



MAX PLANCK INSTITUTE  
FOR PSYCHOLINGUISTICS

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# RESEARCH REPORT

2013 | 2014





## COLOFON

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The current board of directors (left to right): Antje S. Meyer, Simon E. Fisher, Peter Hagoort, and Stephen C. Levinson.

# PREFACE

**F**or more than three decades, the Max Planck Institute for Psycholinguistics has been at the forefront of research into the foundations of language. Scientists at the Institute investigate how children and adults acquire their language(s), how speaking and listening happen in real time, how the brain processes language, and how language is related to cognition and culture. Our approach to the science of language and communication is unique because we address these fundamental issues at multiple levels, from molecules and cells to circuits and brains, all the way through to behaviour of individuals and populations. This report illustrates the value of such an integrated strategy, describing major highlights in the life of the Institute for the years 2013 and 2014. For interested readers who want to learn more about the research, details can be found on the news archives, departmental pages and blogs of our website ([www.mpi.nl](http://www.mpi.nl)), as well as in the many primary publications, review articles, chapters, books and PhD dissertations that we have produced during this time, examples of which are noted in the pages of this report.

The Institute has broadened its scope in recent years with novel research tracing the connections between genes, brain circuits and language. To do so, we have had to break ground both scientifically and physically. Thanks to the dedicated efforts of many hard-working people, our beautiful new wing was completed before the end of 2014 (see p.6-7), bringing all the Departments under the same roof.

A much cherished feature of the Institute is our ability to bring together scholars and researchers from distinct disciplines and create something that is much more than the sum of its parts. Successful interdisciplinary science does not come for free. We work hard to ensure an environment that fosters open-minded exchange of ideas. 2013 and 2014 saw the development of several new mechanisms to facilitate this, including the establishment of the annual retreat, creation of areas of “common ground” to increase scientist interactions, and schemes to stimulate innovative cross-departmental projects proposed by research staff. We have a very lively community of junior scientists and are particularly proud of our International Max Planck Research School (IMPRS) for Language Sciences, a joint initiative with the

Donders Institute for Brain, Cognition and Behaviour and the Centre for Language Studies, both at the Radboud University. This graduate school has gone from strength to strength. In 2013, after a highly favourable evaluation by external experts, we received the news that Max Planck Society support of the IMPRS will be extended to 2021.

Our science does not happen in a vacuum. We benefit greatly from being embedded in wide network of collaborations, having many joint research efforts underway with different groups at Radboud University Nijmegen. MPI scientists are also key players in projects and initiatives of diverse scales with expert teams in other parts of the Netherlands, Europe, and elsewhere in the world. The success of such initiatives reflects our continued ability to attract significant funding awards in addition to our longstanding support from the Max Planck Society. These larger efforts cannot be properly captured in a research report of this kind, but one particularly apt illustration is the Institute’s leading role in establishing the Language in Interaction consortium ([www.languageininteraction.nl](http://www.languageininteraction.nl)), which unites 41 top scientists from eight research institutions to study universality and variability of language at multiple levels. Supported by a substantial 10-year “gravitation” subsidy from the NWO and the Dutch government, Language in Interaction began its work in 2013, and, by the end of 2014, 17 joint PhD projects were already underway, many of which involve scientists of our Institute.

This is an exciting time for studying the bases of language and communication, as substantive changes in technology and development of theoretical frameworks lead to novel opportunities for scientific advance, accompanied by interesting new challenges. We hope that the pages that follow will give you an overview not only of what we have achieved in 2013 and 2014, but also a flavour of what you may expect from us in the years to come.

Simon E. Fisher  
*Managing Director*



# BREAKING NEW GROUND AT THE MPI

In June 2013, construction work began on a brand new wing for the building, providing an extended auditorium, extra office space, new server rooms, a virtual reality suite, experiment rooms (including baby labs and EEG facilities) and, for the first time at our Institute, in-house molecular biology laboratories.







# ORGANISATION OF THE INSTITUTE 2013-2014

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Wolfgang Klein  
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## The Language Archive

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Stephen C. Levinson, Wolfgang Klein  
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(*Westfälische Wilhelms-Universität, Muenster*)

## Head of Technical Group

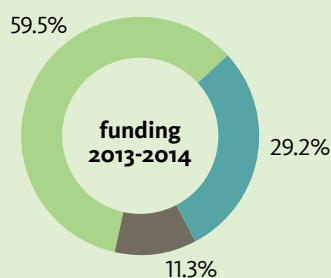
Reiner Dirksmeyer

## Head of administration

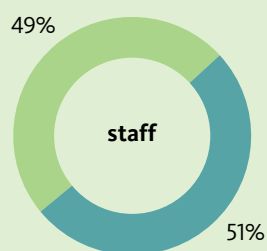
Paul Lommen

## Head of library

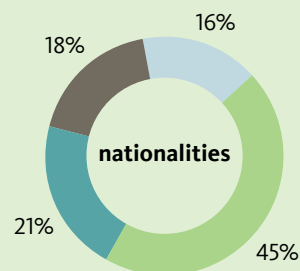
Karin Kastens



■ Max Planck Society  
■ Dutch Ministry of Education, Culture and Science  
■ Third-party funds



■ Female  
■ Male



■ Dutch  
■ German  
■ Other EU citizens  
■ Other



# HONOURS AND AWARDS

## 2013

**Joe Blythe** was awarded a competitive 'Discovery Early Career Research Award' from the Australian research Council, a four-year research position which he will take up at Melbourne University.

**Susanne Brouwer and Caroline Junge** (MPI alumni) won two 'Anne Cutler travel grants'.

**Mark Dingemanse** received the Otto Hahn Medal of the Max Planck Society and the AVT / Anéla Dissertation Award.

**Nick Enfield** was appointed Professor of Linguistics at the University of Sydney.

**Peter Hagoort** was elected a member of the Academia Europaea.

**Daniel Haun** was appointed Professor at the Department of Psychology at the University of Jena.

**Richard Kunert and Suzanne Jongman** won the IMPRS for Language Sciences contest with their essay 'Language, Nature and Nurture – Can genes settle the debate?'

**Willem Levelt** was awarded the American Philosophical Society's Patrick Suppes Prize in the History of Science in recognition of his book 'A History of Psycholinguistics: The Pre-Chomskyan Era'.

**Stephen C. Levinson** was elected Fellow of the Cognitive Science Society and of the Association of Psychological Science.

**Peter Wittenburg** received an Honorary Doctorate from the Faculty of Humanities of the Eberhard Karls University, Tübingen.

## 2014

**Julija Baranova and Elliott Hoey** received honorable mentions for the Best Student Paper Award at the 4th International Conference on Conversation Analysis, Los Angeles.

**Anne Cutler** received the International Speech Communication Association (ISCA) Medal for Scientific Achievement.

**Mark Dingemanse, Zeshu Shao and Gwilym Lockwood** won an MPI Interdisciplinary innovation grant for the winning project: 'Imageability and ideophones: An interdisciplinary study'.

**Michael Dunn** was appointed Professor at the Department of Linguistics and Philology at the University of Uppsala.

**Simeon Floyd** was awarded Documenting Endangered Languages (DEL) funding for his research project in Ecuador in 2014-2015 (NSF and NEH).

**Jolien Francken** was selected for the Lindau Nobel laureate Meeting Medicine / Physiology.

**Clyde Francks** was awarded a grant from the NWO, Earth and Life Sciences programme (ALW) 'The genetic basis of left-right asymmetry in the developing human nervous system'.

**Peter Hagoort** was elected a member of the Koninklijke Hollandsche Maatschappij der Wetenschappen (the Royal Holland Society of Sciences and Humanities).

**Suzanne Jongman and Richard Kunert** won an MPI Interdisciplinary innovation grant for the winning project: 'Attentional support for novel word learning'.

**Wolfgang Klein** was elected Vice President of the Deutsche Akademie für Sprache und Dichtung (the German Academy for Language and Literature), Darmstadt.

**Antje S. Meyer** was elected a member of Academia Europaea.

**David Norris** was appointed an External Scientific Member of the Max Planck Society.

**Federico Rossano** (MPI alumnus) received the Dissertation Award at the 4th International Conference on Conversation Analysis, Los Angeles.

**Lila San Roque, Gerardo Ortega and Mark Dingemanse** (and MPI alumni Tineke Snijders, Caroline Junge and Tessa van Leeuwen) were awarded Veni grants from the NWO for the projects 'Perception verbs in child-adult interaction in two cultures' (LSR), 'The role of gesture in the acquisition is a sign language as a second language'(GO), 'Towards a science of linguistic depiction' (MD), 'Resonating rhythms in the baby brain – on individual differences in language acquisition' (TS), 'Listen to your mother: Elucidating the role of speaker familiarity in initial word learning' (CJ), 'Common neural mechanisms in autism and synaesthesia' (TvL).

**Elliot Sollis** won the International Max Planck Research School for Language Sciences 2014 writing contest for PhD students with 'Speech and What Rose Gong With it'.

**Julia Udden** received an award from the Swedish Dyslexia Fund for the project 'Dyslexia as disconnection: Is connectivity of the left arcuate fasciculus related to common variation in candidate dyslexia genes?'

**Malte Viebahn** was awarded a Deutscher Akademischer Austausch Dienst (DAAD) grant.

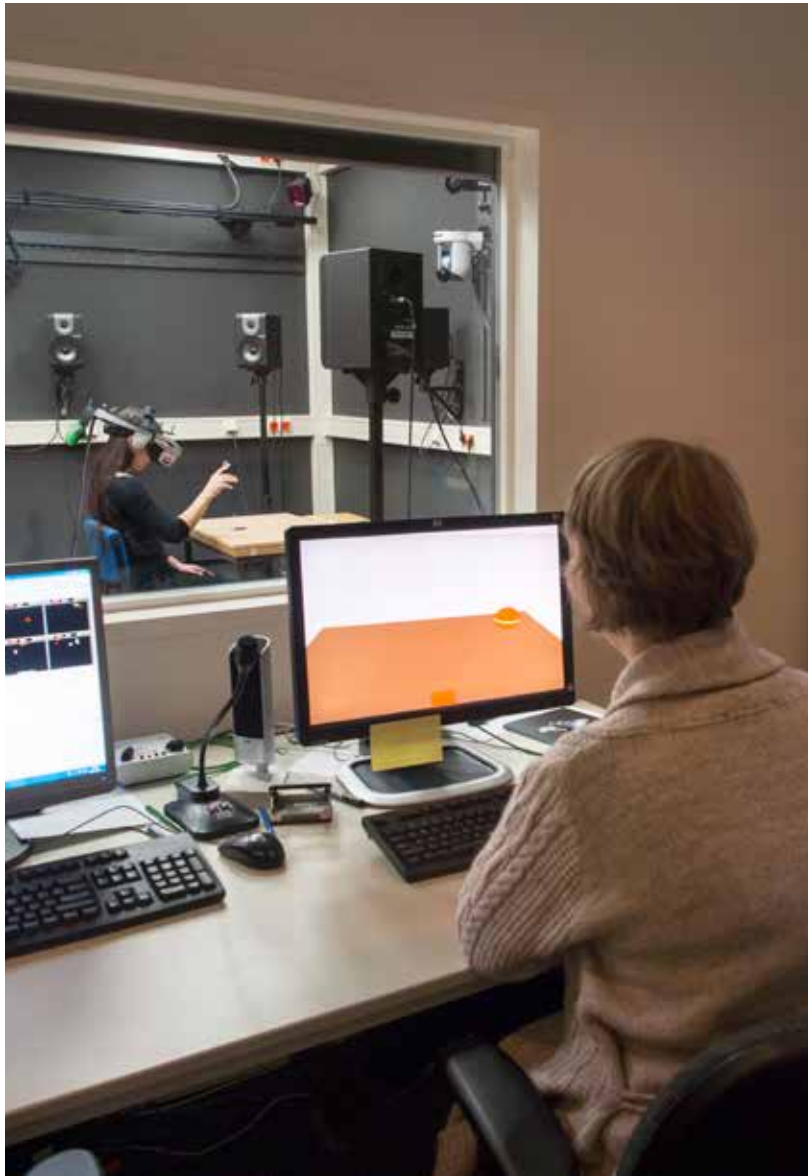
# PHD COMPLETIONS

## 2013

- Atila Andics** *Who is talking? Behavioural and neural evidence for norm-based coding in voice identity learning.*
- Sarah Dolscheid** *High pitches and thick voices: The role of language in space-pitch associations.*
- Vasiliki Folia** *Implicit structured sequence learning.*
- Iris Hanique** *Mental representation and processing of reduced words in casual speech.*
- Kaoru Hayano** *Territories of knowledge in Japanese conversation.*
- Mirjam Kos** *On the waves of language: Electrophysiological reflections on semantic and syntactic processing.*
- Kimberley Mulder** *Family and neighbourhood relations in the mental lexicon: A cross-language perspective.*
- Katja Poellmann** *The many ways listeners adapt to reductions in casual speech.*
- Daniel Puccini** *The use of deictic versus representational gestures in infancy.*
- Joost Rommers** *Seeing what's next: Processing and anticipating language referring to objects.*
- Zeshu Shao** *Contributions of executive control to individual differences in word production.*
- Cathelijne Tesink** *Neurobiological insights into language comprehension in autism: Context matters.*
- Joost Wegman** *Objects in space: The neural basis of landmark-based navigation and individual differences in navigational ability.*
- Marijt Wittenman** *Lexical processing of foreign-accented speech: Rapid and flexible adaptation.*
- Patrick van der Zande** *Hearing and seeing speech: Perceptual adjustments in auditory-visual processing.*

## 2014

- Helen Buckler** *The acquisition of morphophonological alternations across languages.*
- Jiyoun Choi** *Rediscovering a forgotten language.*
- Peter Kok** *On the role of expectation in visual perception: A top-down view of early visual cortex.*
- Saskia van Putten** *Information structure in Avatime.*
- Jana Reifegerste** *Morphological processing in younger and older people: Evidence for flexible dual-route access.*
- Irina Simanova** *In search of conceptual representations in the brain: Towards mind-reading.*
- Gudmundur Bjarki Thorgeirsson** *Infants' understanding of communication as participants and observers.*
- Sho Tsuji** *The road to native listening: Language-general perception, language-specific input.*
- Giuseppina Turco** *Contrasting opposity polarity in germanic and romance languages.*
- Alma Veenstra** *Semantic and syntactic constraints on the production of subject-verb agreement.*
- Annemarie Verkerk** *The evolutionary dynamics of motion event encoding.*



## ACRONYMS

**EEG:** electroencephalography

**ERP:** event related potential

**fMRI:** functional magnetic resonance  
imaging

**IS:** information structure

**MEG:** magnetoencephalography

**PCR:** polymerase chain reaction

**SLI:** specific language impairment

**TMS:** transcranial magnetic stimulation

**VR:** virtual reality



# DEPARTMENT LANGUAGE AND COGNITION



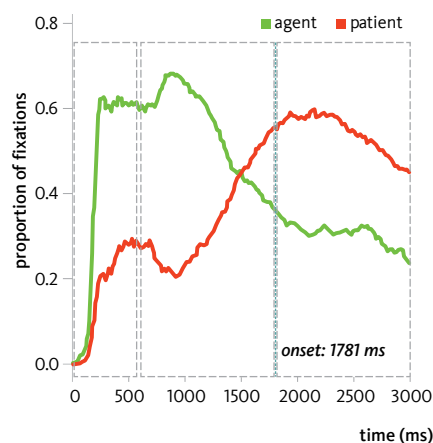
## Goals of the Department

The Language and Cognition Department investigates the relationship between language, culture and general cognition, making use of the “natural laboratory” of language variation. In this way, the Department brings the perspective of language diversity to bear on a range of central problems in the language sciences. It maintains over a dozen field sites around the world, where languages are described (often for the first time), field experiments conducted and extended corpora of natural language usage collected. In addition, work in the Department is characterized by a diversity of methods, ranging from linguistic analysis and ethnography to developmental perspectives, from psycholinguistic experimentation to conversation analysis, from corpus statistics to brain imaging, and from phylogenetics to linguistic data mining.

## Linguistic diversity and language production

Although we appear to do it effortlessly, speaking is a complex cognitive task. We begin with an abstract idea or an intention that we wish to communicate, and, in some rather mysterious way, this information gets transformed into a linearly ordered string of words that conform to the grammatical rules of our language. To what extent does the language we speak affect how this process unfolds? The short answer is that we don’t really know: there are around 7000 languages spoken in the world today, comprising at least 136 phylogenetically distinct language families. These languages vary considerably from one another in their grammatical properties. To date, however, psycholinguistically controlled sentence production research has been conducted on fewer than 30 of them.

### Subject-initial active sentences (AVP word order)



### Verb-initial active sentences (VPA word order)

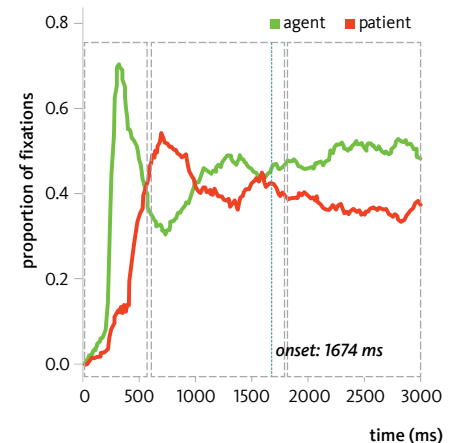


Figure 1: Proportions of fixations to agents (woman; green lines) and patients (chicken; red lines) over time during formulation of sentences like “The woman is chasing the chicken”. Tzeltal speakers fixated the agent in the event with priority until speech onset (left panel), as did Dutch speakers. In contrast, when Tzeltal speakers described the same events with sentences that began with a verb (right panel), formulation was strikingly different: speakers distributed their gaze between the agent and the patient before speech onset. This pattern shows priority encoding of the sentence verb, consistent with word order, over a very broad time window.

