

VI Dubrovnik Conference on Cognitive Science
DUBROVNIK, 22-25 MAY, 2014.



Invited Speakers:

Gergely Csibra, György Gergely, Núria Sebastián Gallés, Luca Bonatti,
Lisa Feigenson, Justin Halberda, Alex Cristia, Emmanuel Dupoux

Chairs:

Judit Gervain & Ágnes Melinda Kovács

Organizers:

Klára Horváth, Dora Kampis, Attila Keresztes, Melita Kovačević,
Nevena Padovan, Csaba Pléh

Centre for Advanced Academic Studies (CAAS) Dubrovnik
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Budapest University of Technology and Economics (BME)



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Programme

Thursday, May 22:

- 16:00–19:00 Registration
17:30–18:30 ERC Information Session
19:00 Welcome Reception

Friday, May 23:

- 8:00–9:00 Registration
9:00–10:00 **Invited talk: *Gergely Csibra***
Infants expect object labels to refer to kind concepts
10:00–11:00 **Invited talk: *György Gergely***
Turn-taking Contingent Reactivity as an Ostensive Cue For
Attributing Communicative Agency
11:00–11:30 Coffee break
11:30–12:30 **Poster session 1**
12:30–14:00 Lunch
14:00–15:00 **Invited talk: *Núria Sebastián Gallés***
Babies from Babel: Discovering language with two languages
15:00–16:00 **Invited talk: *Luca Bonatti***
Mechanisms involved in the acquisition of words and word structure
16:00–16:30 Coffee break
16:30–17:30 **Poster session 2**

Saturday, May 24:

- 9:00–10:00 **Invited talk: *Lisa Feigenson***
Surprise enhances early learning
- 10:00–11:00 **Invited talk: *Justin Halberda***
Approximate Number Representations in the acquisition of terms like *most*, *more* and *seven*
- 11:00–11:30 Coffee break
- 11:30–12:30 **Young researchers' presentations:**
Sandra Kotzor:
Processing of consonant duration: evidence from behavioural and EEG experiments
Olivier Mascaro:
The psychological principle of non-contradiction: a central part of human infants' theory of mind
Sophie J. Milward:
Investigating co-representation effects in 2-5 year-olds:
A computerised joint task
Piotr Mostowski:
Sign Language vs. Manually Coded Spoken Language:
What Neuroimaging Tells Us about the Communication of the Deaf
- 12:30–14:00 Lunch
- 14:00–16:00 **Invited talk: *Alex Cristia & Emmanuel Dupoux***
An integrated approach to infant phonological acquisition
- 16:00–16:30 Coffee break
- 16:30–17:30 **Poster session 3**
- 17:30–17:45 Book launch: Pléh, Csibra, & Richerson (Eds.): *Naturalistic Approaches to Culture* – introduced by Ágnes M. Kovács and Olivier Morin
- 17:45–18:00 Assembly meeting
- 18:00–18:30 Closing words & Farewell reception
- 20:00 Social programme

Friday (May 23), 9:00–10:00

Abstracts - Invited speakers

INFANTS EXPECT OBJECT LABELS TO REFER TO KIND CONCEPTS

Gergely Csibra

*Cognitive Development Center
Department of Cognitive Science
Central European University
Budapest, Hungary*

How do infants interpret object labels they acquire around the first birthday? At one extreme, it has been suggested that labels act as auditory features that are associated with the visual features of the accompanying object. At the other extreme, a label is thought to refer to an abstract concept, which is exemplified by the object to which it is applied. In standard word learning or word priming paradigms it is difficult to discriminate between these proposals as objects exemplifying a common concept and labelled by a common word tend to share visual features as well. We offer two novel ways to approach this question. First, we show that infants group objects together on the basis of a common label even when the objects do not share visual features. Second, we show that when a conceptual representation of an event (a goal-directed action or a social interaction) is available for them, infants prefer to map a novel label to the role an agent plays in it rather than to the visual features of the agent. These results support the view that, at least in ostensive communicative contexts, infants expect labels to refer to concepts rather than being mere auditory associates of visual object features.

Friday (May 23), 10:00–11:00

**TURN-TAKING CONTINGENT REACTIVITY AS AN OSTENSIVE CUE FOR
ATTRIBUTING COMMUNICATIVE AGENCY**

György Gergely

*Cognitive Development Center
Department of Cognitive Science
Central European University
Budapest, Hungary*

In a series of studies within the framework of Natural Pedagogy theory (Csibra & Gergely, 2009, 2011) we have demonstrated human infants' species-unique preparedness to recognize and interpret non-verbal communicative actions that are ostensively addressed to them. Ostensive communication evolved as a species-unique form of epistemic cooperation in humans to guide the addressee to attend to and obtain relevant and new information about referents. Infants are prepared to receive such information from others' ostensive communications in several ways: A) they show special sensitivity to ostensive signals (such as eye contact, infant-directed speech, or infant-induced contingent reactivity) that induce attribution of communicative agency and a communicative intention to manifest new and relevant information about referents (the informative intention); B) Ostensive cues induce an expectation of referent identification and subsequent orientational cues (such as gaze-shift, pointing, or orientational alignment) are interpreted as referential signals to identify the intended referent; and C) ostensive signals induce in infants built-in presumptions of relevance, genericity, and sharedness of the manifested knowledge content.

In this talk I'll present new evidence from eye-tracing studies to support the proposal that Turn-taking Contingent Reactivity at a Distance is a) one of the basic ostensive cues of communicative agency that b) induce the attribution of communicative and referential intentions and c) trigger presumptions of relevance and genericity of the ostensively manifested properties of the referent kind. I'll also present some preliminary results from eye-tracking and pupil dilation measures showing that sensitivity to Contingent Distal Reactivity as an ostensive cue of communication is impaired in autistic children.

Finally, I'll summarize new findings demonstrating similar sensitivity in dogs to Turn-taking Contingent Reactivity as an ostensive cue inducing attribution of communicative agency to humans.

Friday (May 23), 14:00–15:00

BABIES FROM BABEL: DISCOVERING LANGUAGE WITH TWO LANGUAGE

Núria Sebastián Gallés

*Center of Brain and Cognition
Universitat Pompeu Fabra
Barcelona, Spain*

Studies of preverbal infants exposed to a bilingual environment have unveiled the existence of important similarities, but also significant differences in the way monolinguals-to-be and bilinguals-to-be solve the problem of language acquisition. I will review the evidence that shows how very young babies can differentiate the languages of their environment, how they learn the sounds of their languages, and how they learn the very first words. These studies provide important clues to the nature of the successful solutions bilingual babies develop to learn two languages and to become competent adult bilingual speakers.

Friday (May 23), 15:00–16:00

MECHANISMS INVOLVED IN THE ACQUISITION OF WORDS AND WORD STRUCTURE

Luca Bonatti

*Center of Brain and Cognition
Universitat Pompeu Fabra
Barcelona, Spain*

I revise evidence gathered in our and other laboratories suggesting that multiple mechanisms are involved in the acquisition of word and of morphosyntactic regularities. While it is generally assumed that infants possess a powerful learning mechanism, I will argue that the ability to track nontrivial statistical relations becomes fully effective relatively late in development, when infants have already acquired a considerable amount of linguistic knowledge. I will also argue that mechanisms for structure extraction that do not rely on extensive sampling of the input are likely to have a much larger role in language acquisition than general-purpose statistical abilities. Finally, I will revise evidence suggesting that such different learning mechanisms may be helped by exploiting different signals in the input, as shown by the different role of vowels and consonants in word acquisition.

Saturday (May 24), 9:00–10:00

SURPRISE ENHANCES EARLY LEARNING

Lisa Feigenson

*Department of Psychological and Brain Sciences
Johns Hopkins University
Baltimore, USA*

Children acquire enormous amounts of information over the first years of life. This raises a puzzle: given the overwhelming quantity of input available from the environment, how do children know what they should learn about? Here, I will discuss reveal one way in which infants' and children's learning is beneficially restricted: learning is targeted at aspects of the world that violate prior expectations. In a series of experiments, we showed infants and preschoolers events that either culminated in surprising, physically impossible outcomes, or in unsurprising, physically possible outcomes that were otherwise identical. Immediately afterwards, we taught them new information about the objects in the events. Across a range of situations, infants and children learned more effectively following surprising events than possible events. Hence, surprise appears to direct and enhance human learning.

Saturday (May 24), 10:00–11:00

**APPROXIMATE NUMBER REPRESENTATIONS IN THE ACQUISITION OF TERMS
LIKE *MOST*, *MORE* AND *SEVEN***

Justin Halberda

*Department of Psychological and Brain Sciences
Johns Hopkins University
Baltimore, USA*

In this talk I will explore the acquisition of words like most in English, assessing the counting (i.e., highest exact cardinality understood), approximate number, formal math, and language abilities of children and adults. For example, in one series of studies, children judged sentences like, “are most of these animals sheep or skunks” in contexts that varied the ratio of the two sets of animals. We find (a) that some children acquire most prior to acquiring counting abilities and (b) that some children show knowledge of cardinality without knowledge of most. New evidence from psychophysical modeling of performance reveals the hallmark ratio-dependence of children relying on the Approximate Number System to evaluate most. We also explore how the relationship between language ability, approximate number understanding and school math performance may develop through representations of “internal confidence”. Our work is suggesting that work in the formal semantics of quantified sentences and work in basic numerical cognition can fulfill the promise of the cognitive science mission to connect theorizing across levels of description and across traditional disciplinary boundaries – the future looks bright!

AN INTEGRATED APPROACH TO INFANT PHONOLOGICAL ACQUISITION

Alex Cristia and Emmanuel Dupoux

*Laboratoire de Science Cognitive et Psycholinguistique
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Paris, France*

Infants learn language with amazing speed. We do know some of the landmarks in early acquisition, but we still don't know how they do it. In this paper, we demonstrate the need for a coherent framework drawing from both the empirical literature on infant speech perception, and from computational models of early phonological acquisition. We also propose one possible implementation of such a framework, and discuss its strengths and limitations.

We first review findings regarding extraction of phonological knowledge at an early age. A multitude of behavioral and psychophysiological approaches have demonstrated that infants lay the foundations of the inventory of sound categories found in the ambient speech (Werker & Tees, 1984), extract the phonotactics of their native language (Jusczyk et al., 1993), store frequently experienced wordforms (Mandel et al., 1995), and even remember word-meaning associations (Bergelson & Swingley, 2012), all of this taking place in parallel during the first year of life. Moreover, each level of phonological knowledge is not learned in an all-or-none fashion, but rather improves as the infant gains in age and experience. Empirical work even suggests that there can be interactions between levels: For instance, nine-month-olds increase their sensitivity to a foreign sound contrast if they hear it used in the context of a minimal pair (Yeung & Werker, 2009), suggesting an interaction between phonological and lexical levels. Thus, a realistic model of phonological acquisition must consider that infants learn several levels simultaneously, that they start out with provisional representations which are gradually improved; and that some improvements can be brought about through learning taking place at other (incomplete) phonological levels.

Second, we review some of the theoretical models that have been proposed to account for such early acquisitions. Even though some general frameworks recognize the need for parallel and gradual acquisitions (Kuhl et al., 2008, Curtin et al., 2011), quantitative computational models have focused on particular subproblems (e.g., Vallabha et al, 2007: constructing phoneme categories through unsupervised clustering, Brent, 1999: segmenting continuous speech using transition probabilities, or Tesar & Smolensky, 1998: learning phonological rules through constraint reranking), typically assuming that the rest of the language system was fixed or independently learned. In addition, most models made simplifying assumptions (toy languages) about the input available to attack the subproblem of choice (e.g., Feldman, Griffiths, and Morgan 2009). We show that when trying to combine such models to address the fuller acquisition picture, extremely severe circularity and scalability problems arise (e.g., Boruta et al, 2011; Varadarajan, et al 2008).

To face this multifaceted challenge, we propose a global learning architecture containing representations of infants' linguistic, cognitive, and social environment at different levels of abstraction, as well as learning mechanisms that adapt each of

Saturday (May 24), 14:00–16:00

these levels to the regularities observable in the input, and mechanisms that regulate interactions between different representations. Our proposed architecture is a “sketch” of what a future integrated theory of early language acquisition would look like, constructed by combining learning mechanisms and levels that have been previously documented in infants and/or artificial learners. Whilst limited, this sketch suffices to underline the most promising areas of research, and the regions that would most benefit from extra attention.

Abstracts – Young researchers

PROCESSING OF CONSONANT DURATION: EVIDENCE FROM BEHAVIOURAL AND EEG EXPERIMENTS

*Sandra Kotzor, University of Oxford, UK
Adam Roberts, University of Oxford, UK
Allison Wetterlin, University of Oxford, UK
Aditi Lahiri, University of Oxford, UK*

About half of the world's languages use consonantal length to contrast words; e.g. Bengali singleton [pata] „leaf” vs. geminate [pat:a] „whereabouts”;. The main acoustic cue for differentiating length of consonants is closure duration, geminates being almost twice as long as singletons. Since duration contrasts are invariably relative, how does a listener process a mispronounced nonword that differs from a real word only in consonantal duration? We used behavioural and ERP recordings in a cross-modal semantic priming paradigm to examine the word medial geminate-singleton contrast in Bengali. Two sets of disyllabic words were chosen as auditory primes; lexical singletons without geminate counterparts, and underlying geminates without corresponding singleton word. Nonword mispronounced primes were created by shortening or lengthening the medial consonant to create the corresponding (fake) geminate or singleton. Significant semantic priming was observed, reflected by faster reaction times and lower N400 amplitudes with nonword mispronunciations, but only when the real word was a singleton. The findings in the present study indicate that this processing asymmetry stems from a difference in lexical specification and full lexical access can be achieved through a mispronunciation only if its representation on the prosodic level does not mismatch with that of the corresponding real word.

