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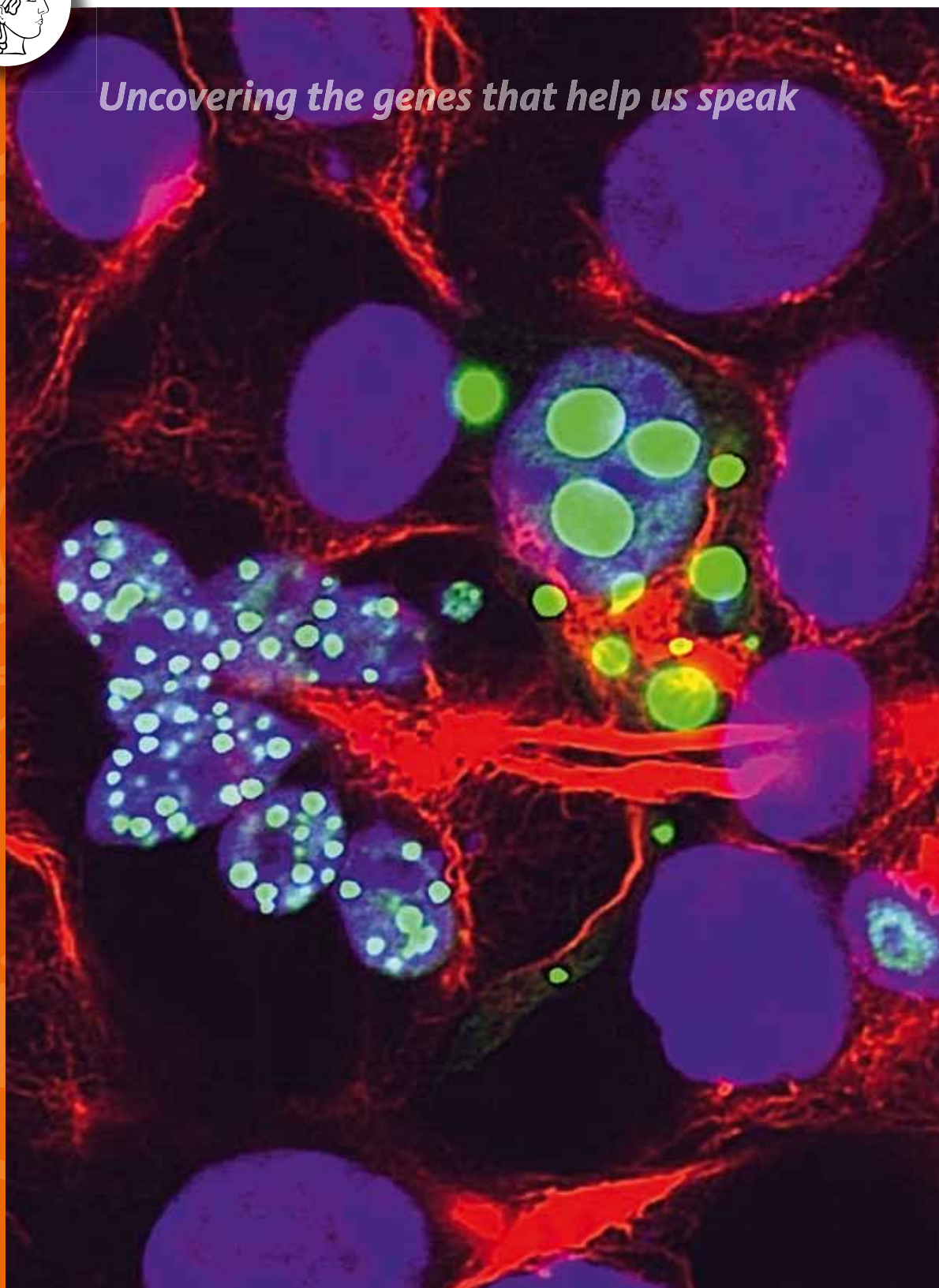
Research Report

Max Planck Institute for Psycholinguistics

Uncovering the genes that help us speak



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Research Report

Max Planck Institute for Psycholinguistics

Contents

The current board of directors (f.l.t.r.): Wolfgang Klein, Simon Fisher, Antje Meyer, Stephen Levinson, Peter Hagoort, and Anne Cutler

Preface

The Max Planck Institute for Psycholinguistics is the only institute in the world devoted entirely to study of language. Its mission is to undertake basic research into the psychological, social and biological foundations of language. On the following pages we report briefly on the work in each Department and Research group. More detailed information can be found on our website (www.mpi.nl).

For the first time in many years, the Research Report is structured with respect to Department and Research group. This reflects an important transition in the organisation of the research in the Institute. For reasons of transparency to the outside world as well as internally, the primary and permanent structure for our research has been made more visible. The flexibility of our research is guaranteed by a project structure, with projects having different scopes and time frames. Projects are shaped within and between departments, as well as with external partners. Herewith both the transparency and the flexibility of the way research at our institute is organised have improved.

During the past two years the relatively new departments Psychology of Language (led by Antje Meyer) and Language and Genetics (led by Simon E. Fisher) became more fully established. Reiner Dirksmeyer was appointed as the Head of the Technical Group and Sebastian Drude as the Head of The Language Archive. The Max Planck Research Group on Adaptive Listening completed their research, and the Group Leader, Andrea Weber, took up a chair at Tübingen University. 2012 was the last year of the Comprehension Department led by Anne Cutler, who retires as Director of the Institute and takes up a research chair at the University of Western Sydney. Luckily, Anne will return to the Institute for several months every summer, and in between we can read Anne's wonderful book *Native Listening: Language Experience and the Recognition of Spoken Words*. Pim Levelt's equally brilliant, though very different book *A History of Psycholinguistics: The Pre-Chomskyan Era* appeared in 2012 and received the Patrick Suppes Prize of the American Philosophical Society.

In December 2012, an international panel visited the Institute as part of a formal evaluation of the International Max Planck Research School for Language Sciences (IMPRS), which is a joint initiative with two institutes at the Radboud University, the Donders Institute for Brain, Cognition and Behaviour and the Centre for Language Studies (CLS). The IMPRS offers a wide range of courses, training and networking opportunities to doctoral students of the participating institutes. We are delighted with the panel's highly favourable evaluation, which is equally due to the hard work of the administrative and teaching team of the IMPRS and to the enthusiasm and excellent research of our students.

Researchers of the Institute have continued to collaborate intensively with colleagues at Radboud University. In September 2012, the Max Planck Institute joined forces with the University Medical Centre and the Donders Institute to launch *Cognomics*, a new initiative that seeks to understand how variations in the human genome affect brain structure and function, to impact on language, memory and other crucial aspects of cognition. The Institute played a leading role in acquiring the NWO programme grant *Language in Interaction* (27.6 M€) which will over a period of 10 years support joint work of the Max Planck Institute, the Donders Institute, the CLS and the Institute for Language, Logic and Computation of Radboud University on language at multiple levels, from genetic building blocks all the way to social interaction.

Many good things happened in the past two years. However, the event that affected us the most was a sad one: Our dear colleague Melissa Bowerman died in October 2011. We miss her very much.

Antje Meyer
Managing Director

Organisation of the institute 2011-2012

Directors
Anne Cutler
Simon E. Fisher
Peter Hagoort *(managing director)*
Wolfgang Klein
Stephen Levinson
Antje S. Meyer

Director emeritus
Willem Levelt

Max Planck research groups
Michael Dunn *(head)*
Daniel Haun *(head)*
Ulf Liszkowski *(head)*
Andrea Weber *(head)*

Max Planck Fellow
Robert Van Valin, Jr. *(Heinrich Heine U. Düsseldorf)*

External groups
Mirjam Ernestus *(head)*
Asli Özyürek *(head)*

The Language Archive
Sebastian Drude *(head)*
Wolfgang Klein *(scientific director)*

External scientific members
Manfred Bierwisch
Pieter Muysken

Scientific council
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Reiner Dirksmeyer

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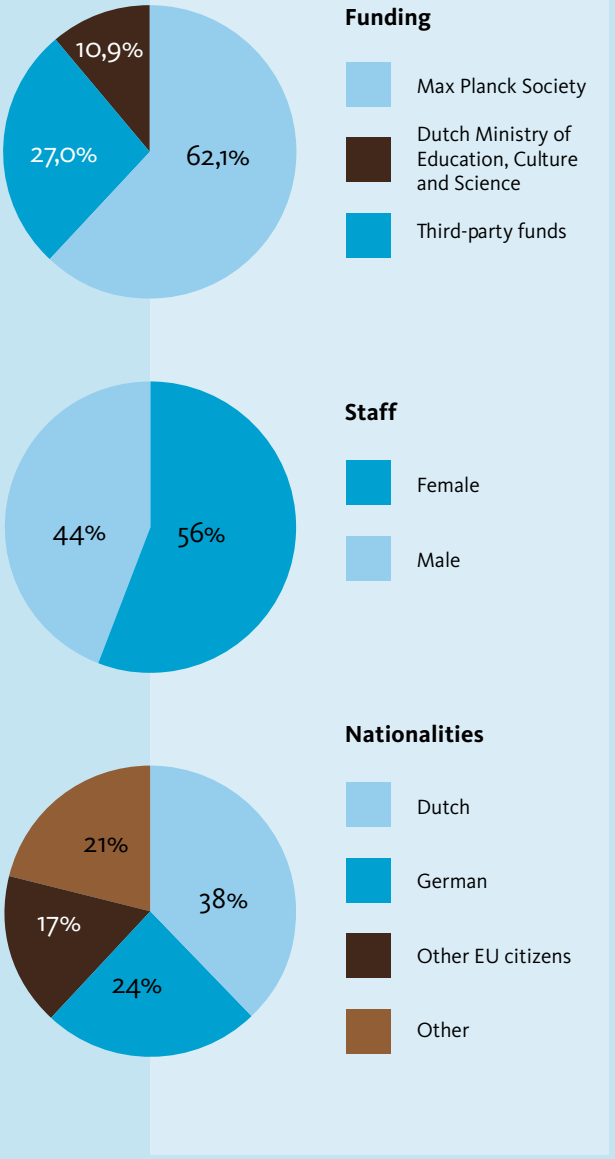

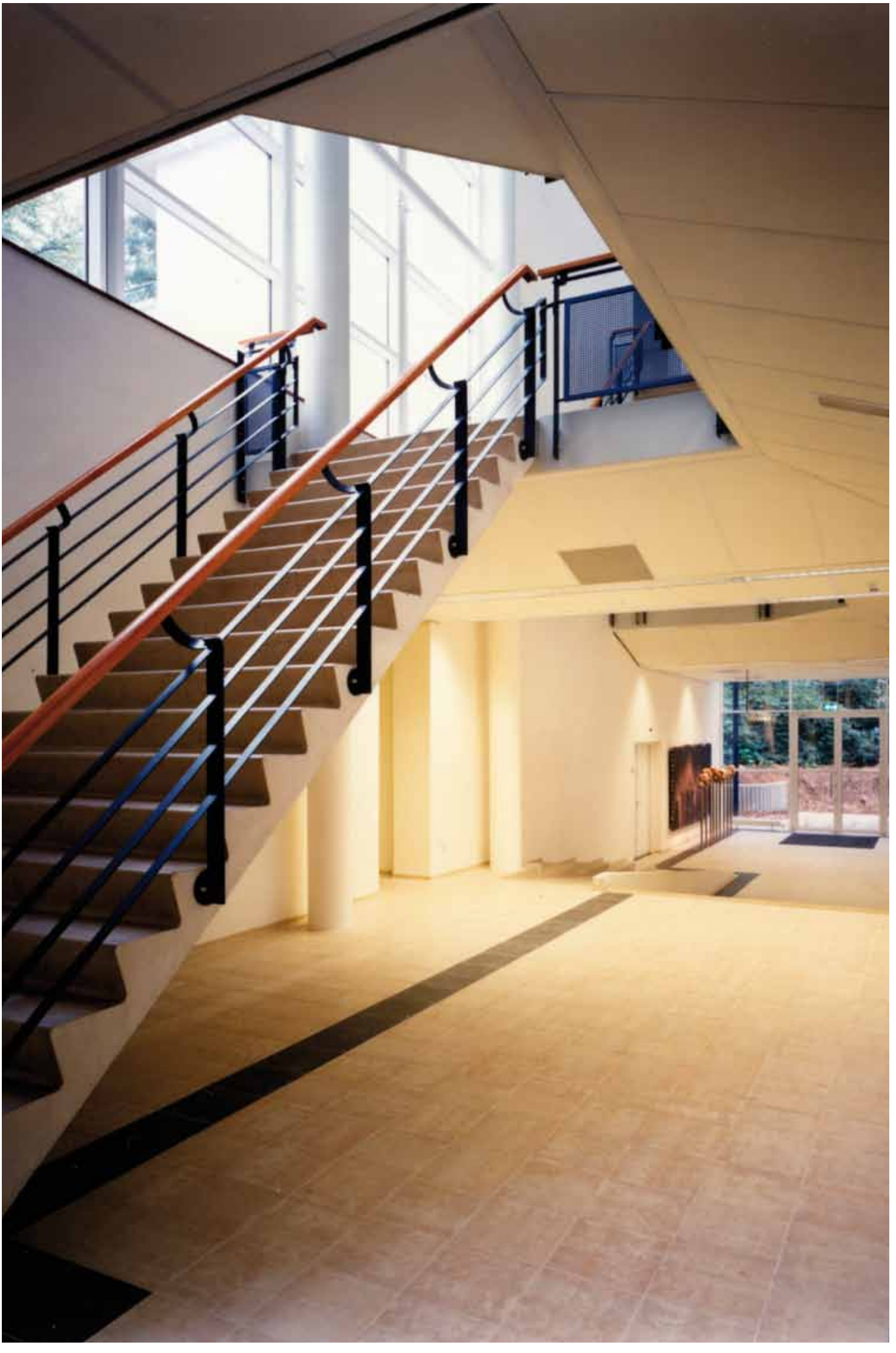

PhD completions

2011

Mark Dingemanse *The meaning and use of ideophones in Siwu.*

Ian FitzPatrick *Lexical interactions in non-native speech comprehension: Evidence from electro-encephalography, eye-tracking, and functional magnetic resonance imaging.*

Sonja Gipper *Evidentiality and intersubjectivity in Yurakaré: An interactional account.*

Caroline Mary Magteld Junge *The relevance of early word recognition: Insights from the infant brain.*

Tessa van Leeuwen *How one can see what is not there: Neural mechanisms of grapheme-colour synaesthesia.*

Marieke van der Linden *Experience-based cortical plasticity in object category representation.*

Stuart Payton Robinson *Split intransitivity in Rotokas, a Papuan language of Bougainville.*

René Scheeringa *On the relation between oscillatory EEG activity and the BOLD signal.*

Matthias Johannes Sjerps *Adjusting to different speakers: Extrinsic normalization in vowel perception.*

Francisco Torreira *Speech reduction in spontaneous French and Spanish.*

Annelie Tuinman *Processing casual speech in native and non-native language.*

Marco van de Ven *The role of acoustic detail and context in the comprehension of reduced pronunciation variants.*

Lin Wang *The influence of information structure on language comprehension: A neurocognitive perspective.*

2012

Miriam Ellert *Ambiguous pronoun resolution in L1 and L2 German and Dutch.*

Reyhan Furman *Caused motion events in Turkish: Verbal and gestural representation in adults and children.*

Birgit Knudsen *Infants' appreciation of others' mental states in prelinguistic communication: a second person approach to mindreading.*

Esther Meeuwissen *Cortical oscillatory activity during memory formation.*

Federico Rossano *Gaze behavior in face-to-face interaction.*

Katrien Rachel Segaert *Structuring language: Contributions to the neurocognition of syntax.*

Connie de Vos *Sign-spatiality in Kata Kolok: How a village sign language of Bali inscribes its signing space.*

Barbara Wagensveld *Rhyme over time: Behavioural & electrophysiological examinations of the nature and development of rhyme awareness.*

Kirsten Mirjam Weber *The language learning brain: Evidence from second language and bilingual studies of syntactic processing.*

Huadong Xiang *The language networks of the brain.*

Honours and awards

2011

Melissa Bowerman was elected as a Fellow of the American Academy of Arts & Sciences.

Aoju Chen was appointed Professor at the Modern Language Department at the University of Utrecht.

Anne Cutler was elected Fellow of the Association for Psychological Science.

Anne Cutler was awarded the Douglas Wright Lecture and Medal, University of Melbourne.

Dan Dediu and **Odette Scharenborg** received Vidi grants from the Netherlands Organsation for Scientific Research (NWO).

Mirjam Ernestus was awarded a European Research Council (ERC) starting grant.

Simon E. Fisher was elected as a member of the International Neuropsychological Symposium.

Adriana Hanulikova received the Jerrold J. Katz Young Scholar Award for 2010 for her paper (with co-authors Merel van Goch and Petra van Alphen) entitled "When grammatical errors do not matter: An ERP study on the effect of foreign-accent on syntactic processing", presented at the 23rd Annual CUNY Conference on Human Sentence Processing, New York, NY, March 2010.

Willem Levelt was honoured with the "Bundesverdienstkreuz mit Stern" (Order of Merit) of the Federal Republic of Germany.

Willem Levelt was appointed as a member of the "Orden Pour le mérite for Sciences and Arts".

Eva Reinisch received the Otto Hahn Medal for her dissertation on listeners' use of temporal information to recognise spoken words in their native language.

Leah Roberts took up the position "Chair in Education" at the University of York.

Peter Wittenburg was awarded the Heinz-Billing-Award 2011. The prize is awarded every two years by the Max Planck Society for the advancement of scientific computation.

2012

Anne Cutler was elected honorary member of the Linguistic Society of America, and honorary member of the Association for Laboratory Phonology.

Simon E. Fisher was chosen Presidential Special Lecturer at the Society for Neuroscience Annual Meeting.

Simon E. Fisher was appointed Professor of Language and Genetics at Radboud University Nijmegen.

Peter Hagoort was invited by the Academia Europaea to become a member of the Academy of Europe.

Peter Hagoort received the Academy Professor Prize of the Royal Netherlands Academy of Arts and Sciences.

Ulf Liszkowski was appointed Professor of Developmental Psychology at the University of Hamburg.

Asifa Majid was appointed Professor of Language, Communication, and Cultural Cognition at the Centre for Language Studies, Radboud University Nijmegen.

Asifa Majid and **Mirjam Ernestus** received Vici grants from NWO.

Matthias Sjerps received the Otto Hahn Medal for his dissertation on the way listeners manage to deal with variation in speech.

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 the task, most children learn their native languages almost effortlessly, and do not need formal teaching to achieve a rich linguistic repertoire. The Language & 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 through 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.

Functional genomics of language-related genes

Discovered over a decade ago by Simon Fisher and colleagues, *FOXP2* was the first gene implicated in speech and language dysfunction. Mutations of this gene account for only a small proportion of cases of disorder. Now, with the advent of next-generation sequencing, it is feasible to rapidly and cost-effectively determine the sequence of lengthy stretches of DNA. This gives exciting new tools for identifying additional gene variants that may impact on speech and language. In initial studies we are sequencing virtually all protein-coding parts of the genome (the 'exome') in children with language-related syndromes, searching for potential causative mutations. The exome constitutes only 2% of our genetic make-up, but contains a lot of functional variation that is relevant to human disease. Not all DNA variants that alter protein sequences actually impair protein function, so it is important to characterise them using model systems, including human cells grown in the laboratory. The power of combining next-generation sequencing and cellular analyses is illustrated by a recent collaboration with Evan Eichler and colleagues (U. Washington, USA) in the first exome sequencing study of autism spectrum disorders (ASD). This group of neurodevelopmental syndromes is characterised by abnormalities of social interactions and communication, and there is evidence of shared etiology with language disorders. The project targeted families with unaffected parents where only one child had ASD, searching the exome for 'de novo' – newly arising non-inherited – mutations that alter protein-coding sequence. In one family, the affected child (who had severe language problems) carried a unique de novo variant affecting *FOXP1*, the most closely related gene to *FOXP2* in the genome. Like *FOXP2*,

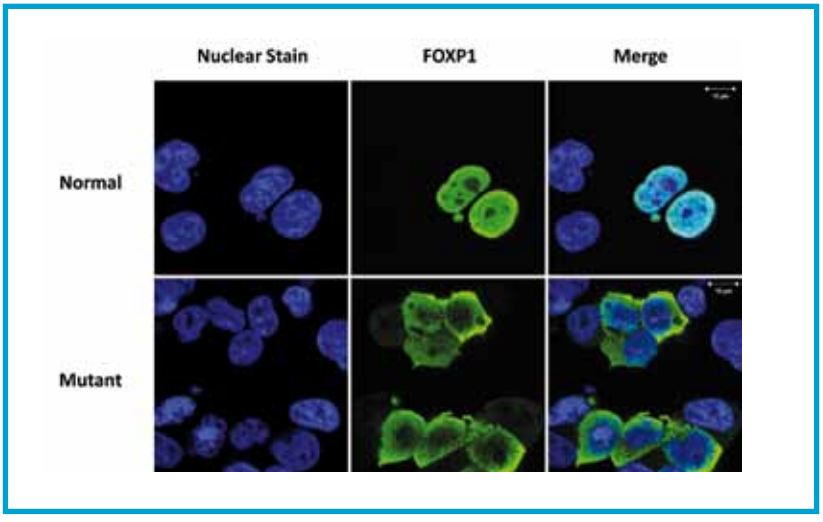

Figure 1: *Damaging effects of FOXP1 mutation. Human cells expressing either a normal version of the protein encoded by FOXP1 (green, upper panel) or a mutated version found in a child affected with ASD (green, lower panel). Unlike the normal protein, the mutant version is not seen in the nucleus of the cell (blue), indicating impaired function.*

Director Simon E. Fisher
Department members Martin Becker, Jasper Bok, Nicolas Brucato, Sara Busquets Estruch, Amaia Carrión Castillo, Sylvia Chen, Pedro Cuadrado, Dan Dediu, Pelagia Derizioti, Paolo Devanna, Danai Dimitropoulou, Clyde Francks, Alessandro Gialluisi, Sarah Graham, Tulio Guadalupe, Martine Hoogman, Katerina Kucera, Sonja Vernes

the *FOXP1* gene encodes a protein which regulates how other genes are switched on and off. In some parts of the brain, the proteins encoded by these genes directly interact and may work together to regulate targets. Pelagia Derizioti generated human cells carrying the same version of *FOXP1* as that found in the child with ASD. She discovered that the mutant protein was mislocalised within the cell *(see Figure 1)* and could not regulate targets in the normal way. Remarkably, the same affected child carried a second mutation, disturbing *CNTNAP2*, a gene that is regulated by *FOXP2* and has been separately linked to ASD and specific language impairment. Through functional analyses in her cellular models, Derizioti confirmed that *FOXP1*, *FOXP2* and *CNTNAP2* belong to a shared functional pathway.