**Director** Stephen C. Levinson

**Department members** Julija Baranova, Mathias Barthel, Luis Miguel Rojas Berscia, Sara Bögels, Kang-Suk Byun, Marisa Casillas, Jeremy Collins, Sarah Cutfield, Rebecca Defina, Mark Dingemanse, Nick Enfield, Simeon Floyd, Gabriela Garrido, Rosa Gisladdottir, Harald Hammarström, Elma Hilbrink, Clair Hill, Elliott Hoey, Judith Holler, Paul Hömke, Gertie Hoymann, Kobin Kendrick, Lilla Magyari, Elizabeth Manrique, Elisabeth Norcliffe, Sean Roberts, Giovanni Rossi, Lila San Roque, Sebastian Sauppe, Gunter Senft, Tayo Takada, Francisco Torreira, Sylvia Tufvesson, Emma Valtersson, Connie de Vos, Ewelina Wnuk

In collaboration with the Psychology of Language Department, researchers in the Language and Cognition Department are working towards increasing the typological coverage of language production research. One area of focus concerns the influence that the basic word order of a language might have on sentence planning. Norcliffe, Konopka, Brown, and Levinson compared sentence production in Tzeltal, a Mayan language spoken in Mexico, where verbs typically come first in the sentence, with that of Dutch, a language where verbs typically come after subjects. Speakers were asked to look at pictures of simple events and describe what was happening while their eyes were tracked with an eye-tracker. The results showed that the uptake of visual information prior to speech onset differs in the two languages, indicating that the type of information that speakers encode varies as a consequence of the word order of the to-be-uttered sentence (Figure 1). When preparing to produce subject-initial sentences, Tzeltal and Dutch speakers preferentially encoded information about the subject before speech onset (left panel). In contrast, when producing verb-initial sentences, Tzeltal speakers encoded verb-related information before speech (right panel). The results points to a tight parallelism between linguistic structure and the time-course of sentence planning. This line of research is currently being extended to other under-studied languages with different grammatical properties, including Tagalog, a verb-initial Austronesian language

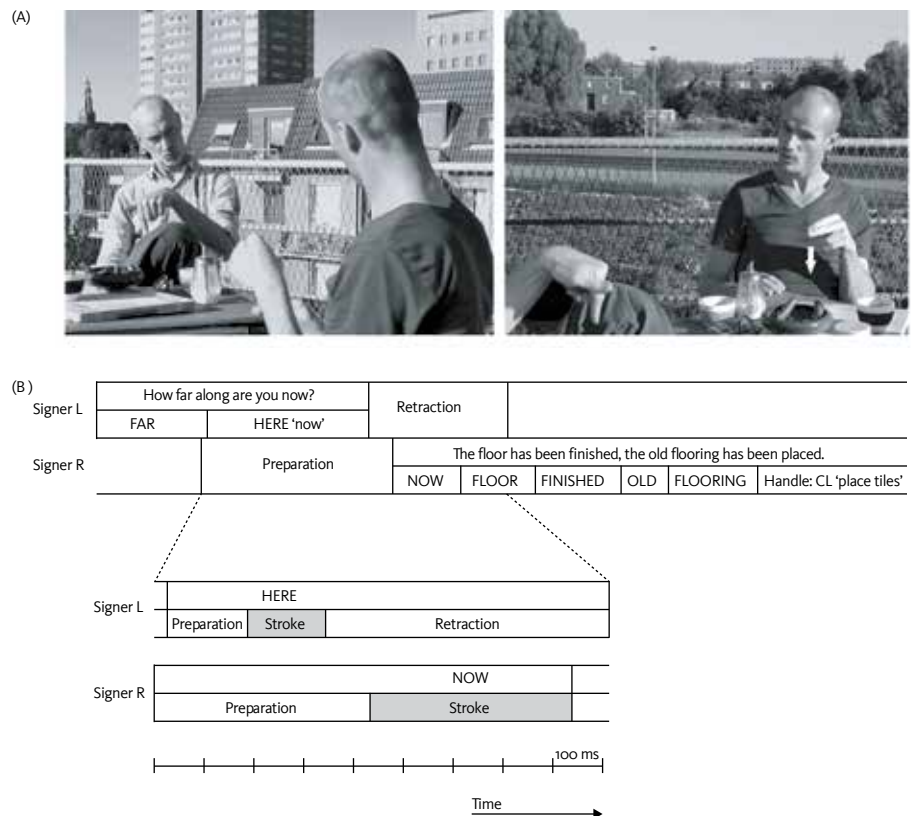


Figure 2: Question-answer sequence in Sign Language of the Netherlands (Nederlandse Gebarentaal). The signer on the right begins the preparation phase of his answer in overlap with the question of the signer on the left, and the signer on the left ends the retraction phase of his question well after the answer is underway. This gives the appearance of massive overlap between turns, as both signers' hands are in motion at the same time. But the most meaningful phases of the relevant signs (the strokes) do not in fact overlap. The slight gap between them corresponds to the slight gap between turns in spoken conversation.

spoken in the Philippines, which has a typologically unusual voice-marking system (Sauppe), and Yéli Dnye, a verb-final language isolate spoken on Rossel Island in Papua New Guinea (Norcliffe, Konopka, and Levinson).

### Does modality affect turn-taking?

Previous research in the Department

showed that fundamental aspects of conversational turn-taking (such as its timing) are remarkably stable across languages and cultures. Speakers from around the world avoid overlapping talk and minimise the silences between conversational turns. It has been suggested that this apparently universal constraint against overlap applies only



to the vocal channel, where simultaneous speech causes interference, and that nonverbal signals, such as manual or head gestures, are exempt. Sign language provides a crucial test for such claims because vision and action do not use the same channel. De Vos and colleagues therefore built a unique corpus of sign language conversation (in Nederlandse Gebarentaal), to see if sign languages conform to the cross-linguistic patterns of turn-taking in spoken languages.

De Vos and Torreira examined the precise timing of the manual movements between turns in question-answer sequences. The results showed that if one measures all visible movements of the hands, the beginning of the answer produced by one interlocutor overlaps quite dramatically with the end of the question of the other interlocutor. Whereas in spoken language the proportion of overlapping turns is between 15 and 40 percent (depending on the language), by this measure over 80 percent of signed turns were in overlap. This confirms the impression by naïve observers that overlap appears to be common in sign language conversation. However, if one analyses the manual movements to identify the most meaningful phase of each sign (the stroke), then the results tell a very different story. If one measures the gap between turns from the end of the final stroke of the question to the beginning of the first stroke of the answer, the proportion of overlapping turns drops to 30 percent, well within the range observed for spoken languages. This suggests that the universal constraint against overlap in conversation is

independent of the modality of the language.

### Gaze behaviour and turn-taking

Since the 1960s, researchers have looked to gaze behaviour to understand conversational turn-taking. Early research suffered from technical limitations, with low optical and temporal resolution and indirect measurement of eye-movements, often based on head direction. Researchers in the Language and Cognition Department are now using eye-tracking to investigate

turn-taking with split-second precision. In a series of experiments, Casillas and colleagues asked adults and children to watch videos of conversations while eye-trackers monitored their gaze. The results showed that the viewers' eye movements anticipate events in the conversation: if A asks B a question, viewers redirect their gaze to B before B's answer. Strikingly, this was observed not only in adults, but also in children as young as one year old. Through clever manipulations of the videos, some involving puppets, Casillas has narrowed in on linguistic



*Figure 3: An image from the Eye-tracking in Multimodal Interaction Corpus (EMIC) built by Holler and Kendrick. Two friends wear eye-trackers while having a conversation. The glasses track their eye movements (the orange circles represent fixations) and overlay them on a recording of the visual scene. This allows for the fine-grained analysis of gaze behaviour in conversation.*





features that signal that the current turn will soon end and that a next turn is about to begin.

In a line of naturalistic research, Holler and Kendrick built a corpus of spontaneous conversations in which participants wore state-of-the-art eye-tracking glasses as they talked with friends (Figure 3). This set-up allows for the investigation of gaze behaviour in situ, with an optimal balance of ecological validity and instrumental precision. A first study examined question-answer sequences in conversations with three participants. Here, if A asks B a question, C can watch the events as they unfold. The results showed that participants planned the redirection of gaze from A to B on average only 40 ms before the first point at which the question was possibly complete. A switch at that point allows participants to optimise the input they receive from A and B's visual behaviour and to divide their attention evenly between their conversational partners.

Enabled by new eye-tracking technologies, this research combines natural and experimental methods, and has already shed new light on cognitive and social processes involved in turn-taking.

### Human sociality and systems of language use

Human Sociality and Systems of Language Use is a 5-year project, funded by an ERC grant to Enfield. The project has made a number of discoveries about language use across cultures. No matter how different the grammars and lexicons of their languages, people around the world share a basic set of techniques to solve problems in communication.

A word like “huh?” — used when one has not caught what someone just said — was found in similar form and function in a highly diverse sample of 21 languages. Remarkable similarities were also observed in the verbal and visual bodily practices speakers of different languages use to ask others for assistance. However, systematic cross-cultural differences were found with regard to how frequently they use these practices, and to whether and when people thank each other for assistance. This project employed a systematic approach to the comparison of languages in informal social interaction. Researchers in the project carried out fieldwork on languages from five continents, collected video corpora of naturally occurring conversation, and contributed to a comparative study of three systems of language use: *repairs* (i.e., how people solve problems in speaking and understanding), *recruitments* (i.e., how people use language to get others to do things), and *reference* (i.e., how people refer to places in the context of social interaction). A key contribution of the project is its attention to verbal as well as visual bodily practices, leading to new findings about the multimodal structure of language use in spoken and signed languages.

The outcomes of the project help to set the agenda for a new tradition in linguistics: a typology of conversational structures that looks for unity and diversity in systems of language use. Project publications document the conceptual and methodological framework as well as the research findings. Together, the findings point to a different kind of infrastructure for language

than linguists have long suggested: they are revealing the essentially social nature of language.

In 2014, several publications from the Language and Cognition Department received global media coverage, and widely read popular science magazines like *New Scientist*, *Scientific American* and *Smithsonian Magazine* devoted major articles to work carried out in the Department. Department members also participated in public outreach, promoting broader understanding of the language sciences.

### Selected publications

**Norcliffe, E., Konopka, A. E., Brown, P., & Levinson, S. C.** (2015). Word order affects the timecourse of sentence formulation in Tzeltal. *Language, Cognition and Neuroscience*, Advance online publication.

**Levinson, S. C., & Holler, J.** (2014). The origin of human multi-modal communication. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, 369, 2013030.

**Wnuk, E., & Majid, A.** (2014). Revisiting the limits of language: The odor lexicon of Maniq. *Cognition*, 131, 125–138.

**Dediu, D., & Levinson, S. C.** (2013). On the antiquity of language: The reinterpretation of Neandertal linguistic capacities and its consequences. *Frontiers in Language Sciences*, 4, 397.

**Dingemanse, M., Torreira, F., & Enfield, N. J.** (2013). Is “Huh?” a universal word? Conversational infrastructure and the convergent evolution of linguistic items. *PloS One*, 8, e78273.

# DEPARTMENT LANGUAGE AND GENETICS



## Goals of the Department

Human children have an unparalleled capacity to acquire sophisticated speech and language skills. Despite the huge complexity of this task, most children learn their native languages almost effortlessly and do not need formal teaching to achieve a rich linguistic repertoire. The Language and Genetics Department was established in 2010 with the goal of shedding new light on this enigma. We adopt the latest innovations in molecular methods to discover how your genome helps you speak. Our work identifies genes that are important for language development and dysfunction, and uses them as windows into the key neural pathways. Success depends on interdisciplinary research at multiple levels, from determining molecular interactions and functional roles in neural cell-biology to effects on brain structure and activity. We go further to ask how genes may help to explain both the evolution and variability of human language.

## Common genetic variants involved in language and reading

While they obviously depend on environmental input, it is well established that language and reading are highly heritable traits. This means that a substantial part of the variation in language and reading performance within human populations is explained by genetic differences between individuals. Studies of twins indicate that receptive and expressive language skills, as well as reading ability, are influenced to some extent by shared genetic effects. Moreover, investigations of developmental language impairments and reading disabilities (dyslexia) support the existence of overlapping genetic and neurobiological mechanisms underlying susceptibility to these disorders.

Work led by Francks and Fisher uses genome-wide screening techniques to identify common genetic variants that affect language and reading. For example, one investigation by Gialluisi and colleagues focused on three richly

characterized datasets from the UK and USA, which comprise children and teenagers with histories of language and/or reading problems, as well as their siblings. Within each dataset, the measures of language and reading performance were substantially

correlated with each other, allowing the calculation of a single index measure that captured a large proportion of the variability across all measures. This index measure was tested for a relation with each of roughly five million known genetic variants distributed

## Meta-Analysis: PC1

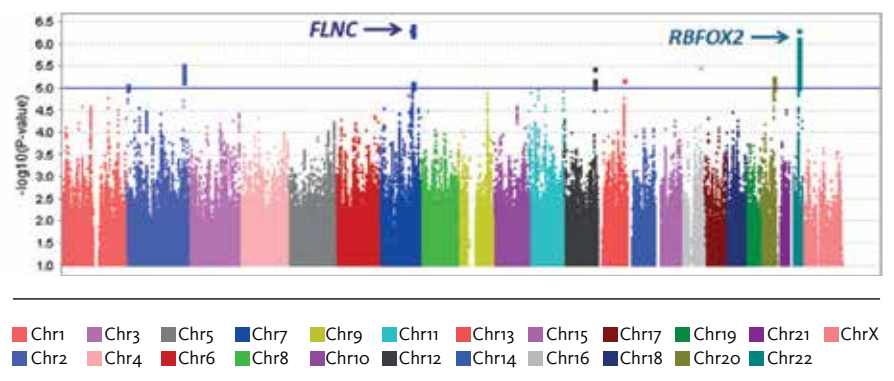


Figure 1: Genome-wide association scanning for language and reading ability in 1862 children and teenagers. The horizontal axis represents the human genome, with different colors symbolizing different chromosomes. The vertical axis represents the statistical significance of associations between genetic polymorphisms and language and reading performance. Each dot represents one genetic variant. Two possible new genetic effects on reading and language are highlighted.

**Director** Simon E. Fisher

**Department members** Martin Becker, Jasper Bok, Nicolas Brucato, Sara Busquets Estruch, Amaia Carrión Castillo, Xiaowei Sylvia Chen, Dan Dediu, Pelagia Derizioti, Paolo Devanna, Danaï Dimitropoulou, Clyde Francks, Alessandro Gialluisi, Sarah Graham, Tulio Guadalupe, Martine Hoogman, Rick Janssen, Carly Jaques, Guy Karlebach, Tulya Kavaklioglu, Katerina Kucera, Scott Moisik, Moritz Negwer, Pedro Rodenas-Cuadrado, Jon-Ruben van Rhijn, Elliot Sollis, Sonja Vernes, Arianna Vino, Kai Wanke

over all chromosomes of the human genome, and the results were merged across all three datasets, giving a total of 1862 study participants.

The results (Figure 1) pointed to new potential genetic associations with language and reading for variants within two genes called *FLNC* and *RBFOX2*, although analyses in additional samples are needed to confirm these findings.

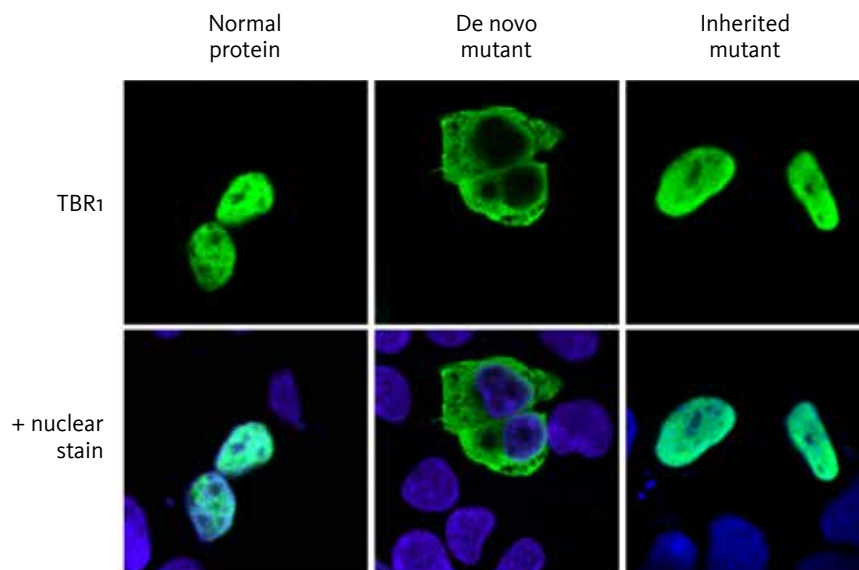
The genetic architecture underlying language-related traits is complex.

There will be many common genetic variants involved; most such variants will individually have a tiny effect on variability in a given population, and very large samples are needed to detect them with certainty. Our study of

almost two thousand participants in three datasets is just one step in a longer research program. We have established an international consortium with other researchers interested in the genetics of language and reading, and are working towards a larger-scale genome-wide association scan that will incorporate thousands of participants. While challenging, this kind of approach has been highly successful for genomic studies of biomedical traits, and holds great promise for our own field.