Keywords: consonant duration, lexical processing, speech perception, phonology

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Saturday (May 24), 11:30–12:30

**THE PSYCHOLOGICAL PRINCIPLE OF NON-CONTRADICTION:
A CENTRAL PART OF HUMAN INFANTS' THEORY OF MIND**

*Olivier Mascaró, Central European University, Hungary
Ágnes Melinda Kovács, Central European University, Hungary.*

Two studies tested infants' psychological principle of non-contradiction. This principle specifies that a mind is unlikely to contain contradictory beliefs or goals, i.e. mental states co-referring to the same state of affair while having mutually exclusive contents.

In a looking-time study, 9-month-olds' evidenced a stronger tendency to expect two hands to belong to two people (instead of one person) when one of these hands prevented the second one from achieving her goal, than when these hands exhibited the same pattern of movements, but without contradictory goals. Therefore infants seem to assume that a single individual is unlikely to aim for "p" and "not-p" simultaneously.

In a second study, informants pointed to indicate a toy's location. When a single informant pointed successively to two different locations, 15-month-olds tended to follow the second pointing. This tendency was significantly reduced when the first and the second pointing were produced by two different informants. Thus infants recognized that an informant is unlikely to assert that a toy occupies two locations simultaneously. Infants assumed that the informant pointing twice revised her belief about the toy's location, arguably postulating that she was unlikely to maintain contradictory beliefs.

Keywords: theory of mind, native epistemology, reasoning, developmental psychology, pragmatics

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Saturday (May 24), 11:30–12:30

**INVESTIGATING CO-REPRESENTATION EFFECTS IN 2-5 YEAR-OLDS:
A COMPUTERISED JOINT TASK**

Sophie J. Milward, University of Birmingham, UK

Sotaro Kita, University of Warwick, UK

Ian A. Apperly, University of Birmingham, UK.

This study aimed to investigate co-representation effects in children by measuring whether they responded more slowly when in the presence of a partner performing a complementary task. Ninety-four 2-5 year-olds played a computer game with the experimenter, where both participants were required to press a button when either a picture of a bear or a duck appeared on the screen. In the Same Task condition, the child and experimenter responded to the same animal. In the Different Task condition, they responded to different animals. The total sample was divided equally into three age groups: Age Group 1 (29-45 months); Age Group 2 (46-60 months) and Age Group 3 (60-69 months). A 2 (Task type) x3 (Age Group) between subjects ANOVA showed main effects of Task type ($F = 9.48, p = .003$) and Age Group ($F = 13.67, p = .001$) and a marginally significant interaction ($F = 2.96, p = .057$). Pairwise analyses show a co-representation effect in Age Groups 2 ($t(29) = -2.91, p < .01$) and 3 ($t(29) = -2.61, p < .05$) but not Age Group 1 ($t(30) = .07, p = .95$), suggesting that co-representation may develop with age.

Keywords: Joint Action co-representation, development

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Saturday (May 24), 11:30–12:30

**SIGN LANGUAGE VS. MANUALLY CODED SPOKEN LANGUAGE:
WHAT NEUROIMAGING TELLS US ABOUT THE COMMUNICATION OF THE DEAF**

Piotr Mostowski, University of Warsaw, Poland;
*Łukasz Bola, University of Warsaw, Poland, Nencki Institute of Experimental
Biology, Warsaw, Poland;*
*Katarzyna Jednoróg, Nencki Institute of Experimental Biology, Warsaw,
Poland;*
Marcin Szwed, Jagiellonian University, Krakow, Poland;
*Paweł Boguszewski, Nencki Institute of Experimental Biology, Warsaw,
Poland;*
Artur Marchewka, Nencki Institute of Experimental Biology, Warsaw, Poland;
Paweł Rutkowski, University of Warsaw, Poland

Natural sign languages that evolve spontaneously in deaf communities (e.g. Polish Sign Language, abbreviated as PJM) should not be confused with artificially created manual variants of spoken languages (e.g. Signed Polish, SJM). Classifier constructions (CCs), i.e. complex three-dimensional structures that replace typical verbs to transmit spatial or movement information, could be viewed as yet another mode of manual communication. The aim of our study was to compare the neural basis of these 3 signing forms.

15 congenitally deaf signers and 14 hearing non-signers underwent functional magnetic resonance imaging (fMRI) while viewing either PJM, SJM or CC-type sentences. The sentences were matched for meaning so that only the grammar differed across the 3 conditions.

Perisylvian regions were activated in deaf signers when watching any of the 3 forms of sign communication. PJM activated the left posterior superior temporal gyrus to a greater extent than SJM. CCs compared to either PJM or SJM activated superior and inferior parietal lobules and precentral gyrus bilaterally.

Our study demonstrates that based on the activity of the left posterior superior temporal region one can distinguish natural from artificial sign communication systems. Furthermore, our results highlight the special status of CCs in the communication of native signers.

Keywords: sign language, deaf, fMRI

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Poster sessions

Poster Session 1.: Friday, May 23, 11:30–12:30

The role of joint action versus attention on depth of encoding

Fruzsina Elekes, Erna Halás, Gábor Bródy, Judit Kárpáti, Kata Oláh, Ildikó Király

12-month-old Italian-learning infants map morphological regularities to conceptual distinctions

Alissa Ferry, Marina Nespor, Jacques Mehler

The impact of social context on children's executive performance

Paula Fischer, Nicolas Chevalier

Infants' detection of perfectly and socially contingent reactivity

Bálint Forgács, Ernő Téglás, Willem E. Frankenhuis, John S. Watson, György Gergely

Word and syllabic segmentation in 6-month-olds French-learning infants

Louise Goyet, Léo-Lyuki Nishibayashi, Thierry Nazzi

Six-months-old infants resolve ambiguous apparent motion by assuming eye-like contrast polarity between foreground and background

Mikołaj Hernik, Gergely Csibra

Understanding Cardinality by Preschoolers

Lilla Hodossy

Longitudinal study on changes in the visual ventral occipito-temporal cortex during the first year of reading acquisition

Ana Karla Monzalvo Lopez, Dehaene Stanislas, Qing Cai, Ghislaine Dehaene-Lambertz

Lexical decision task - reading words and pseudowords in patients with aphasia

Martina Vuković Ogrizek, Rafaela Martić, Ivona Radić Tatar, Paulina Mataija, Marina Paprika

Infant Directed Speech and Direct Eye Contact Share Common Neural Basis

Eugenio Parise, Gergely Csibra

The acquisition of reflexive verb constructions in Croatian: corpus-based study

Eva Pavlinušić, Gordana Hržica

The role of centration in Hungarian preschoolers' interpretation of exhaustivity

Lilla Pintér

Deafness, sign language, and cognition

Mieczysław Pokorski, Sandra Klimańska

Priming thematic structure during sentence comprehension in the absence of syntactic repetition

Vencislav Popov, Penka Hristova

Neural substrates of object tracking and object maintenance in 6-month-olds

Eszter Szabó, Ágnes M. Kovács

What do experienced simultaneous interpreters know that we don't? Working memory and creativity under investigation

Andrea Turner, Monika Albu

Biased facial judgments of trustworthiness is associated with relationship quality of ego-centric social network among patients suffering from personality disorders

Zsolt Unoka, Klára Várhelyi, Eszter Berán, Péter Soltész, Csaba Pléh

Words activate concept formation in adults and children even before this task has been offered

Alexey A. Kotov, Elisabeth F. Vlasova, Tatyana N. Kotova

Comparing the effects of bilingualism and second language learning on automaticity in reading

Kristina Vujnović Malivuk, Marijan Palmović

Wolves and sheep: 14-month-old infants map novel labels to social roles but not to surface appearance in dynamic scenes

Jun Yin, Gergely Csibra

Spontaneous lateralization of mice in choosing arm of the T-maze

Katarzyna Zięba, Maria Maciejewska

Poster Session 2.: Friday, May 23, 16:30–17:30

ERP modulations in mono- and bilingual children: Is the N400-like effect language dependent?

Louise Goyet, Louah Sirri, Pia Rämä

Beneficial effects of naps on novel word learning in 16-month-olds

Klára Horváth, Kyle Myers, Russell Foster, Kim Plunkett

Positive emotions enhance thinking: the role of emotions origins and task difficulty for the efficiency of linear order reasoning

Kamil Imbir

EEG evidence of statistical learning in preverbal infants

Claire Kabdebon, Marco Buiatti, Marcela Pena, Ghislaine Dehaene-Lambertz

Exhaustiveness in Hungarian: experimental investigation on individuals with aphasia

Tamás Káldi

14-month-olds track others' beliefs about numerosity

Dora Kampis, Ágnes M. Kovács

Are visual types basically visual? The exploration of the visuospatial memory performance in immediate serial recall of visually skilled and unskilled subjects

Roland Kasek, Mónika Albu

Processing of stress contrast in a sequence recall task by Croatian speakers

Maja Kelić, Honbolygó Ferenc, Marijan Palmović, Jelena Kuvač Kraljević

What number representation do preschoolers use: analogue magnitude system or object related representation?

Orsolya Kiss, Krajcsi Attila

Changes in neural correlates of performance monitoring during the transition to young adulthood

Martina Knežević, Kim Veroude, Jelle Jolles, Lydia Krabbendam

Development of understanding zero in preschoolers

Petia S. Kojouharova, Gábor Lengyel, Lilla Hodossy, Orsolya Kiss, Attila Krajcsi

How to Measure Ego-Networks?

Anna Rácz, Péter Kardos, Zsolt Unoka, Péter Soltész, Csaba Pléh

Development of domain-specific category knowledge: an eye-tracker study

Anett Ragó, Gabriella Óturai, Thorsten Kolling, Anikó Kónya

Nencki Affective Word List (NAWL) as a linguistic tool in neuroscience

Monika Riegel, Małgorzata Wierzbą, Marek Wypych, Katarzyna Jednoróg, Anna Grabowska, Artur Marchewka

Children's use of multi-modal identity concepts to facilitate speech recognition

Mallika Sen, Josie Briscoe

Role of communicative context in extending functional attribute from one to its kind

Rubeena Shamsudheen, Gergely Csibra

The Development of Non-Native Phonemic Categories at First Exposure

Ellenor Shoemaker

Cognitive representation of close personal-network has strong connection with well-being

Péter Soltész, Anna Rácz, Péter Kardos, Zsolt Unoka, Csaba Pléh

"What's in a name?" - Category label vs identity label in learning novel categories

Vanja Kovic, Jelena Sucevic, Suzy J. Styles

Does verbal negation boost representing the absence of objects in infants?