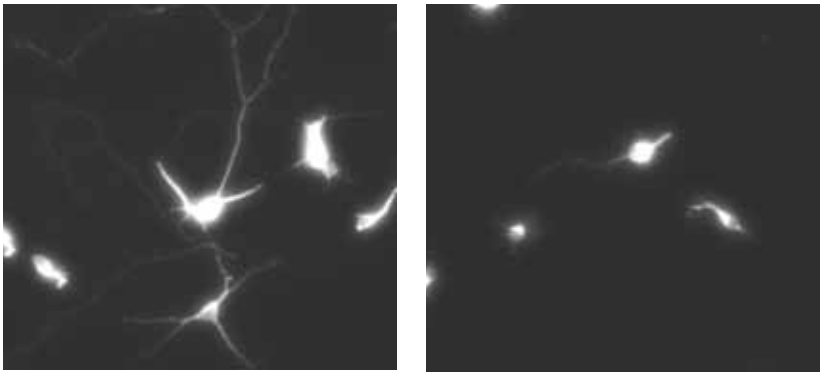

Figure 2: *Foxp2 has effects on neurite outgrowth. Neurons taken from the developing striatum of normal mice (left panel) show longer neurites with more branches than those from mice with mutations of the gene (right panel).*

FOXP2 and neuronal connectivity

We know that damage to *FOXP2* causes a severe speech and language disorder in humans. What are the functions of this gene in the developing brain? Experimental possibilities using human neural tissue are highly limited, but the mouse brain can offer a valuable model system. Mice carry their own version of *FOXP2* (called *Foxp2*) which is remarkably similar to the human gene, in terms not only of its sequence, but also where and when it is switched on in the brain. Sonja Vernes and colleagues developed techniques for screening all the genes of the genome in developing brain tissue from mice, in order to identify targets that are regulated by *Foxp2*. Intriguingly, the researchers uncovered a consistent biological theme amongst the target genes – a significant proportion of them (more than expected by chance) had been previously linked to the development of neuronal projections. These projections, called 'neurites', allow a neuron to connect with and signal to others in the developing brain, a process which ultimately results in the formation of an exquisite network of highly specific connections or circuits. Vernes went on to show that when *Foxp2* is mutated and not functioning properly in early brain cells, these neurons have shorter neurites growing, with fewer branches, as compared to those with the normal version of the gene *(see Figure 2)*. These findings suggest that humans with *FOXP2* mutations may have disturbed neuronal connectivity in some of the circuits where the gene is expressed. Future work will further bridge the gap between genes, neurons, brain circuits and cognitive functions. Vernes and her group (funded in part by an HFSP fellowship and a Marie-Curie grant) aim to investigate the effects of *Foxp2* and its target genes on the development and signaling of relevant neural networks. Using mouse models, they plan to study not only connectivity of *Foxp2*-dependent neurons in the developing brain, but also activation of the crucial circuits in the adult brain during specific behaviours.

Molecular basis of brain asymmetries

Left-right asymmetry of the human brain is one of its key organising features. Many cognitive processes show a degree of lateralisation towards one side or the other, including language, for which certain regions of the left hemisphere are most active in the majority of people. The genetic mechanisms that cause the two halves of the human brain to develop their own specialisations are unknown. Clyde Francks and his group,

Department
Language and genetics

including PhD student Tulio Guadalupe, are attempting to identify genes that influence brain asymmetry. They are doing this through large-scale genetic investigations of a population of 1300 healthy volunteers who have undergone a brain structural MRI scan at the Donders Centre for Cognitive Neuroimaging, as part of Nijmegen's Brain Imaging Genetics (BIG) study (a collaboration between the MPI, the Donders Institute and Radboud University Nijmegen Medical Centre).

Some genes may contain DNA variations that are very common in the European population, that have existed for many thousands of years, and that have subtle effects on brain development. Guadalupe and Francks are screening across the entire genome using millions of genetic polymorphisms, searching for associations with structural asymmetries. Other genes may contain rare mutations that have overtly disruptive effects on the normal pattern of asymmetrical development. To find these, the researchers reconstruct the hidden relatedness of pairs of participants in the study, going back just a few hundred years in history, and scan the genome for long segments shared by people whose asymmetry is relatively under-developed. A particular region of interest in the brain is the planum temporale, a part of the cerebral cortex of the temporal lobe that overlaps with Wernicke's area (an important component of language-related networks). The planum temporale is larger on the left side in most people, and also more asymmetrical in males. The sexual dimorphism of this asymmetry motivates a close investigation of genes involved in sex steroid biology. The identification of genes that influence cerebral asymmetries is expected to shed light on fundamental processes in human developmental neurobiology and evolution. It will also yield potentially important candidate genes to examine in language-related disorders, such as specific language impairment and developmental dyslexia.

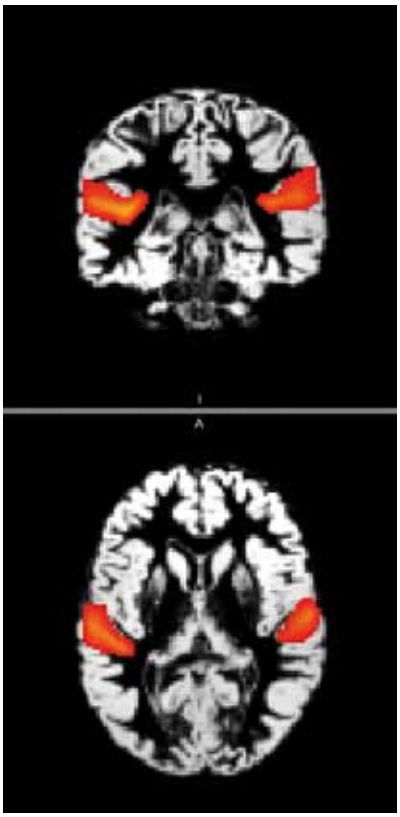

Figure 3: *Brain asymmetries. Measurement of grey matter asymmetry between the left and right planum temporale, from a structural MRI scan, using voxel-based-morphometry and a region-of-interest mask derived from the Oxford-Harvard brain atlas. The left planum temporale is the larger in this subject.*

Genetic contributions to language stability

It is well established that language is continuously changing both in vocabulary and in structure. However, not all aspects of language are equally malleable. Could genetic biases influence how we acquire and use language, making some features more stable? Using modern Bayesian phylogenetic methods and advanced statistics Dan Dediu investigated the historical stability of structural aspects of language. He found that some features do tend to be more stable than others across language families and geographic areas. This result supports the proposal that biases rooted in our biology might affect language change and evolution, 'anchoring' some structural features in the slower changing genetic landscape. Indeed, linguistic tone, which Dediu has previously linked to two brain-growth genes, is one of the most stable features of language.

Further investigation (together with Stephen Levinson, Language and Cognition Department) revealed that abstract profiles of structural stability might retain information about very old events. For example, the study revealed likely connections between the languages of the Americas and those of Northeast Eurasia, most probably dating back to the peopling of the Americas at least 12,000 years or more ago, as well as deep connections between most of the Eurasiatic language families. This line of research is

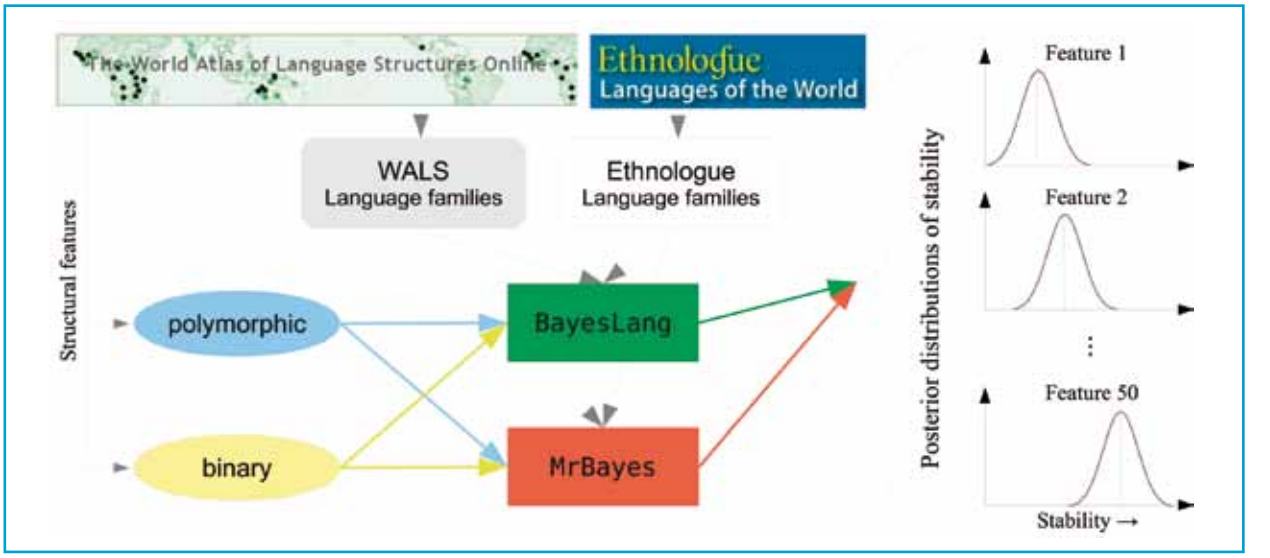

Figure 4: *Estimating the stability of structural features of language using a Bayesian phylogenetic approach. The features were selected from the World Atlas of Language Structures (WALS) and were coded in two ways (binary and polymorphic); language family trees were provided by WALS and the Ethnologue. We used two Bayesian phylogenetic software packages (BayesLang and MrBayes) to estimate the posterior distributions of stability for each considered feature. Shown are possible histograms of stability estimates with stability increasing to the right: the top feature is the most unstable.*

not only of intrinsic importance for historical linguists and typologists, it will also provide hypotheses regarding features that are most subject to genetic influence. Such information will be invaluable for Dediu's newly funded NWO Vidi project "The influence of genetic biases on the evolution, universal properties and diversity of speech and language".

Other work

- Gene mapping in language and reading disorders
- Next-generation DNA sequencing in language impairments
- An inherited disorder of semantic cognition
- Decoding the genetics of synaesthesia
- Language Cognomics
- Protein networks in speech and language

Selected publications

Dediu, D., & Levinson, S. C. (2012). Abstract profiles of structural stability point to universal tendencies, family-specific factors, and ancient connections between languages. *PLoS One, 7*(9), e45198.

Francks, C. (2011). Leucine-rich repeat genes and the fine-tuning of synapses. *Biological Psychiatry, 69,* 820-821.

O'Roak, B. J., Deriziotis, P., Lee, C., Vives, L., Schwartz, J. J., Girirajan, S., Karakoc, E., MacKenzie, A. P., Ng, S. B., Baker, C., Rieder, M. J., Nickerson, D. A., Bernier, R., Fisher, S. E., Shendure, J., & Eichler, E. E. (2011). Exome sequencing in sporadic autism spectrum disorders identifies severe de novo mutations. *Nature Genetics, 43,* 585-589.

Vernes, S. C., Oliver, P. L., Spiteri, E., Lockstone, H. E., Puliyadi, R., Taylor, J.M., Ho, J., Mombereau, C., Brewer, A., Lowy, E., Nicod, J., Groszer, M., Baban, D., Sahgal, N., Cazier, J.-B., Ragoussis, J., Davies, K. E., Geschwind, D. H., & Fisher, S. E. (2011). Foxp2 regulates gene networks implicated in neurite outgrowth in the developing brain. *PLoS Genetics,* 7(7): e1002145.

Whitehouse, A. J., Bishop, D. V., Ang, Q., Pennell, C. E., & Fisher, S. E. (2011). CNTNAP2 variants affect early language development in the general population. *Genes, Brain and Behavior, 10,* 451-456.

Department
Language comprehension

Goals of the Department

The work of the Language Comprehension Department (formerly Comprehension Group) focusses on how acoustic information in speech is mapped to stored lexical knowledge, enabling listeners to interpret speakers' intentions. In the group's final years, research (coordinated in the project *Mechanisms and Representations in Comprehending Speech*) concentrated on how spoken-word comprehension succeeds despite the challenges of variability arising from anatomical, sociolinguistic, or stylistic speaker differences. Since the complexities of spoken-word recognition often only become apparent when we try to comprehend foreign speech, the research included explorations of listening to novel languages and to late-acquired languages, each of which can shed light on how our speech recognition system is tailored to the native language.

Architecture of spoken-word recognition

The Department's work over recent years has shown that listeners are surprisingly flexible. Phonological categories, thought to be fixed early in language acquisition, turn out to be flexible, enabling listeners to adapt rapidly to novel talkers. Participants familiarised with a speaker producing an ambiguous sound in an unambiguous word-final position (e.g., [maʊˢ/f], in which the ambiguous fricative [ˢ/f] must be /s/, because *mouse* is a word and *moufe* is not) learned to apply this knowledge to other words containing the sound /s/. This finding shows that listeners make use of abstractly represented sub-lexical units (e.g., phonemes) in spoken-word recognition. One recurrent claim in the literature has been that sub-lexical units, comparable to letters in written words, are used only as a consequence of learning to read. When McQueen, Tyler and Cutler tested adaptation in adults and 6-year-old pre-readers, however, contrary to the prediction of a role for reading ability, both groups showed equivalent adaptation effects *(see Figure 1)*.

Given that such adaptation targets sub-lexical units, patterns of adaptation can shed light on the nature of these units. This has been a recurring and controversial issue in the history of psycholinguistics; but the adaptation paradigm, with its influence on sub-lexical units, may actually offer answers to this "age-old" question. In line with this, Mitterer, Scharenborg, and McQueen tested whether listeners generalise learning

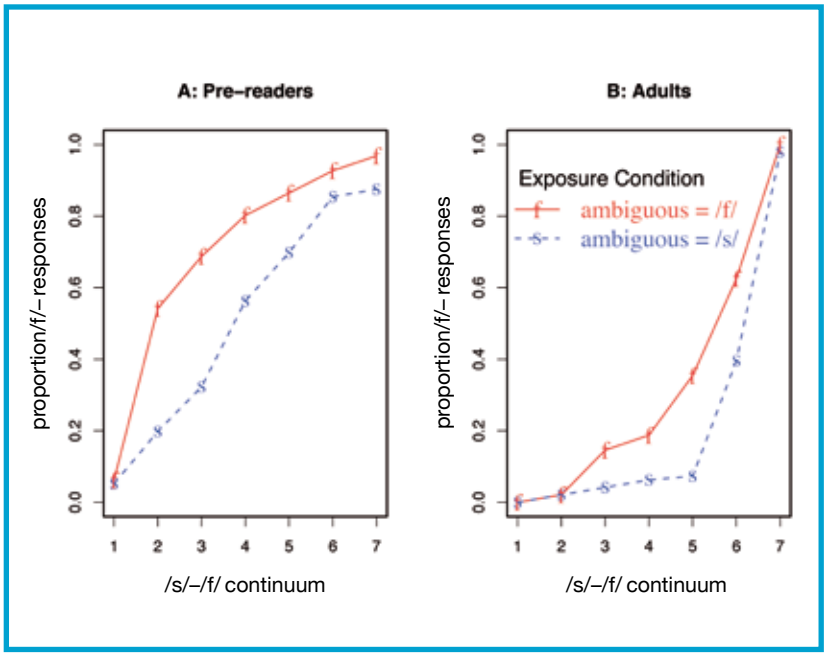

Figure 1: *Consistency of perceptual adaptation across the lifespan. Six-year-olds (before reading acquisition) and adults tend to categorise a name (Fimpy or Simpy?) in accord with prior exposure received in a learning phase; if an ambiguous fricative was heard replacing /f/ (red lines), they more often identify the name as Fimpy, i.e. their /f/ category expands, while if it was heard replacing /s/ (blue lines), they more often decide for Simpy, i.e. the /s/ category expands and the /f/ category is hence smaller. The shift towards the trained category is comparable for pre-readers (left panel) and adults (right panel).*

Director Anne Cutler
Department members Attila Andics, Mirjam Broersma, Jiyoun Choi, Alexandra Jesse, James McQueen, Holger Mitterer, Katja Poellmann, Matthias Sjerps, Annelie Tuinman, Patrick van der Zande, Wencui Zhou

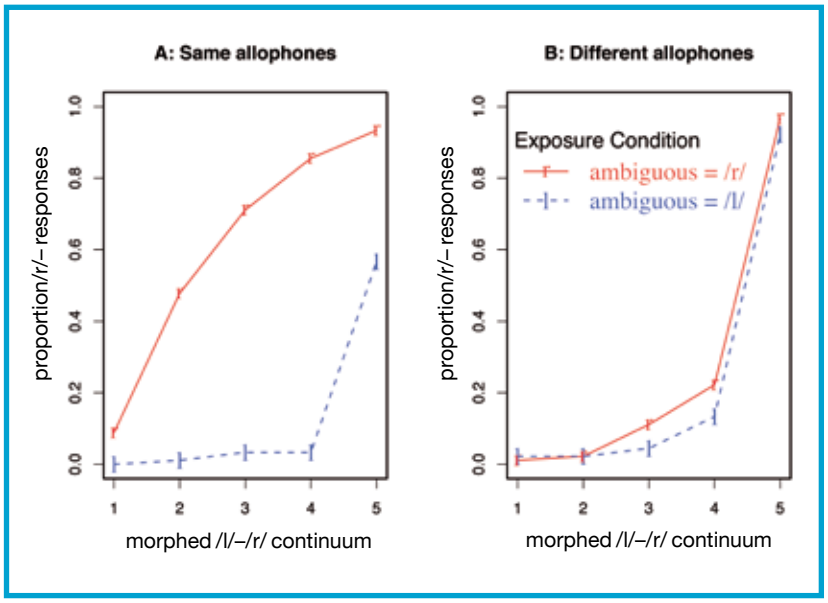

***Figure 2**: Proportion of /r/ responses depending on the test continuum (different panels, varying the similarity of the stimuli between exposure phase and test phase) and exposure to an ambiguous sound replacing /r/ (red lines) versus /l/ (blue lines). The critical comparison is how strongly the two exposure groups (red vs. blue lines) differ. There is a strong adaptation effect if the allophones used in the exposure phase are also used in the test phase (left panel), but no effect if different allophones are used (right panel).*

from one allophone to another. (Allophones are phonetically distinct versions of the same phoneme, such as light and dark /l/ that occur in English in, respectively, syllable onset and offset position). Although for the fricatives /s,f/, Jesse and McQueen found generalisation across syllable positions, here the adaptation did not generalise from one allophone to another *(see Figure 2)*, suggesting that context-insensitive phonemes (an analogue to letters which look alike wherever they are in the word) are unlikely to be the sole units of spoken-word recognition. Listeners' store of abstract representations is thus richer than has sometimes been proposed. Further evidence was provided by the PhD project of Poellmann (supervised by Mitterer and McQueen), investigating adaptation to phonetic reductions: Listeners adapt to the reduction of "default" features (such as [plosive]) as well as to the reduction of whole syllables. Thus supposedly default features are also coded in the mental lexicon, and at least some form of syllabic coding must exist at a sub-lexical level. In summary, the adaptation paradigm (originally devised by this Department) may hold the key to unlocking the thorny issue of what the units of spoken-word recognition are, both at a sub-lexical and a lexical level.

Native-language adaptation

The perceptual learning work has also shed light upon the relationship between phonological representations formed in different modalities. The PhD project of Van der Zande (supervised by Jesse and Cutler) investigated how learning about speakers affects subsequent processing of visually as well as of auditorily presented speech. In one study, listeners were exposed to audiovisually presented speech that contained an ambiguous sound, whereby the auditory ambiguity was disambiguated by visual cues. These also contained information about the identity of the speaker. In the test phase, listeners categorised ambiguous auditory-only sounds that were produced either by the exposure speaker or by a novel speaker. The categorisations showed generalisation across speakers, indicating that the learning from visual cues was not driven by speaker identity. In another study, listeners heard words containing an auditory ambiguity and used lexical knowledge to disambiguate the input. Afterwards they categorised *visual-only* ambiguities, and here the categorisations showed no effect of perceptual learning. Learning did thus not generalise across modalities at the prelexical level. Perceptual learning processes for auditory and for visual speech are therefore separate, and auditory and visual phonetic categories cannot be inextricably linked.