### Understanding rare mutations

As described above, many common genetic variants are likely to contribute to individual differences in language and reading performance. A complementary strategy for tracing the key genomic connections is to identify rare mutations of large effect size that are sufficient to yield severe problems with development of speech and language. An illustration of the value



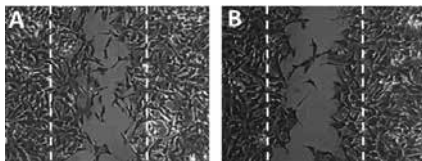
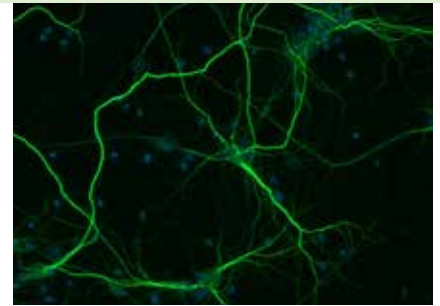
*Figure 2: De novo mutations in the TBR1 gene affect the location of the resulting protein in human cells. The protein, shown in green, is normally found in the nucleus of the cell, shown in blue. Proteins resulting from de novo TBR1 mutations were located outside of the nucleus. Proteins resulting from inherited TBR1 variants were found in the nucleus of the cell, like the normal protein.*

of this approach comes from our recent work on certain mutations that cause autism, a neurodevelopmental disorder involving difficulties with social interaction and communication. Some individuals with autism never learn to speak, whereas others can speak fluently but have difficulties maintaining a conversation.

The genetic underpinnings of autism are complicated and we still have much to learn about them. However, severe cases of autism sometimes result from new mutations occurring in the sperm or egg – these genetic variants are found in the child, but not in his or her parents, and are known as de novo mutations. In recent years,

international research teams have used the latest DNA sequencing techniques to screen all the protein-coding parts of the genome in thousands of unrelated children with severe autism, and found a handful of genes that are hit by independent de novo mutations in more than one child. Deriziotis and colleagues focused on one particularly interesting gene from these studies, called *TBR1*, and used experimental techniques to understand the biological significance of the mutations that had been found. The researchers generated human cells carrying the *TBR1* variants that had been identified in children with autism and assessed the properties of the resulting proteins. Proteins





*Figure 3: FOXP2 affects cellular migration. Neuron-like cells that do not express FOXP2 (panel A) move more quickly than cells that do (panel B), as demonstrated in this assay in which cells are allowed to migrate from the sides of their growth environment to fill an empty space (dotted lines).*

resulting from de novo *TBR1* mutations were found to be mislocalized within the cell (Figure 2). By comparison, for *TBR1* variants that had been inherited from unaffected parents, the resulting proteins appeared normal. Remarkably, the work also showed that the protein encoded by *TBR1* directly interacts with the protein encoded by *FOXP2*, a gene implicated in speech and language disorders (discussed further below). Mutations affecting either of these proteins abolished the interaction, thereby uncovering direct molecular links between clinically distinct disorders that disturb language. Overall, this research highlights the power of coupling data from genome screening with functional analysis in the laboratory, and contributes to an expanding picture of the genetic networks that underpin language.

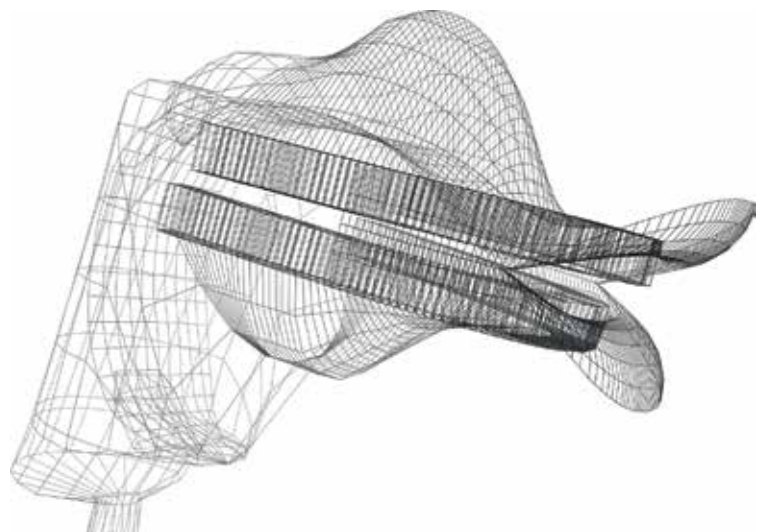
### Genes, neurons and circuits

Rare disruptions of *FOXP2* are one of the best known genetic causes of severe speech and language disorders. The activities of *FOXP2* in a subset of

neurons (brain cells) are thought to be crucial for normal development of key brain circuits. In particular, *FOXP2* acts as a transcription factor, which means that it regulates how other genes (its targets) are switched on or off in different cells and at different developmental timepoints. So, although *FOXP2* mutations account for only a small proportion of children with speech and language impairments, studies of this gene offer exciting opportunities for investigating the relevant neurobiological pathways.

There are a number of fundamental processes that underpin normal development of all brain circuits involved in cognition and behaviour. These processes include the birth of new neurons, their migration from one part of the brain to another, and the formation, maintenance and modulation of connections between them. Work by the

Vernes group indicates that *FOXP2* can regulate expression of a specific set of target genes to control both the migration of neuronal cells and how they connect to each other. The studies used human neuronal cell lines that were obtained from patient biopsies: such cells can survive indefinitely in the laboratory but still possess many characteristics of mature human neurons. With this model, the researchers found that increasing the levels of *FOXP2* activity reduced the speed with which cells migrated (Figure 3) and stimulated the cells to grow more connections to surrounding neuronal cells. Moreover, these aspects of *FOXP2* function were connected to a well-established signaling pathway, centered on retinoic acid (RA), a derivative of vitamin A that is essential for early brain development, and is a key player in learning and memory. The findings



*Figure 4: A realistic computer model of the vocal tract extended to include patterns of anatomical variation, such as variations in the hard palate.*



showed that *FOXP2* influences cellular responses to environmental RA by modulating expression of multiple targets that act in the RA signaling pathway. Therefore, a combination of environmental RA cues and *FOXP2* activity may together contribute to the formation of functionally connected brain networks that are important for human speech and language.

### Vocal tract variation and linguistic diversity

Most contemporary approaches to speech and language assume that differences between individuals in the anatomy and physiology of their speech organs (such as the tongue, the hard palate, or the larynx, collectively known as the vocal tract) do not really matter. But is this true? The G[3]bils (Genetic Biases in Language and Speech) Project aims to test this assumption using a variety of approaches, in the process also shedding light on the genetic, developmental and evolutionary foundations of patterns of normal variation in the vocal tract within and across populations.

One dimension of variation that could be relevant for phonetic and phonological variation is represented by the hard palate. Based on patterns of variation captured by published magnetic resonance imaging (MRI) data, Janssen has extended Vocal Tract Lab (<http://www.vocaltractlab.de>), a realistic computer model of the vocal tract, with a set of parameters that control the shape of the hard palate (Figure 4). These parameters can be fit to newly acquired data, on one hand, and can be

used to generate possible hard palate shapes, on the other. This will allow the quantitative exploration of language evolution across generations of simulated speakers that differ in their vocal tract anatomy, and will generate hypotheses about the type of cross-linguistic variation that is influenced by inter-population anatomical differences. However, very little is currently known about the actual patterning of variation within and between populations, its genetic and developmental causes, and its effects on speech and language. To address this fundamental gap in our knowledge, Moisik and Dediu are conducting a large-scale experiment involving MRI structural scans of the vocal tract, optical intra-oral scans, and real-time MRI scans of speakers from the three different geographical populations (the Netherlands, North India and South India) producing native and novel speech sounds. The resulting database will be the largest for cross-population normal variation in the vocal tract and will allow the exploration and testing of various hypotheses regarding the effect of the vocal tract on language and speech.

### Other work

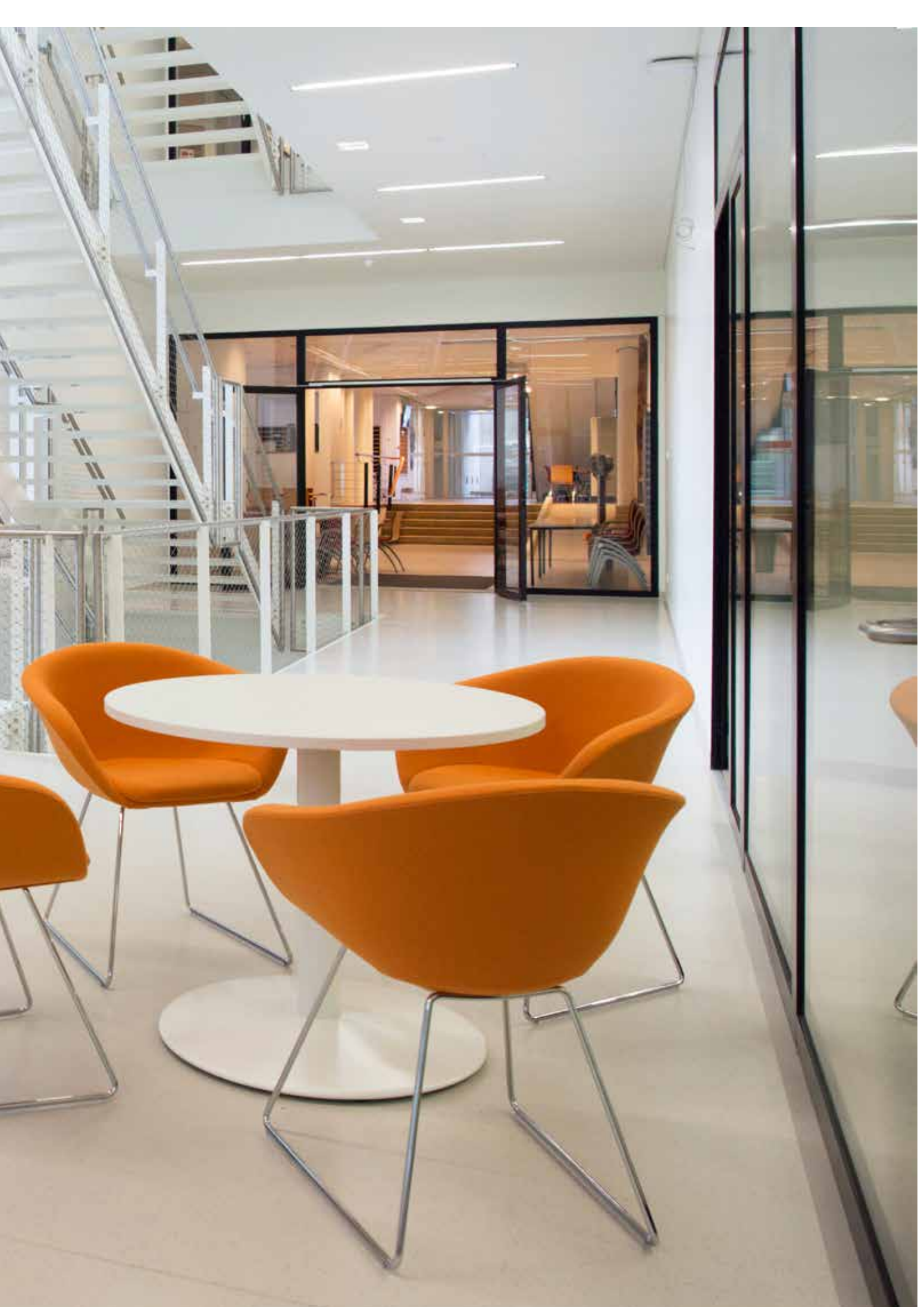
- Next-generation DNA sequencing in language impairments
- Gene discovery in a family with an inherited disorder of semantic cognition
- Decoding the genetics of synaesthesia
- Protein networks in speech and language
- Language Cognomics
- Genetics of brain and behavioural asymmetries

### Selected publications

- Deriziotis, P., O’Roak, B. J., Graham, S. A., Estruch, S. B., Dimitropoulou, D., Bernier, R. A., Gerds, J., Shendure, J., Eichler, E. E., & Fisher, S. E. (2014).** De novo *TBR1* mutations in sporadic autism disrupt protein functions. *Nature Communications*, 5, 4954.
- Devanna, P., Middelbeek, J., & Vernes, S. C. (2014).** *FOXP2* drives neuronal differentiation by interacting with retinoic acid signaling pathways. *Frontiers in Cellular Neuroscience*, 8, 305.
- Fisher, S. E., & Ridley, M. (2013).** Culture, genes, and the human revolution. *Science*, 340, 929–930.
- Gialluisi, A., Newbury, D. F., Wilcutt, E. G., Olson, R. K., DeFries, J. C., Brandler, W. M., Pennington, B. F., Smith, S. D., Scerri, T. S., Simpson, N. H., The SLI Consortium, Luciano, M., Evans, D. M., Bates, T. C., Stein, J. F., Talcott, J. B., Monaco, A. P., Paracchini, S., Francks, C., & Fisher, S. E. (2014).** Genome-wide screening for DNA variants associated with reading and language traits. *Genes, Brain and Behavior*, 13, 686–701.
- Hoogman, M., Guadalupe, T., Zwiers, M. P., Klarenbeek, P., Francks, C., & Fisher, S. E. (2014).** Assessing the effects of common variation in the *FOXP2* gene on human brain structure. *Frontiers in Human Neuroscience*, 8, 473.







# DEPARTMENT NEUROBIOLOGY OF LANGUAGE



## Goals of the Department

The focus of the Neurobiology of Language Department is on the study of language production, language comprehension, and language acquisition from a cognitive neuroscience perspective. This includes using neuroimaging, behavioural and virtual reality techniques to investigate the language system and its neural underpinnings. Research facilities at the MPI include a high-density EEG lab, a Virtual Reality lab, and several behavioural labs. With part of the Department stationed at the Donders Institute for Brain, Cognition and Behaviour (Centre for Cognitive Neuroimaging), we also utilise a whole-head 275 channel MEG system, MRI-scanners at 1.5, 3 and 7 Tesla, a TMS-lab, and several other EEG labs.

## Language as a multimodal phenomenon

In everyday communication, we often use words to describe intended referents and we use our body (e.g., eyes, head, hands and torso) to indicate the location that our addressee should focus her attention on to further facilitate identification of these referents. This is a complex, multimodal behaviour: In a prototypical instance of

successful referential communication, a speaker produces a manual pointing gesture to a physical object, often in temporal alignment with a spoken referential expression that canonically contains a spatial demonstrative (as in “I have bought that book”), while alternating gaze between addressee and referent. In two ERP studies, Peeters and colleagues focused on an important component of this communicative

process by investigating the comprehension of spatial demonstrative terms in a visual context. An egocentric, spatial theoretical account of demonstrative reference was contrasted with a social, interactive account. Participants watched pictures of a speaker who referred to one of two objects using speech as well as an index-finger pointing gesture. In contrast with separately collected native speakers’ linguistic

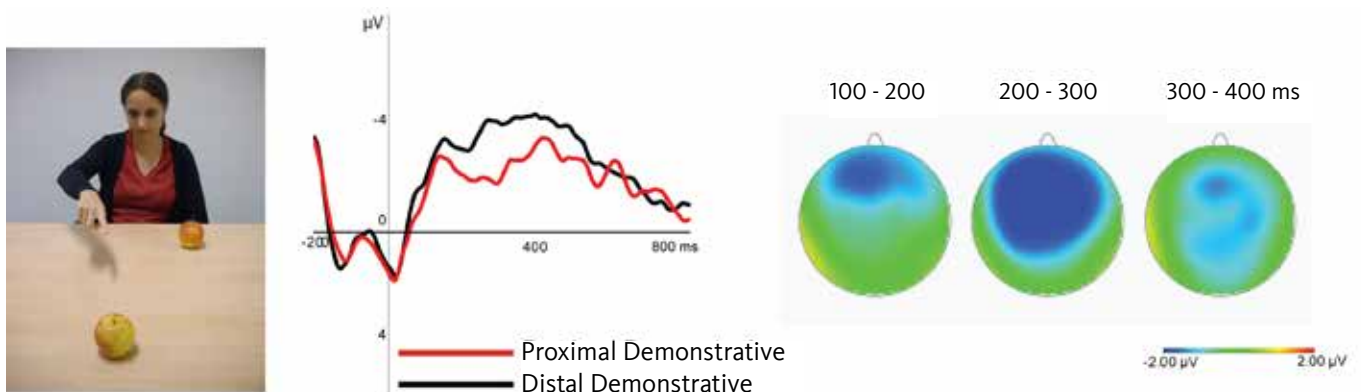


Figure 1: Event related potentials (middle) time-locked to the onset of hearing a spatial demonstrative while seeing a picture in which a speaker pointed at an object in the shared space between speaker and participant (left). Topographic plots (right) show the distribution of the effect over the scalp in time windows between 100 and 400 ms after the onset of hearing the demonstrative term in the visual context.

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intuitions, N400 effects in this study showed that there were higher processing costs for distal demonstratives (“that”) compared to proximal demonstratives (“this”) when speaker and addressee were facing each other and when all possible referents were located in the shared space between them. This effect was observed irrespective of the physical proximity of the referent to the speaker (Figure 1). These findings reject egocentric proximity-based accounts of demonstrative reference, and instead support a sociocentric approach to referential communication. They suggest that interlocutors construe a shared space during conversation, and imply that the psychological proximity of a referent may be more important than its physical proximity.