Eszter Szabó, Ágnes M. Kovács

Two faces of the same coin? Giving and taking actions prime different representations of social interactions in infants

Denis Tatone, Gergely Csibra

A false belief bias in an implicit ToM task: evidence from a continuous measurement

Ágnes Melinda Kovács, Ernő Téglás

Poster Session 3.: Saturday, May 24, 16:30–17:30

Mapping behavioral and neural markers of performance monitoring in children using EEG

Frantzy Acluche, Nicolas Chevalie

Do we need an oxygen-mask for hot executive processes? Focus on emotions, empathy and mindfulness

Mónika Albu, Máté Szondy, Rebekka Lehman

Pointing and Receptive Vocabulary

Nazli Altinok, Aylin C. Küntay, Ulf Liszkowski, Ozge Savas

The Development of Second-order Theory of Mind and its Relationship with Language and Memory

Burcu Arslan, Annette Hohenberger, Rineke Verbrugge

Employing types of agency and patiency in psychotherapeutic discourse: a longitudinal analysis of in-session interaction

Eszter Berán, Pál Czobor, Zsolt Unoka

The acquisition of lexical stress patterns in French-English bilingual children: Evidence from acoustic analyses of word production

Ranka Bijeljic-Babic, Christelle Dodane

Development of implicit category learning: abstraction of a family resemblance structure in case of adults vs. 7 year-old children

Eszter Bóra, Máté Varga, Eszter Somos, Laura Faragó, Anett Ragó

Hemispheric differences in reaction time during processing emotional stimuli

Josipa Bosak, Sanja Budimir, Marijan Palmović

Individuation of agents based on preferences in 10-month-old infants

Gábor Bródy, Kata Oláh, Ildikó Király, Szilvia Bíró

Trend analysis and anomaly detection in time series of language usage

Krisztian Buza, Gabor Nagy, Alexandros Nanopoulos

The matching of visual and auditory stimuli: Competition between phonological and taxonomic representations during spoken-word recognition in 2-years olds

Janette Chow, Anne Aimola Davies, Kim Plunkett

An efficiency in perspective taking during communication

Agnieszka Dębska

Mu rhythm modulation as a result of hand-movement observation - demonstration of MNS activity in humans

Peter Kovar

Lexical deficits, working memory and cognitive control in specific language impairment

Enikő Ladányi, Kata Fazekas, Ferenc Kemény, Ágnes Lukács

Numerical distance and size effect in a discrete semantic network

Gábor Lengyel, Petia Kojouharova, Attila Krajcsi

Fenomenology of learning history

Mateja Lesar, Urban Kordeš

Acquisition of Slovene adjective inflection and semantics

Maja Ljubič, Valentina Oblak

Infants' referential understanding of language

Hanna Marno, Teresa Farroni, Jacques Mehler

Possession understanding in patients with aphasia

Rafaela Martić, Martina Vuković Ogrizek, Ivona Radić Tatar, Paulina Mataija, Marina Paprika

Lexical decision task- reading words and pseudowords in children with specific language impairments

Paulina Mataija, Marina Paprika, Ivona Radić Tatar, Martina Vuković Ogrizek, Rafaela Martić

Phonetic representations in infants

Karima Mersad, Ghislaine Dehaene-Lambertz

Malleability of the basic level effect in categorical induction for biological categories

Vencislav Popov

Abstracts – Posters

THE ROLE OF JOINT ACTION VERSUS ATTENTION ON DEPTH OF ENCODING

Fruzsina Elekes, University Eötvös Loránd, Budapest

Erna Halász, University Eötvös Loránd, Budapest

*Gábor Bródy, University Eötvös Loránd, Budapest, Central European
University, Budapest*

Judit Kárpáti, University Eötvös Loránd, Budapest

*Kata Oláh, University Eötvös Loránd, Budapest, Hungarian Academy of
Sciences, Budapest*

Ildikó Király, University Eötvös Loránd, Budapest

After a joint semantic categorization task, in a surprise recall test, Eskenazi, Doerrfeld, Logan, Knoblich, and Sebanz (2013) found increased memory performance to items that were task relevant to the co-actor compared to non task relevant items. The authors proposed that maintaining a representation of the co-actor's task (press key for e.g. "animals") automatically induces an action plan for the co-actor's target items in addition to monitoring action execution that in turn enhances the accessibility of these items. Is the effect indeed dependent on the simulation of the co-actor's motor response or is the co-actor's mere attention to a given semantic category sufficient to enhance the accessibility of those items? In our study pairs of participants either react to one of three semantic categories by key press or merely count the members of the target category, followed by a surprise recall test. The action plan account predicts no recall improvement in the no motor response condition. There is however reason to expect an effect of attention, as adults' behavior has been shown to be influenced by others' visual perspectives (Samson, Apperly, Braithwaite, Andrews, & Scott, 2010).

Keywords: joint attention, depth of encoding, recall performance

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12-MONTH-OLD ITALIAN-LEARNING INFANTS MAP MORPHOLOGICAL REGULARITIES TO CONCEPTUAL DISTINCTIONS

Alissa Ferry, International School for Advanced Studies, Trieste, Italy

Marina Nespor, International School for Advanced Studies, Trieste, Italy

Jacques Mehler, International School for Advanced Studies, Trieste, Italy

Infants begin learning words during the first year of life. Yet, learning a language requires more vocabulary acquisition; infants must also learn the rules of their language. We examined how 12- to 24-month-olds learn morphological rules in

Italian, a language with rich inflectional morphology. Italian nouns mark both gender (mapping on to natural gender for humans) and plurality on the article and on the noun's final vowel (e.g., il ragazzo; i ragazzi; la ragazza; le ragazze). During each trial, infants viewed two images that differed either in gender (one male, one female) or in plurality (one male, two males). Infants were directed to look at one of the images (e.g., "Guarda il ragazzo!"). At every age, infants increased their looking to the target image in both gender comparison conditions and in the feminine singular/plural condition but not in the masculine singular/plural condition. To examine this discrepancy, we also tested if infants could map singular/plural morphological regularities to singular and plural groups of objects (e.g., one spoon, two spoons). Here, infants succeeded in mapping the masculine morphological regularity to the conceptual distinction. The studies demonstrate that by 12 months, infants begin to comprehend morphological regularities and the rules they mark.

Keywords: language acquisition, morphology, rule-learning, infant cognition

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THE IMPACT OF SOCIAL CONTEXT ON CHILDREN'S EXECUTIVE PERFORMANCE

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Our aim is to examine how the social context (i.e., cooperation, competition) may influence cognitive control in childhood. Prior work has shown that cooperation could enhance cognitive control during childhood and adulthood. In contrast, competition has yielded mixed findings, improving or hampering cognitive control in adults, and has never been tested in pre-schoolers to date. Further, the mechanisms specific affected by cooperation and competition remain unclear. In the present study, we will test the hypothesis that cooperation and competition influence the type of cognitive control that children use. Specifically, we hypothesize that cooperation enhances goal maintenance in children, hence encouraging children to exert cognitive control proactively (i.e., actively anticipate events that will require control). In contrast, competition may favour the utilization of reactive control (i.e., engage control in the moment, in response to occurring events). Our participants are 3.5-5 year old preschoolers. In the experiment we are using an executive functioning task (AX-CPT) and eye tracker to collect pupillometric data. We are manipulating the conditions in three different ways: neutral, competitive and cooperative with a help of a research assistant.

Keywords: executive performance, proactive control, reactive control, preschoolers, social context

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INFANTS' DETECTION OF PERFECTLY AND SOCIALLY CONTINGENT REACTIVITY

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Contingent reactivity might be an important communicative cue in early infancy to establish social interaction. Several studies have shown that infants are able to discriminate between motion patterns that are fully contingent with their own behavior (e.g., their mirror image) from non-contingent ones at around the second month of life. However, social reactivity is highly-but-imperfectly contingent (delayed by seconds, not fully predictable). The goal of the present experiment is to assess infants' sensitivity to stimuli that correspond to socially contingent stimulation, and specifically to determine whether they have a unique preference for it. We tested 4-month-old infants in four experiments in a preferential looking paradigm, using an eye-tracker. Infants were presented with the live video image of their own body (or leg) on one side (perfectly contingent), and either a long delayed (non-contingent), or a mixture of short and long delayed (socially contingent) video image. Preliminary results indicate that 4-5 month-old infants look longer to the condition of perfectly contingent reactivity relative not only to socially contingent reactivity, but even to non-contingent reactivity. Our data analysis focuses on the level of complexity of the stimuli (i.e., body vs. legs), and the amount of motion that is necessary to establish preference

Keywords: contingency detection, social reactivity, preferential looking, eye-tracking, switch

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WORD AND SYLLABIC SEGMENTATION IN 6-MONTH-OLDS FRENCH-LEARNING INFANTS

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Before learning words, infants must extract their sound forms from fluent speech (segmentation ability). Numerous studies have established the emergence of word segmentation by 8 months, and have started identifying the cues used to retrieve

word forms (in particular, rhythmic units and transitional probabilities). The present study focused on the ability of 6-month-old French-learning infants to extract the rhythmic unit of their native language (the syllable) from fluent speech. Using the Headturn Preference Procedure and the passage-word order (familiarization with passages, test with isolated syllables), this study was conducted at an earlier age that syllabic segmentation was shown before in French. In Experiment 1, we tested segmentation of monosyllabic words, demonstrating such segmentation at 6 months. Experiment 2 was conducted in order to explore the segmentation of syllables embedded in bisyllabic words (hence in a case in which the syllabic and lexical levels are distinct) at the same age. The results failed to show a segmentation effect. However, in Experiments 1 and 2, infants were familiarized only for 30s. To determine if longer familiarization is needed for syllabic segmentation, Experiment 3 replicated Experiment 2 with a 45s familiarization. French-learning 6-month-olds were able to extract syllables from bisyllabic words under these conditions. Taken together, these experiments are the first to show syllabic segmentation in French-learning 6-month-olds.

Keywords: Word Segmentation; Infants; French; Prosodic units; Syllables

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**SIX-MONTHS-OLD INFANTS RESOLVE AMBIGUOUS APPARENT MOTION BY
ASSUMING EYE-LIKE CONTRAST POLARITY BETWEEN FOREGROUND AND
BACKGROUND**

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Human infants are sensitive to dynamic gaze direction and to eye-like contrast polarity from birth. However, it is not known whether they rely specifically on contrast-polarity information to identify gaze direction. We tested six-months-old infants (N=48) using a spatial-cueing paradigm. On each trial, a target, randomly presented on one side of the screen, was preceded by a non-predictive central apparent-motion cue (a light and a dark square, swapping locations). We hypothesized that infants' preference for the eye-like contrast polarity should lead them to perceive the apparent-motion cue as directional despite its ambiguity. We found faster initiations of saccades towards the target when its location was congruent with the movement direction of the dark rather than the light square. Moreover, infants showed this pattern of saccadic-reaction times only if the cue was accompanied by an auditory ostensive signal ("Look!" uttered with infant-directed prosody). These results demonstrate that infants' early sensitivity to the eye-like contrast polarity can support the identification of motion direction, and are consistent with the existing findings about the role of communicative signals in gaze-direction processing by human infants.

Keywords: eye-like contrast polarity, apparent motion, gaze direction, spatial cueing paradigm, infancy

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UNDERSTANDING CARDINALITY BY PRESCHOOLERS

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It takes over a year for children to learn the meanings of the first three number words. They eventually master the logic of counting and the meanings of all the words in their counting list (termed as understanding cardinality), when they learn number four, around age three or four. According to our computational model children actually have all the prerequisites making them able to understand cardinality much earlier. Additionally, we suppose that although children might be able to understand the cardinality principle earlier, they do not reach this stage for a long time, because they do not know what counting is for, and they also misunderstand the meaning of the words "one", "two" and "three". Based on this new model we created the "Feed the animals!" game: the game explicitly points to the problem of quantification and demonstrates how numbers can be used to solve this problem. According to the result of the training most of the formerly subset knower children were able to understand the cardinality after 2-4 short (20 minutes) sessions. Essentially, the successful training results are in line with our suggested model of understanding cardinality.

Keywords: understanding cardinality, preschoolers, training

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LONGITUDINAL STUDY ON CHANGES IN THE VISUAL VENTRAL OCCIPITO-TEMPORAL CORTEX DURING THE FIRST YEAR OF READING ACQUISITION

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Reading acquisition requires the development of expertise of the visual system in recognizing arbitrary signs and the link of visual areas with the linguistic network. Specific changes induced by reading acquisition and occurring in ventral occipito-temporal cortex, are explained by neuronal recycling hypothesis. According to it, certain fusiform gyrus's neurons implicated in visual recognition of other object categories (faces and tools), have their function modified to recognize those signs we

know as letters and words. During the present study, ten six years old, French healthy children underwent structural and functional 3T MRI scanings every two months during their first year of reading instruction. They were assessed for reading level, handedness, verbal abilities, and other abilities that have been proven to be predictive of reading difficulties. Every session, eight categories of visual stimuli (houses, faces, words, numbers, tools, bodies and high and low frequency grids) were presented in a mini-block paradigm (stimuli presentation was counterbalanced). After one year of reading instruction, children showed nonspecific activation to words and numbers in the regions known to participate in the phonological reading strategy. Nonspecific response to faces is similar to adults and specific responses to bodies, tools and houses are clearly adult like.

Keywords: reading, developement, fMRI, ventral stream, visual object recognition

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LEXICAL DECISION TASK - READING WORDS AND PSEUDOWORDS IN PATIENTS WITH APHASIA

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Aphasia is an acquired communication disorder caused by brain damage that impairs a person`s ability to understand, produce, and use language. In most aphasias, patients have difficulties in finding words. According to that, it is reasonable to expect that patients with aphasia will have difficulties in differentiating words and pseudowords. The aim of this research is to establish ability to differentiate words and pseudowords in aphasics. The hypothesis are that patients with aphasia will have longer reaction time in lexical decision task, and that patients with aphasia will have more wrong answers than the control group. In this study participated 15 patients with aphasia included in speech therapy in Polyclinic SUVAG and 15 controls. Words and pseudowords used in experiment were from Articulation test (Vuletić, 1990) and examinees had to read them on screen. After reading the word they had to press a button if they recognized a word. After e-prime testing, all examinees were tested using PPVT-II-HR test as a behavioral measure. The results have shown that patients with aphasia had longer reaction time and more errors in recognizing words and pseudowords.

Keywords: aphasia, lexical decision task, e-prime

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INFANT DIRECTED SPEECH AND DIRECT EYE CONTACT SHARE COMMON NEURAL BASIS

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Infants' sensitivity to ostensive signals, such as direct eye contact and infant-directed speech, is well documented. However it is not clear whether:

1. infants are sensitive to ostension as such rather than to the attention catching properties of ostensive signals
2. infants respond to co-occurring ostensive signals with additive arousal, or they respond to the presence/absence of ostension in the communication.

