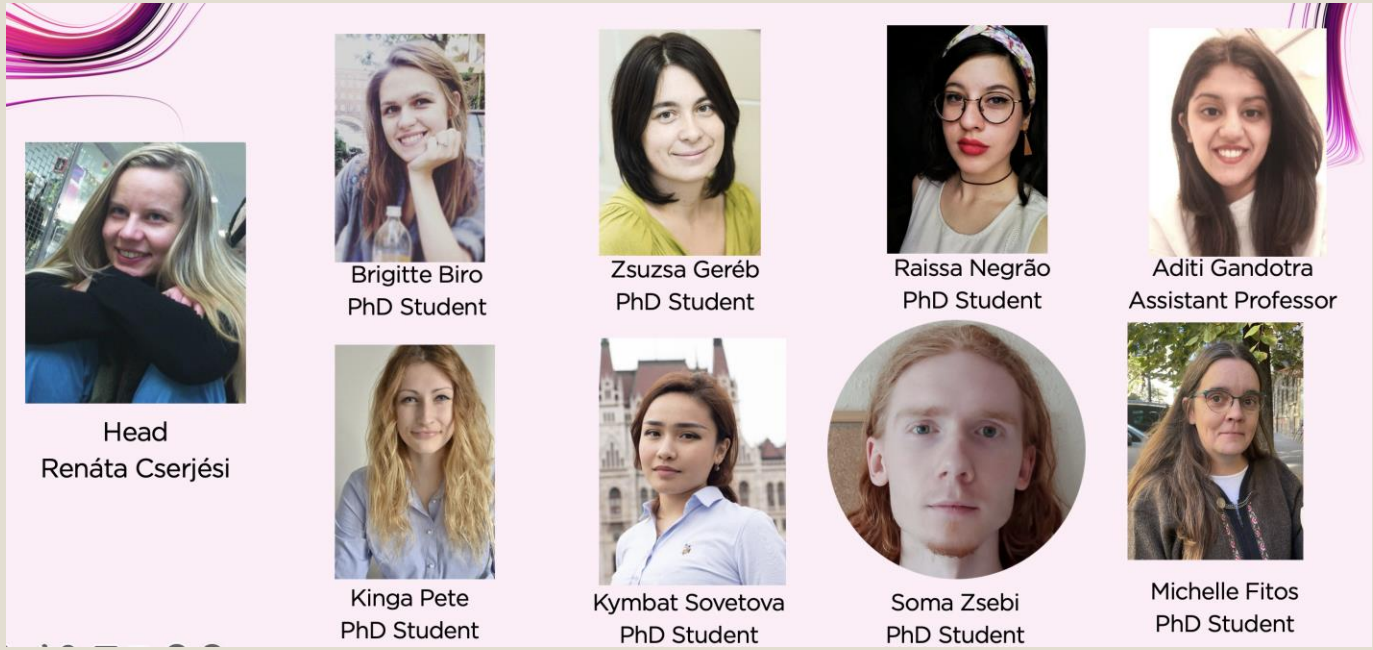
Automatic statistical analysis software

https://www.cogstat.org/

Eötvös Loránd University
Faculty of Education and Psychology

EMIND - Integrative Neuropsychology Research group – Renata Cserjesi

Cognitive vs. Emotional flexibility
Art therapy induced mood and flexibility
Emotional biases in aging
Motor-Cognition-Emotion interactions
Cognitive-Affective training in Post Covid