### In dialogue with an avatar

The use of virtual reality (VR) as a methodological tool is becoming increasingly popular in behavioural research as its flexibility allows for a wide range of applications. This new method has not been as widely accepted in the field of psycholinguistics, however, possibly due to the assumption that language processing during human-computer interactions does not accurately reflect human-human interactions. Yet at the same time, there is a growing need to study human-human language interactions in a tightly controlled context, which is not always possible using existing methods. As VR offers such control, Heyselaar tested whether human-computer language interaction is comparable to human-human language interaction by inviting

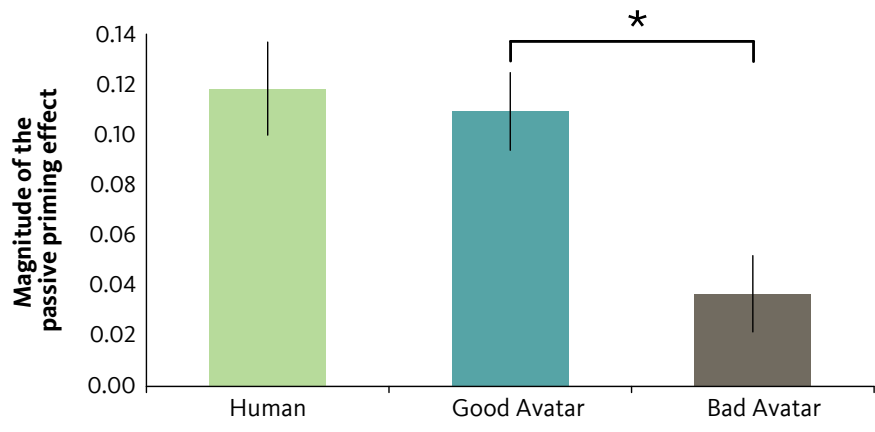


Figure 2: Participants show the same language behaviour when conversing with a human partner and with a human-like digital one. The asterisk represents the significant decrease in the priming effect when participants interacted with the bad avatar compared to the good avatar and human partner,  $p < .05$ .

participants to complete a standard syntactic priming task in the Virtual Reality lab. Participants completed the task with a human partner (confederate), a human-like ‘good’ avatar, and a computer-like ‘bad’ avatar. The study showed comparable priming effects with human partners and good avatars (Passive priming effect: Human: 11.8%; Good Avatar: 10.9%; Figure 2), suggesting that participants attributed human-like agency to the good avatar. Indeed, when interacting with the computer-like bad avatar, the priming effect nearly disappeared (3.4%). This suggests that when interacting with a human-like avatar, sentence processing is comparable to processing in interactions with a human partner. Thus VR is a valid platform for conducting language research and studying dialogue interactions in an ecologically valid manner.



### Mother Of all Unification Studies (MOUS)

When making sense of written or spoken language, we combine individual words into larger units. The brain processes that facilitate this unification are an important topic of study in the Department. MOUS (Mother Of all Unification Studies) is a large-scale project investigating the neural basis of sentence processing with various





techniques. With functional magnetic resonance imaging (fMRI) and magnetoencephalography (MEG), the MOUS team measured brain activity with high spatial and temporal resolution, respectively, in 200 participants reading or listening to sentences. In addition, the team collected anatomical brain scans and genetic samples. The goal is to combine data from different modalities to obtain a more complete picture than is possible with a single-modality study. Another goal is to quantify variability across individuals and to link this variability to genetic factors in collaboration with the Language and Genetics Department. The first phase of the project focused on collection and quality assurance of the data. With all data now collected, the focus has shifted to analysis.

As an example of the initial results, Uddén, Hultén, Schoffelen and colleagues combined brain activity measurements collected separately during reading and listening. Based on fMRI brain activity, they identified a network

of brain regions involving parts of the frontal, temporal and parietal lobes that was commonly activated during reading and listening. Activity in this network increased as sentences unfolded, suggesting that the visual and auditory processing streams converge onto a brain network involved in the more abstract unification process. The MEG results showed this common activation as early as 250 milliseconds after the beginning of a new word. This activation was bilateral in the left and right temporal and inferior frontal cortex (Figure 3).

### Language changes music perception

When we listen to music, do we use resources that are otherwise involved in processing language? Apparently so. For example, hearing an unexpected chord – which taxes music resources – increases the processing problems observed when encountering a syntactically unexpected word in a garden-path sentence like “The attorney advised the defendant was unreliable”. Apparently,



having taxed common resources through concurrent processing of a musical chord, the language processor has less left to work with when encountering syntactic challenges. What are common music-language resources actually doing? Difficult to say. One school of thought characterizes them as general attention resources. In support of this claim, it has been shown that an unexpected chord doesn’t just pose problems for linguistic syntactic processing but also for various other areas of performance: visual perception, number sequence processing, Stroop interference, and so on. Another school of thought has hypothesized that music-language resources are specific to syntax. In this view, music and language are linear sequences with combinatorial principles relating elements - tones/chords or words - to each other. This commonality is thought to be reflected

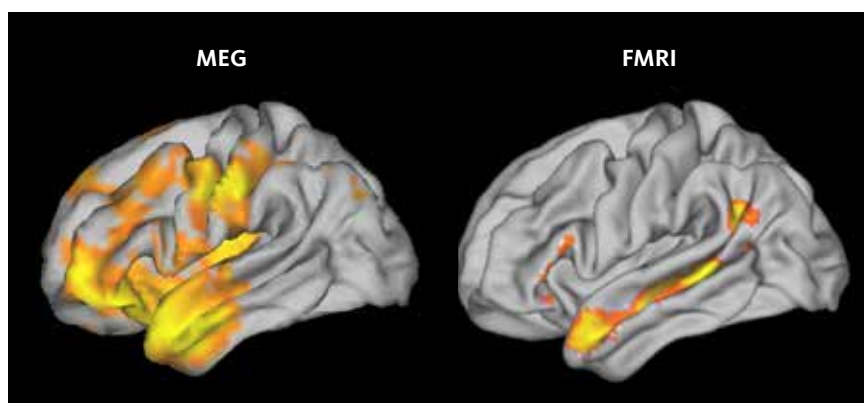


Figure 3: Neural activation common to reading and listening to sentences, as revealed with MEG (left) and FMRI (right).

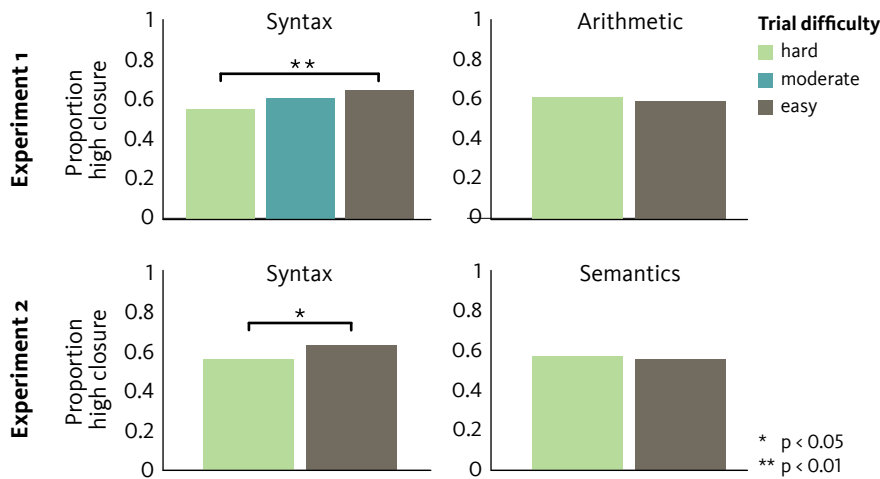


Figure 4: When people read a hard, syntactically challenging sentence while listening to music, their feeling of musical completeness was reduced compared to when they read an easier control sentence (left, Experiments 1 and 2). The y-axis represents this feeling as the proportion of trials that people perceived as well completed ('high closure'). There was no effect of the difficulty of arithmetic tasks or of reading semantically challenging garden-path sentences on music completeness ratings (right).

in shared circuitry which processes syntactic relations between elements. Kunert tested these hypotheses in two behavioural experiments investigating the influence of language on music. The experiments tested the specificity of shared music-language resources. If these resources are part of the general attention system, language/arithmetic effects on music processing should be non-specific. If, on the other hand, these resources are part of a syntax system, then effects should be specific to syntax. In Experiment 1, participants were asked to rate how 'finished' (i.e., how complete) a chord sequence sounded. While listening, they also either read sentences or performed an arithmetic control task. The prediction was that reading a syntactically unexpected word

would tax shared resources, rendering the processing of chords more difficult, as shown by a reduced feeling of musical completeness. Indeed, participants perceived musical stimuli as less complete if they simultaneously read a syntactic garden-path sentence (Figure 4). Interestingly, the arithmetic control task had no effect.

In Experiment 2, participants performed the same music task while either encountering a syntactic or a semantic problem. The latter involved the disambiguation of a semantically ambiguous word, e.g., "mouse": *tool* or *animal* in "The programmer let his mouse run on the table"? In line with the syntax account, only the syntactic challenge affected music ratings.

In sum, the study showed no effect of

an arithmetic difficulty manipulation or of a semantic challenge on music perception (in other words, music perception isn't affected just by any type of processing difficulty). Instead, the shared resources appear to be specific to syntactic processing: in order to change the way people perceive music, one needs a syntactic manipulation in the accompanying language. This suggests that, when listening to music, one also relies on brain resources whose job it is to process the syntactic relations between words.

## Selected publications

- Basnakova, J., Weber, K., Petersson, K. M., Van Berkum, J. J. A., & Hagoort, P.** (2014). Beyond the language given: The neural correlates of inferring speaker meaning. *Cerebral Cortex*, 24, 2572-2578.
- Chu, M., & Hagoort, P.** (2014). Synchronization of speech and gesture: Evidence for interaction in action. *Journal of Experimental Psychology: General*, 143, 1726-1741.
- Hagoort, P.** (2014). Nodes and networks in the neural architecture for language: Broca's region and beyond. *Current Opinion in Neurobiology*, 28, 136-141.
- Hagoort, P., & Indefrey, P.** (2014). The neurobiology of language beyond single words. *Annual Review of Neuroscience*, 37, 347-362.
- Stolk, A., Verhagen, L., Schoffelen, J.-M., Oostenveld, R., Blokpoel, M., Hagoort, P., van Rooij, I., & Toni, I.** (2013). Neural mechanisms of communicative innovation. *Proceedings of the National Academy of Sciences of the United States of America*, 110, 14574-14579.

# DEPARTMENT PSYCHOLOGY OF LANGUAGE



## Goals of the Department

Research in the Psychology of Language Department is directed at developing functional models of speaking and listening. Important aims are to understand the cognitive processes that occur when we talk and listen to language, how these processes are coordinated in time, and how they influence each other. Researchers in the Department also study how speakers and listeners adapt to different communicative situations and how their speaking and listening skills and strategies change with experience. Another important goal of the Department is to identify characteristics of the cognitive system that determine behaviour across a wide range of linguistic tasks. Working memory capacity and processing speed may be such characteristics. A related broad concern is understanding how individual differences in listening and speaking skills and strategies arise.

## Controlling lexical access

Lexical access (the retrieval of words from the mental lexicon) is a key component of speaking and listening. The speed and efficiency of lexical access depends not only on the organisation of the mental lexicon but also on domain-general attention and executive control processes. Earlier work, carried out by Shao, Meyer and Roelofs (Radboud U.) focused on the role of inhibitory control processes and showed that these processes play a critical role during lexical selection. Jongman (with Meyer and Roelofs) has been studying an equally important component of domain-general attention, namely sustained attention. Sustained attention is the ability to maintain alertness over a prolonged period of time. The idea to investigate sustained attention and its relationship to language in adults comes from the literature on children with Specific Language Impairment (SLI), who often

present with attentional deficits. In Jongman's experiments, participants performed both a sustained attention task and a picture description task, producing utterances such as "the bike" or "the red bike". She found that individuals with poorer sustained attention had a higher proportion of extremely slow responses in the naming task than individuals with better sustained attention. These results show that sustained attention is important for fast and fluent language production.

## Sentence formulation and grammatical encoding

When we communicate, we express thoughts by means of words organised in a particular order. So, to what extent is the preparation of a sentence influenced by the availability of those words or by the speakers' familiarity with the linguistic structures in which those words are produced? Konopka and Meyer (2014) used an eye-tracking task

to test how speakers prepare descriptions of simple events (e.g., a picture of a horse kicking a cow) with active and passive sentences in two experiments. In Experiment 1, one of the two characters (the *horse* or the *cow*) was manipulated to be easy to name. In the second experiment, the ease of assembling active and passive sentences was manipulated by exposing participants to other unrelated prime sentences with active and passive structures or to intransitive prime sentences (the control condition). The results showed that both the availability of words and of syntactic structures influenced the way speakers scanned the pictured events in preparation for speaking, but they did so in different ways. In Experiment 1, facilitating encoding of the word *horse* increased the likelihood of speakers encoding information about the horse with priority shortly after picture onset. In contrast, in Experiment 2, facilitating encoding



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of an active structure increased the likelihood of speakers encoding information about *both* event characters after picture onset (see Figure 1 for the contrast between trials where speakers were exposed to active sentences and intransitive sentences before describing the target events). This indicates that linguistic processes play a key role in shaping what information speakers pay attention to when preparing their sentences (i.e., the way they ‘think’ before speaking). In particular, the ease of assembling syntactic structures can influence the degree to which speakers devote processing resources to information that is mentioned *after* the

subject character. An important goal for future research is to identify linguistic variables that can influence sentence formulation across languages. Studies carried out in collaboration with the Language and Cognition Department are addressing this question by comparing sentence formulation in languages that place different constraints on word order than commonly studied languages (like English or Dutch).

### Social circles

People learn language from their social environment, and the process of learning continues throughout their lives. Importantly, people can have

very different social environments. For example, some people only interact with a small group of people that might also be very similar to one another, while others interact with a much wider group of people. This project, led by Lev-Ari, aims at uncovering how individual differences in people’s social circles can lead to differences in linguistic abilities. For example, Lev-Ari discovered that people with smaller social circles have more malleable linguistic representations. This might lead them to play an important role in the process of language change. Having a larger social circle can also boost linguistic abilities. For example, it can improve certain phonological abilities, such as the ability to understand speech in noisy environments. Having a larger social circle also boosts skills at the semantic level, such as global comprehension and prediction of the content of what speakers are about to say. At the same time, having a larger social circle does not confer any advantage for lexical skills, such as the ability to predict which of several synonyms a speaker is likely to use. This project thus shows how properties of the input interact with properties of the linguistic level to jointly shape our linguistic representations. It also shows how individuals’ lifestyles can influence their linguistic abilities.

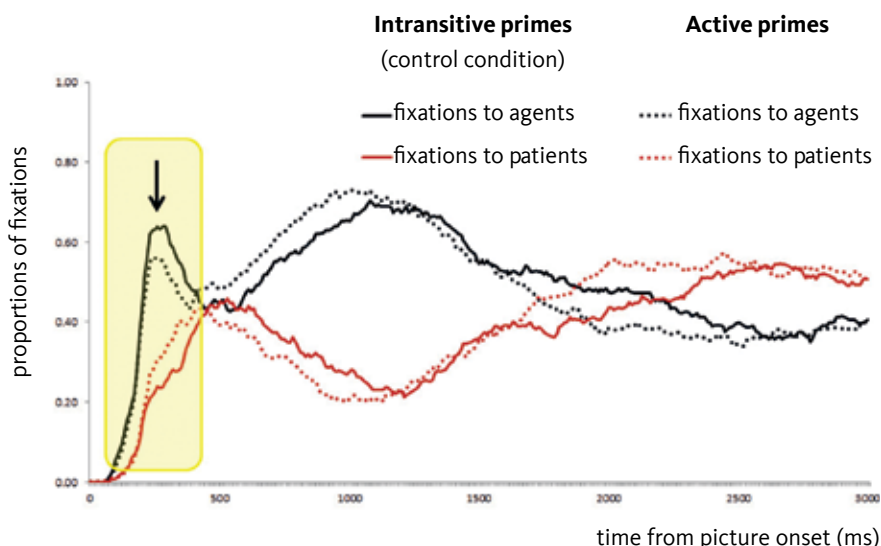
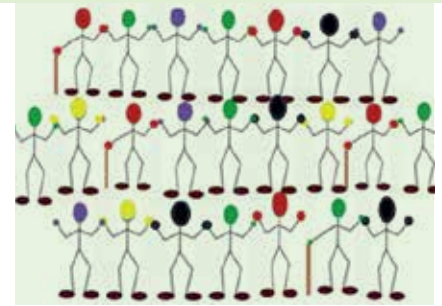


Figure 1: Proportions of fixations directed to agents (horse) and patients (cow) in events described with active sentences (“The horse is kicking the cow”) in Experiment 2 (Konopka & Meyer, 2014). When describing events after Intransitive Primes, speakers quickly directed their gaze to the horse (see highlighted window). When describing events after Active Primes, however, speakers were less likely to immediately fixate the agent (horse) as they also directed some attention to the patient (cow).

### Effects of literacy on cognitive processing

Orthographic systems vary dramatically in the extent to which they encode phonological and lexico-semantic information. For example, in alphabetic systems, such as Dutch, individual



letters represent individual speech sounds. In contrast, logographic systems, such as Chinese, represent less detailed phonological information, yet may contain orthographic components that relate to a word's semantic properties. Studies of the effects of orthographic transparency suggest that such variation is likely to have major implications for how the reading system operates. However, such studies have been unable to examine the unique effects of transparency on reading due to co-varying linguistic factors (e.g., phonological complexity, visual complexity of the orthography) or socio-cultural factors (e.g., teaching methods, educational background). Computational modeling provides a

means of controlling such variables while allowing the researcher to probe the underlying mechanisms at a level that would not be possible in human samples. Smith, Monaghan and Huettig trained neural network implementations of the triangle model of reading (Seidenberg & McClelland, 1989, *Psychological Review*) on different orthographic systems representing the range of the world's writing systems (alphabetic, alphasyllabic, consonantal, syllabic and logographic) while controlling for phonological and semantic structure. Their work demonstrates that this architecture is effective as a universal model of reading, is able to replicate key behavioural and neuroscientific results, and generates

new predictions deriving from an explicit description of the effects of orthographic transparency on reading. For example, the model predicts that an individual's semantic and phonological processing during non-reading tasks (e.g., speech processing) will be affected by structural properties of the orthographic system on which they have been trained.