Testing the limits of native-language adaptation

It is well known, including from this Department's work, that listeners tend to call on the processing strategies they have developed for use with their na-

Department
Language comprehension

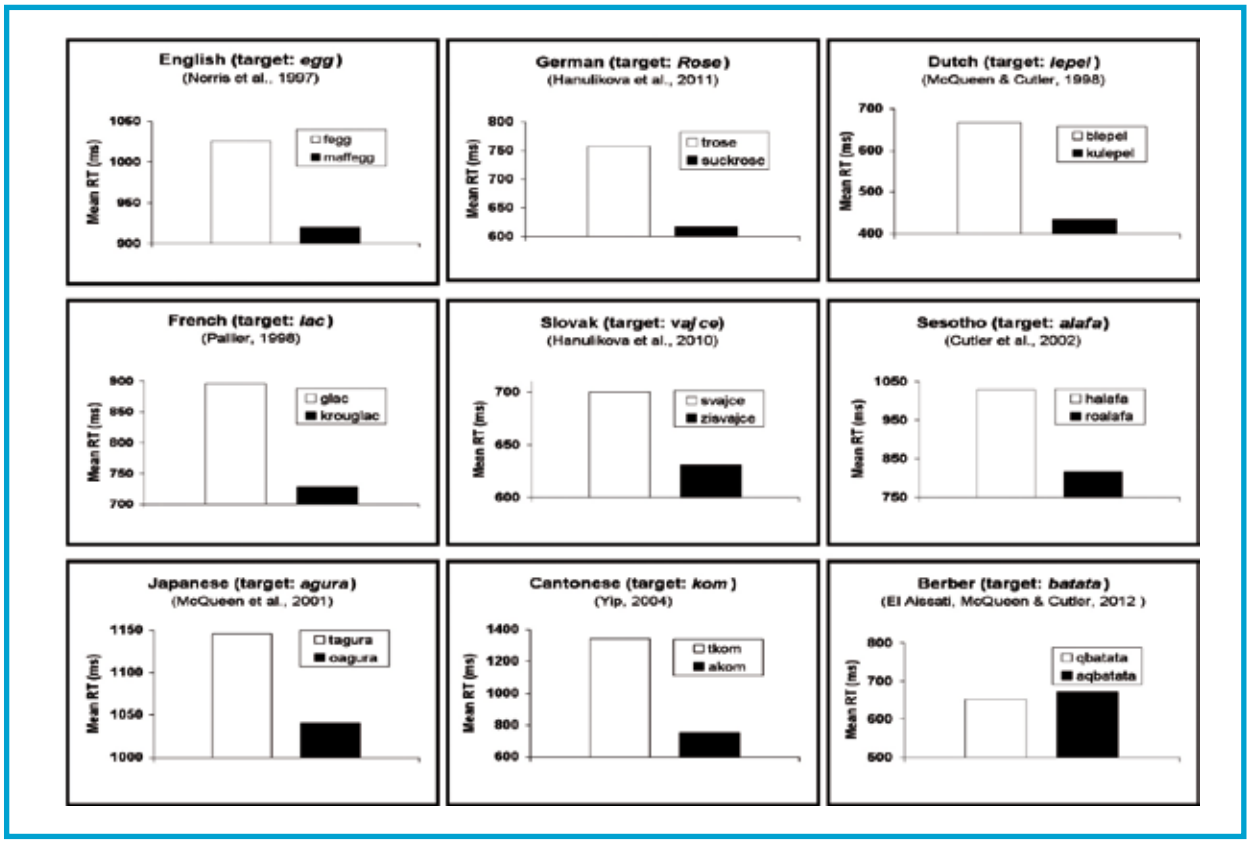

Figure 3: *Spoken words are harder to extract from a speech context if they leave a vowel-less residue (e.g., egg is harder to find in fegg than in mafegg). This effect appears in languages of many families with many different phonological properties. Only in Berber (a language that allows stand-alone content words without vowels) is the effect absent.*

tive language even when listening to speech in an unfamiliar language for which these strategies are inappropriate. To test the limits of this native-language adaptation, three lines of recent research examined listeners' use of information from a novel language on first exposure.

Certain salient prosodic cues, such as pitch movements, are highly common across languages, so that listeners from any language background may be able to use them. Broersma (with Kim and Choi) investigated first the use of such prosodic cues for segmenting the speech stream. Dutch and Korean listeners were exposed to an artificial language from which prosodic information had been removed, except that for each participant there was a single pitch cue present, which corresponded either to a Dutch or a Korean pattern. When the pitch pattern was in line with their native language, listeners segmented the speech stream better than in a baseline (no-prosody) condition. In the cross-linguistic condition (e.g., Dutch listeners, Korean-style cue), listeners could use the pitch cue only with a larger pitch difference and more exposure. The use of prosodic cues for segmentation is thus not universal, but again depends on native language experience.

Second, Broersma investigated Dutch listeners' categorisation of Korean lenis, fortis, and aspirated stops (e.g., /p, p*, p^h/), an extremely difficult distinction for Dutch listeners. Among the phonetic cues to this contrast, some are similar to cues used in Dutch to distinguish voiced from voiceless stops, but others (e.g., the creakiness or breathiness of the voice) are not used in Dutch for any phonological contrast. As expected, the Dutch listeners found the Korean stops very difficult, and distinguished them

only just above chance level. They did however make use of all available cues to some extent – even the completely unfamiliar ones such as creakiness. Thus, though perception of novel speech sounds is affected by degree of similarity to the native language, listeners can rapidly detect and begin to use new and unfamiliar sources of information.

Third, Broersma and Choi (with Dediu), again using the Korean lenis/fortis/aspirated contrast, investigated whether there are robust and stable individual differences in the initial perceptual processing of such a distinction. In multiple sessions Dutch-speakers were trained to categorise the Korean sounds. Stable individual differences indeed appeared: listeners who were good at identifying the sounds in the first session remained so until the last session. Further, benefit from training did not differ as a function of initial performance, i.e., differences between good and poor learners remained similar over time.

The native language advantage

The department's work over many years has provided example after example of how listening to speech is tailored to the native language, making listening in our own language as efficient as it can be (but listening to other languages inefficient). In some ways, however, listening seems just the same across languages. One such effect (termed the Possible Word Constraint) is that it is very hard to recognise a word if it leaves a residue without a vowel in it (e.g., just *f*, or just *kt*; thus it is hard to spot *egg* in *fegg* or *bell* in *belkt*). This effect is seen in many languages with very different phonologies and word structure constraints, as the first eight panels of Figure 3 show.

However, some languages allow standalone content words without vowels. One such language (family) is Berber; [tsskʃftstt tftxtstt] is a Tashelhiyt Berber sentence meaning 'you dried it and rolled it'. Acquiring Berber requires learning to segment such sentences into their component words, and clearly the Possible Word Constraint would be unhelpful with this. Experiments in Berber (the ninth panel of Figure 3) indeed showed that the constraint is not applied there. The native language advantage requires that an otherwise language-general constraint be avoided.

Selected publications

Broersma, M. & Cutler, A. (2011). Competition dynamics of second-language listening. *Quarterly Journal of Experimental Psychology, 64*, 74-95.

Sjerps, M.J., Mitterer, H., & McQueen, J.M. (2011). Listening to different speakers: On the time-course of perceptual compensation for vocal-tract characteristics. *Neuropsychologia, 49*, 3831-3846.

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Cutler, A. (2012). *Native listening: Language experience and the recognition of spoken words.* Cambridge, MA: MIT Press.

El Aissati, A., McQueen, J.M., & Cutler, A. (2012). Finding words in a language that allows words without vowels. *Cognition, 124*, 79-84.

McQueen, J.M., Tyler, M.D., & Cutler, A. (2012). Lexical retuning of children's speech perception: Evidence for knowledge about words' component sounds. *Language Learning and Development, 8*, 317-339.

Johnson, E.K., Westrek, E., Nazzi, T., & Cutler, A. (2011). Infant ability to tell voices apart rests on language experience. *Developmental Science, 14*, 1002-1011.

Broersma, M. (2012). Increased lexical activation and reduced competition in second-language listening. *Language and Cognitive Processes, 27*, 1205-1224.

Mitterer, H. (2011). The mental lexicon is fully specified: Evidence from eye-tracking. *Journal of Experimental Psychology: Human Perception and Performance, 37*, 496-513.

McQueen, J. M., & Huettig, F. (2012). Changing only the probability that spoken words will be distorted changes how they are recognized. *Journal of the Acoustical Society of America, 131*, 509-517.

Hanulíková, A., Mitterer, H., & McQueen, J.M. (2011). Effects of first and second language on segmentation of non-native speech. *Bilingualism: Language and Cognition, 14*, 506-521.

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, thus bringing 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, the department is characterised by a diversity of approaches, ranging from linguistic analysis and ethnography to developmental studies, from psycholinguistic experimentation to conversation analysis, from corpus statistics to brain imaging, and from phylogenetics to linguistic data mining.

THE CATEGORIES PROJECT

This project investigates the nature of linguistic categories and their role in cognition. Linguistic categories have to be learned and are necessarily restricted in number, offering a coarse and uneven grid across experience, with different languages offering myriad categories. This project explores the nature and consequences of this uneven coding. Likewise, syntactic categories and linearisation vary across languages, raising questions about how these language-specific structures are processed.

Perceptual language

One subproject investigates the language of perception – the lexical and grammatical coding of visual, auditory, olfactory, gustatory and haptic experience. Findings challenge the Western view of a universal hierarchy of senses with vision as the most linguistically encodable perceptual modality, followed by audition, touch and taste, with smell at the end. In one study, we explored how easy it was for speakers of different languages to convey perceptual properties (such as *red, high pitch, smooth* and *sour*). Using controlled stimuli, the coding of these perceptual domains was compared across more than 20 languages, drawn world-wide from different stocks. The results show that while English follows the proposed hierarchy, Siwu (a language spoken in Ghana) has touch as the most codable sense, followed by taste, vision, smell and sound; Tzeltal (spoken in Mexico) follows a different order again with taste at the top, followed by vision, audition, touch and smell.

One outcome has been the discovery of languages with elaborate smell lexicons, which is surprising since many scholars have suggested the impossibility of expressing olfactory experiences except through circumlocutions. Wnuk's PhD project has shown that Maniq (spoken in Thailand) has surprisingly fine distinctions in this domain with clear semantic structure *(see Figure 1)*.

Perception verbs

Another subproject examines perception

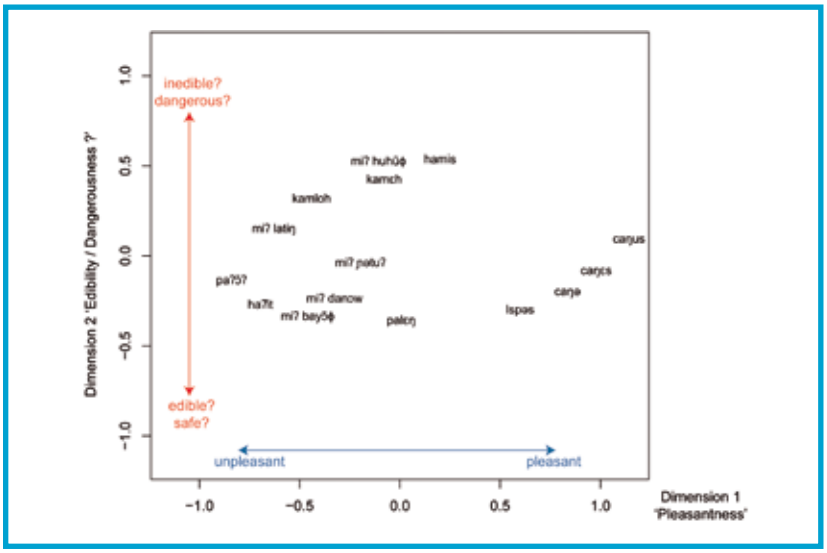

Figure 1: *Two-dimensional MDS of 15 Maniq olfactory terms based on similarity judgements by Maniq speakers. Dimension 1 contrasts terms related to pleasant smells with terms referring to unpleasant smells. Dimension 2 is hypothesised to express one of the following contrasts: 'edible-inedible' or 'dangerous-safe'.*

Director Stephen Levinson

Department members Julija Baranova, Mathias Barthel, Joe Blythe, Sara Bögels, Rebecca Defina, Mark Dingemanse, Tyko Dirksmeyer, Nick Enfield, Simeon Floyd, Sonja Gipper, Rosa Gisladottir, Kaoru Hayano, Elma Hilbrink, Clair Hill, Judith Holler, Gertie Hoymann, Kobin Kendrick, Lilla Magyari, Elizabeth Manrique, Elisabeth Norcliffe, Sean Roberts, Stuart Robinson, Gabriela Garrido Rodriguez, Federico Rossano, Giovanni Rossi, Lila San Roque, Sebastian Sauppe, Gunter Senft, Francisco Torreira, Sylvia Tufvesson, Connie de Vos, Ewelina Wnuk

verbs (such as *see, hear* and *taste*), using a specially constructed database of perception verbs in over 80 languages, in order to determine whether the linguistic encoding of the senses follows the same universal hierarchy proposed for perceptual predicates and patterns of polysemy (e.g. does a single verb cover more than one perceptual modality, e.g. *perceive*). We have found a strong tendency for perception verbs to fall along a hierarchy when it comes to the relative length of the verb forms: verbs of vision and hearing are typically shorter than verbs of tasting and smelling. On the assumption that frequent forms are typically shorter, this suggests striking consistency in the relative frequency of use of these verbs across languages. Polysemy patterns (the use of a single verb to denote more than one sense modality), however, exhibit cross-linguistic variability, arguably reflecting significant differences in how perceptual experiences may be chunked and organised across cultures.

Perception verbs in conversation

Face-to-face conversation is a primary forum for the sharing, manipulation and negotiation of perceptual experience through language. But we know surprisingly little about how people from different languages and cultures use words like *look* and *touch* in everyday interaction. A collaboration of Interactional Foundations of Languages and Categories across Language and Cognition, this subproject works with corpora of video-recorded interaction to study perception verbs in conversational contexts.

Our database holds uses of core perception vocabulary from more than a dozen languages and brings new evidence to the debate on how cultural and universal forces shape the perception lexicon. Results suggest that vision verbs are the most common, but that the rank order for other senses shows more variation from language to language.

The project also examines extended meanings of perception verbs outside of the perception domain - for example using 'see' to mean 'understand'. It has been suggested that these extensions are motivated by common, embodied experience, and will be the same cross-linguistically. Our data show that certain meanings of perception verbs as used in spontaneous speech recur across languages, but that some predicted universals (e.g., extensions from hearing to intellection) are not always supported. Moreover, perception verbs are frequently employed as 'discourse markers' cross-linguistically. A detailed look at sequential contexts, drawing on techniques from Conversational Analysis, indicates that speakers select these verbs to help establish joint attention and intersubjective alignment between conversation participants. Universal tendencies in perceptual language thus seem to be shaped by engagement with interactional dynamics, as well as based on a common physiological basis.

Linguistic diversity and processing

In this project we explore how cross-linguistic differences in the expression and ordering of grammatical categories affect how speakers produce and comprehend language. Our current focus is on sentence production in languages with different basic word orders. In collaboration with the Psychology of Language Department, we use eye tracking to investigate whether speakers of verb-initial languages (Tzeltal and Tagalog), differ from speakers of subject-initial languages (e.g. English) in how they plan their sentences. Preliminary results suggest that speakers of verb-initial languages engage in earlier advanced planning of the relational structure of the event (who does what to whom), indicating that the time course of sentence production is mediated by language-specific grammatical properties.

Selected publications

Majid, A., & Levinson, S. C. (Eds.).(2011). The senses in language and culture [Special Issue]. *The Senses & Society,* 6, 5-18.

Evans, N., Gaby, A., Levinson, S.C. & Majid, A. (Eds.) 2011. *Reciprocals and semantic typology*. Amsterdam: Benjamins.

Kopecka, A., & Narasimhan, B. (Eds.). (2012). *Events of putting and taking: A cross-linguistic perspective.* Amsterdam: Benjamins.

Levinson, S. C., & Gray, R. D. (2012). Tools from evolutionary biology shed new light on the diversification of languages. *Trends in Cognitive Sciences, 16*, 167-173.

Levinson, S. C. (2012). Kinship and human thought. *Science*, 336, 988-989.

Department
Language and cognition

THE INTERACTIONAL FOUNDATIONS OF LANGUAGE PROJECT

The Interactional foundations of language project explores the hypothesis that the cultural diversity of languages is made possible by an underlying universal ethology of communicative proclivities and abilities. The project investigates the nature of these interactional foundations for language use. Within the subsidiary ERC-funded project INTERACT, we focus on two aspects of this infrastructure: the turn-taking system and its timing, and the exchange of speech acts that structures conversation. A puzzle is how speakers are able to respond with the speed that they do (on average within c. 200 ms of the prior utterance) given the known latencies in production (of the order of 3-5 times greater). Using EEG, we have been able to show that responders can use the structure and meaning of the incoming utterance to begin preparation of a response as early as 1200ms before its end *(see Figure 2)*. Turn-taking is being studied under many different conditions, such as in sign language, languages with different word order, and languages with simple vs. complex morphology. There are remarkable parallels in timing despite great variation in the linguistics systems. The development of turn-taking in infants is also under study: results support the emergence of strong alternation patterns around 4 months.

Conversation is composed of the tit-for-tat of speech acts (e.g. offers, questions, requests) and responses to them. Another central puzzle is how we recognise these speech acts, given that they are generally not directly coded in the linguistic structure, and given the tight time course already illustrated. Again, using EEG we have found that speech act comprehension begins very early in utterances (Gisladottir, PhD project). Participants heard target sentences which delivered three different speech acts, such as answers, declinations, pre-offers, depending on the prior turn. When responding to a question "How are you going to pay?", the assertion "I have a credit card" functions as an answer. When following an offer "I can lend you money" the same utterance delivers a declination. When responding to a complaint "I don't have any money", it functions as a prelude to an offer, called a pre-offer. The results indicate that listeners tune in to the speech act meaning of utterances already at the first word *(see Figure 3 on page 21)*.

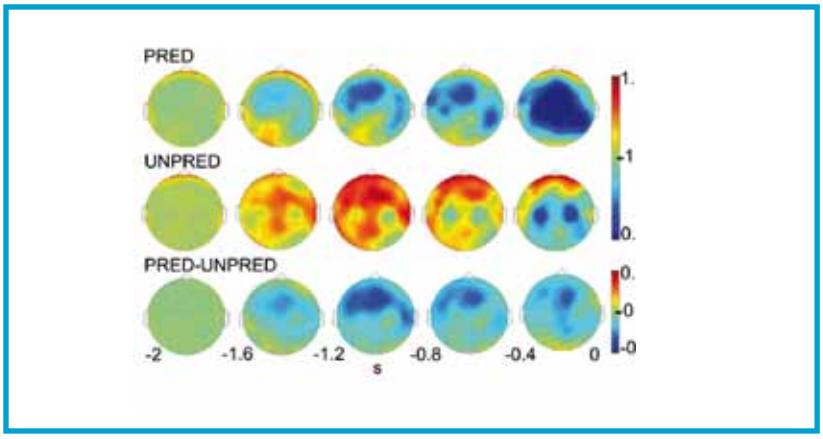

Figure 2: *Beta-power decrease (blue), associated with action preparation, in listeners preparing responses to relatively predictable (top) vs. unpredictable (middle) utterances. The subtraction (bottom) shows the difference between the conditions (Magyari PhD project).*

The ERC-funded sub-project Human Sociality & Systems of Language Use includes a subproject that focuses on sequences of 'Other-Initiated Repair' (OIR); these are sequences in which a hearer signals a problem in hearing or understanding what someone has just said. For example, the interjection 'Huh?' often results in the prior speaker repeating more or less exactly what they have just said. The project compares OIR sequences in 12 languages, representing major and minor languages of Europe, Southeast Asia, East Asia, Australia, South America, and Papua New Guinea, including a sign language. The research is based on corpora of video-recorded interaction in informal settings in homes and villages, among family and friends. Building on findings from qualitative work, the research team has developed a detailed coding scheme for the systematic comparison of OIR sequences, including the lexico-syntactic resources that are used. The languages

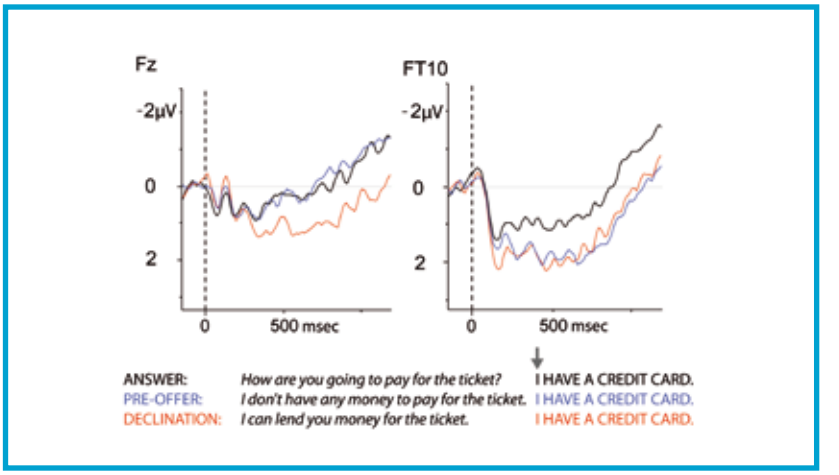

Figure 3: *Grand mean waveforms for declinations, answers and pre-offers at two electrodes, time-locked to the first word (Gisladottir PhD project).*

belong to different language families, have different typological profiles, and are spoken by members of distinctly different cultures. As would be expected, we observe some differences across the languages. For example, while most if not all languages allow speakers to use both an interjection ("Huh?") and a WH-word ("What?") strategy for 'open class' OIR, the relative frequency of these strategies varies, with English showing quite common use of 'What?' for this function, but with many other languages almost exclusively using a 'Huh?' strategy. More striking, however, are the commonalities across these diverse languages: speakers of all of the languages employ a common sequential structure for OIR, and use a common set of functional distinctions, for example between 'restricted' strategies like 'Who?' and requests for confirmation versus 'open class' strategies like 'What?' and 'Huh?'. We have observed striking commonalities in the way the 'Huh?' interjection sounds. In all of the languages tested, a functionally equivalent interjection is pronounced very similarly: a single syllable consisting of little more than a neutral or low/front vowel, typically with rising intonation.

