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IMPRS 2024: INTERDISCIPLINARY APPROACHES TO THE FOUNDATIONS OF HUMAN SPEECH

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Abstract: The International Max Planck Research School (IMPRS) biennial conference on psycholinguistics focused on the psychological, social, and biological foundations of human speech. The conference took an interdisciplinary approach, drawing on data from cognitive research, neuroscience, computer science, medicine, genetics, anthropology, and evolutionary theory. This article provides an overview of the keynote speeches and the most significant posters, presenting the findings of scholars from around the world.

Keywords: IMPRS2024, neuroscience, cognitive research, language studies, speech.

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The International Max Planck Research School (IMPRS) for Language Sciences located in Nijmegen is a joint initiative of the Max Planck Institute (MPI) for Psycholinguistics, the Donders Institute for Brain, Cognition and Behaviour, and the Centre for Language Studies. The IMPRS hosted its fourth conference series in a hybrid format from June 5-7, 2024.

For over four decades, the Max Planck Institute for Psycholinguistics has been advancing interdisciplinary research into the psychological, social, and biological foundations of language. Integrating perspectives from linguistics, psychology, brain sciences, genetics, anthropology, computer science, and medicine, the MPI investigates language comprehension, production, and acquisition, as well as the relationship between language, genetics, and cognition. Its mission is to illuminate the complex interplay of factors that underpin human language.

The biannual IMPRS conference series on Interdisciplinary Approaches to the Language Sciences aims to encourage language scientists to explore new avenues of inquiry and gain deeper insights into human language ability. The conference stands out due to the ample scope of research

in the field of language and communication conducted at multiple levels - from the human genome and the language readiness of the brain to the behaviour patterns of individuals of all ages and populations – and in diverse languages. The 2024 edition focused on four major themes:

1. The dynamic nature of language: Change through time and borders.
2. Language production in social interaction.
3. Language development.
4. Language of the body: From gestures to sign languages.

The first section addressed the issues of the sociolinguistic landscape of different regions, linguistic diversity and multilingualism. Dr. Margot van den Berg and Dr. Corentin Bourdeau traced back the lineage of some African languages. The former focused on retention, innovation, and adaptation in naming and the process of knowledge production to analyse the emergence and subsequent development of the Sranan language. Talking about the methodology and citing the case of the Wolof language, which is “an assemblage of at least five layers”, Dr. Bourdeau stressed that “contact linguistics is of much more help than historical linguistics for understanding the formation of languages” as it avoids a distorted view of reality. Carlo Meloni delivered a speech on the biases concerning the evolution of clause linkage syntax, namely a neurocognitive bias towards hierarchy, or “dendrophilia”, and a bias towards simplicity. His study of 59 languages from Indo-European, Sino-Tibetan, and Tupi-Guaraní families managed to prove that the former factor is less significant, “a moderate bias toward simplicity and substantial lineage-specific variation” being at play. The last speaker of the section was Enock Appiah Tieku, who dwelt on the co-evolving means of construing number and sortal classifiers in Austronesian, which he analysed using the Markov chain model of binary character evolution and the Bayesian phylogenetic comparative method. He concluded that all the types of number marking, including plural and singular, and sortal classifiers changed independently.

The *Language production in social interaction* section focused on the extent to which speaking in a dialogue context fundamentally differs from solo speaking. Relying on the assumption that production and comprehension processes are engaged in a temporally overlapping fashion, Dr. Chiara Gambi applies the control theory and compares monologue and dialogue to mechanical and biological processes to describe the challenges scientists face when applying models of language production and self-monitoring to conversation. They include “(1) the need to distinguish between self- and other-generated utterances; (2) the need to flexibly adjust the amount of advance planning to achieve timely turn-taking; (3) the need to track changing conversational goals,” which, therefore, necessitate sophisticated control architectures. Dr. Anita Tobar Henríquez provided an overview of the studies revealing speakers’ variation of their referential choices with due regard to the individual-, situation- and community-level factors. Caitlin Decuyper’s speech elaborated on the research into the reduction of semantic interference due to conceptual processing rather than social context. Jule Nabrotzky presented her current research into the role of speech entrainment in reducing the silent interval duration between interlocutors’ utterances in a conversation with the help of a Guess Who game.

The *Language development* section discussed the universal vs. language-specific language acquisition trajectory in childhood. Prof. Dr. Shanley Allen studies the case of Inuktitut, a polysynthetic language, to demonstrate the peculiarities of its acquisition as compared with more isolating or fusional “Standard Average European” languages. Dr. Michelle Jennifer White uses a comparative approach to assess vocabulary learning of bilingual toddlers in South Africa and Norway considering their socioeconomic status background and language socialization practices. Xiaotao

Liu's research points to Mandarin-speaking "children's ability to map appropriate verb forms onto unfolding events". The research of Eleni Zimianiti tries to predict the relationship between the item-level difficulty of verb forms, on the one hand, and form-frequency, phonological neighbourhood density and telicity, on the other hand, relying on a large and longitudinal dataset of nearly 40,000 young Dutch speakers, which has been gathered through an educational online platform.