### Nature and limits of predictive processing

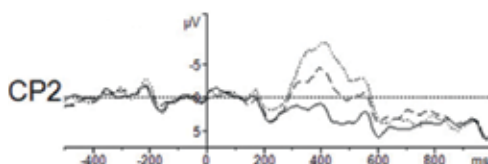
Hintz, Meyer and Huettig investigated the mechanisms underlying anticipatory language processing using EEG. Previous research suggested that when reading short texts, event knowledge about the unfolding discourse influ-

#### Event context:

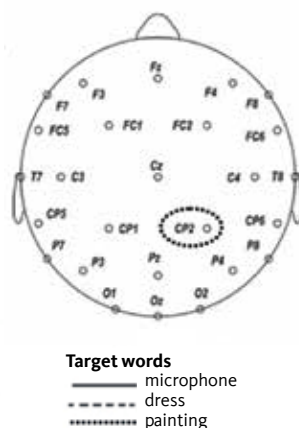
My sister was only twenty when she won a **Grammy** for her first **album**. She seemed so nervous when she gave her acceptance speech.

#### Target sentence:

Her voice was shaky as she spoke into the \_\_\_\_\_ and thanked everyone.



Experiment 1

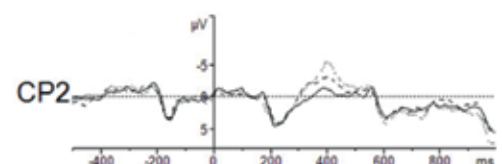


#### Carrier sentences:

When Susie looked inside, she saw a **Grammy** standing on the table. In one of the boxes Tom found an **album** he could use.

#### Target sentence:

Her voice was shaky as she spoke into the \_\_\_\_\_ and thanked everyone.



Experiment 2

Figure 2: Stimulus sentences used in Experiments 1 and 2 and the electrophysiological response to the critical words in the target sentences (indicated by the gap in the target sentences). In Experiment 1, the N400 amplitude in response to a critical word like "dress" was reduced (relative to "painting"), although both words were unexpected at that point. In Experiment 2, this reduction was only observed over right hemispheric parietal electrodes.



ences the reader's predictions about upcoming words. This is normally reflected in a reduced N400 amplitude, an ERP component sensitive to semantic processing and an index of prediction. However, in many relevant prior studies, the influence of event knowledge and the influence of associations between words in the context and the target words could not be separated. Hintz and colleagues used targets words preceded by words that were more or less strongly associated with the targets appearing in a coherent discourse (Experiment 1) or in isolated sentences (Experiment 2). The results showed that both the presence/absence of a coherent discourse context and the association strength between words affected N400 amplitude (Figure 2). These findings demonstrate that, during discourse reading, both event knowledge and simple word associations contribute to the prediction process. The results highlight that multiple mechanisms underlie predictive language processing.

## Dialogue

Members of the Department collaborate with colleagues in the Language and Cognition and Neurobiology of Language Departments on the Dialogue project. Natural conversations are characterized by smooth transitions of turns between interlocutors. For instance, speakers often respond to questions or requests within less than half a second. Given that planning the first word of an utterance can take a second or more, rapid turn-taking suggests that speakers often begin to plan their responses well before the end of the preceding utterance. However, to date, there is little

empirical evidence about the precise temporal coordination of speaking and listening in dialogue. Sjerps and Meyer as well as Barthel, Meyer and Levinson (Language and Cognition Department) used eye-tracking to examine when utterance planning in simple turn-taking situations begins. The results of these studies and those obtained in other research carried out in the Language and Cognition Department suggest that speakers engage in high-level cognitive processes that simultaneously support comprehension and utterance planning throughout a conversation (i.e., interlocutors 'think along' with each other), but that they only initiate the linguistic formulation of their utterances shortly before the end of the preceding turn. For instance, in experiments conducted by Sjerps and Meyer, participants first listened to a short utterance referring to a visual display (e.g., "Put the spoon below the tray and put the apple above the pen"), and then produced an utterance of the same structure to refer to other objects in the display. Throughout the task, participants had to tap a complex pattern with their fingers. Sjerps and Meyer found that participants only started to look at the objects they had to name about a second before the end of the recorded utterance. Around the same time, their tapping performance deteriorated. This indicates that processing load increased around this time, presumably because of the onset of speech planning. The relatively late shift of gaze to the relevant objects and the concurrent late deterioration of participants' tapping performance suggest that there is less simultaneous listening and speech

planning than one might think. This conclusion fits in well with findings from Gerakaki's PhD project. She used pupillometry to measure the cognitive effort arising from concurrent listening and speech planning. She also assessed later memory for words heard during or without concurrent planning. The results showed that planning simple nouns while listening to other words substantially impaired later recognition memory for the heard words. Thus, a reason why speakers might postpone speech planning as long as possible could be that they aim to minimise interference between speech planning and processing of the interlocutor's speech.

## Selected publications

**Konopka, A. E., & Meyer, A. S. (2014).**

Priming sentence planning. *Cognitive Psychology*, 73, 1-40.

**Lev-Ari, S., & Peperkamp, S. (2014).** An

experimental study of the role of social factors in sound change. *Laboratory Phonology*, 5, 379-401.

**Mani, N., & Huettig, F. (2014).** Word

reading skill predicts anticipation of upcoming spoken language input: A study of children developing proficiency in reading. *Journal of Experimental Child Psychology*, 126, 264-279.

**Sjerps, M. J., & Meyer, A. S. (2015).**

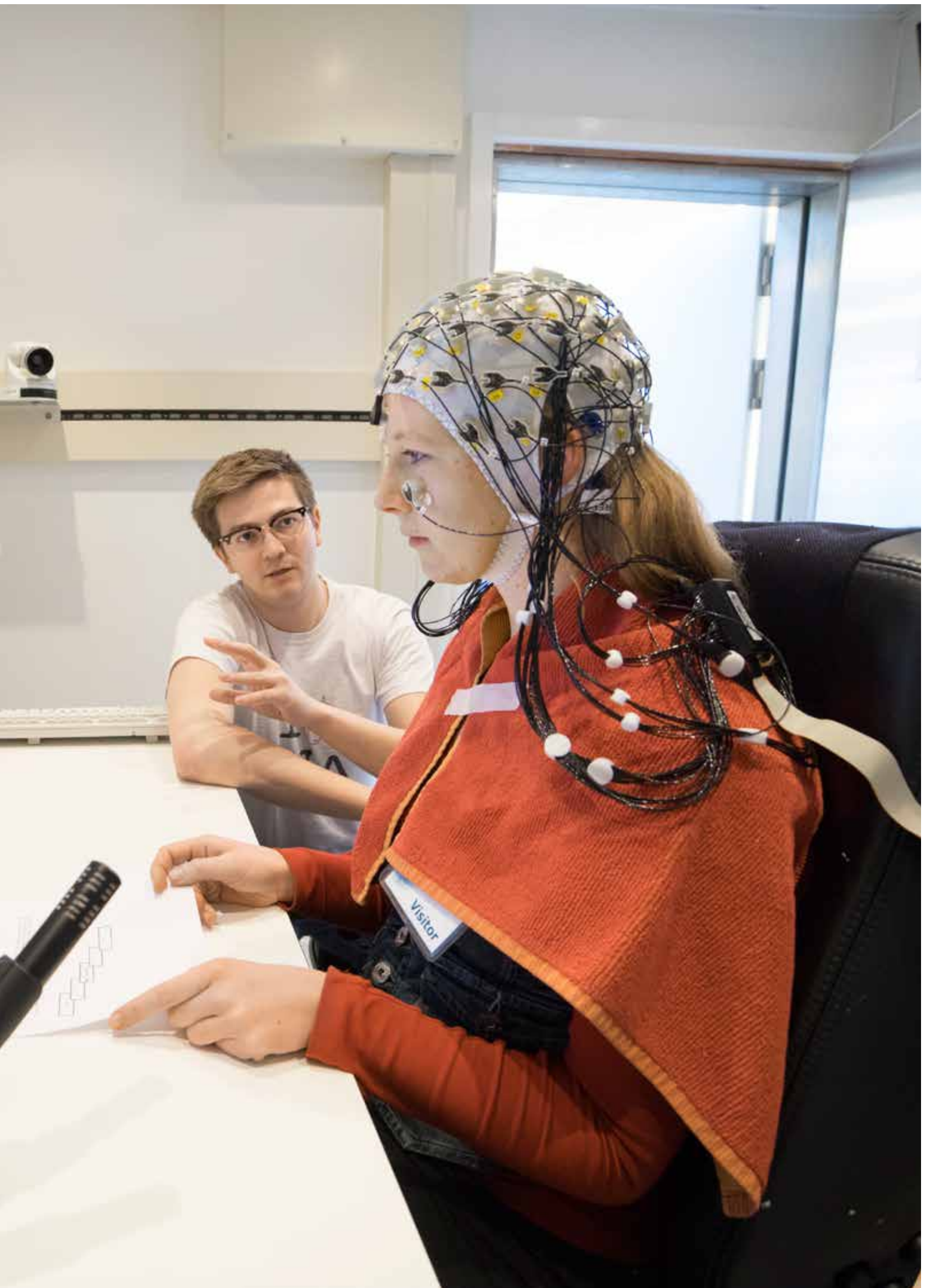
Variation in dual-task performance reveals late initiation of speech planning in turn-taking. *Cognition*, 136, 304-324.

**Smith, A., Monaghan, P., & Huettig, F.**

(2014). Literacy effects on language and vision: Emergent effects from an amodal shared resource (ASR) computational model. *Cognitive Psychology*, 75, 28-54.







# RESEARCH GROUP COMPARATIVE COGNITIVE ANTHROPOLOGY



## Goals of the Group

The Group was hosted at the MPI for Psycholinguistics (Nijmegen) and the MPI for Evolutionary Anthropology (Leipzig) from August 2008 until December 2013. The Group's aim was to explore how patterns of cultural variation are related to variable cognitive function in humans and the other great apes, and to determine the underlying set of psychological mechanisms that allow and stabilise cross-cultural behavioural variability.

## Cross-cultural diversity of chimpanzee social behaviour

During the course of this project, researchers in the Group established a research program at a chimpanzee sanctuary in Zambia where four chimpanzee communities live in one continuous stretch of forest but are separated from one another. Hence any differences in behaviour found across these groups cannot be due to differences in habitat characteristics. A daily observation program achieved through coordination with local chimpanzee caretakers generated over two years of observational records. Based on this database, Cronin, van Leeuwen, Vreeman and Haun extracted the social networks of the four chimpanzee groups. Specifically, focusing on two groups of nearly equal size and demographic structure, Cronin and colleagues found that one group showed high cohesion and close social bonds with many groupmates, while the other was more dispersed and each individual had only a couple of close social relationships. Paralleling these differences, the groups also varied in experimental measures of cofeeding tolerance and hierarchy steepness. Taking the results together, these two demographically matched groups appear to differ in their social dynamics, with one being highly tolerant and cohesive, and the other dispersed and intolerant. Such variation in social tolerance

amongst group members can determine individuals' possibilities for reassurance, options to cooperate and share, as well as opportunities for social learning.

## Cross-cultural diversity of human social behaviour

Distributing jointly produced resources based on work contributions or merit seems fair in many Western societies. However, whether such ideas of distributive justice are culturally specific or whether they apply across human populations remains unclear. In a study carried out by Schäfer, Haun and colleagues from the MPI for Evolutionary Anthropology, pairs of 4- to 11-year-old children from three very different human populations were left to themselves to divide a resource of sweets they had earned together in a fishing game. The results revealed fundamental differences in children's consideration of merit when dividing the rewards amongst themselves: Whereas children from a Western industrialized society (Germany) shared the sweets precisely in proportion to individual work contributions, children from a gerontocratic, pastoralist society in Kenya (the Samburu) divided sweets very unequally but did not take merit into account at all. Children from an egalitarian hunter-gatherer group in Namibia (the #Akhoe Hai||om) distributed the sweets more equally than children from the other

two cultures, with merit playing only a limited role. These results suggest that some notions of distributive justice, such as merit, might not be based on universal human intuitions but rather on culturally constructed behavioural norms.

**Group coordinator** Daniel Haun

**Group members** Emma Cohen, Katherine Cronin, Yvonne Rekers, Nadja Richter, Marie Schäfer, Edwin van Leeuwen, Henriette Zeidler

## Selected publications

**Cohen, E., & Haun, D.B.M.** (2013). The development of tag-based cooperation via a socially acquired trait. *Evolution and Human Behavior*, 43, 230-235.

**Cronin, K.A., Van Leeuwen, E.J.C., Vreeman, V., & Haun, D.B.M.** (2014). Population-level variability in the social climates of four chimpanzee societies. *Evolution and Human Behavior*, 35, 389-396.

**Haun, D.B.M., Rekers, Y., & Tomasello, M.** (2014). Children conform to the behavior of peers; other great apes stick with what they know. *Psychological Science*, 25, 2160-2167.

**Schäfer, M., Haun, D.B.M. & Tomasello, M.** (in press). Fair is not fair everywhere: Cultural variation in children's distribution of goods amongst peers. *Psychological Science*.

**Van Leeuwen, E.J.C., Cronin, K.A., & Haun, D.B.M.** (2014). A group-specific arbitrary tradition in chimpanzees (Pan troglodytes). *Animal Cognition*, 17, 1421-1425.



# RESEARCH GROUP EVOLUTIONARY PROCESSES IN LANGUAGE CHANGE



## Goals of the Group

The Group operated from January 2009 to June 2014 and investigated the dynamics of cultural evolution with particular emphasis on language change. Members of the Group carried out empirical investigations on all levels of linguistic organisation, from phonology and morphology, through syntax, to semantics and the linguistically encoded aspects of social organisation and population history.

Research during the wrapping-up phase of this Group focused on the rapprochement of historical linguistics and quantitative phylogenetics. While in principle all historical linguistics is phylogenetic, quantitative phylogenetic approaches seek to introduce the notions of statistical falsifiability and hypothesis testing to the historical linguistic enterprise. This approach is beginning to gain traction in linguistics, and it is increasingly common for historical linguistic publications to include some kind of quantitative component. As part of outreach activities, Dunn taught practical courses on analysing language change with phylogenetics at the University of Edinburgh and at the Moscow Autumn School in Typology. The phylogenetic analysis of typological variation has been a major concern of the Research Group since the beginning. Fittingly, the last major outcome of the Group was the phylogenetic analysis of a large scale typological survey: Annemarie Verkerk's PhD project *The evolutionary dynamics of motion event encoding* (2014). Verkerk constructed a parallel corpus of glossed and analysed motion event expressions from translations of Carroll's *Alice in Wonderland* and *Through the Looking Glass*, and Coelho's *O Alquimista*, representing a sample of 20 languages from the Indo-European family. The analysis of motion event

encoding in this database started from the well-known 'Talmian dichotomy', a classification of languages into those that locate the path element of a motion expression in the verb, against those that locate it in some satellite element of the clause. A corpus analysis showed that this traditional dichotomy cannot capture important aspects of the diversity of constructional possibilities, and a statistical analysis was presented supporting a more nuanced typology.

Verkerk used a range of phylogenetic comparative methods to model the evolutionary processes giving rise to the diversity of these motion expressions in the Indo-European languages. In one analysis, she used an ancestral state estimation technique to trace how the typological classification of languages has varied over time. This makes a strong prediction about the kind of motion event encoding present in the ancestor of Indo-European languages, and reveals the different historical tendencies present within each of the lineages in the family. A second phylogenetic analysis of variation tests for evolutionary correlations between elements of the lexicon and the structural type of motion event encoding. The analysis shows a regular historical process in which evolution towards satellite framing (grammatical constructions placing path expressions in clause satel-

lites rather than verbs) is accompanied by an increase in size of the verbal lexicon encoding manner, and that evolutionary change away from satellite framing is accompanied by an increase in the size of the verbal lexicon encoding path. This kind of robust statistical demonstration of a general historical process is something that linguistic typology has always aspired to achieve, but which, in the traditional way of working, has been an unattainable goal.

**Group coordinator** Michael Dunn

**Group members** Fiona Jordan, Vishnupriya Kolipakam, Ger Reesink, Annemarie Verkerk

## Selected publications

- Dunn, M.** (2014). Language phylogenies. In C. Bower, & B. Evans (Eds.), *The Routledge Handbook of Historical Linguistics* (pp. 190-211). London: Routledge.
- Dunn, M.** (2014). Gender determined dialect variation. In G. G. Corbett (Ed.), *The expression of gender* (pp. 39-68). Berlin: Mouton de Gruyter.
- Majid, A., Jordan, F., & Dunn, M.** (2015). Semantic systems in closely related languages. *Language Sciences*, 49, 1-18.
- Verkerk, A.** (2014). Diachronic change in Indo-European motion event encoding. *Journal of Historical Linguistics*, 4, 40-83.
- Verkerk, A.** (2014). The correlation between motion event encoding and path verb lexicon size in the Indo-European language family. *Folia Linguistica Historica*, 35, 307-358.

# RESEARCH GROUP MULTIMODAL LANGUAGE AND COGNITION



Action variant

Perceptual variant

## Goals of the Group

This Group investigates how our communicative bodily actions interact with and are recruited as part of language structure, processing (production and comprehension), development, and use in context.

The focus is on two domains of human communicative behaviour:

- (1) eye gaze and hand gestures that people use while speaking, and
- (2) sign languages used by deaf people (including homesigns, emerging or established sign languages). Cross-linguistic and cultural comparisons as well as a variety of methodologies (corpus, developmental and experimental studies, as well as neuroimaging) are used to understand how humans use multiple modalities in communication and how their use is related to (neuro)cognition and development.