We investigated how 5-month-old infants interpret such signals by measuring neural responses such as gamma-band oscillations and event-related brain potentials (ERPs) to their compounds. In Experiment 1, we found that ostensive signals from different modalities display overlapping electrophysiological activity in 5-month-old infants, on both gamma oscillations and ERPs, suggesting that these stimuli share neural processing mechanisms independently of their modality. In Experiment 2, in which infants were presented with compounds of audiovisual stimuli, gamma oscillations did not show a pattern of activation consistent with any of the a priori hypotheses. However, the ERPs showed that the activation to ostensive signals from different modalities reflected the presence of ostension in either stimulus stream. These data support the thesis that ostensive signals obligatorily indicate to young infants that communication is directed to them.

Keywords: infants, ostensive communication, multimodal signals, ERP, gamma oscillations

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THE ACQUISITION OF REFLEXIVE VERB CONSTRUCTIONS IN CROATIAN: CORPUS-BASED STUDY

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The group of reflexive verb constructions in Croatian encompasses semantically and syntactically diverse verbs: intransitive verbs with obligatory reflexive marker, intransitive verbs that have reflexive marker only in some constructions, and subgroup of transitive verbs that can be accompanied by reflexive marker if it marks either intransitivization of the verb or co-reference of the arguments, i.e. reflexive/reciprocal meaning. Given the diversity of reflexive constructions, children

acquiring them in Croatian have a rather difficult task. In order to examine this process, reflexive constructions in linguistic production of three children aged 1;2-3;2 were studied. The data were extracted from Croatian corpora in CHILDES database using CLAN software. Reflexive constructions from children's utterances containing proper usage, overgeneralizations and omissions of reflexive marker were analyzed in terms of the verb's argument structure (one- vs. two-argument verbs) and the semantic and/or syntactic role that reflexive marker carries in a specific construction. The results give insight into the chronological aspect of the acquisition of verbs relative to their argument structure in Croatian, and demonstrate the process of learning to express semantically specific concepts, such as reflexivity and reciprocity.

Keywords: linguistic production, verb acquisition, reflexive marker, verb argument structure, reflexivity

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THE ROLE OF CENTRATION IN HUNGARIAN PRESCHOOLERS' INTERPRETATION OF EXHAUSTIVITY

Lilla Pintér, Pázmány Péter Catholic University, Hungary

This poster will give account of an experiment demonstrating that 6-year-old children cannot access the exhaustive interpretation of sentences like (1), and will argue that this is not only due to their immature grammar, but also to their immature cognitive abilities. (1) A [MACI]FOC kapta meg a csokoládéját ("It is the teddy bear who got his chocolate") Adult native speakers of Hungarian interpret sentences like this exhaustively, i.e. they accept it as a proper description only if there is no other animal in the scene that got a chocolate. As opposed to this, preschoolers find (1) overwhelmingly acceptable in cases when someone else got a chocolate, too. It is a well-attested fact that children in the pre-operational phase (between the age of 2 and 7) show evidence of centration, which is the tendency to focus on only one salient aspect of a situation, and to neglect any other potentially relevant aspects. I assume that this cognitive characteristic of preschoolers can bias their results in the Truth-value Judgement Tasks and Picture Matching Tasks. Therefore I compared these results to those of a test that measures centration, so I can prove that children at the age of 6 do not solve these tasks in a consistently non-adult like fashion because they have not acquired the exhaustive meaning of the Hungarian pre-verbal focus yet, but because they basically ignore all the other relevant subjects and objects.

Keywords: centration, exhaustivity, pre-verbal focus

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DEAFNESS, SIGN LANGUAGE, AND COGNITION

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Lack of access to one sense modifies brain adaptation to other environmental sensory inputs. Deafness is a kind of sensory deprivation that specifically enhances visual communication skills developed due to sign language. The effect of visual communication on psychocognitive features is unsettled. In this study we seek to determine emotional intelligence, assessed from the ability to discern emotions from facial expressions, visual and mental attention, and non-verbal fluency in the deaf people in comparison with the hearing ones. We examined 29 prelingually deaf people aged 40-50, communicating only in sign language, and 30 age-matched hearing persons. Mental measurements included: Emotional Intelligence Scale-Faces, d2 Test of Attention, and Figural Fluency Test. The findings were that the deaf defined significantly fewer emotions as known, compared with the hearing ones. However, the deaf men, but not women, were able to properly recognize a higher percentage of emotions associated with a definite face look, among the emotions they knew. In contrast, the deaf women, but not men, fared better in non-verbal fluency, compared with the hearing persons. Deafness had little effect on attention. In conclusion, despite gender differences in brain adaptation to handle visual inputs, deafness does not impede the processing of cognitive tasks.

Keywords: visual communication, sign language, cognitive functions, deafness, sensory loss

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PRIMING THEMATIC STRUCTURE DURING SENTENCE COMPREHENSION IN THE ABSENCE OF SYNTACTIC REPETITION

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The structure of previous sentences influences both production and comprehension of subsequent sentences, although there is less support for the latter. The repetition of syntactic structure is thought to be the main driver of structural priming and while evidence for the influence of thematic roles is controversial, the two are often confounded in the literature. Our goal was to disentangle their respective influences. An experiment showed that a shared thematic structure was sufficient to elicit structural priming effects during comprehension of ambiguous sentences in the absence of syntactic repetition. When participants read an unambiguous prime sentence with an instrumental thematic role they tended to interpret the corresponding role in the ambiguous prepositional phrase in the target as an instrument as well. This effect was present only when prime and target sentences shared their whole thematic structure, not only the key role. The effect size was

comparable to those reported by studies that confound the two structures which suggests that the thematic structure is primarily responsible for structural priming of comprehension. Finally, we propose that structural priming is the result of automatic analogical mapping and transfer.

Keywords: structural priming, thematic roles, language comprehension, analogical mapping

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NEURAL SUBSTRATES OF OBJECT TRACKING AND OBJECT MAINTENANCE IN 6-MONTH-OLDS

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Young infants display rich abilities underlying object tracking and object maintenance, however it is unclear how these two abilities are related and whether they share specific underlying neural substrates. The aim of this study was to investigate the relation and the neural basis of these mechanisms early in development.

We measured the neural correlates of object tracking and object maintenance in 6-month-old infants with Functional Near InfraRed Spectroscopy (fNIRS). Infants were presented with short scenes about animated animals in two conditions. In the Object Maintenance condition the target animal moved behind an occluder, while in the Object Tracking condition the target went among other similar animals. According to the results representing the two scenes recruited partly similar and partly different brain structures. In the Object Maintenance condition a significant activation was observed in the left superior temporal and frontal channels, while the Object Tracking condition elicited activation in bilateral inferior temporal and left superior temporal channels. While the two tasks showed an expected dissociation (Object Tracking involving higher inferior temporal and Object Maintenance higher frontal activation), the similar superior temporal activation may reflect a shared mechanism common to both conditions (possibly sustaining an object file).

Keywords: object tracking, object maintenance, fNIRS

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WHAT DO EXPERIENCED SIMULTANEOUS INTERPRETERS KNOW THAT WE DON'T? WORKING MEMORY AND CREATIVITY UNDER INVESTIGATION

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OBJECTIVES: Simultaneous interpreting (SI) is an extreme aspect of bilingual language control which requires outstanding cognitive skills. The objective of this study is examining how simultaneous interpreting influences the development of the subcomponents of Baddeley's working memory model (WM) and investigating the association between SI and creativity.

METHOD: Multiple measures of the subcomponents of WM and creativity were carried out by comparing experienced simultaneous interpreters ($n=20$; $\text{exp} > 8$ yrs, mean age= 50, 9; $\text{SD}= 9,95$), and a non-interpreter group constructed using the matching sample method, factors controlled were sex, age, education and language proficiency.

RESULTS: Simultaneous interpreters performed significantly better on all factors of the Circles subtask of the Torrance TCT and also outperformed the controls on the Digit Span Backward and the Response Suppression condition of the Hayling test, showing better executive functioning and complex verbal working memory capacity. No difference was found on all other measures of the capacity of the phonological loop and visuospatial sketchpad.

CONCLUSIONS: As techniques become proceduralized in SI, the role of the phonological loop and visuospatial sketchpad of Baddeley's WM model play a lesser role whereas outstanding executive functions and creativity become a critical skill.

Keywords: simultaneous interpreting, working memory, executive functions, creativity, Hayling test

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BIASED FACIAL JUDGMENTS OF TRUSTWORTHINESS IS ASSOCIATED WITH RELATIONSHIP QUALITY OF EGO-CENTRIC SOCIAL NETWORK AMONG PATIENTS SUFFERING FROM PERSONALITY DISORDERS

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People make fast and easy judgments on traits of trustworthiness using facial features, and these impressions may influence their appraisal of social partners' intentions. Patients suffering from personality disorders (PD) are prone to under

attribute trustworthiness to faces. It needs further investigation whether PD patients 'under attribution of trustworthiness is related to their appraisal of social partners' intentions in their ego-centric network.

Our goal was to investigate the associations between judgments of trustworthiness based on human faces and relationship quality in the participants' egocentric social network. This is a way to introduce an existing social modulator characterizing the evaluator into cognitive/emotional judgments.

Methods: 43 patient (37 female, mean age:36.3, SD:13.3) suffering from PD. To investigate perception of trustworthiness we used female and male trustworthy/untrustworthy faces morphed monotonically along 7 grades. Ego-alter relationship quality was measured by social network questionnaire. Results: There were significant negative associations between trustworthiness ratings of faces and malevolence attributions to social partners in the participants' ego-centric social networks.

Discussion: Negative facial judgments of trustworthiness were shown to be associated with higher malevolence attribution to partners in the egocentric social network of individuals with PD.

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Keywords: ego network, facial personality trait perception, trustworthiness

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WORDS ACTIVATE CONCEPT FORMATION IN ADULTS AND CHILDREN EVEN BEFORE THIS TASK HAS BEEN OFFERED

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The effect of language on concept formation and development is an ongoing debate among researchers (Sloutsky, 2010). According to the previous research labels can facilitate concept formation even if they aren't used as a feedback (Lupyan et.al., 2007). However in most research investigating language influence on category learning, the varying of verbal labels often correlates with the varying of perceptual features. Such confound doesn't allow to clarify if the language is used as a mean to enrich the perception or it's a social marker for generalization. In our experiment we have separated the process of concept formation from the word use. Adults and 4-6 year-olds performed noncategorical visual identification task either with or without labels for target objects. Right after that task subjects had to form a concept on the basis of new categorial information added to the target objects. Only subjects from the label condition (but not subjects from the no-label condition) formed a concept. Additionally we found that the older the subjects were, the stronger the influence of language on concept formation was. These results prove that the effect of language

influence on concept development can be more distant in time than it was supposed before.

Keywords: concepts, concept formation, language, label, preschoolers

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COMPARING THE EFFECTS OF BILINGUALISM AND SECOND LANGUAGE LEARNING ON AUTOMATICITY IN READING

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The present study aims to investigate the scope of bilingual and second language automaticity in reading. More specifically, it aims to define whether different levels of bilingual language proficiency produce differences in automaticity in reading in the weaker language. We tested three groups of high school children: the first group were Croatian German early bilinguals, the second group were Croatian native speakers who started learning German in primary school and were currently enrolled in a German immersion programme at school and the third group were Croatian native speakers who started learning German in primary school and were currently learning German as a subject at school. We tested the participants on a modified version of the Stroop test in which they were presented with pictures of an animal or an object with names of an animal or an object written over the picture. The names of the objects and animals were written in one of the two languages: Croatian or German and were either congruent or incongruent. The four conditions were presented randomly. We found the Stroop effect for all three groups in Croatian language and the Croatian German early bilingual group demonstrated the Stroop effect in German language as well.

Keywords: bilingualism, automaticity in reading, second language learning

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WOLVES AND SHEEP: 14-MONTH-OLD INFANTS MAP NOVEL LABELS TO SOCIAL ROLES BUT NOT TO SURFACE APPEARANCE IN DYNAMIC SCENES

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We used eye-tracking methods to assess whether 14-month-old infants map a novel label to an abstract concept (a social role in an interaction) as easily as they associate it with perceptual features (visual appearance of an agent). In the training trials of Experiment 1, infants were presented with an animated agent chasing another one, and then a hand ostensibly pointed to and labelled the chaser with a nonsense word. Crucially, the appearance of the agents differed across trials. During the test, infants looked first, and significantly longer, at the chaser upon hearing the familiar word, compared to hearing a novel word. In Experiment 2, infants were presented with the two unchanging agents moving independently on screen, and in each training trial one of them was consistently labelled. When we applied the same test of word learning as in Experiment 1, we found that infants were unable to associate the trained label with the visual features of the agents referred. This pattern of result indicates that it is easier for infants to learn a label for an abstract concept than for an object characterized by certain perceptual features, which is incompatible with associative theories of word learning.

Keywords: label learning, abstract concept, perceptual feature, social role

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SPONTANEOUS LATERALIZATION OF MICE IN CHOOSING ARM OF THE T-MAZE

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Nowadays it is known that functional lateralization of human brain is a fact. More and more researches shows us, that also other species have lateralized mind. It is important for our knowledge of evolution to study animals behavior to find out more about this phenomenon. This is one of the main topic research in comparative and evolutionary psychology.