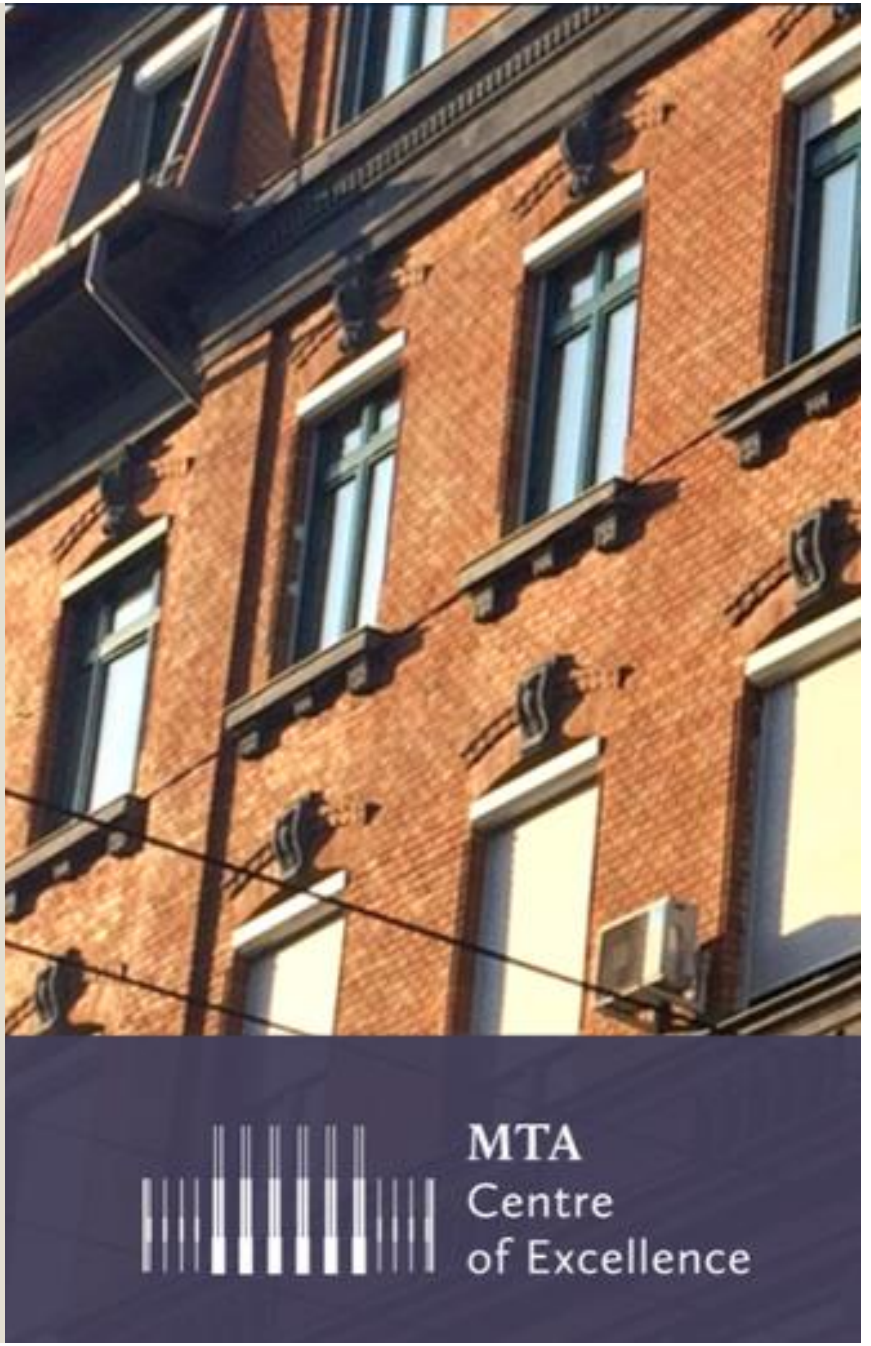
ELTE Institute of Psychology Research groups

Behavioural Science Lab

Sleep & Cognition lab - The heterogeneity of REM sleep, the neurophysiology of Nightmare Disorder

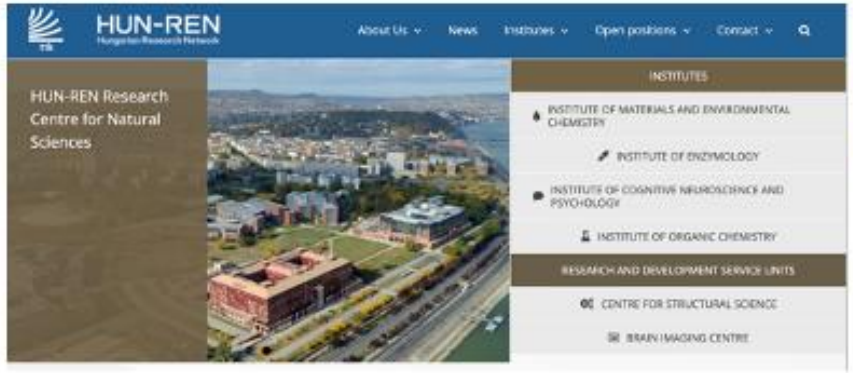
Cognitive abilities & Individual differences lab – executive functions and their measurement method