Non-verbal ways of conveying information were covered by the speakers of the conference in the *Language of the body* section. Prof. Dr. Martha Alibali delivered a presentation on gestures as a specific form of bodily action and their involvement in mathematical thinking, learning, and teaching. She stated that gestures reflect and shape mathematical knowledge, as well as are integrated into communicative interactions during mathematics instruction, thereby affecting people's mathematics identity. Dr. Anna Puupponen presented an unusual perspective on the body language – the meaning-making strategy of constructed action (CA) in singers taking the role of a discourse referent and enacting feelings, thoughts, and utterances. Her research sought to shed light on CA-related socio-individual aspects on the basis of corpus data and the EEG data on the cognitive processing of CA. Dr. Dilay Z. Karadöller aims to investigate whether 8-year-old children's visual attention varies when planning descriptions of object locations in speech vs. speech-plus-gesture by eliciting descriptions of left-right relations and drew a conclusion that informative descriptions receive more visual attention to spatial relations amid the multimodal presentation of disambiguating information. Annika Schiefner proved the absence of the relationship between embodiment and iconicity in the signer's body as perceived by deaf and hearing participants in the UK and Germany, but stated that "iconicity appears to be linked to lexical similarity between sign languages".

The posters presented at the conference addressed a wide range of issues pertaining to the abovementioned fields - from crosscultural aspects of language acquisition to the role of the environment in language production. In their research project *Deciphering an unfamiliar language: The role of shared phonology and semantics* Anna Meliksetian, Agata Wolna and Zofia Wodniecka of the Jagellonian University (Poland) adopt an interdisciplinary approach to mutual intelligibility between closely related languages - Polish, Czech, Russian, and Spanish - to see if Polish natives with no prior exposure to the given foreign languages can decipher the potential message after examining stimuli pictures and voice recordings of correct words and distractors. The scholars point to the lack of full consistency between the similarity across the languages and mutual intelligibility but conclude that the phonological overlap is a driving force behind the latter on the condition that it is accompanied by semantic overlap. They also suggest that the two overlaps should concur to affect the degree of mutual intelligibility.

The *Non-native accents impede implicit, but not explicit, language learning* poster by Kate-lyn McClure and Phillip Hamrick from Kent State University discussed the impact of accented speech on language acquisition given that L2 learning tends to involve exposure to speech with an unfamiliar – often non-native – accent. Drawing a line between implicit and explicit language acquisition, the poster postulates that L1 learning is driven predominantly by implicit learning (i.e., unconscious) mechanisms while L2 learning is supported by conscious ones. The researchers hypothesized that alterations in language processing and a bigger cognitive load should significantly hamper implicit learning and are very likely to affect explicit learning. However, the findings reveal that a non-native accent impedes implicit, rather than explicit learning, possibly making L2 learning more explicit to ensure its effectiveness.

Dutch scientists Cecilia Husa, Antje Meyer and Linda Drijvers apply the Rapid Invisible Frequency Tagging (RIFT) method to measure how attention is distributed between the two demanding related processes of speech planning and speech comprehension and, on the whole, to evaluate its possible use for studying representations. The processes overlap, leading to short turns between speakers and dependency of speech planning on the content of comprehension. The experiment did not indicate any impact of relatedness on auditory attention to distractors or early visual attention to targets. However, the intermodulation peak may point to participants' avoidance of integration of the related target picture and distractor.

The overview of the conference would be incomplete without mentioning several poster reports on gestural mimicry, convergence and accommodation, which may in the long run affect the curricula in terms of skills trained. The *Inhibiting gestural mimicry induces higher cognitive load* report presented by Dr. Monika Chwalczuk from the Institute of Psychology of the Polish Academy of Sciences calls on the need to reconsider the recommendation to regard the use of gestural mimicry in dialogue interpretation as a sign of weak proficiency and to limit gestures. Copying the speaker's gestures and gestural interaction in interpreter-mediated communication are intensified under higher cognitive load but inhibiting them triggers higher self-reported indicators of cognitive load and longer reaction time. Restricted hand movements stand in the way of mental stimulations activated through gestures and make it impossible for the working memory to offload through embodied productions leading to slower renditions and stronger mental fatigue. According to Dr. Monika Chwalczuk, gesture mimicry should not be inhibited in dialogue interpreting since it functions as a cognitive aid strategy.

The *Conflicting talker information may hinder convergence in synchronous speech* poster compiled by Orhun Uluşahin et al. sheds light on the issue of convergence between speakers and listeners, that is the tendency of interlocutors to sound more like each other over time, and the impact of talker information on it. The research findings are as follows. Participants consistently converged across three synchronous speech experiments, with conflicting talker information leading to fewer convergers than congruent talker information, which suggests the involvement of shared representations across production and perception.

The issue of the correlation between people's individual traits and language production throughout communication deserves special attention. It was a matter of concern in *The role of gender, personality traits, and social biases in shaping linguistic accommodation: An experimental approach* poster submitted by a group of international experts from the University of Edinburgh, University of Ireland, and Max Planck Institute for Psycholinguistics. Ching-Yat Cheung, Simon Kirby, and Limor Raviv use a curious dyadic communication experiment to analyse whether participants' accommodation behaviours are influenced by their gender, the perceived gender of their interlocutors, their personality traits, or their gender attitudes and biases. The experiment involves learning a few expressions in an artificial language and playing a communication game with a computer-simulated male/female partner. The game is followed by a personality questionnaire (Big5) and implicit/explicit gender bias tests. The ongoing research has already produced some preliminary results: it points to the short-lived accommodating behaviour during interaction, which does not persist in the post-communication test. Besides, men are more likely to accommodate regardless of the partner's gender.

The conference was held in person and live-streamed via Mediasite, with the Discord application facilitating interaction with online participants. The hybrid format proved highly effective as the proceedings were readily accessible online and would remain available until the publication of the official proceedings. This accessibility promotes continued post-conference exchange and discussion among researchers.

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