

What does our brain say about our social nature?

18th Conference of the European Society
for Cognitive Psychology
Budapest, Hungary
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European Research Council

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ERC projects in cognitive psychology

Cognitive psychology is the branch of psychology studying how people acquire and process information. This wide field is at the interface of many different research domains such as philosophy, linguistics, animal communication, education, public health or neurosciences.

The European Research Council (ERC) that funds junior and senior world-class researchers based in Europe promotes fundamental research in all scientific areas, including studies on cognition. Around 100 projects are currently being funded by the ERC in the field of cognitive studies, with budgets up to €3.5 million.

The ERC has put together this collection of ERC projects to give a taste of the breadth and depth of some of its funded research in cognitive psychology. You'll read about: the acquisition of language in infants; the underlying mechanisms of reading; the way our brain computes numbers; the cognitive and neural substrate of social interactions or the influence of social context on our perception of the world.

ERC at the 18th Conference of the European Society for Cognitive Psychology

ERC Symposium

29 August • 10:00 – 12:00 • Room 0.83

ELTE University Congress Center

Opening remarks by Prof. Nuria Sebastián Galles, member of the ERC Scientific Council

Presentation of research by ERC grantees Ágnes Melinda Kovács, Jonathan Grainger and Avishai Henik

ERC grantees, Prof. Glyn Humphreys and Prof. Gergely Csibra, are respectively keynote speaker and member of the organising committee for the conference.

Towards a new theory of orthographic processing

Studying visual word recognition is critical for understanding the development of reading skills and its associated disorders (i.e. dyslexia). Dr Jonathan Grainger proposes a multi-faceted approach aimed at developing a model of orthographic processing allowing us to better understand how visual features link with different types of letter representation to provide access to semantic representations.

Experimental approaches combining eye tracking and neurophysiological measurements such as EEG (electroencephalography) are expected to help improving diagnosis of disorders concerning reading skills and to find new ways for remediation.



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Principal Investigator: Jonathan Grainger

Host institution: Centre National de la Recherche Scientifique, France

Project: Cracking the orthographic code (O-CODE)

ERC call: Advanced grant 2008

ERC funding: €2.2 million for five years



Understanding our social nature

What are the roots of our social nature? How do people develop the ability to ascribe beliefs, desires and intentions to others and to interpret their behaviours? Standard theories have long suggested that understanding others' behaviour in terms of their mental states requires a great amount of learning and effort. Recent research showed however that infants as early as 7 months of age understand mental states. Dr Ágnes M. Kovács and her team use behavioural studies complemented with eye tracking and brain imaging studies to investigate the mechanisms that would allow a very early, powerful and effortless understanding of other minds. These mechanisms seem to be necessary to build up one's social life and competences, and their impairment may be an important feature of developmental disorders such as autism. This project will help understanding the nature of the basic cognitive and brain mechanism that allow humans from early infancy onwards to learn about and from others, predict their behaviour and to communicate and collaborate with each other.



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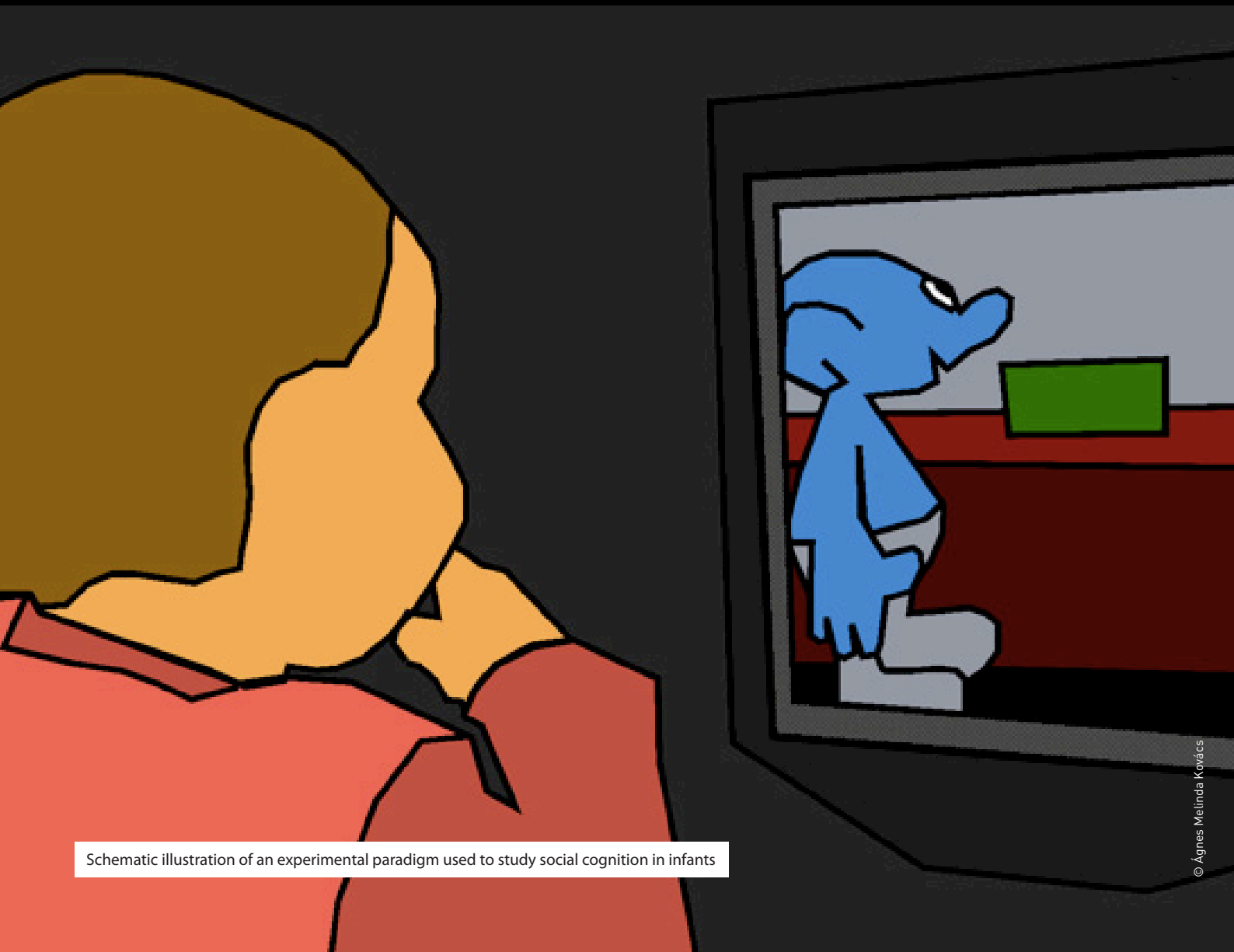
Principal Investigator: Ágnes Melinda Kovács