## Spatial language facilitates spatial cognition

Does spatial language influence how people think about space? Previous research addressed this question by comparing speakers of languages that encode space differently. Özyürek, Gentner and Goldin-Meadow addressed this question by observing deaf children who did not know a conventional language, and testing their performance on nonlinguistic spatial tasks. They studied deaf children living in Istanbul whose hearing losses prevented them from acquiring speech and whose hearing parents were not able to expose them to sign language. Lacking a conventional language, the children used gestures called *homesigns* to communicate with their hearing parents. Özyürek and colleagues showed that homesigners do not use gesture to convey spatial relations in the way that deaf children exposed to sign language do. Next, they tested a new group of homesigners on a spatial mapping task involving the relations *top*, *bottom* and *middle*, and found that they performed

significantly worse than hearing Turkish children who were matched to the deaf children on another cognitive task. The absence of spatial language thus went hand-in-hand with poor performance on the nonlinguistic spatial task, pointing to the importance of spatial language in thinking about space.

## Type of iconicity matters

Most studies investigating sign language acquisition have claimed that signs whose structures are motivated by the features of their referent (i.e., iconic signs) do not play a role in language development. Özyürek, Ortega and Sumer tested whether different variants of iconic signs might modulate learning of sign-referent links. Results from a picture description task indicated that lexical signs with two possible iconic variants are used at different rates by deaf signers (*Turkish Sign Language*) from different age groups (5-7 yrs, 8-9 yrs, adults). While children favoured variants depicting actions associated with their referent (the action variant), adults signing to other adults preferred

variants representing their perceptual features (the perceptual variant). Deaf parents interacting with their children used action and perceptual variants at equal rates. Children initially preferred action variants, possibly because these variants give them the opportunity to link a linguistic label to familiar schemas akin to their familiar motor experiences.

**Group coordinator** Asli Özyürek

**Group members** Zeynep Azar, Emanuela Campisi, Linda Drijvers, Reyhan Furman, Gerardo Ortega, David Peeters, Louise Schubotz, Beyza Sümer, Inge Zwitterlood

## Selected publications

**Furman, R., Kuntay, A., & Özyürek, A.** (2014). Early language-specificity of children's event encoding in speech and gesture: Evidence from caused motion in Turkish. *Language, Cognition and Neuroscience*, 29, 620-634.

**Ortega, G., Sumer, B., & Özyürek, A.** (2014). Type of iconicity matters: Bias for action-based signs in sign language acquisition. In P. Bello, M. Guarini, M. McShane, & B. Scassellati (Eds.), *Proc. of the 36th Ann. Meeting of the Cognitive Science Society* (pp. 1114-1119).

# MAX PLANCK FELLOW SYNTAX, TYPOLOGY, AND INFORMATION STRUCTURE



JEREMY HAMMOND

## Goals of the Group

The interaction of pragmatics and grammar happens on several levels and can affect grammar in various ways. Since the interactions of information structure (IS) and morphosyntactic form differ from language to language, an important question arises: what are the co-occurrence patterns of these interactions? Starting from this question, the Group works on determining the role of IS in explaining differences in grammatical systems. Another major task of the Group is to re-evaluate the status of the IS primitives as cross-linguistically valid categories. To achieve this, members of the Group combine extensive corpus analysis with production experiments.

**Group coordinator** Robert D. Van Valin, Jr.

**Group members** Jeremy Hammond, Dejan Matić, Saskia van Putten

One of the major projects of the Group is the investigation of IS in complex sentences. The variability of complex structures across languages is a product of the ways in which IS constraints interact with language-specific rules. Many of the classic problems for linguistic theory, such as island constraints, reference tracking and left dislocation, receive new solutions

under this view. In addition to these more general topics, members of the Group are involved in describing the interaction of IS, syntax and semantics in understudied languages. Van Valin investigates IS in Lakhota (Siouan), a language with a rich article system sensitive to IS distinctions, including three types of indefinite articles. Hammond's work is devoted to the reference tracking system in Whitesands (Oceanic; Vanuatu). He explores the ways in which textual structures influence the establishment of reference. Matić's research concentrates on two languages of Siberia: Tundra Yukaghir (isolate) and Even (Tungusic). He focuses on the interplay of IS, illocution and contrast as the determining factors of sentence structure in these two languages. The language studied by van Putten, Avatime (Kwa; Ghana), has a rich system of syntactic and morphological means of marking IS, including contrastive particles, left-detachment, fronting and tonal morphemes. Van Putten's work focuses on the semantics and pragmatics of these categories.



SASKIA VAN PUTTEN

Community Event, Vane, Ghana.

## Selected publications

**Hammond, J.** (2014). *Switch Reference in Whitesands*. PhD Thesis, Radboud University.

**Matić, D. & I. Nikolaeva.** (2014). Realis mood and focus in Tundra Yukaghir. *Lingua*, 150, 202-231.

**Van Putten, S.** (2014). *Information Structure in Avatime*. PhD Thesis, Radboud University.

**Van Valin, Jr., R. D.** (in press). An overview of information structure in three Amazonian languages. M.M.J. Fernandez-Vest & R.D. Van Valin, Jr. (Eds.), *Information Structure and Spoken Language*. Berlin: Mouton de Gruyter.



DEJAN MATIĆ

Language documentation, Siberia, Russia.

# EXTERNAL GROUP CLSM SPEECH COMPREHENSION



## Goals of the Group

The ultimate goal of the Group is to build a model of speech comprehension that accounts for how listeners process their native or non-native language in naturalistic listening conditions. Members of the Group therefore investigate how listeners understand informal speech, which often includes reduced pronunciation variants, like “yeshay” for “yesterday”. Moreover, the Group investigates why listeners differ in how easily they process speech in everyday noisy and distracting conditions.

## Reduced words

Ernestus and colleagues continued investigating the processes underlying the comprehension of reduced pronunciation variants (e.g., “smester” for “semester”). On the basis of corpus and experimental studies, Ernestus, Hanique and Brand conclude that the mental lexicon may contain several pronunciation variants of each word, including variants that only occur in casual speech. These lexical representations are likely to be abstract, as Nijveld, Bentum, ten Bosch and Ernestus found evidence that more detailed representations are only encoded in short-term memory.

Ten Bosch, Ernestus and Boves (Radboud U.) built a computational model simulating participants’ behaviour in listening experiments. This model is unique because of its following properties: 1) it takes real speech as its input, 2) it keeps modularity to a minimum, and 3) it produces responses as well as reaction times. The model also closely simulates participants’ behaviour in lexical decision experiments. Moreover, Aalders, Brand, Nijveld, Mulder and Ernestus, partly in collaboration with Giezenaar (Radboud in’to Languages) have documented that reduced pronunciation variants may

pose serious challenges to both beginning and advanced learners of a language. Ernestus and Schertz (U. Toronto) have also shown that native and non-native speakers show the same patterns of reduction resulting from speech planning but not from other production processes.

## Differences among language users

Listeners are known to differ in their ability to quickly adapt to a novel listening situation (e.g., when encountering a speaker with a foreign accent, or when people with severe hearing impairments receive a cochlear implant). Neger, Janse and Rietveld (Radboud U.) found that this perceptual learning process relates to a listener’s ability to implicitly detect statistical regularities in nonlinguistic input. In another study, Janse and Jesse (UMass Amherst) showed that listeners with higher working memory capacity were better able to anticipate upcoming spoken language input. Moreover, Koch and Janse have started investigating individual differences in the production of phonemic contrasts in words. The results suggest that even relatively mild, age-related hearing impairment have consequences for the ‘sharpness’ of older adults’ pronunciation of /s/. The latter result contributes to our knowledge

**Group coordinator** Mirjam Ernestus

**Group members** Ellen Aalders, Martijn Bentum, Louis ten Bosch, Sophie Brand, Sascha Coridun, Iris Hanique, Esther Janse, Xaver Koch, Kim Koppen, Huib Kouwenhoven, Lisa Morano, Kimberley Mulder, Thordis Neger, Annika Nijveld, Mark Noordenbosch, Juliane Schwmidt, Malte Viebahn

of the stability of speech motor routines and of how production and perception are intertwined in language use.

## Selected publications

**Ernestus, M.** (2014). Acoustic reduction and the roles of abstractions and exemplars in speech processing. *Lingua*, 142, 27-41.

**Hanique, I., Ernestus, M., & Schuppler, B.** (2013). Informal speech processes can be categorical in nature, even if they affect many different words. *Journal of the Acoustical Society of America*, 133, 1644-1655.

**Janse, E., & Jesse, A.** (2014). Working memory affects older adults’ use of context in spoken-word recognition. *Quarterly Journal of Experimental Psychology*, 67, 1842-1862.

**Neger, T.M., Rietveld, T., & Janse,** (2014). Relationship between perceptual learning in speech and statistical learning in younger and older adults. *Frontiers in Human Neuroscience*, 8, 628.

**Ten Bosch, L., Boves, L., & Ernestus, M.** (2013). Towards an end-to-end computational model of speech comprehension: simulating a lexical decision task. In *Proc. of the 14th Ann. Conference of the Intl. Speech Communication Association* (pp.2822-2826).





# THE LANGUAGE ARCHIVE



## Goals of the Group

The Language Archive (TLA) is a unit at the Institute jointly supported by the Max Planck Society (MPG), the Berlin-Brandenburg Academy of Sciences and Humanities (BBAW), and the Royal Netherlands Academy of Arts and Sciences (KNAW). TLA was officially launched in October 2011 and has been established (1) to maintain and extend the existing digital archive of language materials, and (2) to continue the development of advanced software tools for the creation, archiving, access, and federation of language resources.

## Language data

TLA maintains one of the largest accessible online digital language data archives, currently covering more than 200 languages and around 90 terabytes of data. This includes endangered languages data from the DOBES (Documentation of Endangered Languages) programme of the Volkswagen Foundation. The archive includes a large variety of material including, for example, data from studies of first and second language acquisition, sign language, and studies of gesture and multilingualism. The archive's infrastructure meets high archiving requirements (it holds the Data Seal of Approval) and serves as a model and reference for similar initiatives.

## Tools

TLA is developing the Language Archiving Technology (LAT) software suite – a unique set of tools that cover the life cycle of language resources. ELAN is a leading tool for the scientific annotation of multimedia recordings. Its data format is supported by a

growing number of other tools and by the online visualisation tool ANNEX (part of LAT). In early 2014, TLA decided that an overhaul of its archiving framework was required in order to make it less costly to maintain in the long run. A new archiving system is being developed based on the open source Fedora Commons data repository framework, which serves as the basis of more than 300 data repositories around the world.

## Projects and collaboration

TLA continued to play an important role in several large European research infrastructure projects, such as CLARIN, DASISH, and EUDAT. Within the INNET project, TLA was able to establish 3 further regional language archives making use of the archiving technology it developed in Yaoundé (Cameroon), Tbilisi (Georgia) and Manokwari (Indonesia). Within the Europeana Sounds project, TLA is making the sound recordings in the archive openly available via the Europeana portal of online cultural heritage.

**Group coordinators** Daan Broeder, Sebastian Drude (*heads*), Stephen C. Levinson, Wolfgang Klein (*directors*)

**Group members** Eric Auer, Willem Elbers, Jean-Charles Ferrieres, Binyam Gebrekidan Gebre, Jeroen Geerts, George Georgovassilis, Twan Goosen, Christopher Haskett, Alexander Koenig, Lari Lampen, Anna Lenkiewicz, Przemyslaw Lenkiewicz, Kees Jan van de Looij, Sander Maijers, André Moreira, Olaf Seibert, Shakila Shayan, Olha Shkaravska, Guilherme Silva, Han Sloetjes, Aarthi Somasundaram, Herman Stehouwer, Paul Trilsbeek, Dieter van Uytvanck, Menzo Windhouwer, Peter Withers, Florian Wittenburg, Peter Wittenburg, Nick Wood

## Selected publications

Drude, S., Trilsbeek, P., Sloetjes, H., & Broeder, D. (2014). Best practices in the creation, archiving and dissemination of speech corpora at the Language Archive. In S. Ruhi, M. Haugh, T. Schmidt, & K. Wörner (Eds.), *Best Practices for Spoken Corpora in Linguistic Research* (pp. 183–207). Newcastle upon Tyne: Cambridge Scholars Publishing.

Trilsbeek, P., & Koenig, A. (2014). Increasing the future usage of endangered language archives. In D. Nathan, & P. Austin (Eds.), *Language Documentation and Description*, 12 (pp. 151–163). London: SOAS.

# INFRASTRUCTURE TECHNICAL GROUP



## Goals of the Group

The Technical Group (TG) has two major goals: (1) to provide the IT infrastructure of the workplaces, labs, servers, and field equipment for the day-to-day running of the Institute, and (2) to devise experimental systems and software that enable new scientific developments within the Institute.

## Computer systems

The Institute has a new server room and the storage systems have been upgraded to provide state-of-the-art computing and storage. With the upgrade to fast SSD (solid-state disk) storage for some important storage areas, our archive system provides fast access to hundreds of millions of files. Our system is able to handle heavy data flow from labs and it enables fast access to central Max Planck supercomputers and storage systems. Backup and archived data are mirrored to these central computer centers. The general data archive system is adapted to handle many different kinds of projects and experimental data.

## Experimental labs

The Institute maintains six reaction time labs, three eye-tracking labs, various portable eye-tracker setups (glasses and remote eye-trackers), two Faraday-caged EEG labs, one gesture lab as well as a baby lab. Two new interaction labs have been set up to run interaction experiments with two participants seated in two different rooms. The Institute has also built a Virtual Reality (VR) lab that gives researchers unique experimental possibilities. Participants in the Virtual Reality lab can be placed in unusual and carefully controlled environments. In order to

enhance the reality of participants' experience, the lab is equipped with a 3D sound system and a floor that can shake to simulate motion. Facilities are also available to record EEG during VR experiments. New software will be integrated to the VR lab (Unity3D) to support more realistic facial expressions of avatars.

The main neuroimaging facility is housed in the Donders Centre for Cognitive Neuroimaging, where 1.5, 3 and 7 Tesla fMRI, MEG and EEG labs are maintained by a dedicated Technical Group.

A new electronic laboratory notebook system was introduced to provide professional documentation (archiving compliant to auditing requirements) of experiments and analysis procedures in the labs.

## Field expeditions

During the period of review, 25 field expeditions were fully equipped with everything from solar panels to portable eye-trackers. Scientists at the Institute are increasingly conducting more reaction time, eye-tracking and EEG experiments in the field, requiring highly specialized equipment. In addition, semi-professional, high-definition cameras for fieldwork have now become standard equipment.

**Head** Reiner Dirksmeyer

**Group members** Herbert Baumann, Dik van den Born, Jeroen Derks, Alex Dukers, Ronald Fischer, Gerd Klaas, Peter Nijland, Albert Russel, Tobias van Valkenhoef, Kees van der Veer, Ad Verbunt, Rick van Viersen, Johan Weustink, Nick Wood

## Molecular biology laboratories

Since December 2014, the institute is now also equipped with state-of-the-art molecular biology facilities at biosafety level ML-I or ML-II. In addition to a large main laboratory for general molecular biology and bacterial cloning, there is a tissue culture room for working with mammalian cell lines, and separate laboratories for RNA work and histology. Equipment in these rooms includes fume hoods, biological containment cabinets, real-time PCR machines, thermal cyclers, high-speed centrifuges, CO<sub>2</sub> incubators, shaking incubators, fridges and freezers. The institute also has its own dedicated microscopy facility with several microscopes, including a confocal fluorescence microscope. There is a separate laboratory kitchen for preparing media, equipped with an autoclave, industrial dishwasher, and ultrapure water device.





# LIBRARY



## Goals of the Group

The Library Group has two major goals: (1) to support researchers at the Institute in all their information needs by providing printed or electronic content, and (2) to support publication management.

**Members:** Karin Kastens (head), Meggie Uijen, Annemieke Sweere

## A hybrid library

The library collection closely follows the Institute's research. The library still purchases printed books, but starting in 2013, it became an e-only library for journal content. The Max Planck-wide licenses, together with dozens of locally licensed e-journal subscriptions specifically aimed at our research, provide access to more than 60,000 academic e-journals. Access to e-books is primarily guaranteed via Max Planck-wide resources. In addition, the library uses two different e-book platforms for individual ebook purchases.

Source software VuFind. The new catalog (<http://catalog.mpi.nl>) integrates content from the library (135,000 books and book chapters), electronic content from Max Planck-wide licenses (500,000 e-books, 60,000 e-journals), plus the publication data from the institutional repository MPG.PuRe (7,300 items). A recent user survey showed that the staff are aware of the broadened access and find it easy to search and access items.

and librarians to enter publication data and upload full texts. The librarians perform a quality check. The publication data are uploaded daily onto the MPI website and are rendered on personal and department pages with links to full texts and supplementary material.

## Open Access

We also provide information about Open Access, especially information about Max Planck-wide agreements regarding article processing charges.

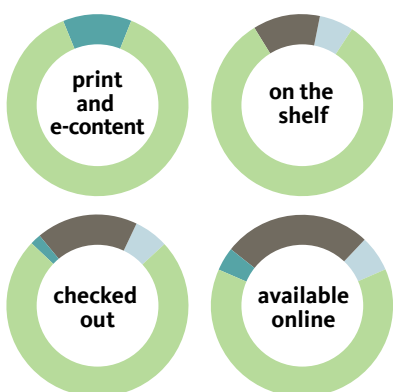
## Catalog search interface

In January 2013, we started using a new catalog interface based on the Open

## Publication Management

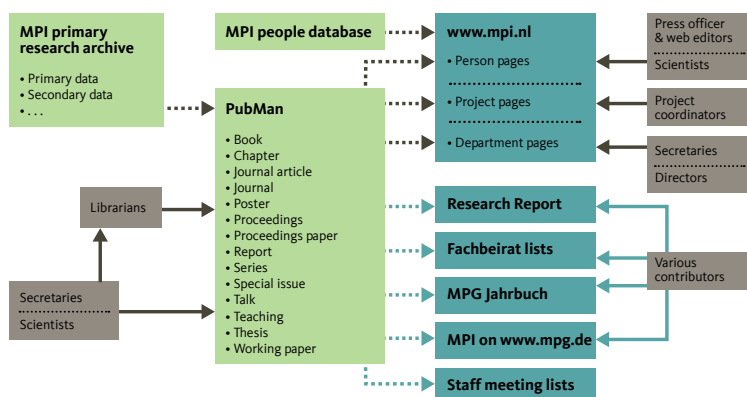
We manage the publication output of our Institute via our institutional publication repository MPG.PuRe (<http://pubman.mpg.de>). The workflow allows researchers, secretaries

If you search the catalog, is it made clear that items are....



yes no uncertain no answer

## MPI information flow



sources databases outlets



# INTERNATIONAL MAX PLANCK RESEARCH SCHOOL (IMPRS) FOR LANGUAGE SCIENCES



## Goals of the IMPRS

Launched in 2009, the International Max Planck Research School (IMPRS) for Language Sciences is a joint initiative of the Max Planck Institute for Psycholinguistics and two partner institutes based at Radboud University Nijmegen (the Donders Institute for Brain, Cognition and Behaviour and the Centre for Language Studies). The school covers a wide range of topics, including linguistics, language and genetics, neurolinguistics, psycholinguistics, and language acquisition.