A T-Shaped Maze verifies whether an animal learned how to choose the appropriate arm, but we noticed that animals shows particular preference for torsion right in the first turn in T-maze.

Research we would like to present shows spontaneous lateralization of mice in choosing arm of the T-maze. In this research was analyzed behavior of 40 CD-1 mice: 20 female and 20 male. Each mouse was put into the maze. Under observation was first reaction - first turn into one of arms.

The statistically relevant intra-group differences in the amount of right entrances into arms displayed in bidominal test ($p=0,038$) mice more often used right sleeves -

Posters Session 1, Friday (May 23), 11:30–12:30

67,5% of mice chose to turn right on the end of the maze but no differences were observed in side of first turn reactions between male and female.

Keywords: mouse, lateralization, T-Shaped Maze

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ERP MODULATIONS IN MONO- AND BILINGUAL CHILDREN: IS THE N400-LIKE EFFECT LANGUAGE DEPENDENT?

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Our previous study with French monolingual children showed an N400-like effect in 18-month-olds with normal-high, but not with normal-low productive skills. The effect was found in all 24-month-olds. These findings suggest that lexical items are organized by their semantic relatedness at the end of the second year of life and even earlier in children with normal-high vocabulary skills. In our current study, we studied both monolingual and bilingual 18-month-old children in an auditory semantic priming task to investigate whether the N400 effect for French words is dependent on language exposure. The results showed that in monolingual children (n=22) the N400 effect was significant over the frontal and posterior recording sites. However, the frontally distributed N400 response was modulated by SOA length between prime and target words. The N400 response was obtained only in the short SOA condition whereas over the posterior sites, the effect occurred in both short and long SOAs. The results of bilingual children (n=9) are currently being analyzed. The results will be discussed in terms of development of cognitive processes related to automatic and controlled mechanisms underlying semantic priming.

Keywords: Semantic priming; Bilingualism; ERPs; N400; Language development

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BENEFICIAL EFFECTS OF NAPS ON NOVEL WORD LEARNING IN 16-MONTH-OLDS

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There are many studies suggesting that sleep and cognition are related; however, the developmental aspects of the relationship are rather neglected. In this study, we aim to investigate how a nap effects novel word learning in laboratory environment. 16-month-old infants were randomly assigned to nap and wake groups. Both groups are taught two pseudowords in an interactive play and an on-screen training session. Their performance was tested in the intermodal preferential looking task using eye tracking immediately after training and after a nap (nap group) or equivalent waking period (wake group) as well. We compared target looking times and proportions between the groups and a significant interaction of session and group was revealed. Immediately after learning, infants in the wake group performed better, but after a

period of 1.5 hours, they seemed to forget the new words. Contrary, although infants in the nap group did not show learning before their naps, their performance was significantly better after sleeping. To the best of my knowledge, this study is the first which showed sleep dependent memory consolidation in such young infants.

Keywords: sleep dependent memory consolidation, infants, word learning, nap

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POSITIVE EMOTIONS ENHANCE THINKING: THE ROLE OF EMOTIONS ORIGINS AND TASK DIFFICULTY FOR THE EFFICIENCY OF LINEAR ORDER REASONING

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One of the main thesis resulting from the knowledge gathered so far in field of emotion - cognition interactions is that positive emotions give the beneficial effects on cognitive performance. This poster presents data based on the duality of mind theories distinguishing automatic and reflective processes. We assume that positive emotions should improve cognitive performance in case of linear order reasoning accuracy. This relationship should be observed when both the emotional process and cognitive task operate in the same mental system (reflective one). Study involved 43 subjects (26 women and 17 men), students from various Warsaw universities, aged from 19 to 25 ($M=21.8$; $SD=1.65$). Task was to read sentences describing states and situations connected to emotions (positive of automatic or reflective source) and imagining what may feel person in such a situation. Second task was to learn linear order syllogism (e.g. $A>B$; $B>C$; $C>D$), by creating mental model (imagining relationships between objects) and answer a few questions (e.g. Is $B>C$?). Collected data show the accuracy of predicted hypothesis with. After imagining situations described in sentences connected with reflective emotions subjects gave more accurate answers than in conditions of automatic emotions and neutral ones. Described effect referred specifically to the difficult questions, requiring a transitive relationships (separated by one additional object; e.g. Is $A>C$?).

Keywords: Automatic and reflective emotions, duality of mind theories, linear order reasoning

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EEG EVIDENCE OF STATISTICAL LEARNING IN PREVERBAL INFANTS

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Statistical learning is a powerful implicit learning mechanism that infants can use to perform complex computations of co-occurrences among adjacent or more distant elements. We investigated infants' ability to extract the underlying structure of a continuous speech stream using electroencephalography. We also explored the interplay between experience and maturation, comparing 8-months-old full-term with preterm infants matched by maturational age or duration of exposure to speech. First, during a training session, infants were exposed to a 2 minutes continuous synthesized speech stream comprising AxC "words" separated by a subliminal 25ms pause. Then, during the subsequent test session, infants were presented with either "rule-words" that did not appear during training, but followed the training rule, or "part-words", that appeared in the stream, but violated the rule. Using frequency tagging to analyze the training, we found a power increase at the syllabic but also at the word frequencies suggesting that infants were indeed parsing the stream into words. Rule learning was confirmed by the significantly different responses to "rule-words" and "part-words" around 550ms and 1400ms after word onset. These results observed in the 3 groups suggest that long-distance dependencies are rapidly and easily used by infants to extract structural regularities in speech.

Keywords: Statistical learning, language, electrophysiology

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EXHAUSTIVENESS IN HUNGARIAN: EXPERIMENTAL INVESTIGATION ON INDIVIDUALS WITH APHASIA

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Based on introspection, generative linguistic accounts claim that the Hungarian preverbal focus (pre-VF) has exhaustive interpretation determined at the syntax-semantics interface, as well as the syntactically analogous structure associated with the progressive aspect. Alternative pragmatic accounts, however, claim that the interpretation of pre-VF is determined by contextual and cognitive factors. The purpose of our work is to examine the issue experimentally by looking for dissociation between: (1) the exhaustiveness of pre-VF interpretation, (2) the interpretation of the

analogous structure, and (3) the logico-semantic operation necessary for exhaustive interpretation. The generative account predicts that (i) pre-VF has exhaustive interpretation, (ii) the two syntactically analogous structures are interpreted with equal consistency, (iii) since the syntactic and logico-semantic operations are jointly responsible for the exhaustive interpretation, performance in (1) can be derived from performance in (2) and (3). The experiment was conducted on subjects with moderate agrammatism and controls. The aphasic group was involved, since if pre-VF is a syntactic-semantic phenomenon, the aphasic group should have difficulties with (1) and (2). The predictions of the generative view were not borne out. The results of the two groups converged: pre-VF is not interpreted exhaustively while aspectual differences are consistently interpreted by both groups. The findings support the pragmatic account.

Keywords: information structure, exhaustivity, syntax-semantics interface, aphasia

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14-MONTH-OLDS TRACK OTHERS' BELIEFS ABOUT NUMEROSITY

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Infants' understanding of others' beliefs has been documented in a wide range of tasks. Recently it was proposed that infants' ability to attribute mental states is limited and does not extend to identity or numerosity (Butterfill & Apperly, 2013). We tested whether 14-month-olds show sensitivity to another person's belief regarding the number of objects in an opaque box. We used a manual search paradigm where infants search longer if they think there is still an object present (Feigenson & Carey, 2003). Infants saw a scene where objects were put into, and occasionally taken out from a box by two Experimenters (E1 and E2). In the end, E2's belief about the number of objects either corresponded to the child's knowledge (True Belief), or differed from it (False Belief). We measured the duration of infants' object-search after this manipulation. Results show that search times were influenced by the belief of E2 regarding the number of objects [0/1] remaining in the box. This provides support that infants' reasoning about mental states involves sophisticated representational abilities that exceed the limits of proposed simpler mindreading forms (e.g. Rakoczy, 2012). Hence, this casts doubt on the necessity for separate systems for simpler and advanced mentalizing abilities.

Keywords: Theory of Mind, infants, development, numerosity

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ARE VISUAL TYPES BASICALLY VISUAL? THE EXPLORATION OF THE VISUOSPATIAL MEMORY PERFORMANCE IN IMMEDIATE SERIAL RECALL OF VISUALLY SKILLED AND UNSKILLED SUBJECTS

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AIM: The study primarily aims to evaluate the relation of basic visual processes, executive functions and visual skills in a sample of professionally trained (architects, designers, etc.) and visually non-trained individuals. Second, the experiment seeks answers whether the relation of basic visual processes and professional training appears in metacognitive level or is independent of it.

METHOD: Visually trained and control subjects were tested online with four working memory (WM) tasks: (1) a control version of the Corsi Block Tapping Test (CBTT) measuring visuospatial sketchpad (VSSP); (2) a variant of CBTT test measuring VSSP and the serial component of Central Executive (CE); (3) a variant of CBTT measuring VSSP and self-monitoring component of CE; (4) a variant of CBTT measuring the inhibition component of CE.

RESULTS: Results show that the most difficult task to perform is the inhibitional task and self-monitoring can contribute to a better performance. However, no significant differences were found between the visual trained and control subjects across the four tasks.

CONCLUSIONS: Visuospatial processes play a smaller role in the immediate spatial recall performance, while executive functions, like inhibition or self-monitoring ability seemingly are more important abilities in visual creativity.

Keywords: working memory, executive functions, Corsi Block Tapping Test, immediate serial recall, metacognition

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PROCESSING OF STRESS CONTRAST IN A SEQUENCE RECALL TASK BY CROATIAN SPEAKERS

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Phonological system includes segmental, but also rhythmical and prosodic features which can have discriminative role and dissociate lexical units. Depending on prosodic characteristics of the native language, speakers can differ in their ability to process and represent prosodic features. Dupoux et al. (2001) showed that French speakers have a marked difficulty to process stress information ("stress deafness"), as compared to Spanish speakers. The suggested background of this difficulty is that in French stress is non-discriminative, but in Spanish the location of stress carries

lexical information (e.g. Spanish).

In the present study, we investigated the stress processing performance of Croatian speakers. In Croatian, suprasegmental features can have discriminatory role, but the stress location rarely dissociates two lexical units, thereby Croatian differs from languages presented above.

In the experiment, the sequence recall task (Dupoux et al, 2001) was used in order to avoid discrimination based on direct acoustical cues. High phonological variability, high memory load and limited time ensured that speakers used abstract mental representations of phonological features. Participants were monolingual adult speakers of Croatian. The results showed no differences between phonological processing on segmental and suprasegmental level in Croatian speakers. These results will be used to plan future research and to study special populations.

Keywords: speech perception, phonology, stress

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WHAT NUMBER REPRESENTATION DO PRESCHOOLERS USE: ANALOGUE MAGNITUDE SYSTEM OR OBJECT RELATED REPRESENTATION?

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Our research contrasts the analog magnitude system (AMS) and an object based representation in numerical task. According to the AMS model the system stores the values as continuous magnitudes, and this AMS has a strong spatial property. In contrast, an alternative discrete representation stores quantities in an object based representation.

We assume that children can more easily work with stimuli and tools that better suit to the internal representation. According to the AMS model, children should perform better using tools similar to the spatial mental number line, presenting the quantities in a continuous order, e.g. a number line. Conversely, in the case of an object based representation, children should perform better using discrete objects, e.g., disks. Participants included cardinal-principle-knowers, ranging the age of 5 to 7 years. In order to test the two possible models, we gave the children simple arithmetical operations such as addition and subtraction, using different counting tools: either number line or disks.

The results show that children make less error with disks than with number line, and they prefer using disks over the number line. The number line tool is less intuitive than the disk tool. These results are in contrast with the spatial model of AMS, and confirm the role of the object based number representation in the early developmental phase of exact enumeration.

Keywords: analog magnitude system, object based representation, discrete vs. continuous representation, preschoolers

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CHANGES IN NEURAL CORRELATES OF PERFORMANCE MONITORING DURING THE TRANSITION TO YOUNG ADULTHOOD

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Transition to adulthood is a period of high cognitive challenges which require particular skills for success in fulfilling everyday tasks, such as self-control, performance evaluation and behavioural adjustment. These skills are controlled by the prefrontal cortex. Robust age and sex differences were noted in the prefrontal cortex maturation during childhood and adolescence, and these differences extend into young adulthood. However, research on related cognitive changes during young adulthood is scarce. The aim of this study was to examine whether and how the experience of adult transitions and the protracted development of prefrontal cortex foster self-control functions crucial for mature adult behaviour: response inhibition and performance monitoring. To examine this, we used a go/no-go paradigm and fMRI, focusing on a narrow age range (18 - 25), comparing late adolescents (age 18 - 19) and young adults (age 23 - 25). During performance monitoring, late adolescents showed more activation in right inferior frontal gyrus than young adults, while males showed more activation in left inferior parietal lobe than females. No effects of age and sex were found for response inhibition. Our findings suggest continuation of age and sex-related differences in neural mechanisms underlying performance monitoring well into young adulthood.