Host institution: Central European University, Budapest, Hungary

Project: Representational preconditions for understanding other minds in the service of human collaboration and social learning (REPCOLLAB)

ERC call: Starting grant 2011

ERC funding: €1.5 million for five years



Schematic illustration of an experimental paradigm used to study social cognition in infants

Decoding the mechanism behind learning languages

Several studies have revealed the power of the human brain to extract regularities from the speech signal through distributional learning. This implies that language learning occurs in an incidental manner and that attention plays a marginal role. But speech input is so rich and multidimensional that infants need to pinpoint the appropriate subset of dimensions to be computed. The research of Prof. Nuria Sebastián Gallés is about detecting the way the information present in the speech input is selected for computation. Her project will study the relationship between the mechanisms of attention, the cognitive control and the acquisition of language in early stages, underlying two critical aspects of language learning: the establishment of phonetic categories and the early acquisition of words. Combining longitudinal studies with neuroimaging experiments in adults and infants, she will analyse how enhanced mechanisms of attention and cognitive control can improve the way infants learn to speak their mother tongue. She also examines how bilingual environments impact on these mechanisms in preverbal infants.

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Principal Investigator: Núria Sebastián Gallés

Host institution: Universitat Pompeu Fabra, Barcelona, Spain

Project: Mechanism of cognitive control and language learning (UNDER CONTROL)

ERC call: Advanced grant 2012

ERC funding: €2.5 million for five years



Countable or non-countable: how our brain computes numbers

In the area of numerical cognition, many scholars believe in the existence of an innate, domain-specific number sense allowing us to count quantities. However, there is evidence that children at an early age do not count numbers but rather estimate the amount or the size of objects. Could this ability indicate the existence of an evolutionarily older system dedicated to the perception and evaluation of non-countable dimensions, such as size or amounts? If so, such a system may have helped humans to develop their dorsal brain system and would be the predecessor of the quantification system dealing with discrete properties and numbers. Behavioural experiments, neuroimaging techniques, brain studies of injured individuals, computation, and experiments with animals having low-level brain systems (archer fish) will be used by Prof. Avishai Henik's team to test whether the ability to perceive and evaluate size and amounts is a core part of numerical cognition. The experiments will also help to unravel the neurocognitive mechanisms that underlie deficiencies in numerical cognition, such as in dyscalculia - a deficit in processing numerical and arithmetical information, similar to dyslexia.



© Avishai Henik

Principal Investigator: Avishai Henik

Host institution: Ben-Gurion University of the Negev, Israel

Project: Size matters in numerical cognition (SMiNC)

ERC call: Advanced grant 2011

ERC funding: €2.2 million for five years



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The way we see the world

Traditionally, it is believed that human perception is consistent across individuals and social contexts. There is however strong evidence suggesting that the brain activity changes when people have particular expectations about a sensory stimulus and that perception can be tuned to favour certain stimuli matching our personal goals. With his ERC grant, Prof. Glyn Humphreys will use various techniques and methodologies from cognitive neuroscience, social, cultural and life-span psychology to assess how far social factors can affect the brain information processing and impact perceptual processes. His goal is to develop a framework for better understanding the role of social context on human perception at different stages of development.

© Glyn Humphreys



Principal Investigator: Glyn Humphreys

Host institution: University of Oxford, United Kingdom

Project: Personal perception (PePe)

ERC call: Advanced grant 2012

ERC funding: £2.1 million for five years



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Children's take on learning

How babies learn from adults? What's the role of communication in this process? Prof. Gergely Csibra and his team had demonstrated that infants expect words to match with objects even before they start to speak. Research also suggests that babies' brains are prepared to learn from communication, but the underlying processes are not yet known.

With this ERC project, Prof. Csibra will now test how communication - language as well as signals such as gaze direction or pointing - impact babies' brain development. Using eye-tracking and neuroimaging techniques, the research group will unveil the cognitive and neural systems that support this process. Their ultimate point is to demonstrate that communication to babies in early months of life not only strengthens the affective bond between parents and children, but also fosters learning.

© Gergely Csibra



Principal Investigator: Gergely Csibra

Host institution: Central European University, Budapest, Hungary

Project: Human infants' preparedness for relevance-guided learning through ostensive-referential communication (OSTREFCOM)

ERC call: Advanced grant 2009

ERC funding: €1.5 million for five years



An investigation at the Cognitive Development Center

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Prof Helga Nowotny
ERC President and Chair of its Scientific Council



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