## Review outcome

The six year evaluation of the IMPRS took place in December 2012, and the evaluation report was received in February 2013. The external reviewers were very impressed by the IMPRS. They were very positive about the science they witnessed, the maturity of the students, and most aspects of the structure of the school, in particular the web-based checkpoint system which ensures that students adhere to an agreed plan and timetable of research and allows monitoring of their progress at each stage in the doctoral programme. The reviewers recommended further formalizing the selection procedure. From 2014 onwards, students can only be admitted to the school upon formal approval by four members of a central Admission Committee who evaluate the student candidates. Based on the positive evaluation and a submitted prolongation proposal, the IMPRS for Language Sciences has received a renewed budget until July 2021.

## Students

Most students of the first cohort entered the school in September 2009. The first IMPRS PhD student obtained her doctoral degree in February 2013. By the end of 2014, a total of sixteen students (from

the 2009 and 2010 cohorts) had defended their theses, and the dissertations of eight additional students were approved. Twenty-one new students joined the school in 2013 and eighteen more in 2014. By the end of 2014, there were seventy-five students from twenty-two different countries and at varying levels of research progress enrolled in the IMPRS programme.

## Training programme

In addition to following core courses and technical courses offered by Radboud University, IMPRS students must follow a curriculum that ensures they acquire a basic knowledge of most language science disciplines as well as soft skills (e.g., presentation techniques, writing CVs, research ethics). The central course in the curriculum, 'Current issues in Language Sciences', has been revised and directed towards teaching the students how to write for a general audience. The IMPRS for Language Sciences also organizes special courses based on student needs, such as courses in statistics (R), programming (Python, Matlab), and LaTeX in 2013-2014.

## Activities

All IMPRS for Language Sciences

**Spokesperson:** Stephen C. Levinson (director)

**Coordinator:** Els den Os

**Assistant:** Dirkje van der Aa

students also participate in a range of activities. These include presentations of their own work as well as attending and preparing guest lectures and organising events. For example, the research school arranged a preparatory session prior to the Nijmegen Lectures by Prof. Willem Levelt and Prof. Russell Gray. In 2014, students started organising the second international IMPRS workshop to be held in 2015.

## Research projects

The research projects of PhD students span the breadth of the language sciences. Below is a representative selection of some of their topics:

- Matthias Franken (Donders, 2013 cohort) *The role of feedback control in speech motor learning*
- Elliot Sollis (MPI, 2013 cohort) *Functional genomics of language-related genes*
- Emma Valtersson (MPI, 2014 cohort) *Phonetical and visual bodily cues to turn-taking in spontaneous conversation: A cross-linguistic study*
- Lisa Morano (CLS, 2013 cohort) *Learning pronunciation variants for words in a foreign language: The role of abstract versus exemplar representations*

# EVENTS AND ACTIVITIES

## 2013

### WORKSHOP

#### 2nd Developmental Language Disorders Network Meeting

*Organised by Paula Fikkert (Radboud U. Nijmegen), Simon E. Fisher, and Frank Wijnen (Utrecht U).* Presenters: Elma Blom (U. Utrecht), Nina Davids (Kentalis / Radboud U. Nijmegen), Babette Diepeveen (TNO Leiden), Jetske Klatter-Folmer (Radboud U. Nijmegen), Margreet Luinge (Hanze U. Applied Sciences Groningen), Ardi Roelofs (Radboud U. Nijmegen), and Margot Visser-Bochane (Hanze U. Applied Sciences Groningen). *Utrecht, January 22.*

### WORKSHOP

#### Language Evolving: Genes and Culture in Ongoing Language Evolution

*Organised by Karen Emmorey (San Diego State U.) and Stephen C. Levinson.* Participants: Dan Dediu, Simon E. Fisher, Russell Gray (U. Auckland), and Carol Padden (U. California). *AAAS Annual Meeting: Boston, February 14-18.*

### WORKSHOP

#### Quotation and Depiction in Interaction

*Organised by Mark Dingemanse and Esther Pascual (U. Groningen).* Participants: Philippe de Brabanter (VU Brussels), Herb Clark (Stanford U.), Ad Foolen (Radboud U. Nijmegen), and Emar Maier (U. Groningen). *March 8.*

### WORKSHOP

#### Toolkits of Cognitive Neuroscience: Advanced Analysis and Source Modeling of EEG and MEG Data

*Organised by Robert Oostenveld and Jan-Mathijs Schoffelen.* Presenters: Nietzsche Lam, Robert Oostenveld, Jan-Mathijs Schoffelen, and the members of the FieldTrip development team. *April 8-11.*

### WORKSHOP

#### Place, Landscape and Language

*Organised by Lila San Roque.* Participants: Felix Ahlner (Lund U.), Joe Blythe, Niclas Burenhult (Lund U.), Eve Clark (Stanford U.), Mark Dingemanse, Nick Enfield, Love Eriksen, Simeon Floyd, Caroline Hägerhäll (NMBU Oslo), Clair Hill, Juliette Huber (Lund U.), Elizabeth Manrique, Giovanni

Rossi, Konrad Rybka (U. Amsterdam), Åsa Ode Sang (SLU Uppsala), Connie de Vos, and Cedric Yvinec. *April 18-19.*

### SYMPOSIUM

#### Minerva Symposium on Emergent Languages and Cultural Evolution

*Organised by Stephen C. Levinson, and Wendy Sandler (U. Haifa).* Participants: Mark Aronoff (SUNY), Onno Crasborn (Radboud U. Nijmegen), Dan Dediu, Nicholas Evans (Australian National U.), Susan Goldin-Meadow (U. Chicago), Russell Gray (U. Auckland), Irit Meir (U. Haifa), Carol Padden (UC San Diego), Sean Roberts, Ann Senghas (Columbia U.), Kenny Smith (U. Edinburgh), Luc Steels (VU Brussels), Markus Steinbach (U. Göttingen), Connie de Vos, Tessa Verhoef (VU Brussels), and Ulrike Zeshan (U. Central Lancashire). *June 20-22.*

### WORKSHOP

#### Universality and Variability: New Insights from Genetics

*Organised by Dan Dediu, Sarah Graham, and Sonja Vernes.* Presenters: Jennifer Culbertson (George Mason U.), Robert Daland (UCLA), Matt Goldrick (Northwestern U.), and Joe Pater (U. Massachusetts Amherst). *LSA Institute at the University of Michigan, June 29-30.*

### WORKSHOP

#### Crowd Sourcing Apps and Infrastructure

*Organised by Sebastian Drude.* Participants: Bruce Birch (ANU Canberra), Nanna Floor Clausen (Danish Data Archive), Alexander Czmil (BBAW), Reiner Dirksmeyer, Marc Kemps-Snijders (Meertens Instituut), Stephen C. Levinson, Hans Jorgen Marker (Swedish National Data Service), Antje S. Meyer, Albert Russell, Dirk Wintergrün (MPI History of Science), Peter Withers, and Peter Wittenburg. *June 24.*

### CONFERENCE

#### CLARIN-D M24

*Organised by Sebastian Drude and Dieter Van Uytvanck.* Presenters: Chris Biemann (TU. Darmstadt), Andre Blessing (U. Stuttgart), Thomas Eckart (Leipzig U.), Richard Eckart de Castilho (U. Heidelberg), Peter Fischer (IDS), Alexander Geyken (BBAW), Erhard Hinrichs (U. Tübingen), Hannah

Kermes (U. Saarbrücken), Thomas Kisler (U. München), Jonas Kuhn (U. Stuttgart), Eliza Margaretha (IDS), José Martínez (U. Saarbrücken), Felix Rau (U. Köln), Marc Reznicek (U. Bochum), Ingmar Schuster (Leipzig U.), Frank Wiegand (BBAW), Andreas Witt (IDS), and Thomas Zastrow (U. Tübingen). *June 27-28.*

#### WORKSHOP

##### **Genes and Language: From Molecules to Linguistic Diversity**

*Organised by Dan Dediu and Sonja Vernes.* Presenters: Hannah Cornish (U. Edinburgh), Michael Dunn, Paul Heggarty (MPI-EVA Leipzig), F. Kammerzell (Humboldt-U. Berlin), Gerhard Jager (U. Tübingen), and Maggie Tallerman (Newcastle U.). *Berlin, August 26-30.*

#### SYMPOSIUM

##### **Cognomics**

*Organised by Simon E. Fisher and Barbara Franke (Radboud UMC Nijmegen).* Keynote lecturers: David Glahn (Yale U.) and Genevieve Konopka (UT Southwestern). Presenters: Marco Benevento (Donders Institute Nijmegen), Dorret Boomsma (VU Amsterdam), Ype Elgersma (Erasmus MC Rotterdam), Elia Formisano (Maastricht U.), Hilleke Hulshoff Pol (UMC Utrecht), Arfan Ikram (Erasmus MC Rotterdam), Floris Klumpers (Donders Institute Nijmegen), Stan van Pelt (Donders Institute Nijmegen), Annette Schenck (UMC Nijmegen), and Henning Tiemeier (Erasmus MC Rotterdam). *September 10-11.*

#### WORKSHOP

##### **Switch-Reference: State of the Art and Where To Go from Here?**

*Organised by Rik van Gijn (U. Zurich), Jeremy Hammond, and Robert Van Valin.* Presenters: John Haiman (Macalester College, St. Paul) and Pamela Munro (UCLA). *Split, September 18-21.*

#### COURSE

##### **LAT Software Training for Documentary Linguists**

*Organised by Alexander König and Paul Trilsbeek.* Participants: Laura Arnold (U. Edinburgh), Elisabeth Birk (U. Berlin), Luis Calcina (U. Iquitos), Samona Kurilova (U. Yakutsk), Simanique Moody (Leiden U.), Joseph Koni

Muluwa (U. Brussels), Anthony Agoswin Musah (U. Frankfurt), Jaker Ruiz (IIAP Iquitos), Kalyanamalini Sahoo (U. Antwerp), Achim Schumacher (U. Köln), Andreas Waibel (U. Frankfurt), Zinaida Waibel (U. Frankfurt), and Joanne Yager (Lund U.). *October 22-25.*

#### MEETING

##### **3rd Developmental Language Disorders Network Meeting**

*Organised by Paula Fikkert (Radboud U. Nijmegen), Simon E. Fisher, and Frank Wijnen (Utrecht U.).* Presenters: Gerard Bol (U. Groningen), Babette Diepeveen (TNO Leiden), Elise Dusseldorp (TNO Leiden), Anne Marie Oudesluys-Murphy (Leiden UMC), Paul H. Verkerk (TNO Leiden), and Vera van Mulken (Radboud U. Nijmegen). *October 28.*

#### WORKSHOP

##### **INNET Regional Archivists**

*Organised by Paul Trilsbeek.* Participants: Tero Aalto (CSC Helsinki), Felix Ahlner (Lund U.), Alexander Arkhipov (Moscow State U.), Adriana Ávila (CIESAS Mexico City), Jonathan Blumtritt (U. Köln), Luis Calcina (IIAP Iquitos), Sara Court (U. Florida Gainesville), José Farfán (CIESAS Mexico City), Hari Kristanto (U. Negeri Papua), Alex de Kweldju (U. Negeri Papua), Martin Matthiesen (CSC Helsinki), Csaba Oravecz (Hungarian Academy Budapest), Felix Rau (U. Köln), and Jaker Ruiz (IIAP Iquitos). *October 28-29.*

#### WORKSHOP

##### **DASISH WP5**

*Organised by Daan Broeder and Przemyslaw Lenkiewicz.* Participants: Valentina Asciutti (King's College London), Sebastian Drude, Stuart Dunn (King's College London), Claudia Engelhardt (U. Göttingen), Binyam Gebrekidan Gebre, Timo Gnadt (U. Göttingen), Arjan Hogenaar (DANS), Indrek Jentson (U. Tartu), Birger Jerlehag (Swedish National Data Archive), Bart Jongejan (U. Copenhagen), Georgi Khomeriki (DANS), Herve L'Hours (UKDA), Lene Offersgaard (U. Copenhagen), Marieke Polhout (DANS), Mike Priddy (DANS), Olha Shkaravska, John Shepherdson (UKDA), Catharina Wasner (GESIS), Marion Wittenberg (DANS), and Bart Wloka (Austrian Academy of Science). *November 26-27.*

## 2014

## MEETING

**4th Developmental Language Disorders Network Meeting**

*Organised by Paula Fikkert (Radboud U. Nijmegen), Simon E. Fisher, and Frank Wijnen (Utrecht U.).* Presenters: Marcel Becker (Radboud U. Nijmegen), Courtenay Frazier Norbury (Royal Holloway, U. London), and Maartje Kouwenberg (Auris). *February 10.*

## WORKSHOP

**Embodied Views of Basic Categories in Language and Cognition**

*Organised by Patric Bach, Roel Willems, and Dietmar Zaeferer.* Marburg, Germany, *Annual meeting of German Linguistics Society, March 5-6.*

## WORKSHOP

**Linguistics Quo Vadis**

*Organised by Peter Hagoort.* Participants: Jenny Audring (U. Amsterdam), Mark Dingemanse, Ray Jackendoff (Tufts U.), Pim Levelt, Stephen C. Levinson, Pieter Muysken, Johan Rooryck (Leiden U.), Pieter Seuren, Dan Slobin (UC Berkeley), Arie Verhagen (Leiden U.), and Henk Verkuyl (U. Utrecht). *March 10.*

## WORKSHOP

**Comprehension = Production**

*Organised by Falk Huettig and Antje S. Meyer.* Participants: Audrey Bürki (U. Geneva), Franklin Chang (U. Liverpool), Eve Clark (Stanford U.), Herbert Clark (Stanford U.), Martin Corley (U. Edinburgh), Mirjam Ernestus (Radboud U. Nijmegen), Chiara Gambi (Saarland U.), Peter Hagoort, Rob Hartsuiker (Ghent U.), Claartje Levelt (Leiden U.), Maryellen MacDonald (U. Wisconsin-Madison), Martin Pickering (U. Edinburgh), Meghan Sumner (Stanford U.), Anna Woollams (U. Manchester), and Pienie Zwitserlood (U. Münster). *March 26-28.*

## WORKSHOP

**Information Structure in Head-Marking Languages**

*Organised by Dejan Matić, Saskia van Putten, and Robert Van Valin.* Participants: Anna Berge (U. Alaska), Jürgen

Bohnenmeyer (U. Buffalo), Ines Fiedler (HU Berlin), Janet Fletcher (U. Melbourne), Maurizio Gnerre (U. Naples), Jeff Good (U. Buffalo), Cristin Kalinowski (U. Buffalo), Jean-Pierre Koenig (U. Buffalo), Anja Latrouite (U. Düsseldorf), Deborah Loakes (U. Melbourne), Ranko Matasovic (U. Zagreb), Karin Michelson (U. Buffalo), Amina Mettouchi (CNRS Paris), Gilles Polian (CIESAS), Valentian Schiattarella (CNRS Paris), Eva Schultze-Berndt (U. Manchester), Ruth Singer (U. Melbourne), Elisabeth Verhoeven (HU Berlin), Jenneke van der Wal (U. Cambridge), and Ewa Zakrzewska (UVA). *March 28-29.*

## MINI-WORKSHOP

**African Linguistic Typology**

*Organised by Harald Hammarström.* Participants: Dan Dediu, Tom Guldemann (HU Berlin), Stephen C. Levinson, Suzanne van der Meer, Sean Roberts, Guillaume Segerer (CNRS Paris), and Hedvig Skirgård. *April 7.*

## WORKSHOP

**Toolkits of Cognitive Neuroscience: Advanced Analysis and Source Modeling of EEG and MEG Data**

*Organised by Robert Oostenveld and Jan-Mathijs Schoffelen.* Presenters: Nietzsche Lam, Robert Oostenveld, Jan-Mathijs Schoffelen, and the members of the FieldTrip development team. *May 6-9.*

## WORKSHOP

**Brain and Literature Workshop with Winfried Menninghaus**

*Organised by Roel Willems.* *May 12.*

## WORKSHOP

**Other-Initiated Repair**

*Organised by Mark Dingmanse and Nick Enfield.* Participants: Markku Haakana, Salla Kurhila, and Niina Lija (U. Helsinki). *May 19.*

## SYMPOSIUM

**Dialogues on the Role of Top-Down Factors in Sensory Processing**

*Organised by Jolien Francken, Peter Kok, and Floris de Lange.* Presenters: Moshe Bar, Tobias Donner, Karl Friston, Sid Kouider, Pieter Roelfsema, and Chris Summerfield. *May 21.*



### WORKSHOP

#### Mental Imagery & Dance

*Organised by Vicky Fisher.* Participants: Ad Foolen (Radboud U. Nijmegen), Tulya Kavaklioglu, Katerina Kucera, Lilla Magyari, and Julia Udden. *June 3.*