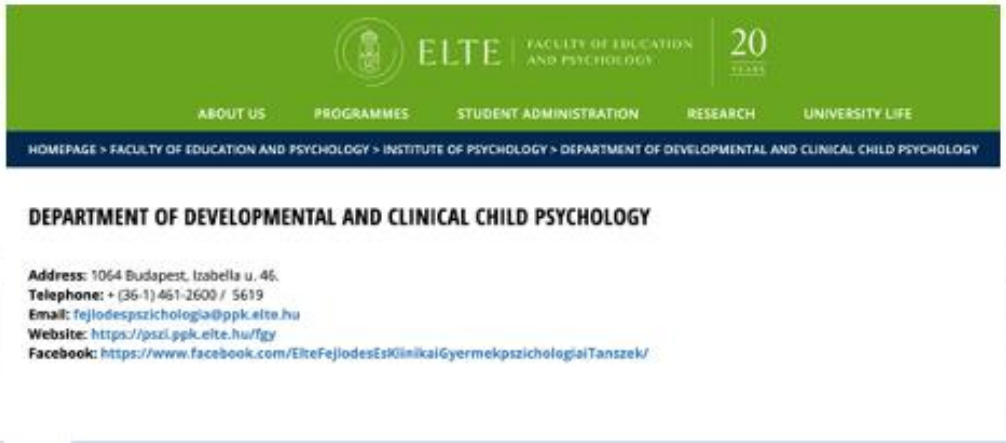
Human Interaction Research Group
& **Adaptation Research Group –** hypnosis research, effect of suggestive communication



Research Group of Neurocognitive Development, Hungarian Academy Sciences

Ferenc Honbolygó - honbolygo.ferenc@ttk.mta.hu





Maria Ioanna Zavogianni

Fülöp Flóra

Kertész Csaba

Nagy Sándor

Maria Noboa

Investigating the neurocognitive mechanisms of ***speech perception, reading, music, implicit learning and cognitive control in adults, children and infants***, with a special focus on clinical and developmental aspects, using the latest techniques of brain imaging (EEG, fMRI).

Neuroethology of Communication Lab

ELTE TTK Department of Ethology

Attila Andics (attila.andics@gmail.com)
Lágymányos Campus, Southern Building 6.205/a

We investigate the evolution of social-communicative capacities using ethological and comparative cognitive neuroscientific methods (EEG, fMRI, fNIRS).

PROJECT TOPICS

Experimental projects:

- How does our mind construct **internal representations of the 3D visual world based on 2D retinal** input?
- How are **higher level abstractions built automatically from sensory input** and how they influence subsequent knowledge acquisition?
- How does **active learning operate as captured by eye movements**?
- How is information from **different modalities** (audition, vision) combined during these processes?
- Measuring human **cue combination** with **continuous psychophysics**
- Combining **VR** and motor behavior to explore **active learning**

Inventory

Also, there are more **computational projects** (math skills are needed):

Automating doubly Bayesian inference using probabilistic programming languages (inferences about inference algorithms)

Developing a theory of representation learning by simulating the effect of inductive biases

…… Any questions?

Via email: cogsci@ppk.elte.hu

MSc Program details:

https://www.elte.hu/en/computational-and-cognitive-neuroscience-msc

INFO FOR VISITING STUDENTS FROM MEI:COGSCI:

https://pszi.ppk.elte.hu/en/content/meicogsci-info-for-incoming-students.t.8212

Detailed presentations for research labs:

https://tinyurl.com/ELTEProjects

Please always cc me, when writing directly to one of the researchers!

Thank you for your attention, hope to see you in Budapest soon!