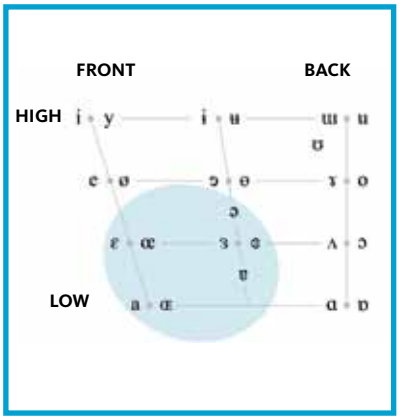

Figure 4: *The possibility space for vowels in human languages can be expressed as a function of distinctions in 'height' and 'backness': in most languages studied, an interjection for 'open class other initiation of repair' (as in English "Huh?") was attested, and in all of the sample languages this interjection consisted of a simple syllable whose vowel nucleus came from the shaded region.*

The existence of striking commonalities across languages and cultures in practices for OIR lends some support to an 'interactional infrastructure' hypothesis, which suggests that interactional structures are more likely than lexico-grammatical structures to be universal.

Selected publications

Magyari, L., De Ruiter, J. P. (2012). Prediction of turn-ends based on anticipation of upcoming words. *Frontiers in Psychology, 3*, 376.

Zeshan, U., De Vos, C. (Eds.). (2012) *Sign languages in village communities: Anthropological and linguistic insights*. Berlin: Mouton de Gruyter.

Levinson, S.C. (2012). Interrogative intimations: On a possible social economics of interrogatives. In J.P. De Ruiter (Ed.), *Questions: Formal, functional and interactional perspectives* (pp. 11-32). New York: Cambridge University Press.

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Department
Neurobiology of language

Goals of the Department

The focus of the Neurobiology of Language Department is 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.

Themes

The research of the Neurobiology of Language Department is centred on two major themes, and its daily research activities are organised in the form of 13 research projects. The two major themes are *Unification* and *Language in Action*. The Unification theme seeks to work out the details of the Memory, Unification and Control (MUC) framework that guides part of our research programme. Crucial questions are: How are different sources of information that are retrieved from memory or provided by sensory input unified with language into an interpretation (comprehension) or message (production) beyond the single word level? Which neural networks are recruited for these unification operations? To what degree are these shared between production and comprehension, and what is the nature of their dynamic interplay with memory components, such as the mental lexicon or episodic memory of a prior discourse?

The Language in Action theme is grounded in the idea that language is not just a collection of sentences waiting to be coded or decoded. It helps us coordinate with others to accomplish goals or share experiences, it supports the development and maintenance of social relationships and culture, and it helps us to think about the world. In this theme, we examine the neural and cognitive architecture of the language system when embedded in richer social, physical, or discourse contexts than are typically studied in the cognitive neuroscience lab. Do classic findings on linguistic coding and decoding scale up in situations where language is used for a purpose? What neural and cognitive architecture supports context-dependent aspects of language use, such as inferences about the speaker and his or her state of mind? In what way does the core neural machinery studied in the Unification project interact with other brain systems, such as those involved in vision, motor behaviour, attention, affective evaluation, the pursuit of goals, and episodic memory of prior discourse?

The current research portfolio of the department contains a series of 13 projects addressing key issues for our understanding of the language system as instantiated in the human brain. The majority of these projects fall within the scope of the two themes just described. But the department is also involved in a series of large-scale collaborative projects, including the Cognomics project (together with MPI's Language and Genetics Department, the Genetics department of UMC St Radboud, and the Donders Centre for Cognitive Neuroimaging) that aims at linking genes, brain and cognition; the FOCOM project (with Wageningen University and industrial partners) on the interaction between food and cognition; and the large-scale EU Human Brain Project. The research projects are carried out by staff and PhD students from 15 different countries.

Decoding semantic information

A fascinating challenge in cognitive neuroscience is to construct a device that would translate brain signals into speech. A device like this could restore communication for aphasic patients with severe word finding problems, due to their inability to retrieve the sound patterns of words. Construction of such a device strongly relies on our understanding of cognitive mechanisms that underlie semantic memory and speech production.

We study the brain activity related to representations of particular concepts that are part of the system of conceptual knowledge. In an initial series of experiments we used state-of-the-art machine learning techniques, together with electroencephalography (EEG) and function-

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Department members Dan Acheson, Salomi Asaridou, Jana Basnakova-Hanulova, Marcel Bastiaansen, Danchao Cai, Mingyuan Chu, Daniel Casasanto, Alex Cristia, Diana Dimitrova, Sarah Dolscheid, Hartmut Fitz, Ian Fitzpatrick, Hubert Fonteijn, Jolien Francken, Franziska Hartung, Annika Hulten, Caroline Junge, Miriam Kos, Vicky Lai, Nietzsche Lam, Alina Lartseva, Tessa van Leeuwen, Marieke van der Linden, Esther Meeuwissen, Laura Menenti, Izabela Mikula, David Peeters, Karl-Magnus Petersson, René Scheeringa, Katrien Segaert, Jan-Mathijs Schoffelen, Louise Schubotz, Irina Simanova, Laura Staum, Cathelijne Tesink, Julia Uddén, Flora Vanlangendonck, Jolien ten Velden, Barbara Wagensveld, Lin Wang, Kirsten Mirjam Weber, Roel Willems, Huadong Xiang

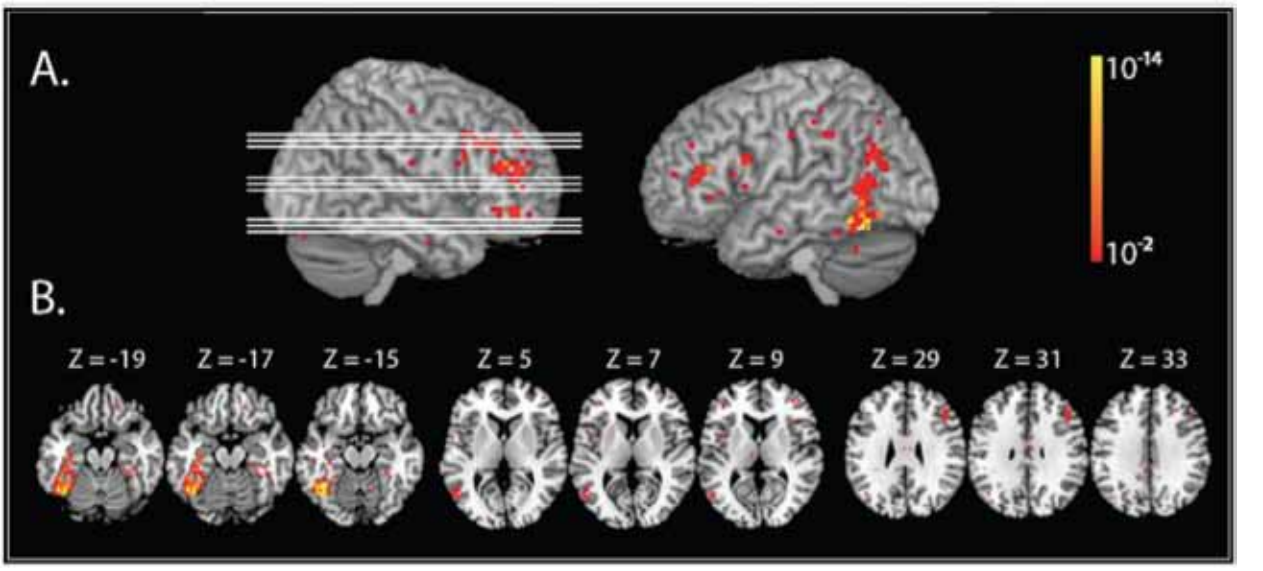


Figure 1: *Brain areas involved in discrimination between different semantic categories (animals versus tools) regardless of the input modality (pictures, sounds, spoken words, written words).*

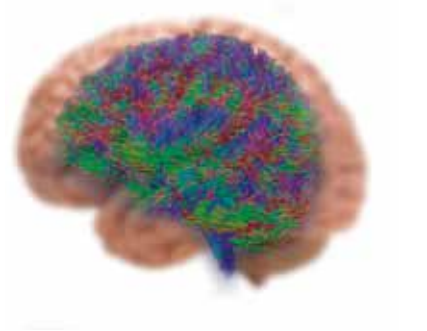
al magnetic resonance imaging (fMRI). We explored patterns of brain activity that are characteristic for the processing of different semantic categories, for instance animals and tools. We learned to predict the category of a perceived object from EEG or fMRI in individual subjects at the single-trial level. Moreover, we were able to localise the shared substrate for semantic processing when the object was presented in different modalities, such as a picture of a dog, the auditory or visual word "dog", and the sound of barking. The results of this experiment are shown in *Figure 1*.

Currently we are focusing on the possibility for detecting semantic information during overt speech. Using magnetoencephalograpy (MEG), we are able to reconstruct the dynamics of brain activation preceding internally generated overt word production. We explore these activation patterns in search of features that could be used for predicting a word's semantic category. Recently we achieved impressive accuracies (up to 80% correctly predicted trials) in this experiment. The results provide an important step towards the use of concept decoding in the context of real-time brain-computer interface applications.

Speech and gesture

Language and action systems are highly interlinked. A critical piece of evidence is that speech and its accompanying gestures are temporally well-synchronised. The underlying mechanism responsible for the synchronisation is still under debate. We investigated how speech and gesture are orchestrated during joint speech-gesture production. This was done in a series of experiments in which participants were pointing to one of four lights that went on, while saying "this light" for the near lights and "that light" for the far lights (see set-up in Figure 2).

According to the interactive view of speech-gesture production there is continuous information exchange between the speech and gesture systems during planning and execution, that is, both before and after a gesture has been initiated. Alternatively, the ballistic view proposes that the information exchange occurs only before gesture initiation, and the two systems become independent once gesture execution has started. Through virtual reality and motion tracking technology, we disrupted the speech or gesture system after a gesture had been initiated, and assessed the resultant effect on the other system. Disrupting gesture execution led speakers to delay their speech onset, and disrupting



Department
Neurobiology of Language

Figure 2: *The set-up of the Speech and Gesture study in the Virtual Reality lab of the MPI.*

speech production led speakers to prolong their gesture execution. The bi-directional interaction between the speech and gesture systems existed even at the late phase of gesture execution. Our results shed new light on psycholinguistic and computational models of speech and gesture production.

TMS and unification

The posterior middle temporal gyrus (MTG) and inferior frontal gyrus (IFG) are two critical nodes of the brain's language network. Previous neuroimaging evidence from our lab has supported a dissociation in the functions of these two brain regions, indicating that the MTG is involved in the retrieval of lexical syntactic information and the IFG in unification operations that maintain, select and integrate multiple sources of linguistic information over time.

We tried to find causal evidence for this dissociation using a brain stimulation technique (trancranial magnetic stimulation; TMS) that allowed us to temporarily modulate brain activity in the IFG and MTG as people read sentences. We manipulated the ease of lexical-syntactic retrieval and unification by using sentence material with and without a temporary word-class (noun/verb) ambiguity (e.g., run). In one group of participants, TMS was applied to the IFG and MTG on separate days, whereas in a control group, no TMS was applied. After the application of TMS, subjects read the sentences while their eye movements were recorded. Eye movements were quantified at two critical sentence regions: a temporarily ambiguous region and a disambiguating region. Results show that stimulation of the IFG increased the magnitude of the ambiguity effect (ambiguous - unambiguous) at the disambiguating region in three measures: first fixation durations, total reading times, and regressive eye movements. IFG stimulation also modulated the ambiguity effect for total reading times in the temporarily ambiguous region. No clear effects of MTG stimulation were observed. The study represents one of the first attempts to modulate sentence comprehension performance with brain stimulation, and provides causal evidence in favour of the left IFG supporting unification operations during language comprehension.

Information structure and attention

In spoken language, pitch accent can mark certain information as in focus, which allows attentional resources to be allocated to the focused information. Using functional magnetic resonance imaging (fMRI), we examined whether pitch accent, used for marking focus, recruits general attention networks during sentence comprehension. We independently manipulated the prosody and semantic/pragmatic congruence of sentences, and found that semantic/pragmatic processing influenced the bilateral inferior and middle frontal gyrus. The prosody manipulation showed bilateral involvement of the superior/inferior parietal cortex, superior and middle temporal cortex, as well as the inferior, middle, and posterior parts of the frontal cortex. We compared these regions with attention networks that were localised using an auditory spatial attention task. Both tasks activated bilateral superior/inferior parietal cortex, superior temporal cortex, and the left precentral cortex.

Furthermore, an interaction between prosody and congruence was observed in bilateral inferior parietal regions: for incongruent sentences, there was a larger activation if the incongruent word car-

ried a pitch accent, than if it did not. The common activations between the language comprehension and the auditory spatial attention tasks demonstrate that pitch accent activates a domain general attention network, which in turn is sensitive to semantic/pragmatic aspects of language. This evidence supports a view in which languages have built-in linguistic devices to recruit the contribution of a general attentional network in the service of processing the most relevant information.

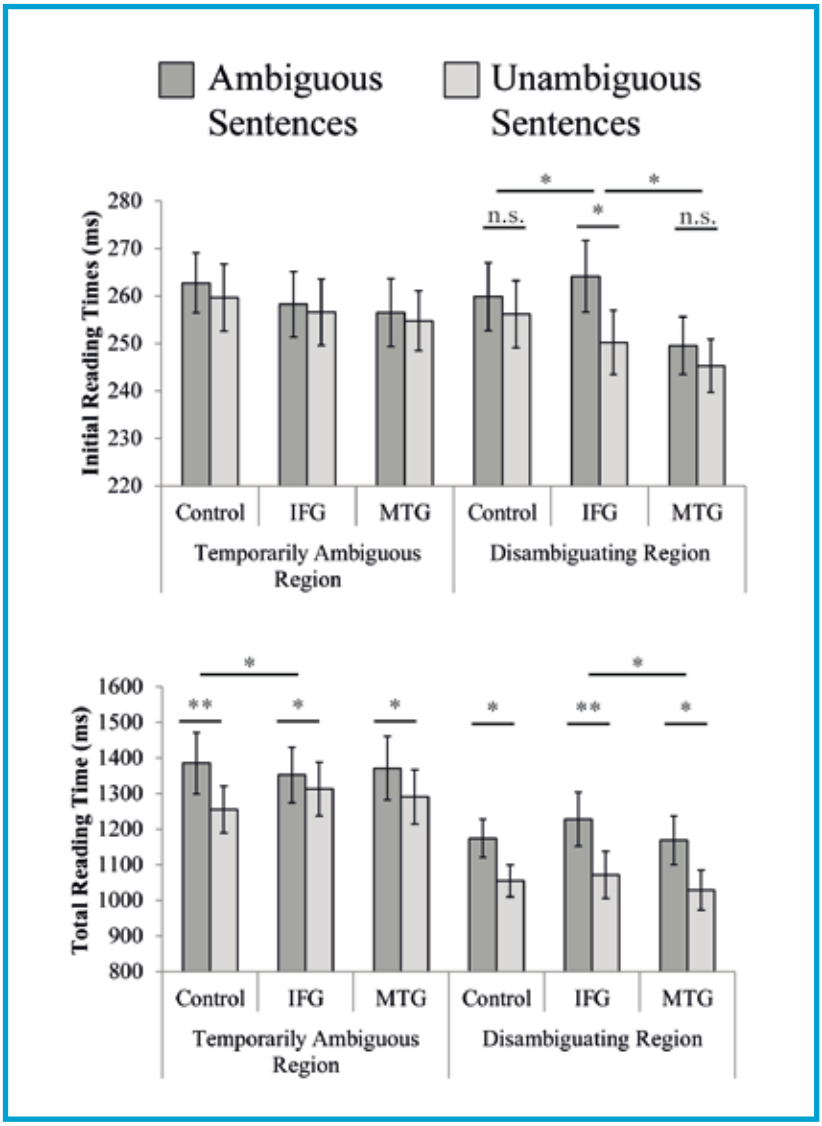


Figure 3: *Sentence reading times as a function of TMS group and sentence region for ambiguous and unambiguous sentences.*

Other projects

- Neuroanatomy of language
- Mother of all unification studies
- Neurocomputational models of language
- Neuropragmatics
- The enlanguaged brain
- Dialogue
- Language and emotion
- Monitoring
- Acquisition
- Simulation

Selected publications

Segaert, K., Menenti, L., Weber, K., Petersson, K. M., & Hagoort, P. (2012). Shared syntax in language production and language comprehension - An fMRI study. *Cerebral Cortex, 22,* 1662-1670.

Petersson, K. M., & Hagoort, P. (2012). The neurobiology of syntax: Beyond string-sets [Review article]. Philosophical Transactions of the Royal Society of London. *Series B, Biological Sciences, 367,* 1971-1883.

Stein, J.L., et al (2012). Identification of common variants associated with human hippocampal and intracranial volumes. *Nature Genetics, 44,* 552-561.

Van Leeuwen, T. M., Den Ouden, H. E. M., & Hagoort, P. (2011). Effective connectivity determines the nature of subjective experience in grapheme-color synesthesia. *Journal of Neuroscience, 31,* 9879-9884.

Scheeringa, R., Fries, P., Petersson, K. M., Oostenveld, R., Grothe, I., Norris, D. G., Hagoort, P., & Bastiaansen, M. C. M. (2011). Neuronal dynamics underlying high- and low- frequency EEG oscillations contribute independently to the human BOLD signal. *Neuron, 69,* 572-583.

Department
Psychology of language

Goals of the Department

The Psychology of Language Department aims to develop functional models of speaking and listening. We aim to understand which cognitive processes occur when people talk and understand spoken utterances. One important broad concern of the department is to identify characteristics of the cognitive system that determine behaviour across a wide range of linguistic tasks. Working memory capacity, processing speed, or the size of the mental lexicon might be such characteristics. A second broad concern is to determine not only what all adult speakers of a language have in common, but also to describe and understand the differences between them. In our projects, we often ask participants to carry out several linguistic and non-linguistic tasks and then study their performance profiles across these tasks. This allows us to identify commonalities across speakers and to investigate how performance differences arise between them. While most experimental work in psycholinguistics to date has been carried out with student participants, we welcome the participation of speakers and listeners with more diverse backgrounds.

Controlling lexical access

Lexical access – retrieving words from the mental lexicon – is a key process in the production and comprehension of utterances. The efficienc y of lexical access depends not only on the organization of lexical knowledge, but also on non-linguistic control and monitoring processes. In the project Controlling Lexical Access we study exactly when and how executive control affects lexical access, and how the interplay between control processes and lexical knowledge leads to individual differences in the efficiency of lexical access in production and comprehension.

In her dissertation project Shao first studied whether three components of executive control – updating of memory content, shifting between tasks, and inhibition – influence the efficiency of object and action naming and then focused specifically on the role of inhibition. Using different paradigms and recording naming latencies and evoked potentials, she separated the effects of selective inhibition, used to suppress strong semantic alternatives *(see Figure 1)*, and nonselective inhibition, used to stop any unwanted response. A new PhD project by Jongman investigates the role of sustained attention in single object naming and sentence production.

Complementing this work on executive control processes, other research in the project focuses on how lexical representations are accessed and change with experience. In her PhD project, Reifegerste has been studying how young and older listeners and readers access morphologically complex verb forms, such as "walked" or "slept". She found that the frequency of the surface forms had a more consistent effect on the speed of word recognition in older than in young listeners and readers, perhaps because the older participants had encountered the complex forms more frequently than

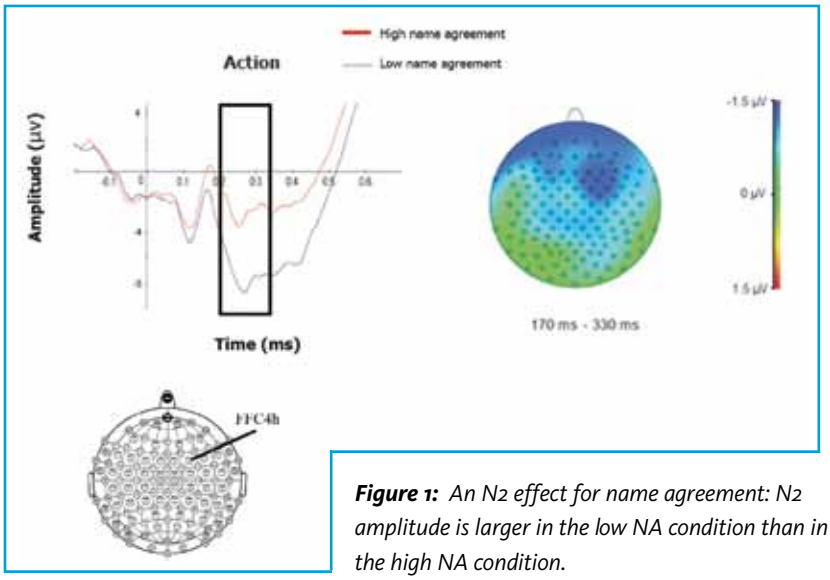


Figure 1: *An N2 effect for name agreement: N2 amplitude is larger in the low NA condition than in the high NA condition.*

Director Antje Meyer

Department members Lesya Ganushchak, Svetlana Gerakakis, Florian Hintz, Falk Huettig, Suzanne Jongman, Agnieszka Konopka, Cornelia Moers, Jana Reifegerste, Joost Rommers, Zeshu Shao, Matthias Sjerps, Alastair Smith, Alma Veenstra, Maartje van de Velde, Loan Vuong

the younger ones. In another project, Vuong and Meyer, in collaboration with Christiansen (Cornell University) study individual differences in word and grammar learning. Key issues are whether good word learners are also good grammar learners and which general cognitive skills support word and grammar learning.