Keywords: functional MRI, prefrontal cortex, cognitive development, go/no-go, performance monitoring

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DEVELOPMENT OF UNDERSTANDING ZERO IN PRESCHOOLERS

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Whether the concept of zero is a part of an innate number system or a purely semantic concept we acquire, understanding its development could help to understand the development of numerical cognition. The results of the few studies targeting this issue were contradictory.

As a starting point we hypothesize that (1) for preschoolers the less sophisticated concept of nothing is sufficient for solving the numerical tasks typical for their age and moreover, (2) it is impossible to differentiate between the concepts of zero and

nothing at this age.

We investigated whether 3-5-year-old children: (1) understand the word zero, (2) can use zero in simple tasks such as comparison, addition and subtraction, and (3) know that zero is a number.

Our results showed that children can use the concept of nothing as well as they use natural numbers in numerical tasks, however, they typically learn the word zero as a synonym of nothing at a later stage. Additionally, they are uncertain about the status of zero as a number, potentially because they think that number is a property of a set, while zero describes the lack of a set. The latter finding might reflect an object-based number representation in preschoolers.

Keywords: numerical cognition, zero, pre-schoolers

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HOW TO MEASURE EGO-NETWORKS?

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When trying to assess a person's ego network researchers face- among others - the problem of interpretation (subjects might interpret the instruction differently) and the issue of forgetting (subjects might forget relevant persons when they have to recall them from memory).

Goals: We wanted to examine if these issues are present when using an instruction ("name generator") developed by Robin Dunbar aimed at assessing a person's close and frequent relationships ("inner circles", 15-20 acquaintances).

Method/Sample: 94 university students - assigned to two groups - took part in the experiment. In the free recall phase one group got Dunbar's name generator while the other got three simpler name generators. In the second phase both groups were allowed to use a memory aid (mobile device phonebook) to add more persons to the list of acquaintances.

Results/Discussion: Our results suggest that the size of the Dunbarian inner circles is robust and insensitive to the use of different name generators. The use of mobile device phonebook increased the number of acquaintances recalled by 14,3% (from 14,11 to 16,14 acquaintances), however these connections were significantly less important emotionally than those reported from memory.

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Keywords: ego network, name generator, memory aid

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DEVELOPMENT OF DOMAIN-SPECIFIC CATEGORY KNOWLEDGE: AN EYE-TRACKER STUDY

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Domain-specific category organization is well documented in adults. However, not much is known about its development. The present study tested whether the head bias that was found by previous studies resulted from domain-specific or domain-general categorization processes. Our hypothesis was that in case of the former the head bias would not be confined to close species but it would rather be a general categorization strategy.

To test for the head bias four category pairs with normal and hybrid exemplars were created (cat-dog, fish-bird, bird-plane, fish-plane). Silhouette pictures of real category members were used in order to both encourage basic level discrimination and allow higher order similarity comparison that enables superordinate discrimination. Subjects (18 adults and 16 preschool children) were asked to name all 48 pictures while their eye movements were registered.

The registration of eye movements showed a global head bias and a divergence of eye fixation and categorization behavior in adults, which seems to be an important methodological point. Preschoolers were more conservative based on their eye movements, as they showed a universal head bias that was more robust in the animate-animate category contrasts. This shows that domain-specific category representation is stable at this age.

Keywords: domain specific knowledge, cognitive development, categorization, eye-tracking

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**NENCKI AFFECTIVE WORD LIST (NAWL) AS A LINGUISTIC TOOL IN
NEUROSCIENCE**

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In the behavioural and neuroimaging studies of emotion, the crucial challenge for a researcher is choosing the appropriate and controlled stimuli to evoke emotional states. So far, the standardized databases of verbal stimuli have been created in certain languages, yet not in Polish.

Nencki Affective Word List (NAWL) is the cultural adaptation of the German database Berlin Affective Word List-Reloaded (BAWL-R) (Vo et al., 2009). It consists of 2902 emotional and neutral words with the controlled psycholinguistic parameters, such as: frequency of use, number of letters and grammatical form. All the words have been standardized on the population of 266 subjects (130 men, 136 women) aged 20-52 years ($M=23,7$; $SD=4,99$) and mostly of Polish origins, on the dimensions of emotions such as valence and arousal, as well as imageability. The obtained ratings of emotional arousal and emotional valence formed the boomerang-shaped affective space, in which emotionally valenced words are characterized by higher arousal. Additionally, all the words were assigned to the following discrete emotion categories: happiness, anger, sadness, fear, and disgust.

The standardized NAWL database may be useful in studying emotions from both perspectives, dimensional and discrete, both on the Polish population and in the cross-cultural studies.

Keywords: verbal stimuli, valence, arousal, imageability

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**CHILDREN'S USE OF MULTI-MODAL IDENTITY CONCEPTS TO FACILITATE SPEECH
RECOGNITION**

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In adult speech perception, talker identity influences extraction of speech content from noise. Children can form identity constructs from an early age and show rapid learning of new face-voice identity pairs. An emerging issue is whether children

actively use identity cues to facilitate performance on linguistic and cognitive tasks. The present study investigated children's ability to use voice and facial identity cues to perform speech-in-noise recognition (N= 30; 6-10years, Mean age = 8.7 years). In Experiment 1A, six children performed a speech recognition task; keywords were recalled from sentences presented in noise. The signal to noise ratio of spoken sentences was varied (-5dB, 0dB, +5dB) and the identity of the speaker was either familiar or unfamiliar. Children showed a significant improvement of keyword recall for familiar speakers. In Experiment 1B, the speech-in-noise recognition paradigm was repeated for familiar speakers only, across 3 conditions with concurrent face cues (identity-matched face to speaker; familiar face but incongruent with speaker; unfamiliar face). Children's keyword recall was significantly better in the identity matched face-voice condition compared to the other two conditions. Findings imply children actively use multimodal identity knowledge to facilitate speech processing, with potential application to supporting speech comprehension in children at risk.

Keywords: person identity, multi-modal cues, speech-in-noise recognition

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ROLE OF COMMUNICATIVE CONTEXT IN EXTENDING FUNCTIONAL ATTRIBUTE FROM ONE TO ITS KIND

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The theory of natural pedagogy propounds that children interpret ostensively communicated object attributes as kind relevant. Three-year-old children are found to infer ostensively conveyed information to be generalizable to kind. However, a recent study showed that 18-month-old infants generalize knowledge from non-ostensive demonstrations, while not doing so from ostensive demonstrations. Infants were presented with a target action, eliciting a non-obvious dispositional property, performed ostensively or non-ostensively on a novel toy. The demonstration toy was then handed over to the infants, who were also tested with two inert test toys: one that was identical to the demonstration toy and one that differed in color. Infants in non-ostensive condition were found to perform more target actions on the test toys compared to the children in the ostensive condition. Our study attempted a fairly direct replication of this study with a few minor changes to emphasize the ostensive and non-ostensive nature of the respective experimental situations. Our results indicate that generalization to within-category objects that are differently colored is not significantly influenced by the contexts but strongly affected by negative evidence.

Keywords: Natural Pedagogy, Categorization, Function, Color

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THE DEVELOPMENT OF NON-NATIVE PHONEMIC CATEGORIES AT FIRST EXPOSURE

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The current study examines the development of non-native phoneme discrimination in the very first hours of exposure to a second language. Thirty-six native speakers of French received a total of 14 hours of oral input in Polish over a 10-day period. None of the participants had previously been exposed to Polish or another Slavic language and the input included no explicit phonological instruction. Participants completed an AX discrimination task at three intervals: T1 (0 hours of input), T2 (4.5 hours of input) and T3 (10.5 hours of input). Stimuli consisted of pairs of CV non-words including six fricatives from the Polish phonemic inventory: /sa/, /za/, /ɕa/, /ʒa/, /ʃa/, /ʒa/. Discrimination of non-native phonemes (/ɕa/, /ʒa/, /ʃa/ and /ʒa/) showed a main effect of Test Interval ($p = .0056$), indicating that participants' discrimination improved significantly as a function of input. Post-hoc analyses showed, however, that the difference was only significant between T1 and T3, suggesting that 4.5 hours of input was not sufficient for participants to begin to establish new phonemic categories. Nonetheless, the current results show a rapid and significant increase in the ability of participants to discriminate non-native sounds after very limited input in the target language, shedding light on the developmental course of adult phonological acquisition. Results will be discussed in light of current theories of implicit language learning.

Keywords: speech perception, second language phonology, phonological development, phoneme discrimination, first exposure

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COGNITIVE REPRESENTATION OF CLOSE PERSONAL-NETWORK HAS STRONG CONNECTION WITH WELL-BEING

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The study assesses whether the perceived quality and quantity of close personal ties affects the quality of life. We collected data on 1560 close personal ties from 95 participants on a female biased university sample (mean-age 23.5; SD=2.05). Participants completed an online questionnaire that collected personal (ego) and network data (alters) on close connections tapping onto the quality and frequency measures of the relationships. Our goal was to understand the relationship between quality of life and personal network characteristics in terms of emotional closeness,

liking, readiness to seek help in general and in emotional matters, conflict, the frequency of discussing personal matters, the frequency of communication, and the number of close connections mentioned. Except for the conflict variable we expected positive beta values in connection with well-being (WBI-5). We analyzed data by aggregating data collected on alters per individual and also by multilevel analysis using alter and individual data in hierarchical structure. Results on this sample show that only the number of alters (contrary to our previous results) and the single binary variable, readiness to seek help when facing emotional problems were associated with well-being. These variables accounted for almost 20% of the variation of reported well-being.

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Keywords: ego-network, well-being, network-size, help-seeking, relationship

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"WHAT'S IN A NAME?" – CATEGORY LABEL VS IDENTITY LABEL IN LEARNING NOVEL CATEGORIES

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Every object being categorized can be described by two labels: category-label and identity-label. How are these two aspects related in the process of categorization? Does categorizing an object presented with a category-label result in object representation different than the one when an identity-label is presented? Novel category learning experiment was conducted to address these questions. Besides that, we examined how the shape-sound mapping within the object-label relation influences potential effects. The hypothesis was that learning objects with category-label would result in faster categorization than learning with individual-labels, and that this process would happen faster in shape-sound congruent than in incongruent condition. The task consisted of two learning blocks (with and without feedback, respectively), followed by a test-block whereby participants classified two simultaneously-presented-items as same or different. RT analysis in the first-learning-block showed that participants were faster in congruent condition and more accurate when category-labels were introduced, while no differences in speed or accuracy were found in the second-learning-block. The test-block revealed significant three-way (TaskTypeXCongruencyXTargetsIdentity), as well as IdentityXCongruency interaction. Taken together, these results indicate that learning label-object mapping is facilitated in congruent condition and that category-labels can activate more categorical representation of objects than when objects are acquired with individual-labels.

Keywords: categorization, category-label, identity-label, shape-sound mapping

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DOES VERBAL NEGATION BOOST REPRESENTING THE ABSENCE OF OBJECTS IN INFANTS?

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While there is a rich literature concerning how infants represent various properties of objects, we know very little about whether and how they encode representations with empty content, specifically regarding the absence of objects. The purpose of the current series of studies is to investigate the role of language (specifically linguistic negation) in forming such representations. In three experiments, 15, 18 and 24-month-olds watched four or two objects hidden in an opaque box. After all or some of the objects were retrieved the experimenter told to the participant: "It's not [there]" (not to be - "Nincsen" in Hungarian) or "I don't find it" ("Nem találok"). If infants understand "It's not [there]" (not to be) they should search less in this condition. Our results show that 15 and 18-month-old infants did not differentiate between the two conditions. However, the older age group showed a different pattern, specifically they searched longer in the "I don't find it" than in the "It's not [there]" (not to be) condition, suggesting that they understand the linguistic negation "not to be". Such results raise the possibility that language may enhance the encoding of empty sets, which should be confirmed by further studies using non-verbal communication.

Keywords: object representation, negation, language

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TWO FACES OF THE SAME COIN? GIVING AND TAKING ACTIONS PRIME DIFFERENT REPRESENTATIONS OF SOCIAL INTERACTIONS IN INFANTS

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In light of recent studies about infants' sensitivity to distributive fairness, we sought to investigate whether infants' sociomoral intuitions about resource transfer extend to the domain of reciprocity. Across 6 looking-time studies, we found that 12-month-olds spontaneously formed expectations about the likely recipient of an act of reciprocity in the context of object-mediated interactions. Infants expected an agent who received an apple by another agent (Giver) to give back to the Giver rather than to an unrelated agent (Study 1-2); and an agent targeted both by a Giver and a Taker to give back to the former and take back from the latter (Study 3-4). These results *prima facie* suggest that infants expected agents to reciprocate in kind. However, Study 5-6 revealed that infants responded to a change in the direction of object transfer only for giving actions, thus suggesting that, while they encoded the identity of the agents interacting and the type of action relating them for both types of actions, they

represented the complementary action roles of the two agents (Giver, Givee) only in the giving case. Therefore, despite their seemingly specular nature, giving and taking actions may afford distinct representations of social interactions in young infants.