### WORKSHOP

#### Communicative Intention in Gesture and Action

*Organised by Emanuela Campisi, Judith Holler, Asli Özyürek, and David Peeters.* Participants: Tanja Behne (U. Göttingen), Aylin Kuntay (Koc U. Istanbul), Katja Liebal (FU Berlin), Ulf Lischowski (Hamburg U.), Lisette Mol (Tilburg U.), Sasha Ondobaka (Donders), Giovanni Rossi, Jan de Ruiter (Bielefeld U.), Luisa Sartori (U. Padova), Cordula Vesper (U. Budapest), and Paul Vogt (Tilburg U.). *June 4-5.*

### WORKSHOP

#### Pre-ICCA Workshop

*Organised by Kobin Kendrick and Stephen C. Levinson.* Participants: Julija Baranova, Mathias Barthel, Marisa Casillas, Elma Hilbrink, Elliott Hoey, Lilla Magyari, Elizabeth Manrique, Giovanni Rossi, and Connie de Vos. *June 11.*

### MINI-SYMPOSIUM

#### Evolution, Typology, Corpora. Evolutionary Processes in Language and Culture

*Organised by Michael Dunn and Stephen C. Levinson.* Participants: Laura Fortunato and Bernhard Waelchli. *June 13*

### COURSE

#### Netherlands Graduate School of Linguistics: The Genetic Foundations of Language and Speech, from Molecules to Linguistic Diversity

*Organised by Dan Dediu and Sonja Vernes.* *June 16-27.*

### WORKSHOP

#### Evo Devo as an Approach to Understanding Communication: Modeling, Genetics, and Developmental Research in Vocal Communication and its Neurological Underpinnings

*Organised by Ulrike Griebel (U. Memphis) and Kimbrough Oller (U. Memphis).* Presenters: Dan Dediu, Ulrike Griebel (U. Memphis), Kimbrough Oller (U. Memphis), Sonja Vernes, and Anne Warlaumont (U. California Merced). *Vienna, July 22-25.*

### WORKSHOP

#### Cold Spring Harbor Laboratory Course on Genetics & Neurobiology of Language

*Organised by Simon E. Fisher, David Poeppel (New York U.), and Kate E. Watkins (Oxford U.).* Keynote lecture: Dorothy Bishop (Oxford U.). Presenters: Kate Arnold (St. Andrews U.), Richard Aslin (U. Rochester), Matt Davis (Cambridge U.), Nina Dronkers (U. California Davis), Karen Emmorey (San Diego State U.), Wolfgang Enard (Ludwig-Maximilians U. Munich), Evelina Fedorenko (Massachusetts Institute of Technology), Tecumseh Fitch (U. Vienna), Peter Hagoort, Christoph Kayser (U. Glasgow), Mairead MacSweeney (U. College London), Tara McAllister Byun (New York U.), Silvia Paracchini (U. St Andrews), Liina Pytkkanen (New York U.), Mabel Rice (U. Kansas), Constance Scharff (Freie U. Berlin), Sonja Vernes, and Janet Werker (U. British Colombia). *Long Island, New York, July 28 – August 3.*

### COURSE

#### Brain Imaging Genetics, Radboud Summer School

*Organised by Barbara Franke (Radboud UMC Nijmegen), Simon E. Fisher, and Tulio Guadalupe.* Presenters: Alejandro Arias Vasquez (Radboud UMC Nijmegen), Christian Beckmann (Donders Institute Nijmegen), Jan Buitelaar (Radboud U. Nijmegen), Elia Formisano (Maastricht U.), Kimm van Hulzen (Radboud UMC Nijmegen), Neda Jahanshad (U. California Los Angeles), André Marquand (Queens College London), Sarah Medland (Queensland Institute Medical Research Brisbane), Thomas Nichols (Warwick U.), David Norris (Donders Institute Nijmegen), and Marcel Zwiers (Donders Institute Nijmegen). *August 11-15.*

### WORKSHOP

#### INNET for Regional Archivists

*Organised by Alexander König and Paul Trilsbeek.* Participants: Tero Aalto (CSC Helsinki), Felix Ahlner (Lund U.), Alexander Arkhipov (Moscow State U.), Eric Auer, Patricia Bermúdez (FLACSO Quito), Jonathan Blumtritt (U. Köln), Daan Broeder, Luis Calcina (IIAP Iquitos), Heliton Castro (Museu Goeldi Belem), Evelyn Chibaka (U. Buea), Rose Costa (Museo do Índio, Rio de Janeiro), Reiner Dirksmeyer, Sebastian Drude, Willem Elbers, Peter Fankhauser (IDS Mannheim), Gustavo Garcia (CAICYT Buenos Aires), Twan Goosen, Daniel Jettka

(U. Hamburg), Lars Johnsen (National Library Oslo), Anna Khoroshkina (Moscow State U.), Jan van Mansum (DANS Den Haag), Martin Matthiesen (CSC Helsinki), Jozef Misutka (Charles U. Prague), André Moreira, Felix Rau (U. Köln), Gabriela Rios (FLACSO Quito), Miguel Hernández (IIAP Iquitos), Jaker Ruiz (IIAP Iquitos), Marcel Schaeben (U. Köln), Anna van Meegen Silva (U. v. Amsterdam), Emmanuel Ngué Um (CERDOTOLA Yaoundé), Dieter Van Uytvanck, Tobias van Valkenhoef, Menzo Windhouwer, and Thomas Zastrow (RZG Garching). *August 25-27.*

#### CONFERENCE

##### **Society for Neurobiology of Language 2014**

*Organised by Peter Hagoort.* Presenters: Pascal Fries (ESI), Willem Levelt, Constance Scharff (FU Berlin), and Mike Tomasello (MPI Evolutionary Anthropology). Participants: Nina Dronkers (UC Davis), Simon E. Fisher, Angela Friederici (MPI Human Cognitive and Brain Sciences), Steve Small (New York U.), and Kate Watkins (U. Oxford). *Amsterdam, August 27-29.*

#### SYMPOSIUM

##### **A Neurobiology of Natural Language Use?**

*Organised by Roel Willems. Amsterdam, August 28.*

#### SYMPOSIUM

##### **Towards a Neuroscience of Mutual Understanding**

*Organised by Peter Hagoort, Arjen Stolk, and Ivan Toni.* *September 1.*

#### WORKSHOP

##### **Working Memory**

*Organised by Susan Gathercole (MRC, Cambridge) and James McQueen (Radboud U. Nijmegen).* Participants: Evelien Barendse (Radboud U. Nijmegen), Esther Janse (Radboud U. Nijmegen), Susan Nouwens (Radboud U. Nijmegen), Nijmegen), Ardi Roelofs (Radboud U. Nijmegen), Eva van de Sande (Radboud U.), and Brigitte Vugs (Kentilis). *October 4.*

#### WORKSHOP

##### **Language Comparison with Linguistic Databases: RefLex and Typological Databases**

*Organised by Harald Hammarström and Guillaume Segerer*

*(CNRS Paris).* Participants: Sebastian Bank, Marion Cheucle, Doug Cooper, Mark Donohue, Sébastien Flavie, Robert Forkel, Paul Heggarty, Mattis List, Suzanne van der Meer, Yves Moñino, Steven Moran, Pieter Muysken (Radboud U. Nijmegen), Konstantin Pozdniakov, Guillaume Segerer, Hedvig Skirgård, George Starostin, Martine Vanhove, and Soren Wichmann. *October 7-9.*

#### SYMPOSIUM

##### **Perspectives on Language Development**

*Organised by Antje S. Meyer.* Participants: Shanley Allen (TU Kaiserslautern), Anne Christophe (LSCP Paris), Celeste Kidd (U. Rochester), Bob McMurray (U. Iowa), and Michael Ramscar (U. Tübingen). *October 14.*

#### WORKSHOP

##### **Language Evolution and Diversity (WP5 Language in Interaction)**

*Organised by Hans Rutger Bosker, Pieter Muysken and Simon E. Fisher.* Participants: Mark Dingemanse, Clyde Francks, Fabian Heim (FU Berlin), Pralle Kriengwatana (Leiden U.), Friederike Luepke (U. London), Jonathan Peelle (Washington U.), Franck Ramus (CNRS Paris), Luis Miguel Rojas-Berscia (Radboud U. Nijmegen), and Constance Scharff (FU Berlin). *October 30-31.*

#### WORKSHOP

##### **Clarín-D-2**

*Organised by Sebastian Drude and Dieter Van Uytvanck.* Participants: Volker Boehlke (Leipzig U.), Christoph Draxler (U. München), Thomas Eckart (Leipzig U.), Ludwig Eichinger (IDS), Willem Elbers, Alexander Geyken (BBAW), Dirk Goldhahn (Leipzig U.), Twan Goosen, Hanna Hedeland (U. Hamburg), Gerhard Heyer (Leipzig U.), Erhard Hinrichs (U. Tübingen), Marie Hinrichs (U. Tübingen), Pawel Kamocki (IDS), Hannah Kermes (U. Saarbrücken), Thomas Kisler (U. München), Jörg Knappen (U. Saarland), Dörte de Kok (U. Tübingen), Jonas Kuhn (U. Stuttgart), Timm Lehmberg (U. Hamburg), Kees Jan van de Looij, Cerstin Mahlow (U. Stuttgart), Sander Maijers, Elke Teich (U. Saarland), Olha Shkaravska, Oliver Schonefeld (IDS), and Thorsten Trippel (U. Tübingen). *December 4-5.*







# LECTURES AND COLLOQUIA

## Nijmegen Lectures

### 2013

JANUARY 28-30 | **WILLEM J.M. LEVELT**, MPI FOR PSYCHOLINGUISTICS, NIJMEGEN

*On the Pre-Chomskyan History of Psycholinguistics*

The series included six lectures: 'Overview and timeline', 'Brain and language', 'Nineteenth century laboratory and speech error studies of language processing', 'Twentieth century studies of adult language usage: Experimental, functional and statistical', 'Psycholinguistics during the Third Reich', 'Launched by communication technology and veterans research: The birth of modern psycholinguistics'. Discussants in the seminars were Randi Martin, (Rice U.), Peter Indefrey (U. Düsseldorf), Sophie Scott (U. College London), Herbert H. Clark (Stanford U.), Marc Brysbaert (Ghent U.), Elena Lieven (U. Manchester), Theo Mulder (KNAW), Antal van den Bosch (Radboud U. Nijmegen), and Wolfgang Klein (MPI Psycholinguistics).

The lectures were organised in collaboration with Radboud U. Nijmegen by Dan Acheson, Martina Bernhard, Paula Fikkert, Svetlana Gerakaki, Elma Hilbrink, Asifa Majid, and Roel Willems.

### 2014

JANUARY 27-29 | **RUSSELL GRAY**, UNIVERSITY OF AUCKLAND

*No Miracles! A Darwinian view of the evolution of cognition, language and culture*

The series included three lectures: 'The evolution of cognition without miracles', 'The evolution of language without miracles', 'The evolution of culture without miracles'. Discussants in the seminars were: Cecilia Heyes (U. Oxford), Katherine Cronin (MPI Psycholinguistics), Bart de Boer (VU Brussel), Harald Hammarström (MPI Psycholinguistics), Mónica Tamariz, (U. Edinburgh), and Asifa Majid (Radboud U. Nijmegen).

The lectures were organised in collaboration with Radboud U. Nijmegen by Martina Bernhard, Sara Bögers, Dan Dediu, Michael Dunn, Monique Flecken, Pieter Muysken, and Sean Roberts.

## Donders Lectures

### 2013

MARCH 28 | **DORA ANGELAKI**, BAYLOR COLLEGE OF MEDICINE, HOUSTON

*Optimal integration of sensory evidence: Building blocks and canonical computations*

APRIL 25 | **JEFFREY BINDER**, MEDICAL COLLEGE OF WISCONSIN

*Semantic cognition and the human angular gyrus*

SEPTEMBER 5 | **ANTHONY WAGNER**, STANFORD U.

*The cognitive neuroscience of remembering*

OCTOBER 3 | **SUSAN GATHERCOLE**, MRC COGNITION AND BRAIN SCIENCES UNIT, CAMBRIDGE

*Working memory and its disorders: Causes, consequences and treatment*

NOVEMBER 28 | **RAINER GOEBEL**, U. MAASTRICHT

*Decoding fMRI brain activity patterns in real-time: From basic research to clinical applications and back*

### 2014

JANUARY 23 | **GLYN HUMPHREYS**, OXFORD U.

*The salient self: Explorations of self-bias in mind and brain*

MARCH 27 | **ELIZABETH PHELPS**, NEW YORK U.

*Changing fear*

OCTOBER 9 | **SABINE KASTNER**, PRINCETON U.

*Neural network dynamics for attentional selection in the primate brain*

## Lecture C.L. de Carvalho-Heineken Prize for Cognitive Science

OCT 1 2014 | **JAMES MCCLELLAND**, STANFORD U.

*Interactive processes in perception and language*

### MPI Colloquium series

#### 2013

FEBRUARY 19 | **RENS BOD**, U. AMSTERDAM

*How hierarchical is language?*

APRIL 16 | **HERBERT H. CLARK**, STANFORD U.

*Depicting as part of spontaneous communication*

MARCH 19 | **JEFFREY LIDZ**, U. MARYLAND

*The representational basis of statistical learning in natural language*

MAY 21 | **MARTIN CORLEY**, U. EDINBURGH

*Disfluency in speech: The listener's perspective*

NOVEMBER 19 | **INA BORNKESSEL-SCHLESEWSKY**, U. MARBURG

*Towards a neurobiologically and cross-linguistically plausible model of language processing*

#### 2014

FEBRUARY 18 | **RAY JACKENDOFF**, TUFTS U.

*Aligning linguistics and psycholinguistics: The parallel architecture and theories of language processing*

MARCH 24 | **PIENIE ZWITSERLOOD**, U. MÜNSTER

*Behavioural and neural correlates of learning novel words*

MAY 20 | **BALTHASAR BICKEL**, U. ZÜRICH

*Rethinking universals of language*

JUNE 24 | **MARCO CATANI**, U. LONDON

*From tractography to neuropragmatics*

SEPTEMBER 23 | **LARRY BARSALOU**, EMORY U.

*Situating emotion*

OCTOBER 21 | **CHRISTIAN KELL**, GOETHE U. FRANKFURT

*Cortical dynamics and subcortical-cortical interactions underlying speech (re-)production*

NOVEMBER 18 | **MERIDETH GATTIS**, CARDIFF U.

*The active child and early language development*

### Nijmegen Gesture Centre lecture series

#### 2013

MARCH 12 | **JANET BAVELAS**, U. VICTORIA

*Collateral communication with hand and facial gestures*

MARCH 25 | **THOMAS C. GUNTER**, MPI HUMAN COGNITIVE AND BRAIN SCIENCES

*Gesture, speech, and communication: Exploring gesture style and covert gesture activation*

APRIL 9 | **GABRIELLA VIGLIOCCO**, U. COLLEGE LONDON

*Semantic representation*

MAY 16 | **EVE V. CLARK**, STANFORD U.

*Adults use speech and gesture to inform children*

JUNE 17 | **MARTHA ALIBALI**, U. WISCONSIN-MADISON

*Gesture and meaning*

DECEMBER 17 | **MARLOES VAN DER GOOT**, MPI PSYCHOLINGUISTICS

*Differences in the nonverbal requests between great apes and human infants*

#### 2014

JANUARY 21 | **RICCARDO FUSAROLI**, AARHUS U.

*Gestures in interaction: Quantitative approaches to motivation and coordinative dynamics*

APRIL 8 | **MAX LOUWERSE**, TILBURG U.

*Synchronization of linguistic and non-linguistic channels*

MAY 15 | **MARILINA MASTROGIUSEPPE**, U. TRENTO

*Gestural communication in children with Autism Spectrum Disorders during spontaneous mother-child interaction*

JUNE 16 | **ELENA KOULIDOBROVA**, CENTRAL CONNECTICUT STATE U.

*Language interaction effects: Evidence from argument omission in the languages of bimodal bilinguals*

JUNE 16 | **DIANE LILLO-MARTIN**, U. CONNECTICUT

*Binational bimodal bilingual language development project*

SEPTEMBER 30 | **SAMANTHA ROWBOTHAM**, U. MANCHESTER

*Seeing pain: How gestures help us to communicate about pain*

OCTOBER 16 | **GUDMUNDUR THORGRIMSSON**, MPI

PSYCHOLINGUISTICS

*Infants' understanding of gesture hand shapes in interaction and social observation*

## LECTURES AND COLLOQUIA

### E Humanities in Action lecture series

#### 2013

JAN 31 | **ALEXANDER MEHLER**, GOETHE U. FRANKFURT

*Linguistic networks: Text-technological representation and quantitative analysis*

MARCH 13 | **PAOLO MANGHI**, ISTI, PISA

*Aggregative data infrastructures in the cultural heritage*

APRIL 17 | **PAVEL IRCING**, U. PILSEN

*Fast search in large audiovisual archive: The MALACH story*

MAY 15 | **WALTER DAELEMANS**, U. ANTWERP

*Detecting author personality from text*

JUNE 12 | **HARALD HAMMARSTRÖM**, RADBOUD U. NIJMEGEN

*Unsupervised learning of morphology for lesser-studied languages*

NOVEMBER 6 | **KHALIL SIMA'AN**, U. AMSTERDAM

*The hierarchical structure of translation data*

NOVEMBER 20 | **MAX LOUWERSE**, TILBURG U.

*Symbol interdependency in conceptual processing (or: Language encodes perceptual relations)*

#### 2014

JANUARY 15 | **ALEXANDER CLARK**, KING'S COLLEGE LONDON

*Strong learning of context-free grammars (and MCFGs)*

FEBRUARY 12 | **MARCO BARONI**, U. TRENTO

*Linking vectors to the world: Multimodal and cross-modal distributional semantics*









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