Sentence planning and grammatical encoding

This project investigates how speakers coordinate conceptual and linguistic planning when they describe scenes or events in descriptive utterances such as "The girl is pushing the boy." We record the speakers' eye movements as they describe pictures of these events *(see Figure 2)*. Eye gaze is tightly related to visual attention. By recording when and for how long speakers look at each part of a scene, and by relating this to their overt speech, we can determine how speakers temporally align their preverbal and verbal planning.

An important issue in current theories of sentence generation is how far ahead people plan when they speak, specifically whether speakers first determine the gist of a scene and then "zoom in" on the individual event participants, or whether they plan sentences in a more linear fashion, starting planning with only one event participant and adding the second participant later. Work carried out in this project, primarily by Konopka, demonstrated that speakers do not strictly adhere to either of these strategies and are quite flexible in the way they plan utterances. Broadly speaking, when the event is easy to comprehend and when a grammatical structure can readily be constructed, speakers tend use large planning units, but when the event is harder to describe, they opt for smaller increments.

Another important and highly controversial issue in psycholinguistic theory is to what extent the grammatical structure of a language affects the way speakers prepare their preverbal messages and corresponding utterances. Norcliffe and Konopka have been investigating this by comparing the eye gaze patterns of speakers using languages differing in word order, specifically Dutch, where the verb follows the first character mentioned in the sentence (e.g., "The girl is pushing"...), and Tzeltal, where the verb is mentioned first (e.g., "Pushing"...). Their initial results indicate substantial effects of linguistic structure on speakers' visual inspection of scenes. Dutch speakers are far more likely to quickly direct their gaze to the character that is mentioned first than speakers of Tzeltal, who tend to distribute their attention more evenly between the event participants. This suggests that the uptake of visual information from a picture can be guided by linguistic structure.

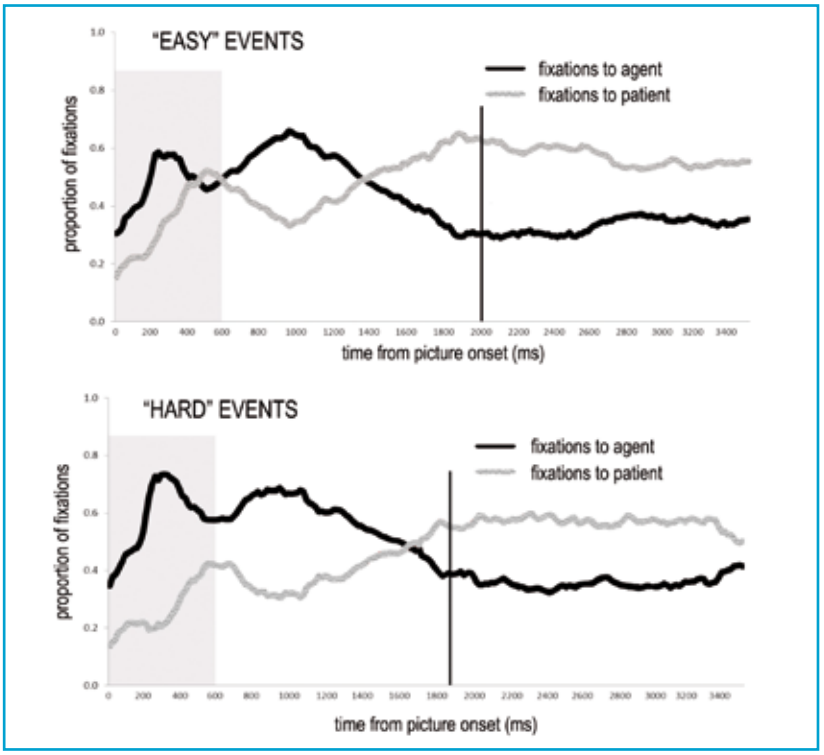


Figure 2: *Proportions of fixations to the agent and patient during the planning of descriptions of "easy" and "hard" events. The vertical line indicates the speech onset.*

Department
Psychology of language

Coordination of cognitive systems

This project investigates the relationship between language comprehension and production and other cognitive processes, including attention, vision, and working memory. In his dissertation project, Smith developed a computational model that simulates how linguistic information interacts with information from other modalities (e.g., vision) when processing spoken words, and how this interaction may influence eye gaze behaviour (*see Figure 3)*. The model replicates and offers explanation for a wide range of language mediated eye gaze phenomena. The model demonstrates how complex patterns of eye gaze behaviour can result from learning to associate the features that represent an item in one modality (e.g., its spoken form) to features of its representation in another modality (e.g., its visual form). Future work will explore how the interaction of linguistic and non-linguistic information changes over the course of development and how exposure to different tasks (e.g., learning to read) can affect this interaction.

Limits of predictive language processing

This project investigates the importance of prediction for language processing. The focus is on the mechanisms and representations underlying prediction, and on individual differences in anticipatory behaviour. Huettig and colleagues showed that 2-year-olds, like adults, are able to predict upcoming linguistic input that is a fit to a familiar verb. Upon hearing familiar verbs such as "eat", the "average" 2-year-olds anticipated verb arguments that were semantically appropriate and looked more toward these objects (e.g., a piece of cake) than toward unrelated distractor objects in a visual scene. More importantly, the children's prediction skills were significantly correlated with their productive vocabulary size (the number of words they produce), but not with the size of their receptive vocabulary (the number of words they understand). These findings highlight one possible mechanism driving prediction in language comprehension, with a strong suggestion that children's production skills underlie their ability to predict upcoming linguistic input. Further analyses suggested that prediction using production is not a general feature of language comprehension but may be specific to the acquisition of production representations.

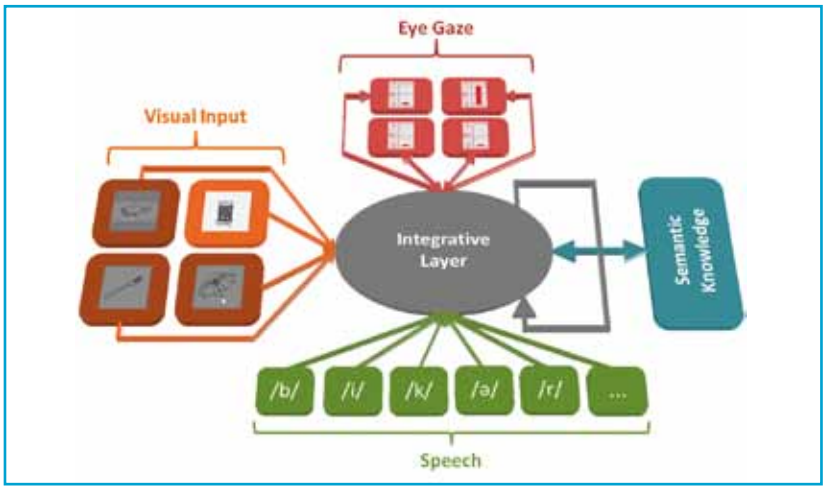


Figure 3: *Diagramme of model architecture. Arrows indicate the flow of information through the network. Activation of a unit in the eye gaze layer represents the probability of fixating the corresponding location in the visual field.*

In his dissertation project, Rommers investigated which types of representations listeners can pre-activate. Participants listened to predictable words (e.g., "moon") in sentences such as "In 1969 Neil Armstrong was the first man to set foot on the moon" while viewing a display with several objects. Anticipatory eye movements towards target objects (e.g., a moon) as well as to objects with a similar visual shape (e.g., a tomato) were observed before the predictable word had been heard. An ERP experiment where no pictures were presented showed analogous effects on the amplitude of the N400 *(see Figure 4)*. These results suggest that listeners can activate specific visual attributes of objects before they are mentioned in a sentence.

Effects of literacy

On an evolutionary time frame, the invention of writing systems is a very recent event. Throughout most of human history cognitive processing has not been influenced by the knowledge of written language.
Moreover, one billion people are currently unable to read. An important question

'In 1969 Neil Armstrong was the first man to set foot on the ...'

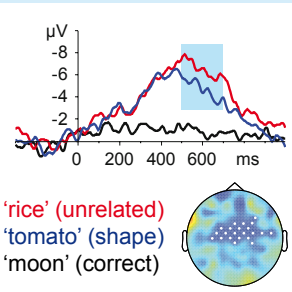


Figure 4: *ERPs from spoken word onset (0 ms). The blueshaded area highlights the difference between the shape and the unrelated condition. A head map shows the scalp topography of this difference. The N400 amplitude in response to words that did not fit in the sentence (blue and red lines) was reduced when the shape of the word's referent was similar to the expected word's referent ("tomato") compared with when it was not ("rice").*

is therefore how literacy affects other cognitive functions. Huettig and colleagues found that (il)literacy has consequences for the ability to select relevant information from a visual display of non-linguistic material. Low and high literacy observers were compared on both an easy and a more difficult visual search task *(see Figure 5)*. The low literacy group was slower and less efficient than the high literacy group. Importantly, detailed spatial analyses traced the difference in efficiency to a specific region of the display, just right of the centre. This result suggests that the high literacy group had better spatial attention to the right centre. This ability is consistent with results from reading research demonstrating that during the fixation of one word, some properties of the next word (to the right or left, depending on reading direction in the language). Huettig and colleagues therefore argue that reading skills have important cognitive consequences that go beyond the processing of orthographic stimuli. Thus, cultural inventions such as reading shape general cognitive processing in non-trivial ways.

Dialogue

Finally, members of the department collaborate with members of the NBL and LC departments in the Dialogue project. An important challenge for the interlocutors in dialogue is to allocate cognitive resources to processing the other person's speech and simultaneously preparing their own utterance. Currently we are developing paradigms to measure the mental load arising at different moments in a dialogue, and to determine how well interlocutors succeed in dividing their attention across listening and speech planning.

Figure 5: *The left panel shows an easy search display where the target is a red chicken among green chickens. The right panel shows a difficult search display where the target is a skinny chicken among fat chickens.*

Selected publications

Huettig, F., Singh, N., & Mishra, R. K. (2011). Language-mediated visual orienting behavior in low and high literates. *Frontiers in Psychology, 2*, 285.

Mani, N., & Huettig, F. (2012). Prediction during language processing is a piece of cake - but only for skilled producers. *Journal of Experimental Psychology: Human Perception and Performance, 38*, 843-847.

Rommers, J., Meyer, A. S., Praamstra, P., & Huettig, F. (2013). The contents of predictions in sentence comprehension: Activation of the shape of objects before they are referred to. *Neuropsychologia, 51*, 437-447.

Vuong, L., Meyer, A. S., & Christiansen, M. H. (2011). Simultaneous online tracking of adjacent and non-adjacent dependencies in statistical learning. In L.Carlson, C.Hölscher, & T. Shipley (Eds.), *Proceedings of the 33rd Annual Conference of the Cognitive Science Society* (pp. 964-969). Austin, TX: Cognitive Science Society.

Shao, Z., Roelofs, A., & Meyer, A. S.(2012). Sources of individual differences in the speed of naming objects and actions: The contribution of executive control. *Quarterly Journal of Experimental Psychology, 65*, 1927-1944.

Konopka, A. E. (2012). Planning ahead: How recent experience with structures and words changes the scope of linguistic planning. *Journal of Memory and Language, 66*, 143-162.

Research group
Adaptive listening

Group coordinator Andrea Weber
Group members Neil Bardhan, Frank Eisner, Eva Reinisch, Odette Scharenborg, Marijt Witteman

Goals of the group

The Adaptive listening group investigates how and when listeners adapt to variability in the speech signal that is introduced by speakers with a foreign accent. In the Adaptive listening group's first two years, we repeatedly found that long-term experience with an accent can lead to a general adaptation that is of help whenever we encounter a new speaker of that accent. But how do listeners get there? What constrains or helps the learning process and when does it stabilise? These were the main questions we addressed during the last two years.

Limits of adaptation

In collaboration with Melinger from Dundee University, Eisner and Weber investigated adaptation to word-final devoicing by English listeners. In an exposure-test paradigm, English listeners not only showed adaptation to final devoicing but they generalised the learning to word-initial position. This overgeneralisation was absent when the exposure contained tokens of a voicing difference in the initial position, and when the speaker was a native speaker of English rather than a Dutch learner of English. Thus, distributional information and speaker attributes can constrain the transfer of adaptation.

Stability of adaptation

Reinisch, Weber, and Mitterer tested the retuning of phoneme categories across languages. Dutch listeners were exposed to English words with a final f or s. Some listeners heard the final s replaced with an ambiguous sound; others, the final f. Listeners' subsequent categorisation of s-f continua showed a shift in their category boundary that was consistent with their exposure. This shift occurred when listeners were performing in their second language, and when the exposure was in L2 and the categorisation in L1. Category retuning in L2 is not self-evident given the long-lasting difficulties learners can have with L2 sounds, and transfer across languages opposes theories that assume that maintenance of exposure circumstances is a prerequisite for perceptual learning. Scharenborg and Janse investigated the ability of listeners advanced in years to adapt to unusual pronunciations in their L1. They exposed older (66+) Dutch listeners to words with ambiguous final l or r and then tested their categorisation on an l-r continuum. They found a shift in category boundaries, showing that perceptual learning remains in place late in life.

Foreign accents

In her PhD project, Witteman showed that only listeners who are familiar with an accent can easily recognise words from an unfamiliar speaker in that accent. She then explored which exposure types help inexperienced listeners to adapt to accent, independent of the speaker. Dutch listeners were exposed to a German speaker who mispronounced the vowel in Dutch *huis*. She used a cross-modal priming paradigm and found that after subjects briefly heard one of two German speakers with the same vowel mispronunciation their recognition of accented words was facilitated. This result is an early sign of speaker-independent learning. Furthermore, Witteman found in collaboration with Bardhan, McQueen, and Weber that adaptation to foreign-accented speech can still be observed after one week.

Selected publications

Erb, J., Henry, M. J., Eisner, F., & Obleser, J. (2012). Auditory skills and brain morphology predict individual differences in adaptation to degraded speech. *Neuropsychologia, 50*, 2154-2164.

Hanulikova, A., Van Alphen, P. M., Van Goch, M. M., & Weber, A. (2012). When one person's mistake is another's standard usage: The effect of foreign accent on syntactic processing. *Journal of Cognitive Neuroscience*, *24*, 878-887.

Reinisch, E., Weber, A., & Mitterer, H. (2013). Listeners retune phoneme categories across languages. *Journal of Experimental Psychology: Human Perception and Performance, 39*, 75-86.

Scharenborg, O., Janse, E. (2013). Comparing lexically-guided perceptual learning in younger and older listeners. *Attention, Perception & Psychophysics.* Advance online publication.

Witteman, M. J., Weber, A., & McQueen, J. M. (2013). Foreign accent strength and listener familiarity with an accent co-determine speed of perceptual adaptation. *Attention, Perception & Psychophysics.* Advance online publication.

Research group
Communication before language

Group coordinator Ulf Liszkowski
Group members Simone Bijvoet, Leontine den Boer, Guðmundur Bjarki Þorgrímsson, Christine Fawcett, Reyhan Furman, Nuria Esteve Gibert, Thomas Grünloh, Suzanne Jongman, Verena Kersken, Birgit Knudsen, Patricia Manko, Daniel Puccini, Veronica Ramenzoni, Janne Willems, Rocio Silva Zunino

Goals of the group

Human communication is premised on an understanding of others' minds and cooperative motives for acting together. How do these abilities emerge, and how do infants communicate before they have language? We investigate infants' developing social cognition and social motivation in relation to their emerging prelinguistic communication within social and cultural contexts. Our work is motivated (a) by the idea that the psychological basis of human communication develops ontogenetically prior to language and is first expressed in gestures; and (b) by the question of whether social and cultural differences in interaction influence infants' emerging prelinguistic communication.

Infant communication

We investigate the social-cognitive and cooperative basis of human communication before language. We investigate how infants understand others from a second-person perspective as they interact with them, and how infants understand others from a third-person perspective as they watch them interacting. We found that one-year-olds use a non-verbal pointing gesture to correct and warn others in anticipation of action mistakes or mishaps, based on mental state attributions and prosocial motivation. We investigate how infants reach for objects under solitary and social conditions, and the influence of distance and mobility on infants' communicative requests. From the perspective of comprehension, we investigate how infants understand non-verbal pointing acts of displaced reference, and whether infants parse and fast-map novel, multimodal gesture-word referents. In a novel imitation paradigm investigating infants' third-person social understanding, we found that one-year-olds attempt to reproduce a joint action when the action demonstration contained two persons with a shared goal but not when there were parallel goals or only one person. In eye-tracking studies we study infants' expectations about others' verbal and gestural interactions.

Social interaction

Here we investigate how types and the frequency of social interaction influence the emergence of prelinguistic communication and social cognition. For example, in semi-natural and experimental interaction studies we found that the shared activity of joint regarding elicits more pointing than the shared activity of joint acting. We also found that infants invite a person to join in an activity more if she has previously interacted with them in synchronous mimicry than when she conducted different actions.

To study naturally occurring differences in social interactions, we use a cross-cultural approach. We found systematic differences in the frequency of home-recorded, naturally occurring bouts of object-directed shared activity in eight- to fifteen-month-old infants of the Yucatec Mayans, Dutch, and Shanghai-Chinese. The differences in the frequency of shared activity predicted differences in infants' usage of deictic gestures, and in particular, the emergence of index-finger pointing. We found evidence from seven different cultures for a universal usage of index-finger pointing around ten to fourteen months of age, revealing a prelinguistic universal of human communication. Ongoing studies test infants' social cognition and communicative biases across different cultures to determine the influence of social interactional 'input' on the emergence of infant social cognition. In longitudinal studies we test the individual contributions of parental input and social understanding on the emergence of prelinguistic communication.

Selected publications

Fawcett, C., & Liszkowski, U. (2012). Observation and initiation of joint action in infants. *Child Development, 83*, 434-441.

Knudsen, B., & Liszkowski, U. (2012). 18-month-olds predict specific action mistakes through attribution of false belief, not ignorance, and intervene accordingly. *Infancy, 17*, 672-691.

Liszkowski, U. (2013). Using theory of mind. *Child Development Perspectives.* Advance online publication.

Salomo, D., & Liszkowski, U. (2012). Sociocultural settings influence the emergence of prelinguistic deictic gestures. *Child Development*. Advance online publication.

Research group
Comparative cognitive anthropology

Group coordinator Daniel Haun
Group members Emma Cohen, Katherine Cronin, Laura Damerius, Zaida Kosonen, Edwin van Leeuwen, Yvonne Rekers, Nadja Richter, Disa Sauter, Marie Schäfer, Maddalena Tacchetti, Henriette Zeidler

Goals of the group

The group is a collaboration between the MPI for Psycholinguistics and the MPI for Evolutionary Anthropology. We aim to explore how patterns of cultural variation are related to variable cognitive function in humans and the other great apes, and the psychological mechanisms underlying cross-cultural behavioural variability.

Chimpanzee culture

Groups of chimpanzees vary in their behavioural repertoires. In the past, scholars have speculated about the parallels that can be drawn between the behavioural differences across chimpanzee groups and human cultural variation. Our research group has provided evidence that similar mechanisms might be at play. We observed grooming behaviour in four groups of chimpanzees. Two of the four groups used a very specific grooming technique: the grooming handclasp (*see Figure 1*). Between the two communities that engaged in the grooming handclasp, subtle yet stable differences existed in the styles that they prefer. Additionally, we showed that the grooming handclasp behaviour was passed on to next generations, and that ecology and genetics were unlikely predictors of the preferred handclasp styles. Hence, we concluded that the grooming handclasp might be a cultural phenomenon, reminiscent of how humans across cultures engage in different ways of greeting each other.

Figure 1: *The grooming handclasp, a behaviour that only exists in certain chimpanzee populations.*

Following the crowd

The transmission of knowledge amongst peers is a key feature of human cultural variation. Chimpanzees and orangutans, two of our closest living relatives, also pass on group-specific behaviour from one generation to the next. Whether and how this process resembles the transmission of knowledge in humans is still largely unknown. We presented two-year-old human children, chimpanzees and orangutans with two different strategies for how to retrieve food from a puzzle-box: a majority strategy and a minority strategy *(see Figure 2)*. The result: Most of the chimpanzees and most of the children chose the section that the majority of individuals had also chosen. Orangutans appeared to randomly select a section. Hence, the tendency to adopt the behavioural variants demonstrated by the majority is a shared feature of human and chimpanzee social learning. This tendency may, in turn, help to account for the emergence and stability of cultural variation in both species.

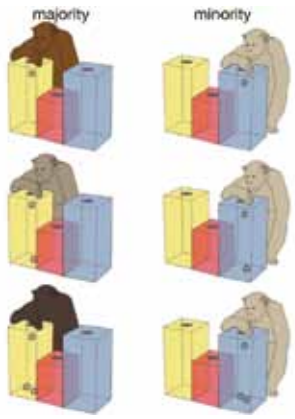


Figure 2: *One option is demonstrated by 3 different individuals, once each (majority). One option is demonstrated by 1 individual 3 times (minority). One option is never demonstrated.*

Selected publications

Haun, D.B.M., Rekers, Y., & Tomasello M. (2012). Majority-biased transmission in chimpanzees and human children, but not orangutans. *Current Biology 22*, 727-731.

Haun, D.B.M., Rapold, C. J., Janzen, G., & Levinson, S. C. (2011). Plasticity of human spatial memory: Spatial language and cognition covary across cultures. *Cognition*, 119, 70-80.

Sauter, D., LeGuen, O., & Haun, D.B.M. (2011). Categorical perception of emotional expressions does not require lexical categories. *Emotion, 11*, 1479-1483.