Keywords: social cognition, reciprocity, social relations

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**A FALSE BELIEF BIAS IN AN IMPLICIT TOM TASK: EVIDENCE FROM A
CONTINUOUS MEASUREMENT**

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Successful social interactions seem to rely on an efficient mindreading system, employing mechanisms that allow fast and largely automatic processing of the relevant information. Automaticity however, may have a cost. Here we tested whether processing of others' mental contents results in specific biases in adult participants (N=20). We developed an eye-tracking paradigm, where participants watched movies involving a central character that searched for a ball hidden in a sandbox at several possible locations. In half of the trials (false belief condition) the ball is transferred to a new location by a mechanic arm while the character is away. In the rest of the trials this transfer is seen by the character (true belief condition). The task was to point to the actual location of the target object on a touchscreen. While earlier paradigms involved discrete object locations this method allows continuous measures both for manual responses and eye-movements. Analyzing the scanning patterns allowed us to identify a spatial bias: the false belief location worked as an attractor for the eye. Participants demonstrated a shift of fixation coordinates toward the original location of the object only in the false belief but not in the true belief condition.

Keywords: theory of mind, eye tracking

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**MAPPING BEHAVIORAL AND NEURAL MARKERS OF PERFORMANCE MONITORING
IN CHILDREN USING EEG**

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Young children have been observed to be less efficient at adjusting control in comparison to adults in an effort to adapt to their environment. This study will investigate whether it is possible to facilitate an increase in internally driven performance monitoring and feedback processing in children in the absence of external feedback, to allow for more efficient adaptation to a progressively more demanding and changing environment. High-density-event-related potential (ERPs) will be obtained from 50 healthy participants (20 adults, 30 children) during a modified version of the Eriksen flanker (EF) task. Behavioral measures (e.g. error rates and response time) as well as neural activity associated with performance monitoring (ERN/NE, Pe) feedback processing (FRN) and cognitive control adjustment (N2) will be measured and compared between three different feedback conditions. We will assess how participants adjust their behavior during conditions when no external feedback about participants performance is provided, conditions when external feedback is provided, and conditions when the participants are asked to provide their own feedback estimating how well they believe they are doing on the task in the absence of external feedback. We predict, different adaptive according to the participants' form of difficulty with monitoring performance and processing feedback.

Keywords: performance monitoring, feedback processing, cognitive control, Eriksen Flanker Task, electroencephalography (EEG)

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**DO WE NEED AN OXYGEN-MASK FOR HOT EXECUTIVE PROCESSES? FOCUS ON
EMOTIONS, EMPATHY AND MINDFULNESS**

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Aim: This study investigated the link between self-reported mindfulness (nonjudgmental attention to present-moment experience) and different emotional processes, from the recognition of basic emotions to empathy.

Method: The study addresses the relationships between (a) dispositional measure of

mindfulness (FFMQ, Baer et al., 2006); (b) mindfulness ability as cognitive flexibility, measured with Necker-cube illusion task and (c) different measures of hot executive functions, like recognition of basic emotions, complex emotions, body-language, social inferences, social analogies, empathy.

Results: Overall the results suggest a negative correlation between emotional and social skills measurements and self-reported mindfulness (especially with Nonjudging factor). Furthermore, Necker cube illusion measuring cognitive flexibility could be used as an objective tool for measuring mindfulness abilities.

Conclusions: This pattern of results suggests that mindfulness is intimately linked to improvement of cognitive flexibility. Emotional functions tend to show an inverse pattern, explained by the fact that mindfulness-based interventions are focusing on reduction of emotionality, and during the therapy the oxygen-mask principle of empathy is applied. Mindfulness is more related with compassion, a concept and ability somehow different from empathy, being related with distinct brain activations. The relevance of these findings for mental balance and well-being are discussed.

Keywords: mindfulness, cognitive flexibility, emotional functions, empathy, compassion

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POINTING AND RECEPTIVE VOCABULARY

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Infants start pointing with their index-fingers by 10 to 14 months. However, the predictive role of pointing production for early language is relatively unexplored. In this study, 35 mother-infant dyads visited the lab three times when their infants were at 8, 10 and 12 months of age. To measure frequency of pointing we used a semi-observational Decorated Room paradigm to elicit pointing from infants and their mothers. We found a predictive effect of maternal index finger pointing frequency at 8 months on the display of infant pointing behavior at 10 months. We further collected maternal reports on infants' receptive vocabulary size using Turkish Communicative Developmental Inventory when the infants were 10 and 12 months old. We found that maternal index finger pointing frequency at 8 months predicted the percentage of action and non-action words comprehended at 10 months. We also found that 10 months old index-finger pointers and whole-hand pointers were reported to comprehend more action words by time, whereas non-pointing infants at 10 months did not show a significant developmental increase in the action words they comprehended. We will discuss these findings in relation to the possible role of pointing in preparing the way for early vocabulary comprehension.

Keywords: pointing, preverbal communication, early word learning

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THE DEVELOPMENT OF SECOND-ORDER THEORY OF MIND AND ITS RELATIONSHIP WITH LANGUAGE AND MEMORY

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There is a developmental lag between first-order and second-order Theory of Mind (ToM). While first-order ToM develops around the age of four, second-order ToM develops between the ages of five and six. Miller hypothesized that this gap could be related to the difficulty of realizing the recursive nature of attributing a belief to others or it could be related to the difficulty of holding in mind different beliefs, which adds complexity to working memory. Verbrugge also hypothesized that this gap is due to children's need to overcome serial processing rather than simple memory capacity. We tested these hypotheses with 124 Turkish children of ages from 4 to 12 years old, by using second-order false belief tasks (FBT_2), double-embedded relative clauses (REL_2), complex and simple memory tasks. The results revealed that even though REL_2 is a good predictor of FBT_2 for younger children (age range: 3;11 - 6;5), the complex memory score is a better predictor. Furthermore, we found that there is a significant relationship between comprehension of REL_2 and complex memory. Our results support the hypotheses of Miller and Verbrugge.

Acknowledgments: We are grateful to the Netherlands Organization for Scientific Research for Vici grant NWO-277-80-01, awarded to Rineke Verbrugge.

Keywords: Second-order Theory of Mind; Language; Memory

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EMPLOYING TYPES OF AGENCY AND PATIENCY IN PSYCHOTHERAPEUTIC DISCOURSE: A LONGITUDINAL ANALYSIS OF IN-SESSION INTERACTION

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Background: According to Jackendoff's concept of agency not only intentional actors (i.e. persons) may be regarded as agents, but inanimate objects or processes as well. Expanding this view to patiency, we use the expression of "patient" referring to whom or what is being subjected to a cause-event, or undergoing state-alteration. Relevance of using different types of agency and patiency to psychotherapy process is investigated.

Methods: In a longitudinal case study of 1.5 years we observed client-therapist interaction at the therapy session. We analyzed two audio-recorded sessions, from the beginning and from the end of the observation period. Transcribed sessions were segmented into intonation units. Expression of agency and patiency was coded in intonation units in both sessions based on our categorization of types of agency and

patency concerning whether the agent or patient is identical with the narrator, or not, another living person or an inanimate object/process.

Results: Talkers' use of types of agency/patency differed according to their interactional roles, as well as between the two sessions.

Discussion: Longitudinal changes in use of agency/patency types on the part of the client are relevant to the psychotherapy process concerning sense of agency and moral responsibility expressed in self-narratives.

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Keywords: agency, patency, narrative, therapeutic discourse

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THE ACQUISITION OF LEXICAL STRESS PATTERNS IN FRENCH-ENGLISH BILINGUAL CHILDREN: EVIDENCE FROM ACOUSTIC ANALYSES OF WORD PRODUCTION

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This study investigates the acquisition of lexical stress in monolingual and bilingual children. Stress poses a special challenge for bilingual French- and English-speaking children because those two languages have very different prosodic properties. Two opposing hypotheses were tested: 1) bilingual children build two separate phonological systems and acquired the lexical stress pattern of each language, 2) Even after clear lexical autonomy, bilinguals continue to show cross-linguistic influences and lexical stress patterns in each language should be different from those of monolingual peers. Twenty-four 3;6-6-year-old children participated in this study (8 bilingual French-English, 8 monolingual French and 8 monolingual English), in a task of elicited picture-naming. The acoustic correlates of stress (f_0 , duration and intensity) were measured in 619 disyllabic words and compared across participants. Statistical analyses were performed to examine differences between monolinguals and bilinguals. The main findings were in favor of our second hypothesis: The lexical stress patterns of bilingual children are different when producing words in English and French, and are also statistically different from the productions of monolinguals. Specifically, French-English bilinguals' word productions show an English-like stress pattern for intensity and French-like final-lengthening for duration.

Keywords: acquisition, lexical stress, bilingual children, production

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DEVELOPMENT OF IMPLICIT CATEGORY LEARNING: ABSTRACTION OF A FAMILY RESEMBLANCE STRUCTURE IN CASE OF ADULTS VS. 7 YEAR-OLD CHILDREN

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In case of category learning the most important question is the nature of generalization process. According to multiple system models this learning process is usually implicit, but when the rule is easily describable verbally, the explicit memory system will take over directing learning. During development the more mature implicit system successfully governs category learning from early ages. Our goal was to learn more about the developmental differences in the possible learning strategies of adults and children. 99 adults and 120 7 year-old children were tested in a supervised information-integration category learning task. The diagnostic features were organized according to a family resemblance structure. During learning subjects only saw far-from-prototype exemplars. In the test phase we presented the prototypes and close-to-prototype exemplars. Results show that both age groups learned to separate the two categories successfully without an explicit knowledge. Adults' prototype abstraction was demonstrated by the hit rates. In case of children we didn't find this gradual representation structure. Our results show developmental difference in case of implicit rule learning: children were able to learn the complex implicit rule, but probably due to the slowness or the rigidity of generalization processes, the emergent conceptual representation became different.

Keywords: category learning, cognitive development, implicit memory, typicality effect

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HEMISPHEREIC DIFFERENCES IN REACTION TIME DURING PROCESSING EMOTIONAL STIMULI

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Emotional processing research encounters many debates and inconsistencies in results. There is an evidence for valence theory, but also for the right hemisphere theory. The goal of this research was to test hemispheric asymmetry related to

emotional processing. To test those theories, two experiments with IAPS pictures were conducted. Valence of the pictures was manipulated (pleasant, unpleasant, neutral) as well as the side of the screen where the picture was presented (left/right), while intensity and dominance of presented pictures were controlled. Pictures were presented in pairs (neutral/pleasant and neutral/unpleasant) where participants evaluated which picture is pleasant/unpleasant by pressing the key on the left/right side (left/right hand) on the keyboard depending on which side of the screen the emotional picture was presented. Faster response is expected for unpleasant pictures presented on the left side (answer with the left hand) of the screen, and for pleasant pictures when are presented on the right side of the screen (answer with the right hand). Those results would confirm valence theory (left hemisphere is more active during processing pleasant emotions), which would be shown by faster reaction time in that condition when picture is presented in contralateral visual field and answered with contralateral hand.

Keywords: valence theory, time reaction, IAPS, left hemisphere, right hemisphere

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INDIVIDUATION OF AGENTS BASED ON PREFERENCES IN 10-MONTH-OLD INFANTS

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Recent research on object individuation showed that 10-month-old infants can differentiate humanlike objects from non-humanlike (Bonatti et al., 2002) and self-propelled agents from inert objects, but crucially not an agent from another agent, not even when distinguishable by different surface and dynamic features (Surian & Caldi, 2010). Would infants be able to individuate agents if these agents hold different preferences? We tested this question with an individuation study (Xu and Carey, 1996). Infants ($n=16$) were familiarized with two abstract animated agents emerging from behind an occluder to choose between two possible alternatives, as in the Woodward paradigm (Woodward, 1995). Afterwards, the barrier was removed to show either one agent or two. Infants in the baseline were presented with the same tests but no familiarization. We found that observing agents with different preferences influenced infants' expectations about the number of agents present. This is suggested by the interaction of condition and outcome $F(1,14)=9.872$, $p=.007$). Post hoc tests revealed that infants looked to the two-object display significantly longer ($p=.012$) only in the baseline but not in the experimental condition. These results are consistent with our hypothesis that a demonstrated preference can serve as a basis of agent individuation.

Keywords: object individuation, preference attribution

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TREND ANALYSIS AND ANOMALY DETECTION IN TIME SERIES OF LANGUAGE USAGE

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Usage of the language may be characteristic to the cognitive state of a person. While changes in the usage of the language may occur naturally, i.e., without any special reason, in some cases, such changes might be an (early) indication of cognitive and psychological disorders. In the last decades, blogs attracted large amount of users who write their opinion in forms of posts and comments about various topics ranging from finance over politics to sports and other free time activities. In our study, we consider a large collection of around 30000 web pages containing blog posts and comments. We extract time series describing the users' language usage. In particular, for a user, we extract the total length of posts/comments written by that user and the number of different words used by him/her as function of time for distinct time intervals. We perform trend analysis and anomaly detection on these time series in order to come up with an initial hypothesis of what can be considered as "normal" (or usual, i.e., characteristic to many users) and what should be considered as anomalous.