Van Leeuwen, E.J.C., Cronin, K.A., Haun, D.B.M., Mundry, R., & Bodamer, M.D. (2012). Neighbouring chimpanzee communities show different preferences in social grooming behaviour. *Proceedings of the Royal Society B: Biological Sciences*, 279, 4362-4367.

Research group
Evolutionary processes in language and culture

Group coordinator Michael Dunn
Group members Fiona Jordan, Vishnupriya Kolipakam, Ger Reesink, Annemarie Verkerk

Goals of the group

Modern approaches to evolutionary change have much to offer the study of diversity. In this interdisciplinary Max Planck research group we examine the evolutionary processes determining variation in the form and distribution of elements of language and culture. Group members, specialised in different fields of linguistics, anthropology and human genetics, use modern phylogenetic techniques to address these questions within a quantitative framework.

Semantic systems

The Evolution of Semantic Systems project is a large, cross-linguistic study of semantics being carried out by Dunn and Jordan from the Evolutionary processes in language and culture group and Majid from the Language and Cognition Department. They have designed and constructed an elicitation task, and recruited a consortium of trained native-speakers. For each language studied, twenty participants are prompted (in their native language) to carry out a task covering four semantic domains: (1) the naming of domestic containers, representing object classification, (2) body part naming, representing part-whole relationships, (3) colour terms, representing attributes, and (4) the adpositional encoding of spatial relations, representing relational concepts. This task is being carried out in each of fifty language communities, spanning the entire Indo-European family. The consortium has more than 90 members, and data collection is approximately 80% complete.

We have analysed data from 12 languages of the Germanic subfamily, the first complete portion of the project, using phylogenetic and geostatistical tools to examine naming patterns of the four semantic domains. Even amongst the Germanic languages – a group which is culturally fairly uniform, geographically contiguous, and phylogenetically closely related – naming patterns show differences across the domains. In particular, the objects and spatial relations show a strong, phylogenetically-determined component, distinct from patterns of similarity predicted by spatial proximity. These results suggest that historical language relationships have more influence than does geographic distance (and by proxy, language contact) in the patterning of semantic systems.

Language histories

Language histories provide the backbone for phylogenetic comparative methods. They provide the basic conceptual structure to think clearly about the differences between languages and to analyse those differences statistically. Through work on the Indo-European Lexical Cognacy Database (http://ielex.mpi.nl), Dunn contributed to a major paper on Indo-European origins (Boukaert et al. 2012). Collaborative research is also continuing on the Aslian family (Dunn et al. 2011a). Members of the group have produced comparative phylogenetic analyses using family trees to investigate evolutionary processes in diverse domains of linguistic and social structure. Jordan (2011) inferred probable ancestral states and evolutionary models of change for relative age (older/younger) and relative sex (same-sex/opposite-sex) distinctions in Austronesian sibling terms systems, and has in-press work examing kin-term evolution in Bantu and Kalahari Basin languages as well. Dunn's work on order typology (see Research Report 09|10) was published (2011b), and has provoked considerable discussion across several subfields of linguistics.

Selected publications

Bouckaert, R., Lemey, P., Dunn, M., Greenhill, S. J., Alekseyenko, A. V., Drummond, A. J., Gray, R. D., Suchard, M. A., & Atkinson, Q. D. (2012). Mapping the origins and expansion of the Indo-European language family. *Science*, *337*, 957-960.

Dunn, M., & Terrill, A. (2012). Assessing the evidence for a Central Solomons Papuan family using the Oswalt Monte Carlo Test. *Diachronica*, *29*, 1-27.

Dunn, M., Burenhult, N., Kruspe, N., Tufvesson, S., & Becker, N. (2011a). Aslian linguistic prehistory: A case study in computational phylogenetics. *Diachronica*, *28*, 291-323.

Dunn, M., Greenhill, S. J., Levinson, S. C., & Gray, R. D. (2011b). Evolved structure of language shows lineage-specific trends in word-order universals. *Nature*, *473*, 79-82.

Jordan, F. (2011). A phylogenetic analysis of the evolution of Austronesian sibling terminologies. *Human Biology*, *83*, 297-321.

Max Planck Fellow
Syntax, typology, and information structure

Group coordinator Robert Van Valin Jr.
Group members Jeremy Hammond, Dejan Matić, Saskia van Putten

Goals of the group

The interaction of pragmatics and grammar happens on several levels and can potentially affect grammar in various ways. Since these 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, the members of the group combine extensive corpus analysis of data in their respective languages with production experiments.

Information structure

One of the major projects of the group is the investigation of IS in complex sentences. The leading idea is that many of the observed restrictions and regularities in embedded structures can be traced back to the phenomena of information. 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 classical 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, the members of the group are involved in describing the interaction of IS, syntax, and semantics in understudied languages, and have all conducted extensive fieldwork. Van Valin investigates IS phenomena 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 (Vanuatu). He explores the ways in which texts' macro-structures influence the establishment of reference. Matić's research concentrates on two languages of Northern Siberia: Tundra Yukaghir (isolate) and Even (Tungusic). He is focussing on the interplay of IS, illocution, and contrast as determining factors of sentence structure in these two languages. The language studied by Van Putten, Avatime (Kwa, spoken in 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 fine-grained description of the semantics and pragmatics of these categories.

From left to right: Dejan Matić, Robert Van Valin, Jr., Saskia van Putten, Jeremy Hammond.

Selected publications

Matić, D., & Wedgwood, D. (2013). The meanings of focus: the significance of an interpretation-based category in cross-linguistic analysis. *Journal of Linguistics, 49,* 127-163.

Hammond, J. (to appear). Switch-reference antecedence and Subordination in Whitesands. *Oceanic Linguistics.*

Van Valin Jr., R.D. (2012). Some issues in the linking between syntax and semantics in relative clauses. In: B. Comrie, & Z. Estrada-Fernández (Eds.), *Relative Clauses in Languages of the Americas: A typological overview* (pp. 47-64). Amsterdam: Benjamins.

External group

Language in our hands: Gesture and sign language

Group coordinator Asli Özyürek
Group members Emanuela Campisi, Reyhan Furman, Judith Holler, Gerardo Ortega, David Peeters, Pamela Perniss, Louise Schubotz, Beyza Sümer, Inge Zwitserlood

Goals of the group

Our group investigates how our communicative bodily actions interact with language structure, processing (production and comprehension), and use in context. We focus on two domains of human communicative behaviour where bodily actions are recruited during language use: (1) gestures that speakers use while speaking, and (2) sign languages used by deaf people. We use cross-linguistic comparisons as well as a variety of methodologies (corpus, developmental, experimental, and neuroimaging) to understand the complexity of how humans use multiple modalities in communication.

Influence of eye gaze

Communication is a multimodal phenomenon, involving not only speech but also hand gestures as well as eye gaze. It is known that listeners integrate information from both speech and gesture (Kelly, et al. 2010). Here we asked whether the speaker's eye gaze modulates listener's processing of semantic information from speech and gesture, or if eye gaze is an independent channel of social interaction. Participants were presented with video clips of an actor speaking single sentences. Half of the time the actor's speech contained only general action verbs (e.g., she *trained* the horse) (Speech Only Condition), and half of the time it was accompanied by specific iconic action gestures (e.g., *whip* gesture) (Speech and Gesture Condition). The actor's eye gaze was manipulated such that she either directly gazed at the listener (Addressed Condition) or at another recipient (Unaddressed Condition). Participants were asked to make judgements (yes/no) concerning whether written words flashed on the screen after the viewing of the videos were mentioned in speaker's speech or gesture. Reaction times were longer in the Unaddressed than in the Addressed Condition for both Speech and Gesture utterances and when the flashed word matched the meaning of the gesture. This indicates that participants in the Unaddressed Condition might have focused more attention on gestures (e.g., not having to focus their attention both on the gaze and the gesture) and thus less on the integrated message conveyed by both speech and gesture. Furthermore, in an fMRI experiment using the same stimuli, we found that right MTG (middle temporal gyrus), known to be involved in binding cross-modal semantic information, is activated more strongly in processing Speech and Gesture utterances in the Addressed than in the Unaddressed Condition. Thus, eye gaze modulates the processing of semantic information gleaned from gesture in the context of speech rather than being an independent social cue of interaction.

Role of modality

Unlike spoken language, the visual-spatial modality of sign languages affords the analogue mapping of spatial relations in the real world onto signing space. We addressed whether this affordance influences spatial language development by deaf children acquiring sign language. We compared elicited descriptions of static (locative) spatial relations by deaf children (4-6; 7-10 years) acquiring Turkish Sign Language (TID) natively and to hearing children learning Turkish and to adult patterns. In descriptions of pictures containing non-angular relations (inclusion, containment, and support), children learning both Turkish and TID showed similar patterns of development. However, in encoding angular spatial relations (left-right; front-back) deaf children were faster in achieving adult patterns than hearing children. These findings specify further which aspects of a sign language might be acquired independent of modality and which aspects might facilitate signing.

Selected publications

Holler, J., Kelly, S., Hagoort, P., & Özyürek, A. (2012). When gestures catch the eye: The influence of gaze direction on co-speech gesture comprehension in triadic communication. In N. Miyake, D. Peebles, & R. Cooper (Eds.), *Proceedings of the 34th Annual Conference of the Cognitive Science Society* (pp. 467-472). Austin, TX: Cognitive Society.

Habets, B., Kita, S., Shao, Z., Özyürek, A., & Hagoort, P. (2011). The role of synchrony and ambiguity in speech-gesture integration during comprehension. *Journal of Cognitive Neuroscience, 23*, 1845-1854.

External group
CLSM Speech comprehension

Group coordinator Mirjam Ernestus
Group members Louis ten Bosch, Sophie Brand, Iris Hanique, Esther Janse, Xaver Koch, Thordis Neger, Annika Nijveld, Juliane Schmidt , Marco van de Ven, Malte Viebahn

Goals of the group

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

Reduced words

Previous research has shown that listeners can only recognise reduced words well if these words are presented in a natural sentence context. In a number of studies we have investigated which sentence properties are particularly beneficial.

We found that semantic context aids the recognition of reduced words, but that listeners need additional time to process this semantic information if the context consists of reduced instead of unreduced words. Further, we found that the exact acoustic properties of a word's context also facilitate recognition. This series of experiments has also shown that context is not enough for listeners to recognise a reduced word: they need to hear the reduced word itself as well.

We also continued investigating whether reduced pronunciation variants of words may be stored in the production lexicon. On the basis of speech corpora, we observed that the absence of vowels in several French words (e.g. *plouse* for *pelouse* and *ctait* for *c'était*) is influenced by factors other than those influencing the shortening of these vowels. The absence of these vowels can therefore not result from extreme shortening, which supports the hypothesis that these variants are stored in the mental lexicon.

Differences among listeners

Previous studies have shown that listeners differ in how easily they adapt to unfamiliar, foreign-sounding accents. We investigated what characteristics of listeners are responsible for these differences among a group of older listeners. We found that ease of adaptation is correlated with vocabulary knowledge and selective attention.

We also compared young and older listeners in how much they benefit from seeing the target speaker while hearing a second speaker in the background. Younger listeners benefit more than older listeners when age groups are matched for auditory-only performance. Both age groups benefit more from seeing the talker if they have better attentional abilities. These results contribute to our knowledge of how seeing a speaker helps to segregate mixed speech streams, and how age and individual differences modulate these segregation abilities.

Selected publications

Janse, E., & Ernestus, M. (2011). The roles of bottom-up and top-down information in the recognition of reduced speech: Evidence from listeners with normal and impaired hearing. *Journal of Phonetics, 39*, 330-343.

Torreira F. ,& Ernestus M.(2011). Vowel elision in casual French: the case of vowel /e/ in the word c'était. *Journal of Phonetics 39*, 50-58.

Van de Ven M., Tucker B. V., & Ernestus M. (2011). Semantic context effects in the comprehension of reduced pronunciation variants. *Memory & Cognition 39*, 1301-1316.

Janse, E. & Adank, P. (2012). Predicting foreign-accent adaptation in older adults. *Quarterly Journal of Experimental Psychology, 65*, 1563-1585.

Jesse, A. & Janse, E. (2012). Audiovisual benefit for recognition of speech presented with single-talker noise in older listeners. *Language and Cognitive Processes, 27*, 1167-1191.

The Language Archive

Group coordinators
Sebastian Drude *(head)*,
Wolfgang Klein *(scientific director)*
Group members Eric Auer,
Daan Broeder, Willem Elbers,
Jean-Charles Ferrieres,
Binyam Gebrekidan Gebre,
Jeroen Geerts, Twan Goosen,
Alexander Koenig, Christopher Haskett,
Lari Lampen, Anna Lenkiewicz,
Przemek Lenkiewicz,
Kees Jan van de Looij, Andre Moreira,
Vlado Plaga, Gert van der Plas,
Shakila Shayan, Olha Shkaravska,
Guilherme Silva, Han Sloetjes,
Aarthy Somasundaram,
Herman Stehouwer, Paul Trilsbeek,
Dieter van Uytvanck,
Menzo Windhouwer, Peter Withers,
Florian Wittenburg,
Peter Wittenburg, Nick Wood

Goals of the group

The Language Archive (TLA) is a unit at the institute jointly supported by the MPS, the German BBAW and the Dutch 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. By collaborating in national, European, and international projects, TLA has become a top centre for expertise in language-related scientific data and digital infrastructure in the humanities.

Language data

TLA maintains one of the largest online accessible digital language data archives, currently covering about 200 languages (80 terabytes). 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, 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 and projects

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). The LEXUS online collaborative multimedia lexicon tool is offered now in the completely revised version 3. The more recent ARBIL tool allows the creation of metadata descriptions not only in the IMDI format developed by the TLA, but also the flexible Component Metadata format CMDI. The server-tools LAMUS, AMS and the Archive Browser allow uploading validated data into the archive, organising, assigning access rights and accessing the data. The new KinOath Kinship Archiver is closely integrated into the metadata infrastructure and allows the creation of detailed kinship databases and graphics.

Experts and collaboration

With its unique, broad, and deep expertise in digital language resources and related tools, TLA is a much sought-after partner in projects that contribute to an emerging general infrastructure for research data in the humanities. In particular in Europe, TLA has a leading role in the CLARIN ERIC (European Research Infrastructure Consortium) and the national German and Dutch CLARIN projects. In this context, TLA is updating its technology to the metadata standard CMDI. Similarly, TLA is playing an important role in the new Science Data Centre of the MPS (SciDAM), and ground-breaking projects such as EUDAT, DASISH and iCORDI.

Selected publications

Drude, S., Broeder, D., & Trilsbeek,P. (2011). The 'Language Archiving Technology' solutions for sustainable data from digital fieldwork research. In: Nick Thieberger (Ed.): *Sustainable data from digital research: Humanities perspectives on digital scholarship*. Proceedings of the conference held at the University of Melbourne, 12-14th December 2011. http://hdl.handle.net/2123/7935.

Infrastructure
Technical Group

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

Goals of the group

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

Computer systems

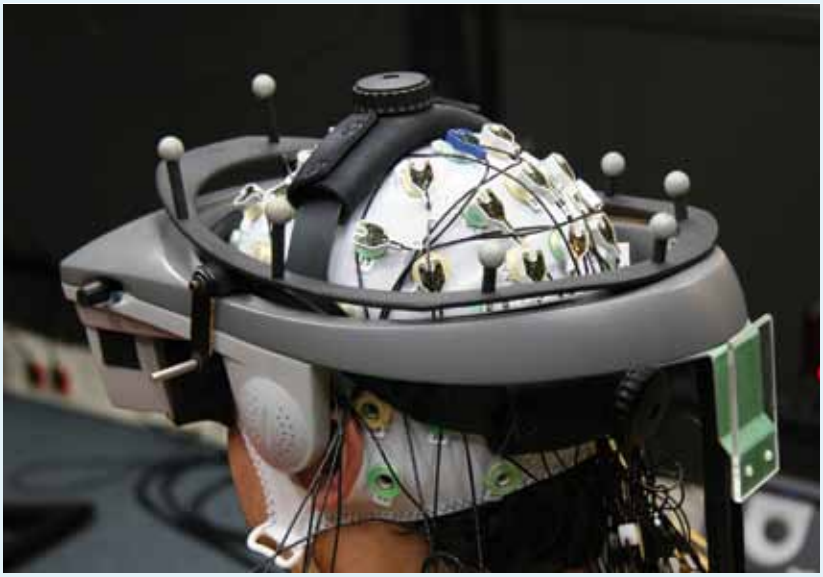
The institute's storage systems have been upgraded to provide state of the art computing and storage. With the upgrade to fast SSD storage (solid-state disk) for some important storage areas, our archive system can provide fast access to hundreds of millions of files. Our system must handle large data flows from labs and enable fast access to central Max Planck supercomputers and storage systems. Backup and archive data is mirrored to these central computer centers. Our general data archive system was adapted to handle many different kinds of projects and experiment data. The institute has played an important role in shaping a new grid for accessing eResources within the Max Planck Society.

Experimental labs

The institute has built and maintains six reaction time labs, three eye movement labs, various portable eye-tracker setups (glasses and remote eye-tracker), two EEG labs (one Faraday-caged), and one gesture lab as well as a baby lab.

The transition to Presentation and Experiment Builder (for Eye Link eye-trackers) is completed and fully supported by the experiment support team. We have also built a virtual reality lab that gives researchers unique possibilities to conduct experiments. Participants in the virtual reality lab can be placed in unusual and carefully controlled environments or circumstances. In order to enhance the reality of the participants' experience, the lab is equipped with a 3D sound system and a floor that can shake to simulate motion. Facilities are available to record EEG during virtual reality experiments.

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



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

Field expeditions

The institute makes use of more than 20 fieldsites around the world. During the period of review, 35 field trips were fully equipped with everything from solar panels to portable eye-trackers.

More and more reaction time and eye-tracking experiments are conducted in the field, and requiring highly specialised equipment. In addition, semi-professional, high definition cameras for fieldwork are now standard equipment.

Library

Head Karin Kastens
Group members Annemieke Sweere, Meggie Uijen

Goals of the group

The Library group has two major goals: (1) Support researchers at the institute in all their information needs, providing printed or electronic content, (2) Support the publication management of the institute's individual researchers.

E-only content

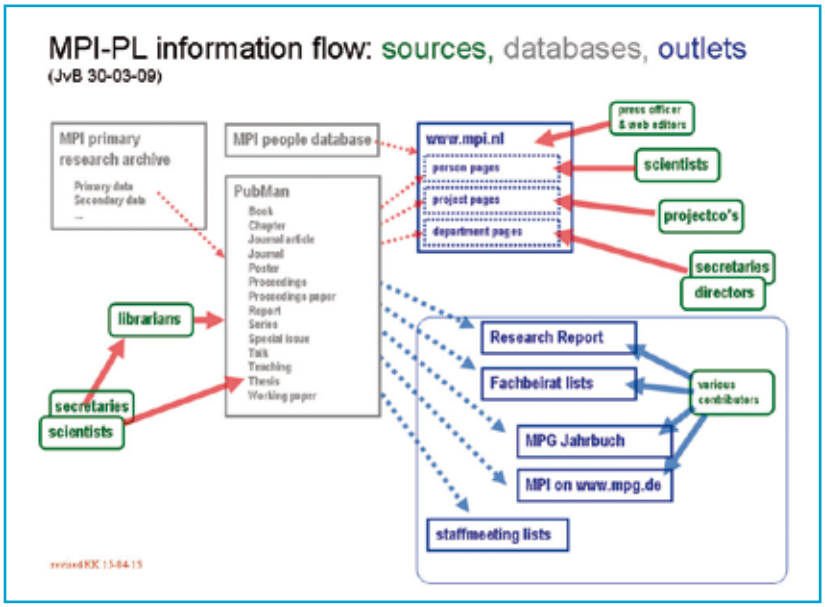
In 2012, we became an e-only library for journal content. Licenses through the Max Planck Society together with our own e-journal subscriptions provide access to more than 15.000 academic e-journals. Access to ebooks is primarily guaranteed via Max Planck Society resources, but in addition we started using two different e-book platforms for individual e-book purchases.

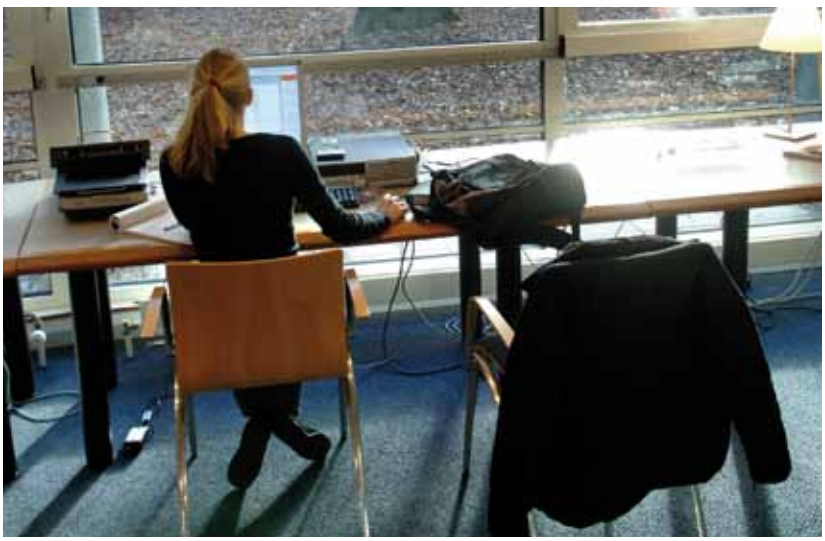
Catalog search and discovery tool

Providing of information on printed as well as electronic content from different sources raised the need for a new search tool to incorporate these data into one search interface. In 2011, we started a project based on the Open Source software Vufind. In collaboration with the Max Planck Digital Library and libraries at four other Max Planck Institutes we specified user functionalities, layout and data exchange formats. The new search interface integrates content from our library, as well as the electronic content from the Max Planck Society licenses regarding e-books and e-journals.