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Keywords: language usage, time series, trend analysis, anomaly detection

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THE MATCHING OF VISUAL AND AUDITORY STIMULI: COMPETITION BETWEEN PHONOLOGICAL AND TAXONOMIC REPRESENTATIONS DURING SPOKEN-WORD RECOGNITION IN 2-YEARS OLDS

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Learning often involves the processing of both auditory and visual stimuli. For example, a parent would teach their child the word cat, whilst pointing at the picture of a cat in a storybook. In order for the child to pair the sound /kat/ with the picture of a four-legged creature with tail, the matching of phonological, semantic and visual

representations from these auditory and visual inputs must take place. What is the order of these matching processes in infants? In this study, we directly compared the time course of the activation of phonological and taxonomic information in infants. 30-months olds and 24-months olds were recruited from monolingual British English households. In 24 target-absent test trials, participants heard a sentence containing a target word and saw 4 pictures: a phonological competitor (same onset consonant as the target), a taxonomic competitor (same category as the target), and two unrelated distractors.

Preliminary Results show that both age groups preferentially fixated the phonological competitor over the distractor early in the post-naming phase, but preferentially fixated the taxonomic competitor over the distractor later in the post-naming phase.

Keywords: visual world paradigm, eye-tracking, infant, spoken-word recognition, lexicon

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AN EFFICIENCY IN PERSPECTIVE TAKING DURING COMMUNICATION

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The research on pragmatic aspects of interpretation investigates how quickly interlocutors can modify interpretations according to the common knowledge in conversation. Experiments 1 and 2 are focused on the role of visual salience and semantic typicality of referents, as a potential factor that may affect the occurrence of egocentric bias and increase cognitive costs of interpretation processes. In the computer version of a perspective taking task participants had to choose objects from the screen, ignoring ones invisible to the speaker. Then, the efficiency in working memory, inhibitory control and attention was measured. The results revealed that the performance in the perspective-taking task depends on the semantic typicality and saliency of the referents in the privileged/invisible area. Regression analysis indicated that measures of inhibition and attention contributed most to explaining response time in the perspective-taking task. What's more participants in a non-mental version of the task that followed pre-recorded commands were generally faster than adults in a second, comparable version of the task, with a real interlocutor and perspective-taking requirement. The results from experiments may indicate above all the importance of executive resources in adults belief reasoning.

Keywords: perspective taking, conversation, common knowledge, inhibitory control

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**MU RHYTHM MODULATION AS A RESULT OF HAND-MOVEMENT OBSERVATION -
DEMONSTRATION OF MNS ACTIVITY IN HUMANS**

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Motor resonance, as demonstrated by mu rhythm attenuation around motor cortex, has been linked to the activity of mirror neurone system in humans. The basic idea - the activation of neurones in human brain normally detected when subject executes motor action is also present when subject observes particular action being executed by someone else. In this experiment, participants (healthy males and females aged between 20 and 30 years) observed various movements of a hand from the profile. Four conditions in total (flat hand without movement, object-oriented grasp, grasp without the object and social grasp) were presented on a screen, separated by the baseline condition.

Hypothesis stipulates that mu rhythm should be desynchronised while observing hand movement, and also that flat hand should exhibit the least amount of rhythm modulation, followed by the pantomime condition (missing object grasp).

Preliminary results (N=9) are well in line with hypothesis ($p < .001$) and currently the data is being analysed with a different approach (3 conditions with respect to the flat hand - no hand movement condition). Planned number of participants is no few than 15 and updated results are expected by mid-March.

Keywords: EEG, motor resonance, mu rhythm, mirror neurons

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**LEXICAL DEFICITS, WORKING MEMORY AND COGNITIVE CONTROL IN SPECIFIC
LANGUAGE IMPAIRMENT**

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We investigated lexical abilities with various tasks (receptive vocabulary test, rapid automatic naming tasks, fluency tests), together with the role of working memory and cognitive control in lexical processes in children with SLI ($n=31$, mean age=8;11) and age and IQ-matched controls. Despite having significantly smaller receptive vocabularies, children with SLI were as proficient as the control group in rapid automatic naming of objects but significant group differences appeared when they

were asked to produce the name of geometric forms together with their size and color in a fixed order (size-color-form). Significant group differences appeared in the fluency tests as well. These results show that word retrieval is problematic for children with SLI when they have to organize several words into a fixed linear order as in the RAN task or retrieve more words based on a linguistic cue as in the fluency task. Difficulties might be especially apparent in tasks involving a heavier WM or cognitive control load; this was supported by significant correlations between performances on RAN size-color-form task and complex WM tasks (n-back, backward digit repetition) which are considered to have WM updating or cognitive control components. These correlations remained significant after controlling for WM storage capacity.

Keywords: specific language impairment, lexical processes, working memory, cognitive control

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NUMERICAL DISTANCE AND SIZE EFFECT IN A DISCRETE SEMANTIC NETWORK

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Moyer and Landauer (1967) described two effects in Indo-Arabic number comparison: the response was slower when (a) the distance between two numbers was small (distance effect) or (b) the numbers were large with the same numerical distance (size effect). They proposed that these effects indicate a continuous system similar to other perceptual systems (e.g., weight discrimination) as the mechanism of number processing. An alternative model suggests that numbers can be processed by a discrete semantic system in which the distance effect results from the semantic distance in the network and the size effect originates from the frequency of the symbols. To contrast the two models we used new number symbols in order to control the frequency of the symbols. Number comparison with uniform new symbol frequency revealed distance but no size effect. In number comparison with frequency similar to the frequency of Indo-Arabic numbers we found both distance and size effects. We infer that the size effect comes from the frequency of the symbols, therefore, these numerical effects cannot be explained by a continuous magnitude system, but by a discrete semantic network. We conclude that a discrete semantic system seems to be the more plausible mechanism behind symbolic number processing.

Keywords: numerical cognition; numerical distance effect, numerical size effect, discrete semantic network, approximate number system

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FENOMENOLOGY OF LEARNING HISTORY

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Main theme of presented research is phenomenology of learning History. The aim of the presented research is to consider child's experience of learning and whether these categories of experience consist of multiple modalities. The poster reviews theories of cognitive styles, learning styles and learning strategies. Since these theories are methodologically based on third-person research, I focused on first-person methodology of explicitation interview and tried to compare new modalities with established ones. My research questions were following: How child experiences process of learning History? Does experience of learning History have different modalities? Which kinds of modalities occur and are they compatible with previous theories? Is understanding of experience of learning usable in pedagogical processes? Qualitative phenomenological research has been done in the form of multiple case studies. Method of gathering information has been explicitation interview. Participants were thirteen years old, schoolmates in elementary school. Analysis will be done on the principle of establishing grounded theory. Expected results are to learn about participant's learning patterns of modalities or styles and implementation and comparison of these results to theories of cognitive and learning styles and learning strategies.

Keywords: fenomenology, learning, interview, learning style

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ACQUISITION OF SLOVENE ADJECTIVE INFLECTION AND SEMANTICS

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The aim of our research is to investigate the new subject of the acquisition of adjectives in Slovene and to focus on parent-child input-output relations in a longitudinal study. As expected from the few existing studies on other Slavic languages and for cognitive reasons, also Slovene adjectives emerge later than nouns and verbs. We analysed speech production and input in child-directed speech of a Slovene girl from age 1;5 to 2;8. After describing the formal aspects of Slovene adjectives, we presented and interpreted the acquisition data in a combined morphological, syntactic and semantic analysis. At age 1;5-1;7 no adjectives were produced, since 1;8 very few, more since 2;0; at 2;1 isolated inflected forms appeared, whereas at 2;8 we found a consistent amount of adequately used adjectives. Our results support the hypothesis that not only the lexical category of adjectives, but also their inflection emerge late and that their development depends

less on input frequencies than on contrastive relations between adjectives, in terms of antonyms and word fields (e.g. of colour terms).

Keywords: language, acquisition, development, adjectives, child's speech

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INFANTS' REFERENTIAL UNDERSTANDING OF LANGUAGE

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Human language is a special auditory stimulus and infants immediately after their birth are equipped to acquire it in a very fast way. For example, newborns are able to distinguish languages based on their rhythmical characteristics (Mehler et al., 1988) and to detect acoustic cues that signal word boundaries (Christophe et al., 1994). But from when they start to understand that language is a referential symbol system, is still unknown. The present study addressed this question. Thirty, 4-months old infants were shown videos of a female face, who was either talking in a normal way, or in a backward way, or she was silent. Each movie ended with an eye-gaze, and an object appeared in a congruent direction with the gaze. Results showed that infants looked faster at the object in the normal speech condition than in the backward speech and silent condition. Additionally, we designed a second experiment where we also included trials with an infant-directed gaze. Results showed that whereas the infant-directed gaze did not help, the object-directed gaze had a strong facilitatory effect. Thus, infants at least from 4 months age old have referential expectations about language, when additional referential cues are provided.

Keywords: language development, referential expectation, referential understanding, eye-gaze

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POSSESSION UNDERSTANDING IN PATIENTS WITH APHASIA

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Aphasia is an impairment of language, affecting the production and comprehension of speech and the ability to read or write. Aphasia is always due to injury to the brain, most commonly from a stroke. It may affect mainly a single aspect of language use

but more commonly, multiple aspects of communication are impaired.

In Croatian, possession can be expressed by possessive adjective, possessive pronoun, possessive genitive and possessive dative. Considering these facts, it can be assumed that patients with aphasia would have difficulties in recognition and use of correct language forms for expression of possession. This field is not yet covered sufficiently in existing literature.

The main goal of this study is to identify are there any differences in comprehension and differentiation language forms for expression of possession and speed of correct form detection in patients with aphasia and control group using e-prime. Special attention will be focused on possessive adjective use.

Participants consisted of 15 patients with motor aphasia that are involved in speech and language therapy in SUVAG Polyclinic and control group consisted of 15 people with no brain injury or language deficit reported.

The results have shown that the control group showed greater speed and accuracy in understanding the possessive adjective.

Keywords: aphasia, possession, e – prime

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LEXICAL DECISION TASK- READING WORDS AND PSEUDOWORDS IN CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENTS

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Lexical decision task is one of the methods in researching language processes. This task is a good indicator of lexical retrieval. The aim of this study is to investigate the possibility of differentiating words and pseudowords in children with special language impairments and controls. Many researches have shown difficulties in memorizing, storing and retrieving words in children with special language impairments, actually the delay of lexical-semantic processing in children with special language impairments. In this study participated 10 children with special language impairments and 10 controls, aged 9-11, included in speech and language therapy in Polyclinic SUVAG. Stimulus was presented visually, on screen, and in testing were used words and pseudowords from Articulation test (Vuletić, 1990). Examinees had to press a button if the word presented on the screen is a real word.

The results have shown that children with special language impairments had longer reaction time and more errors.

Keywords: special language impairments, lexical decision task, language processing, e-prime

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PHONETIC REPRESENTATIONS IN INFANTS

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We provide evidence in support of the hypothesis that infants share with adults a similar neural architecture suitable for computing phonetic representations. Voices, intonations, phonetic combinations affect the physical signal in a way that makes it difficult to describe invariant acoustic cues allowing for phoneme identification. However, to learn their native language, infants need to perceive and manipulate phonemes while disregarding such irrelevant variations. Do human hold phonetic categories as a mental construction from birth or do they develop this ability further during language acquisition? Here we investigated whether infants are able to identify a given phoneme independently of its surrounding phonemes. We recorded high-density event related potentials in twenty-five 3-month-olds French infants while they were presented with a face pronouncing CV syllables that were different but which shared the same consonant. When the consonant was changed, a mismatch response at 400-600 ms was recorded, followed by a late slow wave after 800ms. These responses were obtained even when infants had no visual articulatory information but, instead, blinking-eyes synchronous with the onset of the syllable. These results demonstrate that preverbal infants have access to the phonetic segment within syllables without the need of an articulatory representation.

Keywords: language acquisition, infant, phonetic representation, brain, speech, ERP

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MALLEABILITY OF THE BASIC LEVEL EFFECT IN CATEGORICAL INDUCTION FOR BIOLOGICAL CATEGORIES

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While the basic level in biological categorization changes in naming, recognition and feature listing tasks as a function of experience and expertise, Coley, Medin and Atran (1997) argued that those results do not reflect a basic level but a locus of perceptual and semantic knowledge. They showed that the same generic-species level was privileged in a categorical induction task with two diverse populations: nature-knowledgeable Itzaj Maya and urbanized American undergraduates. According to them people associate the level of generic-species with a biological essence, which makes it a stable basic level, and that deteriorated recognition

strategies are responsible for the malleability of the basic level in perceptual tasks. An alternative explanation is that the inductive privilege is due to different coverage of the sub-categories at each level - there are far more types of fish than there are types of salmon. A pilot experiment with a fake-world paradigm showed that when the number of sub-categories at the level of life-form was reduced, the inductive privilege was decreased, although not eliminated. Further, the inductive privilege of species-genera was not evident for self-rated highly-nature-knowledgeable participants. This represents preliminary evidence that the basic level effect in categorical induction is in fact affected by experience.

Keywords: basic level effects, biological categorization, induction

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