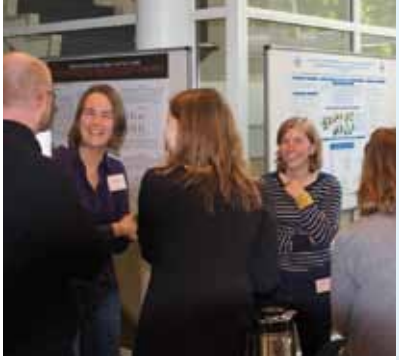
Publication management

We manage the publication output of the institute via our institutional publication repository PubMan (http://pubman.mpdl.mpg.de). Our workflow also allows researchers, secretaries, and librarians to enter publication data and upload full texts *(see Figure)*. The librarians perform a quality check. The publication data are uploaded daily onto our website and are being rendered on person, department, and project pages with links to full texts and supplementary material.





International Max Planck Research School (IMPRS) for Language Sciences



Spokesperson Stephen Levinson
Coordinator Els den Os
Assistant Rachel Sheer, Dirkje van der Aa

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 evaluation of the IMPRS took place in December 2012. The first feedback by the external evaluation committee was extremely positive.

Students

The research school has expanded into a vibrant community gaining international recognition through its highly sought-after PhD fellowships. At the end of 2012, there are four cohorts of IMPRS students, for a total of seventy-five students at varying levels of research progress and representing twenty-four different countries of origin. Thirty percent of these students have a contract with the university and seventy percent with the Max Planck Institute for Psycholinguistics. Since 2011, practically all new Max Planck PhD students enter the IMPRS.

Training programme

At the IMPRS for Language Sciences, the language sciences are investigated using multiple methodologies such as corpus research, fieldwork, psycholinguistic experiments, eye-tracking, neuroimaging, and genetic research. In addition, advanced statistical techniques and computational modeling are used. The PhD students of the IMPRS for Language Sciences follow a curriculum that ensures they acquire a basic knowledge of all disciplines, as well as professional development to advance their young careers.

The IMPRS for Language Sciences also presents special courses based on student need, examples of recent courses include PERL programming and using R for statistics. An effective web-based monitoring system of student's education requirements and their research progress has been developed and was launched in the beginning of 2011.

Activities

All of the IMPRS for Language Sciences students also participate in core activities. These include presentations of their own work as well as attending and preparing guest lectures, and organising events. Organised events in 2011 and 2012 featured masterclasses with the speakers of the international workshop *Frontiers in Linguistics, Acquisition and Multilingualism* and the organisation of an international workshop *Relations in Relativity: New Perspectives on Language and Thought*. This three-day event was conceived of and organised solely by a group of ten IMPRS students. The research school arranged a preparatory session prior to the Nijmegen Lectures 2011, and the students had the opportunity to meet with the speaker Prof. Nicholas Evens.

Research projects

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

- Alessandro Gialluisi (MPI, 2011): Genome-wide screening for DNA variants associated with dyslexia.
- Kevin Lam (Donders, 2010): The inter action between action and language: the role of motor cortex in language comprehension.
- Jeremy Hammond (MPI 2009): Switch reference in Whitesands.
- Sophie Brand (CLS, 2012): Reduced word comprehension by advanced and late learner of French.

Events and activities

2011

CLARIN CMDI Metadata Infrastructure tutorial

Organised by Daan Broeder and Dieter van Uytvanck. Participants: Daan Broeder, Patrick Duin, Matej Ďurčo (ICLTT, Vienna), Leif Jöran Olsson (U. Gothenburg), Thorsten Trippel (U. Tübingen), Dieter van Uytvanck, Menzo Windhouwer, and Peter Withers. *January 17.*

Morphological Complexity: Implications for Psycholinguistics

Organised by Matthew Baerman, Dunstan Brown and Greville Corbett (both U. Surrey), hosted by Stephen Levinson. Participants: Harald Clahsen (U. Essex), Wolfgang Dressler (Austrian Academy of Sciences), Mirjam Ernestus, Angela Friederici (MPI Human Cognitive and Brain Sciences), Alice Harris (U. Massachussetts), Grzegorz Krajewski (U. Manchester), Sabine Laaha (Austrian Academy of Sciences), Stephen Levinson, Gereon Müller and Andreas Opitz (both U. Leipzig), Stefanie Regel (MPI Human Cognitive and Brain Sciences), and João Veríssimo (U. Lisbon). *January 28.*

Co-variation in Vocal Tract Anatomy, Speech Perception, Genes, and Language Typology

Organised by Dan Dediu and Stephen Levinson. Participants: Bart de Boer (U. Amsterdam) Dan Dediu, Didier Demolin (U. Grenoble), Frank Eisner, Mirjam Ernestus, Simon E. Fisher, Robert Ladd (U. Edinburgh), and Stephen Levinson. *February 25.*

Expression of Gender

Organised by Greville Corbett (U. Surrey) with Mouton De Gruyter, hosted by Wolfgang Klein and Stephen Levinson. Participants: Greville Corbett (U. Surrey), Michael Dunn, Sally McConnell-Ginet (Cornell U.), Marianne Mithun (UC Santa Barbara), and Niels Schiller (Leiden U.). *March 4.*

Proposals and Action Ascription in Conversation

Organised by Kobin Kendrick. Participants: Charles Antaki (Loughborough U.), Elizabeth Couper-Kuhlen (U. Helsinki), Paul Drew (U. York), Nick Enfield, John Heritage (UCLA), Kobin Kendrick, Stephen Levinson, Giovanni Rossi and Jack Sidnell (both U. Toronto), and Tanya Stivers (UCLA). *March 17-20.*

Information Structure and Subordination: South America and Beyond

Organised by Jeremy Hammond, Dejan Matić, Saskia van Putten, Robert Van Valin with Rik van Gijn and Pieter Muysken (both Radboud U. Nijmegen). Participants: Leila Behrens (U. Bonn), Oliver Bond (SOAS, London), Ana Paula Brandão (U. Texas at Austin), Helder Ferreira (CIESAS), Lucía Golluscio (U. Buenos Aires), Jeremy Hammond, Katharina Haude (U. Cologne), Erwin Komen and Pieter Muysken (both Radboud U. Nijmegen), Patxi Lascurain (Illinois State U.), Saskia van Putten, Stavros Skopeteas (U. Bielefeld), Luciana Storto (U. São Paulo), Robert Van Valin, Rosa Vallejos Yopán (U. New Mexico), Jean-Christophe Verstraete (KU Leuven), and Ana Vilacy Galucio (Museu Paraense Emilio Goeldi). *April 27-28.*

Comparing projects: Linguistics at MPI Evolutionary Anthropology & MPI Nijmegen

Organised by Stephen Levinson. Participants: Michael Dunn, Nick Enfield, Kobin Kendrick, Stephen Levinson, Asifa Majid, Elisabeth Norcliffe, Robert Van Valin, with Hans-Jörg Bibiko, Bernard Comrie, David Gil, Thomas Goldammer, Harald Hammarström, Iren Hartmann, Martin Haspelmath, Susanne Michaelis, Frank Seifart, Sven Siegmund. *April 29.*

CLARIN European Demonstrator Case and Federated Search

Organised by Daan Broeder. Presenters: Daan Broeder and Henrik Dittmann (EURAC's Institute of Specialised Communication and Multilingualism). *May 9.*

CLARIN-NL ISOcat workshops

Organised by Ineke Schuurman (KU Leuven & Utrecht U.) and Menzo Windhouwer. Utrecht, May 10 and October 24.

IMPRS Frontiers

Organised by Leah Roberts and Rachel Sheer. Participants included: Lila Gleitman (U. Pennsylvania), Marianne Gullberg (Lund U.), John Schumann (UCLA), and Ianthi Maria Tsimpli (U. Thessaloniki). *May 12.*

Frontiers in Linguistics, Acquisition and Multilingualism

Organised by Christine Dimroth, Pieter Muysken (Radboud U. Nijmegen), and Leah Roberts. Participants: Shanley Allen (TU Kaiserslautern), Ad Backus (Tilburg U.), Raphael Berthele (U. Fribourg), Giuliano Bernini (U. Bergamo), David Birdsong (U. Texas at Austin), Jürgen Bohnemeyer (SUNY Buffalo), Aoju Chen, Ian Fitzpatrick (U. Düsseldorf), Monique Flecken (U. Heidelberg), Lila Gleitman

Unless specified otherwise the event took place at the MPI. Affiliations are given for participants and organisers not affiliated with the institute.

(U. Pennsylvania), Marianne Gullberg (Lund U.), Janet van Hell (Pennsylvania State U.), Roeland van Hout (Radboud U. Nijmegen), Aafke Hulk (U. Amsterdam), Peter Jordens, Gerrit Jan Kootstra (Radboud U. Nijmegen), Ivana Kruijff-Korbayová (Saarland U.), Pim Levelt, Elena Lieven (MPI Evolutionary Anthropology), Ulf Liszkowski, Sarah Liszka (U. Essex), Bettelou Los (Radboud U. Nijmegen), Bhuvana Narasimhan (U. Colorado at Boulder), Despina Papadopoulou (U. Thessaloniki), Rebekah Rast (American U. Paris), Gerhard Schaden (U. Lille 3), Sarah Schimke, Petra Schumacher (U. Mainz), John Schumann (UCLA), Ludovica Serratrice (U. Manchester), Christiane von Stutterheim (U. Heidelberg), Rosemarie Tracy (U. Mannheim), Ianthi Maria Tsimpli (U. Thessaloniki), Sharon Unsworth (Utrecht U.), Robert Van Valin, Henk Verkuyl (Utrecht U.), and Daniel Véronique (U. Paris 3). *Kerkrade, May 13-14.*

DoBeS training courses
Organised by Paul Trilsbeek. Courses on technical aspects of language documentation. *June 27-30, and November 28-December 1.*

DoBeS Workflow Practices
Organised by Paul Trilsbeek. Workshop on language documentation and its role in linguistics, anthropology, and language maintenance. *June 30-July 1.*

CLARA Summer School 2011 on Infrastructure Tool Development
Organised by Eric Auer, Przemyslaw Lenkiewicz, Han Sloetjes, and Peter Wittenburg. Participants: Eric Auer, Rolf Bardeli (Fraunhofer IAIS, Sankt Augustin), Przemyslaw Lenkiewicz, Stefano Masneri (Fraunhofer HHI, Berlin), and Han Sloetjes. *July 5-12.*

Information Structure and Spoken Language: Cross-Linguistic Comparative Studies
Organised by Jocelyne Fernandez-Fest (CNRS, U. Paris 3) and Robert Van Valin in conjunction with the 2011 LSA Linguistic Institute. Participants: Jirasak Achariyayos (CNRS, U. Paris 3), Fida Bizri (INALCO, CNRS-SeDyl), Danh Tành Do-Hurinville (INALCO, CNRS-MoDyCo), Ricardo Etxepare (CNRS, U. Bayonne), Jocelyne Fernandez-Fest (CNRS, U. Paris 3) Pablo Kirtchuk (INALCO, CNRS-LACITO), Annie Montaut (INALCO, CNRS-SeDyl), Dejan Matic, Irina Nikolaeva (SOAS, London), Saskia van Putten, Peter Slomanson (Aarhus U.), Julia Marie-Ange Souletis (CPGE Henri IV, U. Paris 4), and Robert Van Valin. *At U. Colorado at Boulder, July 9-10.*

Conjunct/Disjunct Alignment from a Cross-Linguistic Perspective
Organised by Simeon Floyd, Elisabeth Norcliffe, and Lila San Roque (Stockholm U.), in conjunction with the 2011 LSA Linguistic Institute and with the support of the Wenner-Gren Foundation (workshop grant CONF-558). Participants: Henrik Bergqvist (Stockholm U.), Martine Bruil (Leiden U.), Connie Dickinson (U. Oregon), Nicholas Evans (ANU), Simeon Floyd, Robb Fried (U. Buffalo), David Hargreaves (Western Oregon U.), Alice Harris (U. Massachusetts), Barbara Kelly (U. Melbourne), Liberty Lidz (UC Berkeley), Robyn Loughnane (Humbolt-U. Berlin), Zarina Molochieva (U. Münster), Elisabeth Norcliffe, Mark Post (James Cook U.), Lila San Roque, Keith Slater (U. North Dakota), Tobias Weber (U. Zurich), and Stephen Wechsler (U. Texas at Austin). *At U. Colorado at Boulder, July 13-14.*

Interactional Foundations of Language 2011
Organised by Nick Enfield and Stephen Levinson in conjunction with the 2011 LSA Linguistic Institute. Participants: Alan Cienki (VU Amsterdam), Elizabeth Couper-Kuhlen (U. Helsinki), Bill Croft (U. New Mexico), Barbara Fox (U. Colorado at Boulder), Makoto Hayashi (U. Illinois at Urbana-Champaign), Sally Rice (U. Alberta) and Mike Tanenhaus (U. Rochester). *At U. Colorado at Boulder, July 16-17.*

CLARIN Metadata Infrastructure Developers (CMDI) workshop
Organised by Daan Broeder and Dieter van Uytvanck. August 23.

'Words from other worlds' - Celebratory workshop for Gunter Senft's 60th birthday
Organised by Mark Dingemanse and Stephen Levinson. Presenters: Mark Dingemanse, William Foley (U. Sydney), Stephen Levinson, John Liep (U. Copenhagen), and Thomas Widlok (Radboud U. Nijmegen). *August 30.*

Child Language & Eyetracking: Analyses and Rationale (CLEAR)
Organised by Helen Buckler and Sho Tsuji with Paula Fikkert and Stefanie Ramachers (both Radboud U. Nijmegen). Participants: Helen Buckler, Rein Cozijn (Tilburg U.), Tom Fritzsche (U. Potsdam), Sabine Hunnius (Donders Institute), Brigitta Keij (Utrecht U.), and Jocolien van Rij (U. Groningen). *September 14.*

Individual Differences in Second Language Learning: 4th A. Guiora Roundtable Conference on the Cognitive Neuroscience of Language
Organised by Nick Ellis (LSA, U. Michigan), Wolfgang Klein, Antje Meyer, Leah Roberts, and John Schumann (UCLA). Participants: Niclas

Events and activities

Abrahamsson (U. Stockholm), Sible Andringa (U. Amsterdam), Philip S. Dale (U. New Mexico), Robert DeKeyser (U. Maryland), Adriana Hanulíková, Janet van Hell (Pennsylvania State U.), Jan Hulstijn (U. Amsterdam), Kenneth Hyltenstam (U. Stockholm), Antje Meyer, Leah Roberts, Rob Schoonen (U. Amsterdam), John Schumann (UCLA), Núria Sebastián-Gallés (U. Pompeu Fabra), Richard Sparks (College of Mt. St Joseph), and Huadong Xiang (Donders Institute). *September 22-23.*

Official opening of The Language Archive

Organised by among others Wolfgang Klein, Paul Trilsbeek and Peter Wittenburg. Speakers included Wolfgang Klein, Wilhelm Krull (Volkswagenstiftung), Theo Mulder (Royal Netherlands Academy of Arts and Sciences KNAW), and Angelika Storrer (Zentrum Sprache der BBAW). *Berlin, October 11.*

Production and Comprehension of Spontaneous Speech

Organised by Mirjam Ernestus, Iris Hanique (Radboud U. Nijmegen), and Natasha Warner (U. Arizona). Presenters: Martine Adda-Decker (U. Paris 3), Irina Apushkina (St. Petersburg State U.), Antti Arppe (U. Helsinki), Vincent Aubanel (U. Basque Country), Harald Baayen (U. Alberta), Rachel Baker (UCL), Katharine Barden (Bristol U.), Hans Rutger Bosker (Utrecht U.), Ann Bradlow, Susanne Brouwer, Laura Ann Burchfield (all Northwestern U.), Paul Carter (U. Leeds), Martin Cooke (U. Basque Country), Laura Dilley (Michigan State U.), Philip Dilts (Northwestern U.), Tyko Dirksmeyer, Mirjam Ernestus, Cédric Gendrot (U. Paris 3), Evelin Graupe (U. Kiel), Maria Graziano and Marianne Gullberg (both Lund U.), Sarah Hawkins (U. Cambridge), Valerie Hazan (UCL), Tania Henetz (Stanford U.), Falk Huettig, Nivja Helena de Jong (Utrecht U.), Ahsanul Kabir (U. Greenwich), Tyler Kendall (U. Oregon), Friederike Kern (U. Hildesheim), Midam Kim (Northwestern U.), Mybeth Lahey, Eleanor Lawson (U. Edinburgh), Jenna Silver Luque (Northwestern U.), Brett Margolis (Northwestern U.), Sven Mattys, (Bristol U.), James McQueen, Holger Mitterer, Kelsey Mok (Northwestern U.), Oliver Niebuhr (U. Kiel), Nelleke Oostdijk (Radboud U. Nijmegen), Michele Pettinato, (UCL), Anne-France Pinget (Utrecht U.), Leendert Plug (U. Leeds), Ryan Podlubny, (U. York), Petr Pollak, Katja Pollmann, and Václav Procházka (all three TU Prague), Hugo Quene, (Utrecht U.), Olga Raeva (St. Petersburg State U.), Elena Riekhakaynen (St. Petersburg State U.), Ralph Rose (U. Tokyo), Ted Sanders (Utrecht U.), Carolin Schmid (U. Paris 3), Louise Schubotz (Radboud U. Nijmegen), James Scobbie (U. Edinburgh), Natalia Slepokurova, (St. Petersburg State U.), Jane Stuart-Smith (U. Glasgow), Marisa Tice (Stanford U.), Benjamin Tucker (U. Alberta), Jürgen Trouvain (Saarland U.), Marco van de Ven, Anatoly Ventsov (St. Petersburg State U.), Julian Villegas (U. Basque Country), Kodi Weatherholtz (Ohio State U.), Laurence White (Plymouth U.), and Lukas Wiget (U. Zurich). *December 12-13.*

Workshop in Comparative Cognitive Anthropology. Origins of Cultural Diversity: Phylogeny - History - Ontogeny

Organised by Daniel Haun. Presenters: Paul Harris (Harvard U.), Stephen Levinson, Katja Liebal (Free U. Berlin), Frank Marlowe (Harvard U.), Phillippe Rochat (Emory U.), Carel van Schaik (U. Zürich), and Harvey Whitehouse (U. Oxford). *Schloss Ringberg, Rottach-Egern, December 14-17.*

2012

Automatic Processing of Sign Language

Organised by Przemyslaw Lenkiewicz. Speakers included Onno Crasborn (Radboud U. Nijmegen), Justus Piater (Innsbruck U.), and Xavier Suau (UPC Barcelona). *February 28.*

Developmental Language Disorders

Organised by Paula Fikkert (Radboud U. Nijmegen), Simon E. Fisher, and Frank Wijnen (Utrecht U.). Presenters: Simon E. Fisher, Ellen Gerrits (U. Applied Sciences Utrecht), and Jan de Jong (U. Amsterdam). *February 29.*

Egophoricity

Organised by Simeon Floyd, Elisabeth Norcliffe, and Ralph Rose (U. Tokyo), Lila San Roque. Participants: Henrik Bergqvist (U. Stockholm), Martine Bruil (U. Leiden), Katja Hannß (U. Cologne), and Erika Sandman (U. Helsinki). *March 8.*

CLARIN-NL ISOcat

Organised by Ineke Schuurman (KU Leuven & Utrecht U.) and Menzo Windhouwer. Participants included CLARIN-NL Call 1 and 2 project members and some international CLARIN members. *Utrecht, March 20, June 19, and October 24.*

EoSS Germanics

Organised by Michael Dunn, Fiona Jordan, and Asifa Majid with Raphael Berthele (U. Fribourg). Presenters: Thorhalla Gudmundsdottir Beck (U. Iceland), Raphael Berthele (U. Fribourg), Robert Clees (U. Trier), Michael Dunn, Claudine Hamen (U. Trier), Fiona Jordan, Carsten

Levisen (U. Aarhus), Asifa Majid, Cornelia Scherpenberg (U. Munich), Linnaea Stockall (U. London), Susanne Vejdemo (U. Stockholm), Arjen Versloot (U. Amsterdam), Matthew Whelpton (U. Iceland), and Martina Zimmerman (U. Fribourg). *Fribourg, April 24-27.*

Relations in Relativity: New Perspectives on Language and Thought
Organised by IMPRS students Inge Alferink, Helen Buckler, Rebecca Defina, Sarah Dolscheid, Joost Rommers, Beyza Sumer, Sho Tsuji, Maartje van de Velde, Maarten Versteegh, and Ewelina Wnuk. Presenters: Emmanuel Dupoux (EHESS, Paris), Monique Flecken (Donders Institute), Dedre Gentner (Northwestern U.), John Kingston (U. Massachusetts), Stephen Levinson, Gary Lupyan (U. Wisconsin), Asifa Majid, Barbara Malt (Lehigh U.), and Roel Willems (Donders Institute). *At MPI and Radboud U. Nijmegen, May 9-11.*

ISOcat in Daily Life
Organised by Ineke Schuurman (KU Leuven, Utrecht U.) and Menzo Windhouwer with in conjunction with the 8th International Language Resources and Evaluation Conference (LREC 2012). Presenters: Matej Durco (ICLTT, Vienna), Irina Nevskaya (U. Frankfurt, Free U. Berlin), Ineke Schuurman (KU Leuven, Utrecht U.), Franca Wesseling (Meertens Instituut), Menzo Windhouwer, and Sue Ellen Wright (Kent State U.). *Istanbul, May 21.*

Describing Language Resources (LRs) with Metadata
Organised by Victoria Arranz (ELDA/ELRA), Daan Broeder, with Bertrand Gaiffe (ATILF), Maria Gavrilidou (Athena Research Center), Monica Monachini, (CNR-ILC), and Thorsten Trippel (U. Tübingen) in conjunction with the 8th International Language Resources and Evaluation Conference (LREC 2012). Presenters: Victoria Arranz (ELDA, Paris), Volker Boehlke (U. Leipzig), Daan Broeder, Hennie Brugman and Martine de Bruin (both Meertens Institute), Michael Carl (Copenhagen Business School), Philipp Cimiano (Bielefeld U.), Torsten Compart (U. Leipzig), Griet Depoorter (Institute for Dutch Lexicology), Elina Desipri, (Athena Research Center), Matej Durco (ICLTT, Vienna). Thomas Eckart (U. Leipzig), Paula Estrella (U. Córdoba, Argentina), Maria Gavrilidou and Ioanna Giannopoulou (both Athena Research Center), Twan Goosen (Athena Research Center), Olivier Hamon (U. Bergen), Hanna Hedeland (U. Hamburg), Christina Hoppermann (U. Tübingen), Kristian Tangsgaard Hvelplund (Copenhagen U.), Marc Kemps-Snijders and Jan Pieter Kunst (both Meertens Institute), Penny Labropoulou (Athena Research Center), Mark Lindeman, Gunn Inger Lyse (U. Bergen), Peter Menke (U. Bielefeld), Carla Parra (U. Bergen), Maarten van der Peet (Athena Research Center), Koenraad De Smedt (U. Bergen), Kai Wörner (U. Hamburg), Rob Zeeman, and Junte Zhang (Meertens Institute). *Istanbul, May 22.*

11th Psycholinguistics in Flanders (PiF) conference
Organised by Iske Bakker, Mirjam Ernestus, Merel van Goch, Asifa Majid, James McQueen, and Vitória Piai. Keynote lectures were given by Rasha Abdel Rahman (Humboldt U. Berlin), and Kathryn Bock (U. Illinois at Urbana-Champaign). *Berg en Dal, June 6-7.*

Semantics and the Child
Organised by Nanjo Bogdanowicz, Wolfgang Klein, Stephen Levinson, and Edith Sjoerdsma. Symposium to honour the work and memory of Melissa Bowerman. Plenary speakers included Soonja Choi (San Diego State U.), Eve Clark (Stanford U.), Dedre Gentner (Northwestern U.), Elena Lieven (MPI Evolutionary Anthropology), Asifa Majid, Bhuvana Narasimhan (U. Colorado at Boulder), Eric Pederson (U. Oregon), Dan Slobin (UC Berkeley), with Christy Burow and Wijbrandt van Schuur. *June 8.*

Multimodality and Language Learning: 3rd Nijmegen Gesture Center (NGC)
Organised by Emanuela Campisi, Reyhan Furman, Judith Holler, Lian van Hoof, Pamela Perniss, Asli Özyürek, and Beyza Sumer. Speakers: Reyhan Furman, Susan Goldin Meadow (U. Chicago), Eugenio Parise (Central European U.), Jennie Pyers (Wellesley College), Katharina Rohlfing (U. Bielefeld), Linda Smith (U. Indiana), Gabriella Vigliocco (UCL), Paul Vogt (Tilburg U.), Bencie Woll (UCL). Discussants were Ulf Liszkowski, Pamela Perniss (UCL), and Gary Morgan (City U. London). *June 14-15.*

FieldTrip: Using the FieldTrip software for electrophysiological data analysis
Organised by Robert Oostenveld (Donders Institute) and Jan-Mathijs Schoffelen. At Universitätsklinikum Hamburg-Eppendorf, June 15-17 and *at Ernst Strüngmann Institute (in cooperation with Max Planck Society), Frankfurt, June 18-20.*

Fourth workshop on Federated Identity Management for Scientific Collaborations
Organised by Daan Broeder. Presenters: Marcin Adamski (PSNC), Daan Broeder, Thomas H. Brunner (SWITCH), Mirjam van Daalen (Paul Scherrer Institute, Switserland), Yuri Demchenko (U. Amsterdam), Niels van Dijk (SURFnet), Willem van Engen (Nikhef), Enrico Fasanelli (INFN), Licia Florio (TERENA), Peter Gietz (DAASI International & DARIAH-DE), David Groep (Nikhef), Lukas Hämmerle (SWITCH, Switserland), Nicole Harris (JISC Advance), Keith Hazelton (U. Wisconsin), Arnoud Jippes (DANS), Bob Jones (CERN), David Kelsey (STFC-RAL), Philip Kershaw (STFC Rutherford Appleton Laboratory), Wolfgang Klein, Jörg Knappen

Events and activities

(U. Saarbrücken), Mikael Linden (CSC-IT Center for Science), Stefan Lueders (CERN), Almudena Montiel (GSI), Wolfgang Pempe (DFN), Remco Poortinga-van Wijnen (SURFnet), Michal Prochazka (CESNET), Ornulf Risnes (U. Saarbrücken), Mark van de Sanden (SARA/EUDAT), Brook Schofield (TERENA), Gergely Sipos (EGI.eu, Amsterdam), Milan Sova (CESNET), Michael Symonds (Atos), Dieter van Uytvanck, Catharina Wasner (GESIS), Heinz Weyer (PSI), Peter Wittenburg, and Ramin Yahyapour (GWDG). *June 21-22.*

Near InfraRed Spectroscopy Sheds Light on the Development of Brain Networks: The Case of Speech Perception
Organised by Alex Cristia in conjunction with the 18th Annual Meeting of the Organization for Human Brain Mapping.
Participants: Fumitaka Homae (Tokyo U.), Jacques Mehler (SISSA, Trieste), Yasuyo Minagawa (Keio U. Tokyo), and Hellmuth Obrig (MPI for Human Cognitive and Brain Sciences). *Beijing, June 13.*

The impact of DoBeS-related Technology on Empirical and Theoretical Linguistics
Organised by Paul Trilsbeek. Presenters: Pius Akumbu (U. Buea, Cameroon), Azeb Amha (Leiden U.), Peter Bouda (U. Munich), Kipiro Damas (U. Hamburg), Swintha Danielsen, (U. Leipzig), Christian Döhler and Nicholas Evans (both ANU), Lucía Golluscio (U. Buenos Aires), Jeff Good (U. Buffalo), Geoffrey Haig (U. Bamberg), Viktoria Kempf (U. Hamburg), Julia Colleen Miller (ANU), Ulrike Mosel (U. Kiel), Stefan Schnell (La Trobe U.), Frank Seifart (MPI Evolutionary Anthropology) Mandana Seyfeddinipur (SOAS, London), Han Sloetjes, Lena Terhart, and Federico Villalta (U. Leipzig). *July 5-6.*

DoBeS Training
Organised by Paul Trilsbeek. Workshops on technical aspects of language documentation. *July 2-5; October 8-11.*

Intraspecific Variation in Primate Social Dynamics
Organised by Katherine Cronin in conjunction with the 6th European Conference on Behavioural Biology. Presenters: Brianne Beisner, Redouan Bshary (U. Neuchâtel), Katherine Cronin, Claudia Fichtel (U. Göttingen), Daniel Haun, Megan Jackson, Peter Kappeler (U. Göttingen), Edwin van Leeuwen, Peter Maciej (U. Göttingen), Brenda McCowan (UC Davis), Ibrahima Ndao and Annika Patzelt (both U. Göttingen), Shannon Seil, Erica van de Waal (U. Neuchâtel), and Dietmar Zinner (U. Göttingen). *Essen, July 5-6.*

1st INNET Regional Archives workshop
Organised by Paul Trilsbeek. Presenters: Sebastian Drude, Willem Elbers, Alexander König, Gert van der Plas, Paul Trilsbeek, with representatives of regional archives in Belém (Brazil), Buenos Aires (Argentina), Halle (Germany), Helsinki (Finland), Iquitos (Peru), Lund (Sweden), Mexico City (Mexico), Moscow (Russian Federation), and Quito (Ecuador), as well as attendants from the University of Cologne. *September 10-12.*

Opening of the Nijmegen Cognomics Initiative
Organised by Simon Fisher and Barbara Franke (UMCN). Cognomics is a collaborative research initiative of the RU Nijmegen Medical Centre, the Donders Institute for Brain, Cognition and Behaviour, and the MPI for Psycholinguistics. Presenters: Simon Fisher, Barbara Franke (UMCN), Leon Kenemans (Netherlands Organisation for Scientific Research NWO), and Matt Ridley (award-winning science author). *September 12.*

CLARIN-NL Fourth Component Metadata Infrastructure (CMDI) tutorial
Organised by Dieter van Uytvanck. Presenters: Daan Broeder, Twan Goosen, Alex König, Ineke Schuurman (KU Leuven & Utrecht U.), Dieter van Uytvanck, Menzo Windhouwer, and Peter Withers. *September 13.*

100 years Max Planck Society
Organised by Peter Hagoort and Pim Levelt. This symposium was organised to celebrate the 100th anniversary of the Max Planck Gesellschaft, and to highlight the contributions of the 10 Dutch Max Planck Directors as well as the relations between the MPG and the science landscape in the Netherlands. Participants: Philippe Bastiaens (MPI of Molecular Physiology,Dortmund), Mischa Bonn (MPI for Polymer Research, Mainz), Paul Crutzen (Emeritus Professor at the MPI for Chemistry, Mainz), Robbert Dijkgraaf (KNAW), Maarten Koornneef (MPI for Plant Breeding Research, Köln), Marcel Kuypers (MPI for Marine Microbiology, Bremen), Johannes Lelieveld (MPI for Chemistry, Mainz), Gerard Meijer (Fritz Haber Institute of the Max Planck Society, Berlin), Eric Jan Mittemeijer (MPI for Intelligent Systems, Stuttgart), Liu Hao Tjeng (MPI for Chemical Physics of Solids, Dresden), Peter van der Veer (MPI for the Study of Religious and Ethnic Diversity, Göttingen), and Hans Zacher (Emeritus). *At KNAW, Amsterdam, September 15, 2011.*

Challenges for the Field of Language Development
Organised by Peter Hagoort and Antje Meyer. Presenters: Emmanuel Dupoux (LSCP, Paris), Cynthia Fisher (U. Illinois at Urbana-

Champaign), Michael Frank (Stanford U.), Peter Hagoort, Aylin Kuntay (Koc University Istanbul), Nivedita Mani (U. Göttingen), Danielle Matthews (U. Sheffield), Antje Meyer, Philippe Rochat (Emory U.), and Dan Swingley (U. Pennsylvania). *October 1-2.*

Global Data Consortium meeting

Organised by Rebecca Koskel (U. New Mexico) and Peter Wittenburg. Presenters: Frank Berman (Rensselaer Polytechnic Institute), Juan Bivarregui (Science and Technology Facilities Council UK), Alan Blatecky (U. North Carolina & NSF), Daan Broeder, Françoise Genova (Strasbourg Astronomical Data Center), Chris Greer (City U. London), Leif Laaksonen (CSC - IT center for science, Finland), Carlos Morais-Pires (European Commission Scientific Officer), Beth Plale (Indiana U.), Herman Stehouwer, Ross Wilkinson (Australian National Data Service), and Peter Wittenburg. *Arlington, October 1-3.*

Connections across Modalities in Interaction

Organised by Kobin Kendrick. Presenters: Paul Drew (U. York), Nick Enfield, Adam Kendon (Emeritus, University Philadelphia), Kobin Kendrick, Anssi Peräkyla (U. Helsinki), Federico Rossano, and Emanuel Schegloff (UCLA). *October 4.*

EuroBABEL - Rural Signing Varieties: Social Dynamics and Linguistic Structure

Organised by Victoria Nyst (Leiden U.) and Connie de Vos. Presenters: Dany Adone (U. Cologne), Tano Angoua (U. de Cocody, Côte d'Ivoire & Leiden U.), Richard Cokart (Hogeschool Utrecht), Keren Cumberbatch (U. West Indies), Annelies Kusters (Bristol U.), Olivier Le Guen (CIESAS), John Haviland (UCSD, San Diego), Elaine Maypilama, Maarten Mous (Leiden U.), Angela Nonaka (U. Texas at Austin), Victoria Nyst (Leiden U.), Joke Schuit (U. Amsterdam), Connie de Vos, Ulrike Zeshan (U. Central Lancashire). *Leiden, November 7.*

Interactional Foundations of Language 2012

Organised by Nick Enfield and Stephen Levinson. Participants included Eve Clark and Herbert Clark (both Stanford U.), Elizabeth Couper-Kuhlen (U. Helsinki), Makoto Hayashi (U. Illinois at Urbana-Champaign), John Heritage (UCLA), Elena Lieven (MPI EvolutionaryAnthropology), Jack Sidnell (U. Toronto), Marisa Tice (Stanford U.) and the Language & Cognition Department. *Schloss Ringberg, Rottach-Egern, October 31-November 3.*

Categories of Information Structure Across Languages (CISAL)

Organised by Jeremy Hammond, Dejan Matic, Saskia van Putten and Robert Van Valin. Presenters: Diana Dimitrova, Nomi Erteschik-Shir (Ben Gurion U.), Ricardo Etxepare (CNRS, U. Bayonne), Jocelyne Fernandez-Vest (CNRS, Paris), Kees Hengeveld (U. Amsterdam), Nikolaus Himmelmann (U. Cologne), Ilkyu Kim (Yale U.), Vadim Kimmelman (U. Amsterdam), Erwin Komen (Radboud U. Nijmegen), Bettelou Los (Radboud U. Nijmegen), Dejan Matic, Lunella Mereu (U. Rome), Irina Nikolaeva (SOAS, London), Victor Junnan Pan (CNRS, Paris), Natalya Serdobolskaya (Russian State U.), Stefan Sudhoff (Utrecht U.), Svetlana Toldova (Russian State U.), Jenneke van der Wal (U. Cambridge), Daniel Wedgwood (U. Edinburgh), Sabine Zerbian (U. Potsdam), and Malte Zimmermann (U. Potsdam). *November 9-10.*

Dynamic Multimodal Communication

Organised by Judith Holler and Asli Özyürek. Participants: Lucas Bietti (KWI Essen & VU Amsterdam), Alan Cienki (VU Amsterdam), Camille Debras, (U. Paris 3), Nicolina Montesano Montessori (Utrecht U. & VU Amsterdam) and Kashmiri Stec (U. Groningen). *November 12.*

Identification of Genes Implicated in Synaesthesia

Organised by Simon Fisher, Sarah Graham, and Katerina Kucera. Presenters: Simon Baron-Cohen (U. Cambridge), Cretien van Campen (Synesthetics Netherlands), Duncan Carmichael (U. Edinburgh), Olympia Colizoli (U. Amsterdam), Simon E. Fisher, Peter Gregersen (Feinstein Institute for Medical Research, Manhasset), Gijs van Haaften and Ellen Hessel (both Utrecht U.), Romke Rouw (U. Amsterdam), Julia Simner (U. Edinburgh), Tessa van Leeuwen (MPI Brain Research), and Peter Weiss-Blankenhorn (Research Centre Jülich). *November 29.*

Mainland Southeast Asian Languages: The State of the Art in 2012

Organised by Bernard Comrie and Nick Enfield. Presenters: Walter Bisang (U. Mainz), Roger Blench (Kay Williamson Educational Foundation), Marc Brunelle (U. Ottawa), Niclas Burenhult, Bernard Comrie (MPI Evolutionary Anthropology), Nick Enfield, David Gil (MPI Evolutionary Anthropology), Mathias Jenny (U. Zurich), James Matisoff (UC Berkeley), Pittayawat Pittayaporn (Chulalongkorn U.), Mark Post (U. Bern), Martha Ratliff (Wayne State U.), Paul Sidwell (ANU), Hilário de Sousa (EHESS, Paris), and Alice Vittrant (U. d'Aix-Marseille). *Leipzig. 29 November-December 1.*

Lectures and colloquia

Nijmegen Lectures

2012

January 9 | **Nicholas Evans,** Australian National U.
Coevolutionary linguistics: Diversity, culture, mind and history
The series included three lectures: 'Exploring the Library of Babel: Linguistic diversity and the human sciences','The refraction of other minds: Language, culture and social cognition', and 'Language and deep time: 60,000 years of linguistic history in Sahul. Discussants in the seminars were Asifa Majid and Fiona Jordan (MPI Psycholinguistics), Balthasar Bickel, (U. Zürich), Michael Cysouw (Ludwig Maximilian U. München), Disa Sauter (U. Amsterdam), Jean-Christophe Verstraete (KU. Leuven), Jordan Zlatev (Lund U.), Claire Bowern (Yale U.), and Peter Trudgill (U. Agder).
The lectures were organised in collaboration with Radboud U. Nijmegen by Nanjo Bogdanowicz, Joe Blythe, Michael Dunn, Ad Foolen, Olga Krasnoukhova, and Julia Udden.

Donders Lectures

2011

April 7 | **Svante Pääbo,** MPI Evolutionary Anthropology
A Neandertal perspective on human origins

June 9 | **Sarah Blakemore,** UCL
The social brain

September 22 | **Peter Dayan,** UCL
When good decisions go bad: Reinforcement learning and computational psychiatry

November 10 | **Paul Glimcher,** New York U., Center for Neural Science
Neuroeconomics: The neurobiology of decision

2012

January 12 | **Jesse Snedeker,** Harvard U.
Fast, smart and out of control: The development of language comprehension

March 1 | **Andreas Meyer-Lindenberg,** Central Institute of Mental Health, Mannheim
Neural risk mechanisms for psychiatric disorders

April 19 | **Richard Ivry,** UCLA, Berkeley
Competitive and inhibitory processes during action selection

June 28 | **Michael Shadlen,** U. Washington, Seattle
Believing and time: A neural mechanism for decision making

November 1 | **David van Essen,** Washington U.,St. Louis
Mapping structure, function, and connectivity in primate cerebral cortex

MPI Colloquium series

2011

January 18 | **Anne-Lise Giraud,** ENS, Laboratoire de Neurosciences Cognitives
Ideas about the role of cortical oscillations in speech and language

February 15 | **Östen Dahl,** Stockholm U.
The structure of human memory and tense-aspect-mood-evidentiality (TAME)

March 15 | **Dianne Newbury,** U. Oxford
Genetic investigations of speech and language disorders

April 19 | **Robert Ladd,** U. Edinburgh
Gradience in linguistic and psycholinguistic perspective

May 17 | **Sven Mattys,** U. Bristol
Penetrability of the speech system by cognitive load

June 21 | **Barbara Kaup**, U. Tübingen
The experiential-simulation view of language comprehension: How is meaning composed?

September 27 | **Timothy Bates,** U. Edinburgh
What can genetics do to advance the science of language and cognition?

October 18 | **Shakti Lamba,** UCL
The evolution of large-scale cooperation in humans

November 15 | **Padraic Monaghan,** Lancaster U.
Design features of language: Language universals emerging from general purpose learning constraints

2012

January 24 | **Matthew Lambon-Ralph,** U. Manchester
Mapping and modelling semantic cognition and its disorders

March 20 | **Franklin Chang,** U. Liverpool
Linking acquisition, production, and comprehension

March 23 | **Manfred Krifka,** Humboldt-U. Berlin
Modality (and Tense) in Daakie (Austronesian, Vanuatu)

May 22 | **Iris Sommer,** UMC Utrecht
Where the voices come from; and how to get rid of them

September 18 | **Evelina Fedorenko,** MIT Cambridge, MA
A novel framework for a neural architecture of language

October 23 | **Mitsuhiko Ota,** U. Edinburgh
Phonology and the lexicon in early language development

November 15 | **Ghislaine Dehaene-Lambertz,** INSERM-CEA
Nature and Nurture in language acquisition: Anatomical and functional brain-imaging studies in infants

Nijmegen Gesture Centre Lecture series

2011

February 2 | **Okan Kubus,** U. Hamburg
Relative clause constructions in Turkish Sign Language (Türk İsaret Dili –TİD)

February 8 | **Douglas Weinbrenner,** MPI for Human Cognitive and Brain Sciences
Behavioral and ERP experiments on how the consistent usage of gesture space is processed

April 28 | **Paul Vogt,** Tilburg U.
Correlations between frequencies of multimodal gesture use and infants' vocabulary development in Mozambique

May 23 | **Karen Emmorey,** San Diego State U.
Signs or Gestures? Characterizing the manual productions of ASL-English bilinguals speaking to non-signers

June 24 | **Judith Holler,** U. Manchester
Gesture use in social context

October 11 | **Carol Padden,** U. California, San Diego
From gesture to new sign language

October 25 | **Sotaro Kita,** U. Birmingham
Gesture, language and cognition

Lectures and colloquia

December 2 | **Olivier Le Guen,** CIESAS
Do emergent languages get created from scratch: Yucatec Maya Sign Language and its sociolinguistic setting

2012

June 4 | **Marie Coppola,** U. Connecticut
WHO chased the bird? Narrative cohesion in an emerging language

April 25 | **Kirsten Bergmann & Stefan Kopp,** Bielefeld U.
Gesture use in dialogue - From empirical analysis to virtual humans and back

Digital Humanities in Action Lecture series

2012

May 9 | **Mike Kestemont,** U. Antwerp
The weight of the author

June 6 | **Antal van den Bosch,** Radboud U. Nijmegen
Big language data

July 12 | **Nick Thieberger,** U. Melbourne
Of droughts and flooding rains: Digital archiving between grants. Reviewing a decade of the PARADISEC

October 17 | **Manfred Stede,** U. Potsdam
Multilevel annotation for discourse research: The ANNIS2 linguistic database

November 5 | **Bruce Birch,** Australian National U.
A usage-based approach to the analysis of prosodic structure, in Iwaidja and in general

November 14 | **Chris Biemann,** Technical U. Darmstadt
Structure discovery in natural language - unsupervised language-independent methods

December 5 | **Bram Vandekerckhove,** U. Antwerp
Exemplar-based generalization at the interface between syntax and semantics

December 19 | **Hunyadi László,** U. Debrecen
An introduction to the multimodal corpus HuComTech and its annotation